MILITARY ENGINEER SERVICES

NAME OF WORK: PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR

Drawings: _____sheets

Signature of Contractor

Asst Dir (Contracts)
for Accepting Officer

Tele: 26362267
Email: cepze8@gmail.com

Military Engineer Services
Headquarters
Chief Engineer Pune, Zone
Dakshin Kaman Marg
Pune – 411001

84636/DEO/ /E8 **May 2026**

M/s. _____

_____

NAME OF WORK: PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR

Dear Sir (s),

1. Tender documents in respect of above work are uploaded on the site https://www.defproc.gov.in. The tender is based on a single stage two cover E- tendering system. The contents of Cover-I & Cover-II are specified in NOTICE OF TENDER.

2. Bid will be received online by ACCEPTING OFFICER up to 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 due date and time fixed for opening.

4. Your attention is also drawn to instruction of 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 to clarify doubts, if any, well before the bid submission Star date mentioned in the website. You are requested not to write piece meal points and forward your points duly consolidated before due date given under critical dates in the website.

5. Unenlisted contractors are required to submit the scanned copies (in pdf file) of document required as per eligibility criteria mentioned in instructions for filling of tender documents and Appendix ‘A’ to NIT along with EARNEST MONEY DEPOSIT (EMD) and tender fee on e-procurement portal and submit the physical documents in the office of **HQ CE PUNE ZONE** 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. (a) Enlisted contractor of MES shall submit the scanned copies (pdf file) of enlistment letter, tender fee and such other documents as mentions in Appx. ‘A’ to NIT on e-procurement portal and submit physical document in the office of **CE PUNE ZONE** before due date and time fixed for the purpose.

(b) Unenlisted contractors and contractor enlisted in MES but 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 due date and time fixed for the purpose. In case of failure to abide by any of these two requirements, the finance bid will not be opened.

7. The contractor must ensure that the tender/bid on the proper form is uploaded in time as the Accepting officers will take no cognizance of any quotations/offer received in another electronic or physical form like email, fax by hand, through post from tenderer/bidder even if they received in time.

8. 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 time fixed.

9. General Conditions of Contracts (IAFW-2249) (1989 print) and errata and amendments there to, Schedule of minimum fair wages and MES SSR (Part-I & Part-II) are not enclosed with these documents. These are available for perusal in the office of GE/CWE concerned and this office.

10. **ANY TENDERER, WHICH PROPOSES ALTERATION TO ANY OF THE CONDITION, SPECIFICATION LAID DOWN IN THE TENDER DOCUMENT OR ANY NEW CONDITION, WHATSOEVER, IS LIABLE TO BE REJECTED.**

11. Details of tender issuing officers are given below: -

Asst. Director (Contracts)	Phone No. 020-26362267 Email- cezp2-mes@nic.in cepze8@gmail.com

Yours faithfully,

(Biddut Haldar)
AEE (QS&C)
Asst. Dir (Contracts)
For Accepting Officer

INSTRUCTIONS FOR 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 as detailed in Notice of tender in one of the following forms, along with their tender/bid: -

(a) Deposit at Call Receipt from a Scheduled Bank in favour of Garrison Engineer Concerned.

(b) Receipt Treasury Challan, the amount being credited to Revenue Deposit of Garrison Engineer.

It is advisable that earnest money is deposited in the form of deposit at 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 GE.

Note: 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 along with technical Bid & hard copy before the date & time fixed for opening of BOQ) will render the bid disqualified for opening of cover II (Finance Bid). As per instructions of Govt of India, MSMEs are not exempted from submission of EMD.

2. PERFORMANCE SECURITY

2.1 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 of an amount equal to **5 % of the contract sum**:

(a) A Bank Guarantee in the prescribed form.

(b) Government securities, FDR, Insurance Surety Bonds or any other Government instruments stipulated by the Accepting Officer.

2.2 If the Performance Security provided by the successful Contractor in the form of Bank Guarantee, it shall be issued by Nationalized / Scheduled Indian bank but its confirmation shall be done only from the Head/Superior Branch of the Bank.

2.3 Failure of the successful Contractor to comply with the requirements of sub clause 2.1 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 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 unenlisted Contractors. In case of MES enlisted contractor, issue of tenders shall remain suspended till deposit of EMD or six months from date of cancellation whichever is later.

3 & 4 - BLANK –

5. **GENERAL INSTRUCTIONS FOR COMPLIANCE**

5.1 The bids received only in the electronic form will be considered. All bids shall be submitted on 'https://www.defproc.gov.in' portal. Documents should be scanned and forwarded in pdf form and XLS form as indicated.

5.2 Bids shall be uploaded on 'https://www.defproc.gov.in' portal 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 will be considered.

5.3 Bid should be DIGITALLY signed using valid DSC. All pages of tender documents corrections/ alterations shall be signed /initialled by the lowest bidder after acceptance.

5.4 Drawings, if issued in physical form must be returned duly initialled by the tenderer/bidder in separate envelope indicating his name and address.

5.5 The tender shall be signed, dated and witnessed at all places provided in the documents after acceptance. All corrections shall be initialled. The contractor shall initial every pages 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 rejected.

INSTRUCTIONS FOR FILLING AND SUBMISSION OF TENDER (Contd...)

5.6 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 a digital signatory himself is the sole proprietor, scanned copy of 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 all arbitration clauses, 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 Article 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 scan 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, 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.

5.7 Even in the 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 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.

5.8 Hard copies of above documents should be sent by the contractor to the Tender issuing authority well in advance to be received within 5 days after the date of bid submission by the bidder.

5.9 Bid (Cover 1& 2) shall be uploaded online well in time.

5.10 The contractor shall employ Indian Nationals after verifying their antecedents and loyalty. Attention is also drawn to special condition 4 referred here-in-after and also conditions 24 & 25 of IAFW-2249 (General Conditions of contract).

5.11 Tenderers/bidders who uploaded their priced tenders/bids and are desirous of being present at the time of opening of the tender/bids may do so at the appointed time.

5.12 **The tenderer/bidder shall quote his rate on BOQ file only. No alteration to the format will be accepted; else the bid will be disqualified and summarily rejected.**

5.13 In case the tenderer/bidder has to revise/modify rates quoted in the BOQ (Excel Sheet) he can do so only in the BOQ, through https://www.defproc.gov.in site only before the bid closing time and date.

5.14. In case revised BOQ is uploaded by the department, tenderer /bidder have to quote in revised BOQ only. The uploading quotation in pre-revised BOQ shall be considered as a wilful negligence by the bidder and his quotation shall be considered non-bonafide.

Note: - The contractor shall ensure compliance of the EPF & MP Act 1952 by the Sub contractor, if any engaged by the contractor for the said work in terms of conditions of tender/contract.

6. WITHDRAWAL/ REVOCATION/REVISION OF OFFER UPWARD/ OFFERING VOLUNTARY REDUCTION AFTER BID SUBMISSION END DATE

In the event of the tenderer/bidder withdrawal or revoking his offer or revising his rates upwards or offering voluntary reduction after the Bid Submission End Date and before expiry of the bid validity period, his offer shall be treated as revoked and the Earnest Money deposited by him shall be forfeited. In the case of MES enlisted contractors, an amount equal to the Earnest Money stipulated in the Notice of Tender shall be notified to the tenderer/bidder for deposit through MRO. Bids of such contractors/bidders shall remain suspended till the aforementioned amount is deposited in the Government Treasury. No other disciplinary/administration action shall be taken against such tenderers. Instead, retendering shall be resorted 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. Reduction offered by the tenderer/bidder on freak high rates referred for review shall not be treated as voluntary reduction.

INSTRUCTIONS FOR FILLING AND SUBMISSION OF TENDER (Contd...)

7. **CPM (CRITICAL PATH METHOD)**

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

7.2 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 subjects are widely available in the market which the tenderer/bidder may make use of.

7.3 The Tenderers/bidder's attention is drawn to special condition of the tender regarding preparation of 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.

7.4 Department may issue amendments/errata in form of CORRIGENDUM to tender /revised BOQ to the tender documents. The Tenderer/bidder is requested to read the tender documents in conjunction with the entire errata/amendments/corrigendum, if any, issued by the department.

8. These instructions shall form part of the contract documents.

Signature of Contractor

Asst Dir (Contracts)
for Accepting Officer

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)
(in lieu of IAFW-2162 (Revised 1960)

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 is merely given as a rough guide and if the work costs more or less, a tenderer / bidder will have no claim on that account.

3. The work is to be completed within the period as indicated in the aforesaid Appendix 'A' in accordance with the 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. Contractors whose names are on the MES approved list and within whose financial category the estimated amount would fall and un-enlisted contractors may submit tender/bid subject to other criteria mentioned in Appendix 'A'. However, in case of term contracts, enlisted contractors of Class SS to E may submit tender. Not more than one tender shall be submitted/uploaded by one contractor/ firm. 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. Two firms shall be deemed to have business dealing if any of the partners/proprietor/director is common among both of them. A breach of this condition will render the tenders/bids of both the parties liable for rejection.

5. The office of the **Chief Engineer Pune Zone** will be the Accepting Officer here-in-after referred to as such for the purpose of the contract.

6. Not more than one tender/bid shall be submitted/uploaded by one bidder firm. 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 tender as separate competitors. A breach of this condition will render the tenders/bids of both the parties liable for rejection.

7. The Technical Bid and Financial Bid (Cover-1 and Cover-2) shall be uploaded by the contractor on or before the date & time mentioned in NIT. A scanned copy of DD with enlistment details and other documents as specified in Appendix 'A' shall be uploaded as Cover-1 (Technical bid) of the tender on e-tendering portal. DD is refundable in case the contractor is not considered eligible in technical evaluation of Cover 1 resulting in non-opening of Cover-2. The applicant contractor shall bear the cost of bank charges for procuring and encashing the DD including revalidation of DDs and shall not have any claim from Government whatsoever on this account.

8. Tender form and conditions of contract and other necessary documents shall be available on website **https://defproc.gov.in** for download and shall form part of contract agreement in case the tender/bid is accepted.

9. In case of MES enlisted contractor who has not executed the Standing Security Bond and un enlisted contractor, the Cover-I shall be accompanied by Earnest Money for the amount mentioned in Appendix 'A' in the form of deposit at call receipt in favour of concerned CCE/GE/GE (I)/AGE (I) (see Appendix 'A') by a Scheduled Bank or in received treasury Challan the amount being credited to the revenue deposit of the concerned CCE/GE/GE(I)/AGE(I) (see Appendix 'A'). The CCE/GE/GE (I)/AGE (I) 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 receipt of intimation from the Accepting Officer to do that.

10. In case of successful contractor i.e., the lowest contractor having submitted EMD, he shall have the option of converting the EMD instrument into part of the Performance Security to be deposited by him within 28 days from the receipt of intimation of acceptance of tender from Accepting Officer.

NOTICE INVITING TENDER (NIT) (Contd/..)

11. Sample of materials and stores to be supplied by the contractor will also be available for inspection by the bidder at the office of concerned GE/GE (I)/AGE (I)/Project Manager during working hours. The bidder is advised to visit the site of work by making prior appointment with GE/GE (I)/AGE (I)/CCE/Project Manager, who is the Executing Agency of the work (see Appendix 'A'). The bidder shall be deemed to have full knowledge of all relevant documents, samples, site etc. whether he has inspected them or not.

12. Any bid which proposes any alteration to any of the conditions laid down or proposes any other new condition whatsoever, is liable to be rejected.

13. The uploading of bid by a bidder implies that bidder has read this notice and the conditions of contract and has made himself aware of the scope and specification of work to be done and of the conditions and rates at which stores (as applicable) etc. will be issued to him and local conditions and other factors having bearing on the execution of the work.

14. The bidder must be in possession of a copy of the MES Schedule (SSR) (Part-I & Part-II of latest edition) including amendments and errata thereto.

15. Accepting Officer does not bind himself to accept the lowest or any tender/bid or to give any reason for not doing so.

16. The Accepting Officer reserves the right to accept a tender submitted by a Public Undertaking/Small & Medium Enterprises (SMEs), giving a price preference/purchase preference over other tender(s)/bids which may be lower, as are admissible under the Government Policy. No claim for any compensation or otherwise shall be admissible for such tenderer/bidder whose tender/bid is rejected.

17. The **Notice Inviting Tender (NIT)** including Appendix 'A' and Annexures thereto, if any, shall form part of the contract agreement.

Signature of Contractor

Asst Dir (Contracts)
For Accepting Officer

APPENDIX- 'A' TO NOTICE INVITING TENDER (NIT)

1.	Name of work	:	**PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR**
2.	Estimated Cost	:	**₹ 2230 Lakhs** at par market approximately.
3.	Period of Completion	:	**21 (Twenty-One) Months**
4.	Cost of tender documents	:	₹ **3,000.00** in the shape of DD/Banker's cheque from any Scheduled Bank in favour of the **Garrison Engineer (North) Ahilyanagar** and payable at **Ahilyanagar**.
5.	Website/portal address	:	https://defproc.gov.in
6.	Type of contract	:	The tender shall be based on drawings and specification (IAFW-2159) and GCC (IAFW-2249) with Schedule 'A' (List of items of Work) to be priced by tenderer. The Tenderer is required to quote their lump sum amounts for pre-priced Part of Schedule 'A' and quote rate against items of other parts of Schedule 'A'. The tenderer is required to quote their lump sum/ rates against items of BOQ.
7.	Timeline details		
	(a) Bid submission start date (b) Bid submission end date (c) Date of bid opening	}	**Refer critical dates on the website.**
8.	Eligibility Criteria		
	(A)For MES enlisted Contractors	:	Contractor shall satisfy the following: - (i) Enlistment in **Class 'SS' & Category a(i)** as per MES enlistment rules. (ii) Shall not carry adverse remarks in Workload Return or any similar report circulated by the competent engineer authority.
	(B) For Contractors not enlisted with MES	:	(i) Contractor shall meet the enlistment criteria of '**SS**' **Class** & **category a(i)** contractor with regard to satisfactorily completion of requisite value works with Central/State Government/Central/ State PSUs/AWHO/ AFNHB/ CGEWHO/ DGMAP, annual turnover, bank solvency, working capital and other requirements given in Para 1.4 & 1.5 of Section 1 of MES Manual of Contracts 2020 as available in all MES formations as well as MES website (www.mes.gov.in). (ii) Not carrying adverse remarks in Work load Report (WLR) or any other similar report circulated by any competent authority, if already working in MES. (iii) Not suspended debarred/blacklisted (either permanently or temporarily) from participating in any bid or for business dealings by any Central/State Government Department or any Central/State Government PSU or any Autonomous Body under Central/State Government or any Local Body as on the bid submission end date. (iv) Details of works completed and under progress in MES be submitted in the following format: -

Srl No	CA No & Name of Work	Value of CA	Date of Commencement	Date of Completion	Extended Date of Completion

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) E TENDER (Contd…)

8.	(B) Contd…		(v) 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.
9.	Tender issuing and Accepting Officer	**:**	Name : Chief Engineer Pune Zone Address : Military Engineer Services, Dakshin Kaman Marg, Pune – 411001 Phone No. & E-mail ID : 022-26362267 cezp2-mes@nic.in cepze8@gmail.com
10.	Executing agency	**:**	**Garrison Engineer (North) Ahilyanagar.**
11.	Earnest Money	**:**	**₹ 14,40,000.00** in favour of the **Garrison Engineer (North) Ahilyanagar** in the form of Deposit at call receipt/ Demand draft payable at Ahilyanagar. FDR not acceptable.

NOTES:

1. 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 fulfilment of other eligibility criteria given in the NIT. Therefore, MES contractors One class below may also bid for this tender. Such contractors (contractors 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 fulfil 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 fulfil 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 eligibility 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 contractor shall be considered provided he meets the criteria. However, foreign firms shall not be eligible for this tender. However Indian Firms having foreign nationals/ 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 following documents in Cover-1 for checking eligibility-

(a) Application for tender on firm's letter head

(b) Enlistment letter issued by the Registering Authority duly renewed for the cycle period in vogue.

(c) Scanned copy of DD/ Bankers Cheque towards cost of tender and EMD in case of SSD bond is not signed at the time of registration.

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) E TENDER (Contd…)

(d) Documents required in respect of Prequalification Criteria (PQC).
(e) Any other document required as described in this Appendix.

5. Contractors not enlisted with MES will be required to upload following documents in Cover-1 for checking eligibility-

(a) Application for tender on firm's letter head.

(b) Scanned copy of DD/Bankers Cheque towards cost of tender and EMD.

(c) Copy of Police Verification Report / Police Clearance Certificate/ Character Certificate from the Police Authority of the area where registered office of the firm is located/ Notarized copy of valid passport of the Proprietor/ Each Partner/Each Director.

(d) All documents required for enlistment in MES for class mentioned in Para 8(B) above as per Para 1.5 of Section 1 MES Manual on Contracts 2020.

(e) Details of works being executed in MES, if any.

(f) Any other document required as described in this Appendix.

6. Tenders not accompanied by scanned copies of requisite DD/ Bankers cheque towards cost of tender and earnest money declaration letter/ Bid Securing Declaration letter (as applicable) in Cover -1 shall not be considered for validation of "T" bid and their finance 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 the Chief Engineer Pune Zone within **05 (five) 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 wilful 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 Cover 1 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).

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 & during its technical evaluation, in case any deficiency is noticed in the documents required to be uploaded by the tenderer as per NIT, a communication in the form of "**Short Fall Documents**" on **www.defproc.gov.in** website shall be sent to the contractor to rectify the deficiency within a period as specified there in, failing which financial bid (Cover-2) shall not be opened & 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 open the finance bid of any applicant/bidder. Technical bid validation shall be decided by Accepting officer based on eligibility of the firm as per criteria given in this Appendix. Tenderer/bidder will be informed regarding non validation of 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 Engineering authority (NHEA) viz HQ CE SC Pune on email ID **dydrcontceengrpl-mes@gov.in** with copy to the Accepting officer on email before scheduled date of opening of Cover-2. Next higher Engineer authority (NHEA) shall decide the matter.

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) E TENDER (Contd…)

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.

11. In case an un-enlisted contractor is already executing works in MES, he shall not be considered eligible for the subject tender if the total value of such works is more than twice the tendering limit of MES class of contractor for which it is eligible. For this purpose, details of the works being executed by such a contractor shall be uploaded in Cover-1 of the bid and shall be checked/ verified by the Accepting Officer.

12. In case of the BOQ is revised though the corrigendum and the bidder has failed to quote on revised BOQ (i.e. he has quoted pre revised BOQ), such bid shall be treated as wilful 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.

13. Withdrawal or Revoking the offer or revising the rates upwards or offering voluntary reduction by the lowest tenderer after bid submission end date shall be considered as wilful default. For this default a penalty of an amount equal to Earnest Money shall be levied. In case of an unenlisted 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/administration action shall be taken against such tenderers. Instead, retendering shall be resorted 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.

14. Irrespective of whatever is mentioned in condition 19.3 of IAFW 2249 with regard to suspension of tenders 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 whichever is later.

15. 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/binding.

16. **INTEGRITY PACT:**

Scanned copy of Integrity Pact (IP) (as given in Appendix 'B' of NIT) duly signed on each page by the bidder(s) shall be uploaded as a part of Tech bid (Cover-1) and original IP duly signed on each page shall be forwarded by post along with the demand draft.

Note 1: Integrity pact is an integral part of contract and both the parties are bound by its provisions.

Note 2: Bidders who do not upload the scanned copy of IP duly signed along with the Tech bid (Cover-1), shall be intimated of the same through the option of shortfall documents (in e-tendering portal) before 'T' bid evaluation. Any bidder who fails to submit the copy of IP duly signed even after this communication, shall be rejected in the technical bid (Cover-1).

17. Court of the place from where tender has been issued shall alone have jurisdiction to decide any dispute out of or in respect of this tender. After acceptance of tender, condition 72 jurisdiction of courts of IAFW 2249 shall be applicable.

Signature of Contractor **Asst Dir (Contracts)**
Date: **For Accepting Officer**

APPENDIX 'B' TO NOTICE OF TENDER (INTEGRITY PACT)
TO BE SIGNED BY THE BIDDER AND SAME SIGNATORY COMPETENT / AUTHORIZED TO SIGN THE RELEVANT CONTRACT ON BEHALF OF MES
INTEGRITY AGREEMENT

General

1. Whereas the President of India, represented by *Chief Engineer Pune Zone, Dakshin Kaman Marg, Pune-411 001* (hereinafter referred as the **'Principal/Owner'**, and the first part, has floated the Tender and intends to award, under laid down organizational procedure, contract for "**PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR"** hereinafter referred to as works/ Services and M/s_____ represented by _____ (which term unless expressly indicated by the contract, shall be deemed to include its successors and its assignees), hereinafter referred to as the Bidder/Contractor and the second part is willing to carryout the works / services.

2. Whereas the Bidder 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 Pune Zone, Dakshin Kaman Marg, Pune-411 001* 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 commits itself to the following: -

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, organization 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 while an inquiry is being conducted by the Principal /Owner the tender process / proceedings under the contract would not be stalled.

APPENDIX 'B' TO NOTICE OF TENDER (INTEGRITY PACT) (CONTD…)

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.

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 dis-favour 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), brokers(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 Sector 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 provision by the Bidder or any one employed by him or acting on his behalf (whether with or without the knowledge of 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.

APPENDIX 'B' TO NOTICE OF TENDER (INTEGRITY PACT) (CONTD…)

(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 thereof. 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.

(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 or 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 Government 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 the 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	Name of IEM	Email id
1.	Shri Narayan Murthy Ganapathy, IFoS (Retd)	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)
E-mail id : dircont1einc-mes@nic.in
Mobile No : 9131948501 & 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.

APPENDIX 'B' TO NOTICE OF TENDER (INTEGRITY PACT) (CONTD…)

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 make 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 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.

(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 authorized 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 awarded.

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.

Dated…….. **(CONTRACTOR)**
Place…… **(SIGN WITH SEAL)**

INTEGRITY PACT

To,

_____

_____

_____

SUB: TENDER ID: 2026_MES_762387_1
"FOR THE WORK PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR"

Dear Sir,

It is hereby declared that MES is committed to follow the principle of transparency equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the Integrity Pact, which is an integral part of tender/bid documents, failing which the tender/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Pact and signing of the same shall be deemed as acceptance and signing of the Integrity Pact on behalf of the MES.

Yours faithfully,

For Chief Engineer

INTEGRITY PACT

To,

Chief Engineer Pune Zone
Dakshin Kaman Marg
Pune-411 001

Sub: **TENDER ID: 2026_MES_762387_1**

Submission of tender for the work of **"FOR THE WORK PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR"**

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 agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed Integrity Pact, which is an integral part of tender documents, 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 the 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 tender/bidder and reject the tender/bid is accordance with terms and conditions of the tender/bid.

Yours faithfully,

(Duly authorized signatory of the Bidder)

(TO BE READ IN CONJUNCTION WITH GENERAL CONDITIONS OF CONTRACTS: IAFW – 2249)
(IN LIEU OF IAFW-2159)

MILITARY ENGINEER SERVICES

Tele: 26362267
E-mail: cezp2-mes@nic.in
cepze8@gmail.com

Military Engineer Services
Headquarters
Chief Engineer Pune Zone
Dakshin Kaman Marg
Pune - 411 001

84636/DEO/ / E8 **May 2026**

LUMP SUM TENDER AND CONTRACT FOR WORKS REQUIRED INTHE EXECUTION OF "FOR THE WORK PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR"

A tender/ bidder who is qualified as per the eligibility criteria mentioned in the tender documents and has interalia sound past record is hereby authorised to tender for the above work. **The tender/ bid (both COVER-1 and COVER-2)** shall be submitted/ uploaded on the MES website portal **(https://www.defproc.gov.in)** as per time and date mentioned in tender documents.

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

Issuing documents
Appointment:
Asst Dir (Contracts)

SCHEDULE 'A NOTES
LIST OF WORKS AND PRICES
PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR

1. The Notes here-in-below shall be applicable to all parts of Schedule 'A' and BOQ. Wherever Schedule 'A' is mentioned in tender documents, it means the Schedule 'A' as well as BOQ as applicable.

2. The Schedules are divided into various parts as detailed below: -

(i)	Sch 'A' Part-I	Building and Structures
(ii)	Sch 'A' Part-II	Site Clearance, Excavation & Earthwork
(iii)	Sch 'A' Part-III	Internal Water Supply
(iv)	Sch 'A' Part-IV	Internal Electric Supply
(v)	Sch 'A' Part-V	Road, Path & Culverts
(vi)	Sch 'A' Part-VI	Sewage Disposal
(vii)	Sch 'A' Part-VII	Area Drainage
(viii)	Sch 'A' Part-VIII	External Water Supply
(ix)	Sch 'A' Part-IX	External Electric Supply
(x)	Sch 'A' Part-X	Hot Water Supply
(xi)	Sch 'A' Part-XI	Rain Water Harvesting
(xii)	Sch 'A' Part-XII	Misc. B/R and E/M works

3. The description of various items of works mentioned in Schedule 'A' and BOQ are in brief and includes for all materials and labour complete unless otherwise mentioned. These shall be read in conjunction with Special Conditions, Particular specifications, Drawings including notes there on, specifications for materials and workmanship contained in MES Schedule Part-I and relevant preambles to various trade sections in MES Schedule Part-II. Words "all as specified and/or shown on drawings and/or as directed" shall be deemed to be included in all items of Schedule 'A' and BOQ whether specifically mentioned in Schedule 'A' and BOQ or not.

4. **PERIOD OF COMPLETION**: -

4.1 The entire work under this contract including connected services as mentioned in BOQ (**Schedule `A' Part-I to Part-XI and including all other items mentioned in BOQ)** shall be completed in all respects **within 21 (Twenty-One) months** in all respects from the date of handing over site as mentioned in Work Order No 1.

4.2 Period of completion of the entire work under this contract is as under and Work Order No 1 for Phase-I and Phase-II shall be issued by GE at a time and Phase-I and Phase-II works shall run concurrently and the final bill payment and defect liability period shall reckon from the actual date of completion of Phase-II works:-

(a)	**Phase- I** Finalization and approval of Bench Mark/Intermediate Bench Marks, initial levels and building levels as specified in Particular specifications here-in-after.	02 (Two) months from the date of handing over of site as mentioned in Work Order No.1.
(b)	**Phase- II** Entire work other than work to be completed under Phase I.	21 (Twenty-One) months from the date of handing over of site as mentioned in Work Order No.1

4.3 The contractor shall immediately on receipt of intimation of AOC, shall submit Performance security to accepting officer and then shall attend office of GE for signing of the Work Order. If it is not possible for the GE to make the entire site available on the order of the work, the contractor will have to arrange his working progress accordingly. No claims for any compensation of whatsoever for not giving the entire site on order of work and for giving the site gradually will be tenable.

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd…)

4.4 **HANDING OVER OF SITE:**
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 the entire site on award of work and for giving site gradually, will be tenable. However, Work Order No 1 shall specifically indicate phased handing over of site as proposed in consultation with users.

4.5 Permission for the usage of any of the existing facilities such as approaches, if available can be granted by the GE on written request from the Contractor stating that any damage caused due to usage of the same shall be made good by the Contractor at no extra cost to the Govt. On the contrary if the Contractor fails to make good the damages caused as above, these damages shall be made good and brought back to the original standard by the Department at the risk & cost of the Contractor. The GE's decision in this regard shall be final, conclusive and binding.

5. **UNIT RATES:**
5.1 **Lump sum amount and Unit rate quoted by the tenderer shall interalia includes for all taxes levied by Central Govt/State Govt/Local bodies viz GST, GST on works contract, Workers welfare tax/cess etc. including recovery of income tax, GST on works contract and labour welfare tax which is deductible at source. No claim of whatsoever nature shall be admitted by the Govt on this account.**

5.2 The unit rates inserted in column 4 of Schedule 'A' Part-I to Part-XI are deemed to be at par with rates contained in MES Schedule of Rates 2020 or rates analogous thereto. The contractor is required to quote his lump sum price against pre-priced Schedule 'A' parts as against the total cost of respective Schedules inserted by MES in BOQ and the percentage plus or minus on the price inserted by MES shall be automatically arrived in BOQ. The contractor shall have no claim whatsoever on account of error or inaccuracies in the unit rates /lump sum price inserted by MES. The amounts tendered by the contractor and the percentages derived shall be deemed to have been calculated in the manner set out in Condition 6A (B) of General Conditions of Contracts IAFW-2249. In the event of discrepancy between the lump sum quoted by the tenderer and percentage arrived in BOQ, the amount quoted shall be treated as firm and percentage altered accordingly in terms of aforesaid condition.

5.3 The unit rates for items of works contained in Sch 'A'/BOQ of Sch 'A' Part-XII shall however be worked out by the tenderer and shall be inserted in the relevant column of BOQ.

6.0 **SCOPE OF LUMP SUM UNDER SCHEDULE 'A' PART-I:**
6.1 The Lumpsum amount for items in Schedule 'A' Part-I shall be deemed to include for entire completion of work complete all as specified and shown on drawings including notes thereon except the work covered under provisional schedule. However, excavation and earth work required for building/Structures as specified in Schedule 'A' Part-I works as specified in particular specification is deemed to be included in lump sum quoted by the tenderer against Schedule 'A' Part-I i.e. Building Works/Structures.

6.2 The cost of following items shall also be deemed to be included in the lumpsum rates quoted by the tenderer against items of BOQ/Schedule 'A' Part-I as shown on drawings and if not specifically excluded as per scope of other provisional schedules of the contract. The list of items of works as indicated here-in-below is illustrative and not exhaustive but shall before general guidance and the contractor is not exempted from performing the entire works asper drawings, Schedules, BOQ and specifications given hereinafter: -

(i) Provision of HDPE service Water tanks of size and capacities as shown on drawing. Wherever, HDPE service tank marked on drawing but capacity not indicated, the same shall be 1000 litres capacity.

(ii) CI/ pressed steel Fan hooks/boxes, Drapery rods, Venetian blinds as shown on drawings, Pegs set fittings and fixture, Nitches to house switch box, MCB's, DB's water/electric metre and the like.

(iii) ATT treatment, WPT treatment, RCC Jalli, RCC Shelving, working platform, cooking platform, crumple section etc. as shown on drawing.

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd…)

(iv) Built in furniture items such as steel locker, writing table, counter rack, notice board, cupboard and any other items as shown on Main drawing and TD drawings shall deemed to be included in lump sum quoted rate.

(v) The mandatory requirements/details such as fittings, shelves, platform, peg sets, mirror, CP grating, Towel rail, Toilet Paper Holder, shelf for Soap, looking mirror, EWC, Indian type WC Orissa pan, urinal, Wash hand basin, Vent pipe upto height of 0.3 m above roof slab etc. shown/indicated in any of relevant drawing or location, is deemed to be applicable in all other similar locations though not specifically shown on other drawings/indicated.

(vi) All sanitary apparatus, appliances, accessories, toilet fittings, kitchen fittings, mirrors etc., NP-3, Gully traps including PCC encasing, CI floor traps/ Nahani traps with CP grating whether shown on drawings or not, plumbing work, UPVC Soil/waste/vent pipes, 1st manhole and SGSW pipe from Gully traps to 1st manhole. All soil/waste pipes shall be taken vertically below GL to a depth as required and shall be provided with a heel rest bends at the lower end and soil pipes shall be connected upto 1st manhole with required slope. Irrespective of what is shown on drawings, the first manhole shall be constructed at a distance of 3.0m from the respective external face of the wall except in cases where 1st manhole is shown in shafts. However, no price adjustment on account of any variation in distance of first manhole from outer edge of building shall be admissible.

(vii) Strengthening measures for buildings for required seismic zone.

(viii) Steps, ramps, plinth protection, platforms, RCC shelves etc. as shown on drawings.

(ix) Coping over parapet walls, drapery rods, rain water pipe, rain water spouts & splash stones.

(x) Cost of cutting, leaving/forming holes, leaving/forming making chases in the walls, floors, ceilings, slab etc as required and making good to match with the adjoining surfaces required in connection with the works included in other parts of Schedule 'A' and BOQ except specifically mentioned under particular item of Schedule 'A' Part-I. No price adjustment shall be made for increase/decrease in the work of cutting/forming holes/chases etc consequent to variation in quantities of items included in other parts of Schedule 'A' and BOQ.

7.0 SCOPE OF ALL SCHEDULES EXCEPT SCH 'A' PART-I

7.1 The quantities of items of work shown in relevant column of BOQ are approximate /provisional and are inserted as a guide only. These shall, however, not be varied beyond the limits laid down in condition 7 of IAFW-2249 (General Conditions of Contract) forming part of this contract.

7.2 The contractor shall be deemed to have calculated his own details before quoting the lumpsum/ Unit rates. Notwithstanding any errors or inaccuracies in the rates inserted by MES or quoted by contractor, those rates shall be deemed to include for the full and entire completion of the items of work in accordance with the provisions of contract and no adjustment shall be made on account of any errors in those rates.

7.3 Unless otherwise mentioned in the description of items, the unit rates (inserted by the department/as well as by the tenderer) shall be deemed to include for all material and labour complete. The description shall also be deemed to include for fixing, erection, installation, testing etc as required by the Government.

7.4 Layout of buildings indicated on site plan is tentative. No adjustment in price shall be done on account of changes/modifications in the final approved layout within the site plan area.

7.5 Probable distribution of various items of internal/external services are indicated on drawings. These are tentative and likely to be varied where necessary at the discretion of the Engineer-in-Charge. The contractor shall not be entitled for any claim on this account.

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd…)

7.6 Similarly the contents/description under column 3, 7 and 8 as the case may be shall be read as under: -

(i)	Column 3	Ref to Drg No	See List of Drawings
(ii)	Column 7	Period of completion	Refer Note No. 4
(iii)	Column 8	Remarks	Refer Sch 'A' Notes

7.7 The Excavation & Earthwork required for works catered under provisional schedules (Sch 'A' Part-III to Part-XI) and BOQ (Part XII) shall be measured & paid for under separate schedule of 'Site Clearance, Excavation & Earthwork' (Sch 'A' Part II), unless otherwise mentioned specifically under description of the items.

8.0 **MINOR CONSTRUCTION DETAILS**

(a) Rate quoted for a particular item and/or lump sum quoted by tenderer shall deemed to be included for any minor details/item of work and/or construction which are obviously and fairly intended which may not have been included in these documents but which are essential for the execution and entire completion of the work as per standard Engineering practice. Decision of 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 and beyond the scope of arbitration clause.

(b) Some of the minor details/ items which shall be deemed to be essential for execution and entire completion of work are detailed as under for guidance: -

(i) Reinforcement for any RCC member not indicated in the drawings but is structural requirement.

(ii) Dwarf wall in situations like verandah, passage etc not indicated in drawings.

(iii) Lintel over doors, windows and openings not shown in drawings.

(iv) Builders hardware for doors/windows etc though not indicated on drawings but essential for usage.

(v) In all the above and similar cases, the details indicated elsewhere in the drawings which are similar or near similar to 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 and binding.

9.0 **MAKES OF ITEMS**

(a) In case Sch "A" items indicate the makes, then same shall be from any one of the makes specified therein at the option of contractor.

(b) If Sch "A" items do not indicate makes, then makes to be incorporated in the work shall be from those **listed Appendix "C"** to Particular Specifications. Selection shall be at the option of contractor from amongst the list. In case manufacturer of the item makes both ISI and non ISI marked items, then ISI marked item shall only be used. Please note that even if any makes are given in Particular Specifications, they shall stand superseded and only the makes given in **Appendix "C"** shall be applicable for all purposes.

(c) Materials/items for which no makes have been specified, shall be ISI marked. Contractor will download list of BIS marked manufacturers from BIS site www.bis.org.in and submit name of manufacturer meeting the contract specifications criteria and hand over the report with a request letter to Engineer- in-Charge with his signature for approval of makes. The material shall only be procured by Contractor after approval of makes by GE concerned. In case ISI marked materials/items are not manufactured then same shall confirm to relevant IS amended upto date.

(d) For materials/items not covered in para (a) to (c) above, the same shall be of best quality available in market and approved by GE.

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd…)

(e) Contractor will intimate in writing to GE the name of make of material along with brand, model No/Cat Part No, etc. which he intends to procure. GE will approve the same within 10 days of receipt of such request after due verification of documents supplied by contractor with his request letter.

10.0 In absence of any specification either in tender documents or in the drawing, the specification as given in SSR for relevant items and/or as per BIS Code shall be considered while quoting the tender. Reference to any drawings which is mentioned in the tender documents and or drawings forming part of the tender but not specifically mentioned in the list of drawings shall deemed to be forming part of the tender. The tenderer shall see such drawings/details in the office of the Accepting Officer/concerned CWE/GE before quoting the tender. No claim whatsoever shall be entertained by the Govt on this account.

11.0 **VALUATION OF DEVIATION**

The percentage addition/deduction of MES Schedule of Rates for the purpose of Pricing deviation vide Condition 62 of IAFW-2249 shall be as follows: -

(a)	For works covered under Schedule 'A' Part-I to Part-XI	Percentage addition/ deduction as derived from the lump sum amount tendered by comparing with the amount inserted by MES (as per condition 6-A of IAFW-2249) as applicable or stipulated in Condition 62 (B)
(b)	For works covered under BOQ/ Schedule 'A' Part XII	As per Condition 62 (F) and (G) of IAFW 2249 (General Conditions of Contracts)

11.1 However, mode of pricing of deviation shall be decided by Accepting Officer in terms of Condition 62 of IAFW-2249.

12.0 M&L or S&F wherever occurring shall be read as "Material and Labour" or "Supply and Fix" respectively. All items of works included in BOQ shall include supply of all materials (new), labour and fixing etc. complete all as specified and shown on drawing except where specifically mentioned otherwise in the description of items/works.

13.0 A list of drawings indicates main drawings under particular heading of building. Certain other connected drawings as referred to in the main drawings but not under particular heading of buildings shall also apply to corresponding items of Schedule 'A'. Details not given in the drawings referred to in the main drawings shall be followed from any other drawings in the list of drawings. The precedence of drawings. Missing details shall be as under: -

(a) For structural details refer structural drawings only. If there is any discrepancy between architectural and structural drawings with regard to structural details, details shown on structural drawings shall prevail. Similarly, if there is discrepancy between structural and architectural drawings, the details shown on Architectural drawings shall prevail. The decision of the Accepting Officer as to what constitute as structural or Architectural details shall be final, conclusive and binding.

(b) For missing reinforcement details of RCC works, adequate reinforcement as per requirement of shall be provided as decided by the Accepting officer and nothing extra payment shall be admissible on this ground.

(c) In case where type and size of beams, slabs and columns are not indicated these shall be provided as decided by the Accepting officer and nothing extra shall be admissible on this ground.

(d) In case of variation between details given in structural drawings and particulars specifications with regard to Structural details, the details given in Structural drawings shall take precedence.

14.0 The contractor shall maintain updated data and progress of work/ records/drawings/CPM etc on computer at site as required by work. One graduate Engineer or one diploma Engineer having adequate knowledge of computer shall be deputed by the contractor for this purpose. The CWE/GE may check these updated details at site on computer.

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd…)

15.0 The department may exercise the right to call the manufacture for verification of the quality of the items as per his discretion.

16.0 The tenderers are advised to refrain from making any stipulations or conditions in their offer.

17.0 **WORKING CONDITIONS**:
(a) The subject work lies in **Restricted Area**.

(b) Tenderers are advised to visit site of work to familiarize themselves with nature of site, access to site, approaches, existence of shrubs/vegetation, etc. security checks exercised by the authorities in whose control the area lies, availability of labour and local materials, space for keeping their men, material in proximity of site, climatic conditions of the area, to enable them their resource planning for completion of work within the period of completion specified in the tender documents. The tenderer shall be deemed to have noted the site condition before quoting their offer irrespective of the fact whether they have visited the site or not and nothing extra shall be admissible on this account.

(c) Tenderers are advised to quote their rates keeping all these factors in view. Sites will be handed over on as-is-where-is basis. No claim whatsoever shall be entertained at a later date after acceptance of tender. If the tenderer envisages any difficulty existing at site and desires to propose any change, he should do so in writing at least seven days before due date of receipt of tender so that his proposals could be seen, analysed and cognizance of any changes can be made in tender documents by issue of suitable amendments as applicable. Tenderers quoted rates are deemed to have applicable. Tenderers quoted rates are deemed to have taken into consideration all these factors irrespective of whether they have visited the site or not.

18.0 **RECORD DRAWING & PSMBs**:
The Contractor shall submit four sets of digital record drawings of buildings/structures & one set of PSMBs duly recording quantities of items required for the periodical maintenance of buildings/structures duly signed by the contractor & concern AGE to the GE immediately along with completion letter of work. The Lump sum amount quoted for Schedule 'A' Part I is deemed to be included for this provision.

19.0 Integrity pact (as given in Appx B of NIT) is an integral part of contract and both the parties are bound by its provisions.

20.0 **BREAK DOWN DETAILS FOR PAYMENT:**
20.1 The tenderer shall submit yard stick for each building / structure mentioned in Schedule 'A' Part-I in duplicate to GE within one month of acceptance of tender, indicating percentage payments to be made for each stage along with supporting details i.e detailed estimate. Yard stick will be technically checked by JE(QS&C)/AGE(Contracts) of GE office and shall further be submitted to the office of CWE for technical check by DCWE(Contracts)/ACWE(Contracts) of CWE office and shall be approved by CWE. The tenderer shall take cognizance of this aspect while quoting the tender. No claim whatsoever arising due to any misinterpretation / misunderstanding on this account shall be admissible. The decision of CWE, in this regard shall be FINAL AND BINDING.

20.2 There may be certain changes in the yard stick percentages as submitted by the contractor while approving the yard stick by CWE due to market rates of various materials and due to policy of the Dept of withholding sufficient amount for later stages of the building. Contractor shall not have any claim on this account and percentage payment made for each stage as per approved yardstick shall be final and binding.

20.3 Payment against lump sum buildings shall be made as per the approved yard stick. Payment against lump sum buildings shall be allowed in III RAR and onwards to Contractor only after yard stick for the buildings is finalized and approved by CWE. Any delay in the payment of III RAR on account of late submission of yard stick by the Contractor to the GE shall be Contractor's responsibility and no claim on this account shall be entertained.

21.0 **FIXING OF SPECIAL (STAR) RATES**
(a) In case of any deviation, mode of pricing shall be decided by Accepting Officer in terms of Condition 62 of IAFW-2249.

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd…)

(b) 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 Rate, it will be clearly stipulated that the same is merely an estimated rate and firm rate shall be fixed based on actual 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.

(c) Draft Star Rate shall be made based on market enquiry through telephonic enquiry/ quotations/ email/rate lists/internet based sources, material & labour constants available in various Civil Engineering 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.

(d) The Draft Star Rate shall be purely a draft rate and shall not be used for claiming final payment during execution of work. However, GE shall allow part payment to the tune of 80% during execution to avoid any financial hardship to contractor.

(e) 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 finalisation 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.

(f) 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.

22. **DIGITAL PHOTOGRAPHS**

The contractor shall provide digital photographs taken at various stages as decided by GE during the progress of work and submit the same along with RARs. Two copies (A4 size) and two soft copies (CD) of each digital photograph shall be submitted by contractor to the GE. The unit rate against Sch 'A'/BOQ shall be deemed to be included the cost of above provision and nothing extra shall be payable on this account. In the event of failure by the contractor to submit the same along with RARs, RARs will not be processed.

23. **SITE ESTABLISHMENT**:

The tenderer shall be required to strictly ensure engagement of Engineers and deployment of T&P, Machinery & Transport as specified in subsequent paras. Inadequate engagement of Engineers/ deployment of T&P, Machinery & Transport shall be considered as serious breach of contract condition attracting ban/ removal/ downgrading/ debarment of the firm/company. The requirement of Engineer/ deployment of T&P, Machinery & Transport required to be ensured by the contractor are as mentioned below. However, this is the minimum requirement.
The contractor at his own shall work out and deploy additional Engineer, T&P, Machineries & transport, if the execution of work in the given time period demands. No extra payment shall be admissible in case more Engineers, T & P, Machinery etc are deployed at site and all cost shall be deemed to be included in the rate quoted by the contractor: -

A) **LIST OF T&P, MACHINERY AND TRANSPORT**:

Srl	Description of T&P desired in work	Unit	Qty	Remark
a	RMC plant with 15 Cum/ hour capacity (Optional)	Each	01	
b	Fully automatic concrete batching plant (1 cum)	Each	02	
c	Vibrator (Needle/ Plate type)	Each	04	
d	Steel shuttering with spans, props etc	Sqm	1000	
e	Trucks / Tippers	Each	02	
f	Tower/ Builder's hoist	Each	01	
g	Total station	Each	01	
h	Cube testing machine (hydraulically operated)	Each	01	

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd…)

j	Excavators (JCB, Power shovel, etc)	Each	01	
k	Drilling machine	Each	02	
l	Boring Rig	Each	01	
m	Transit mixer	Each	01	
n	Delivery Pump/Concrete pump (for RMC)	Each	02	
o	Vibratory roller	Each	01	
p	Power roller 8 to 10 tonne	Each	01	
q	DG Sets/ 10 KVA	Each	01	
r	Crane	Each	01	
s	Auto level with staff	Each	01	
t	Site Testing lab with full set of testing apparatus	Each	01	
u	Steel aluminum ladders 1.5 m to 8m	Each	02	
v	Chase cutting machine	Each	01	
w	Torque wrench for nuts/bolts /screws	Each	01	
x	Magnetic dial indicator for alignment	Each	01	
y	Conduit die set	Each	01	
z	Pipe vice	Each	01	
aa	Bench vice	Each	01	
ab	LT meager 500 Volts	Each	02	
ac	Hydraulically operated & hand operated crimping machines	Each	02	
ad	Portable Drilling Machine	Each	01	
ae	Test bench for light fittings	Each	01	
af	Earth tester	Each	02	
ag	Multi Meter	Each	02	

Signature of Contractor
Dated:

Asst Dir (Contracts)
For Accepting Officer

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART - I

(List of works & prices)

BUILDING & STRUCTURES

Srl No	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	Construction of Single Living Accommodation for 250 OR's (G+2F) with RCC Framed Structure with permanent specifications all as shown on drawings, as specified and directed. Note: Earth filling from NGL to MGL included in the Lump sum scope.		15,20,00,000.00 Each Block	1.00	15,20,00,000.00		
2	Construction of Parking Shed for 50 Scooters with RCC Framed Structure with permanent specifications all as shown on drawings, as specified and directed.		59,00,000.00 Each Block	4.00	2,36,00,000.00		
	Total of Schedule 'A' Part I C/O to BOQ			**Rs.**	**17,56,00,000.00**		

Signature of Contractor
Date:-

Asst. Dir (Contracts))
For Accepting Officer

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART II

(List of works & prices)

SITE CLEARANCE, EXCAVATION AND EARTH WORK

NOTES:

1. All excavation & earthwork required for items of works covered under Schedule `A' Part III to XI and Misc B/R and E/M Works items of BOQ and unless otherwise specifically mentioned in the description of the items of Schedule `A' Part III to XI and Misc B/R and E/M Works items of BOQ shall be measured & paid under relevant items of this Schedule.

2. The excavation and earthwork in trenches or over areas shall be measured and paid under relevant items of Schedule 'A' Part II, excavation and earthwork using mechanical means irrespective of whether the contractor uses manual or mechanical method for excavation.

Srl No	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	Number of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	Surface excavation (not exceeding) 30 cm deep and averaging 15cm deep in any type of soil and getting out excavated material, complete all as specified and directed.		53.10 SQM	4,561.24	2,42,201.84		
2	Earth work in excavation by Mechanical means (Hydraulic excavator) / Manual means **over areas** (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) and not exceeding 1.5 m in dept**h** in **all kind of soil f**or foundations etc. or for shafts, walls, cesspits, manholes, pier holes, laying pipes or underground cables et**c** including getting out and disposal of excavated earth lead upto 50 m and lift upto 1.5m , all as specified and directed.		166.62 CUM	4,064.05	6,77,152.01		
3	Earth work in excavation by Mechanical means (Hydraulic excavator)/ Manual means in **Over Areas** (not exceeding 1.5 m in width or 10 Sqm in plan), depth exceeding 1.5m but not exceeding 3.0m in **all kind of soil** for foundations etc. or for shafts, walls, cesspits, manholes, pier holes, laying pipes or underground cables etc., including dressing of sides and ramming of bottoms including getting out the excavated soil, complete all as specified.		199.93 CUM	28.88	5,773.98		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART II (Contd…)

1	2	3	4	5	6	7	8
4	Earth work in excavation by mechanical means (Hydraulic excavator)/Manual means in foundation **trenches,** drains, shafts, wells, pier holes, manholes, cesspits, laying cable ducts/pipes (not exceeding 1.5 m in width or 10 sqm on plan) and **not exc 1.50m in depth** in all kind of soil, including dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m all as specified and directed.		228.55 CUM	1,332.37	3,04,513.16		
5	Earth work in excavation by mechanical means (Hydraulic excavator)/Manual means in foundation trenches, drains, shafts, wells, pier holes, manholes, cesspits (not exceeding 1.5 m in width or 10 sqm on plan) and depth exceeding 1.5m but not exc 3.0m in depth in all kind of soil, including dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m all as specified and directed.		261.86 CUM	179.01	46,875.56		
6	Returning filling in including spreading, levelling, watering and well ramming in layers not exceeding 25cm complete all as specified and directed.		139.1 CUM	507.39	70,577.95		
7	Removing excavated materials (Soils) to a distance not exceeding 250 metres but not exceeding 500 metres and depositing where directed at a level not exceeding 1.5 mtr above the starting point all as specified and directed.		582.60 CUM	810.00	4,71,906.00		
8	Removing excavated materials (Soils) to a distance not exceeding 250 metres but not 1000 metres and depositing where directed at a level not exceeding 1.5 mtr above the starting point all as specified and directed.		603.00 CUM	684.19	4,12,566.57		
9	M&L Moorum/red bajri filling in pavings laid in layers not exc 15 cm thick, spread, levelled and rammed, rolled and consolidated to required gradient and camber incl watering with power roller complete all · as specified and as directed by Engineer-In-Charge.		1,240.10 CUM	2,131.19	26,42,888.72		

Total of Schedule 'A' Part II C/O to BOQ Rs. 48,74,455.79

Signature of Contractor **Asst. Dir (Contracts))**

Dated: **For Accepting Officer**

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART - III

(List of works & prices)

INTERNAL WATER SUPPLY

NOTES :

1 The contractor shall keep chases in concrete members, masonry works, landings, steps, cills, sunshades, lintels etc. as required for providing water supply pipes and fittings where concealed piping has been specified of girth not exceeding 10 cms and shall make good the surfaces with plaster or pointing in cement mortar 1:3 finished to match the adjoining surfaces. The cost keeping chases or cutting chases, pinning in and making good works shall be included and deemed included in lump sum quoted for Schedule 'A' Part-I and nothing extra shall be admissible/payable for concealing the works under this schedule.

2 The contractor shall include in his unit rate for building for connecting to external water supply system/ valve/ meter to make the internal water supply functional in all respects.

Srl No.	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	Supply, laying/fixing and jointing in any length with fittings such as socket, elbows, bends tees reducers unions, caps plug, nipple short pieces complete laid in walls/cellings or laying in floors/trenches totally concealed type complete all as specified and as directed for following sizes						
	(a) CPVC pipes SDR 11 & Plain CPVC fittings SDR 11 , 16 mm outer dia		139.10 RM	646.00	89,858.60		
	(b) CPVC pipes SDR 11 & Plain CPVC fittings SDR 11, 20 mm outer dia		220.70 RM	290.00	64,003.00		
	(c) CPVC pipes SDR 11 & Plain CPVC SDR 11, 25 mm outer dia		328.50 RM	250.00	82,125.00		
2	S&F Fancy type stop/ angle valve cast copper alloy chromium plated, fancy type Screwed, screwed both ends for iron/CPCV pipe or for unions and fixed to pipe of 15mm bore, complete all as specified and as directed.		682.03 Each	202.00	1,37,770.06		
3	S&F Fancy type bib tap, 15 mm dia, Chromium plated, cast copper alloy with capstan heads screwed down for iron pipe or for brass ferrule fancy type etc complete all as specified and directed by Engineer-in-Charge.		607.57 Each	74.00	44,960.18		
4	S&F Gun metal globe or gate valve, wheel head cast copper alloy screwed down light pressure with crutch or butterfly handle screwed both ends for iron/CPVC pipe for union 25mm dia ISI marked complete all as specified and directed.		587.24 Each	30.00	17,617.20		

Total of Schedule 'A' Part III C/O to BOQ **Rs. 4,36,334.04**

Signature of Contractor **Asst. Dir (Contracts)**

Dated:- **For Accepting Officer**

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART - IV

(List of works & prices)

INTERNAL ELECTRIC SUPPLY

NOTES :

1 The contractor shall keep chases in concrete members, masonry works, landings, steps, cills, sunshades, lintels etc. as required for providing electric wiring where concealed wiring has been specified of girth not exceeding 10 cms and shall make good the surfaces with plaster or pointing in cement mortar 1:3 finished to match the adjoining surfaces. The cost keeping chases or cutting chases, pinning in and making good works shall be included and deemed included in lump sum quoted for Schedule 'A' Part-I and nothing extra shall be admissible/payable for concealing the works under this schedule.

2 The rates under col 4 for supplying, fixing and connecting up main switch fuses, MCBs/ distribution boards etc., shall be deemed to include for provision of cable of requisite sizes and for connecting different switches/ DBs on the same board.

Srl No.	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	M&L Point wiring complete from DB (distribution box) to terminal boxes, using 1100 Volts grade single core PVC FRLSH insulated, unsheathed flexible cable, conforming to IS-694:2010 having bright annealed multi-stranded copper conductor cables for phase, neutral and earth continuity conductor, coloured coded as per IS-13503:1992, 1.5 Sqmm (22/0.30 mm) in PVC rigid concealed conduits medium grade of appropriate size not less than 20 mm NB as required at site with all conduit accessories and fittings, fully concealed in walls/ floors/ ceiling including cutting chases, including Modular metal boxes and cover plates with frame of suitable module for fixing switches, sockets, regulators etc., totally concealed in walls/ floors/ ceiling, , complete and earth wire connected to metal bodies of luminaires/fans etc; at one end and to common earth dolly at other end, all as specified and directed.						

Note:-

1. Proper colour coding shall be adopted for wiring (For Phase-Red, Yellow, Blue, For Earth-Green and For Neutral-Black)
2. All points are required to earthed upto fixtures i.e. Holders, Tube lights, Wall lights, ceiling lights, bulkhead lights, building security light etc.
3. The rate shall include cost of Modular metal boxes and cover plates with frame of suitable module for fixing switches, sockets, regulators etc.

(a) One light point controlled by switch 5/6 Amp single pole one way.	992.75 Per Point		914.00	9,07,373.50
(b) One fan point controlled by switch 5/6 Amp single pole one way.	992.75 Per Point		281.00	2,78,962.75

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART IV (Contd…)

1	2	3	4	5	6	7	8
	(c)One 3 pin 5 Amp socket outlet on same board controlled by one, one way 5/6 Amp switch.		284.10 Per Point	84.00	23,864.40		
	(d) One socket outlet 5/3 pin 5 Amp controlled by one switch on independent board.		1,070.40 Per Point	324.00	3,46,809.60		
	(e) One light point controlled by switch 5 Amp single pole two way.		1,397.96 Per Point	10.00	13,979.60		
2	All as per serial item No. 1 here-in-before but with 2.5 Sqmm, PVC copper stranded cables FRLSH type for phase, neutral and earth for one 15/16 Amp, 3 pin socket on independent board.		1131.39 Per Point	27.00	30,547.53		
3	S&F Modular switch one way, 6 Amp, one module, 230V all as specified and directed.		260.50 Each	1,603.00	4,17,581.50		
4	S&F Modular Switch, 6 Amp, two way, one Module. etc complete all as specified and directed by Engineer-in-Charge		307.30 Each	20.00	6,146.00		
5	S&F Modular socket, 6A, 2-3 pin combined 2 module, 230V all as specified and directed.		340.54 Each	408.00	1,38,940.32		
6	S&F Modular switch one way, 16 Amp, one module, 230V all as specified and directed.		343.70 Each	27.00	9,279.90		
7	S&F Modular socket, 6A/16A, 2-3 pin combined 2 module, 230V all as specified and directed.		528.40 Each	27.00	14,266.80		
8	S&F Modular fan step regulator,120 Watt. 2 modules suitable for 1200/1400mm sweep BLDC complete all as directed and as specified.		1017.95 Each	181.00	1,84,248.95		
9	S&F Lamp holder (Angular/ Straight) type, PVC/Polycarbonate type with back plate, suitable for batten fittings all as specified & as directed.		166.50 Each	190.00	31,635.00		
10	S&F Ceiling rose, surface 3 terminals including PVC/polycarbonate mounting block, isolated body all as specified & as directed.		65.70 Each	1015.00	66,685.50		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART IV (Contd…)

1	2	3	4	5	6	7	8
11	S&F Submain wiring with two single core PVC insulated unsheathed, multistranded flexible FRLSH copper conductor 1100Volts grade cables 6 Sqmm drawn through in and including heavy duty PVC rigid conduits not less than 20 mm dia as required at site, totally concealed in walls/floors including conduit accessories etc. including one single core 6 Sqmm 1100Volts grade PVC insulated unsheathed multi stranded flexible FRLSH copper conductor cable as continuous earth wire and connecting to common earth terminals complete all as specified and directed. Note: Three runs (2+1) of single core FRLSH PVC insulated unsheathed multi stranded flexible copper conductor and one run of PVC conduit heavy duty shall be measured as one unit		259.20 RM	240.00	62,208.00		
12	S&F Submain wiring with two single core PVC insulated unsheathed, multistranded flexible FRLSH copper conductor 1100Volts grade cables 4 Sqmm drawn through in and including heavy duty PVC rigid conduits not less than 20 mm dia as required at site, totally concealed in walls/floors including conduit accessories etc. including one single core 4 Sqmm 1100Volts grade PVC insulated unsheathed multi stranded flexible FRLSH copper conductor cable as continuous earth wire and connecting to common earth terminals complete all as specified & directed. **Note:** Three runs (2+1) of single core FRLSH PVC insulated unsheathed multi stranded flexible copper conductor and one run of PVC conduit heavy duty shall be measured as one unit.		215.00 RM	400.00	86,000.00		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART IV (Contd…)

1	2	3	4	5	6	7	8
13	S&F Submain wiring with four single core PVC insulated unsheathed, multistranded flexible FRLSH copper conductor 1100Volts grade cables 10 Sqmm drawn through in and including heavy duty PVC rigid conduits not less than 25 mm dia as required at site, totally concealed in walls/floors including conduit accessories etc. including one single core 10 Sqmm 1100Volts grade PVC insulated unsheathed multi stranded flexible FRLSH copper conductor cable as continuous earth wire and connecting to common earth terminals complete all as specified & directed. Note: Five runs (4+1) of single core FRLSH PVC insulated unsheathed multi stranded flexible copper conductor and one run of PVC conduit heavy duty shall be measured as one unit.		565.78 RM	60.00	33,946.80		
14	S&F Submain wiring three phase with four single core PVC insulated unsheathed, multistranded flexible FRLSH copper conductor 1100Volts grade cables 6 Sqmm drawn through in and including heavy duty PVC rigid conduits not less than 25 mm dia as required at site, totally concealed in walls/floors including conduit accessories etc. including one single core 6 Sqmm 1100Volts grade PVC insulated unsheathed multi stranded flexible FRLSH copper conductor cable as continuous earth wire and connecting to common earth terminals complete all as specified & directed. Note: Five runs (4+1) of single core FRLSH PVC insulated unsheathed multi stranded flexible copper conductor and one run of PVC conduit heavy duty shall be measured as one unit.		392.66 RM	200.00	78,532.00		
15	S&F MCB SP, AC 240 V, 6 to 32 Amps 10 KA capacity, 'C' series making connection with suitable size of copper lugs etc complete all as specified and directed.		294.00 Each	358.00	1,05,252.00		
16	S&F MCB SPN, AC 240 V, 40 to 63 Amps, 10 KA capacity, 'C' series, making connection with suitable size of copper lugs etc complete all as specified and as directed.		1330.39 Each	45.00	59,867.55		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART IV (Contd…)

1	2	3	4	5	6	7	8
17	S&F Sheet metal enclosure (Factory made) double door shutter type for distribution board (when MCBs are to be used) single pole and neutral 240 volts 8 way protection class IP-43, suitable for fixing MCBs, Isolators etc, confirming As per IEC 61439-3, suitable for flush mounting and surface mounting, with 100 Amps rated copper busbar, with Neutral bar, Earthbar and cable alley for cable management, fully shrouded, Neutral bars, prefilters masking sheet complete all as specified and as directed.		1912.70 RM	23.00	43,992.10		
18	S&F Sheet metal enclosure (Factory made) double door shutter type for distribution board (when MCBs are to be used) single pole and neutral 240 volts 12 way protection class IP-43, suitable for fixing MCBs, Isolators etc, confirming As per IEC 61439-3, suitable for flush mounting and surface mounting, with 100 Amps rated copper busbar, with Neutral bar, Earthbar and cable alley for cable management, fully shrouded, Neutral bars, prefilters masking sheet complete all as specified and as directed. Note:- MCBs will be measured and paid separately.		2264.90 Each Job	22.00	49,827.80		
19	S&F 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. as required 4mm dia galvanised iron or steel wiret complete all as specified and as directed		60.20 RM	40.00	2,408.00		
20	Supply and fix Exhaust fan, steel body, AC single Phase. 230V of size 300mm sweep with, blades, and frame and louvers, complete all as specified and directed.		3548.59 Each	19.00	67,423.21		
21	S&F Ceiling fans complete with fan blades, down rods and accessories, 230 V, 1200 mm, Min air delivery 210 CFM with service value 7.7 BEE Five star rated with brushless direct current motor (BLDC) without remote complete all as specified and directed. Note: Fan Regulator shall be measure and paid respectively.		2283.57 Each	11.00	25,119.27		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART IV (Contd…)

1	2	3	4	5	6	7	8
22	S&F Ceiling fans complete with fan blades, down rods and accessories, 230 V, 1400 mm Sweep, Min air delivery 245 CFM with service value 7.7, BEE Five star rated with brushless direct current motor (BLDC) without remote complete all as specified and directed. Note: Fan Regulator shall be measure and paid respectively.		2283.57 Each	170.00	3,88,206.90		

Total of Schedule 'A' Part IV C/O to BOQ **Rs. 34,73,104.98**

Signature of Contractor **Asst. Dir (Contracts)**

Dated:- **For Accepting Officer**

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART - V

(List of works & prices)

ROAD, PATH & CULVERTS

NOTES :

1 All excavation & earthwork required for items of works covered under this Schedule `A' shall be measured & paid under relevant items of Schedule `A' Part II, unless otherwise specifically mentioned in the description of the items.

Srl No.	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	M&L 100 mm thick plain cement concrete 1:4:8 type D2 (40mm graded stone aggregate) as in sub base finished rough to receive finishes complete all as specified and as directed.		533.00 / Sqm	900.00	4,79,700.00		
2	Providing and laying 60mm thick factory made chamfered edge cement concrete paver block of M-35 grade with approved colour, design & pattern as in footparth, parks, lawns, drive ways or light traffic parking etc., of required strength, thickness & size/shape, made by table vibratory method usingPU mould, laid in required colour & pattern over and including 50mm thick compacted bed of fine sand, compacting and properembedding/ laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. Complete all as specified and directed.		873.70 / SqM	900.00	7,86,330.00		
3	Rolling and consolidating formation surfaces in cutting, including watering as necessary, filling in the depressions which occur during the process, with 8 to 12 tonne power roller, consolidating to required gradient and camber all as specified.		26.00 / 10 Sqm	211.40	5,496.40		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART V (Contd…)

1	2	3	4	5	6	7	8
4	M&L Laying and compacting 150 mm thick (compacted thickness) Granular Sub Base Course (GSB) grading as per Grade I as specified Table 400-1 of MoRTH specifications for Road and Bridge works, 2013, in a single layer over compacted subgrade with natural sand, crushed gravel, crushed stone, crushed slag or combination thereof as per the grading required The materials are mechanically mixed, spread and levelling on the subgrade by using motor grader of adequate capacity, and rolling with vibratory roller of capacity 80-100 KN static weight for achieving required compaction density of atleast 98% of the Maximum Dry Density. Consolidating to required gradient and camber complete all as specified and as directed with finished surface tolerances as per Table 900-1 of MORTH specifications for Road and Bridge works, 2013.		3936.71 10 Sqm	211.40	8,32,220.49		
5	M&L 225 mm thick (compacted thickness) Wet Mix Macadam gradin(WMM) in three layers 75 mm each grading as per table 400-13 of MORT&H specification for road and bridge works 2013 manufactured in WMM Plant material comprising of clean, crushed, graded aggregate . and granular material premixed with water to a dense mass, spreading with sensor paver and rolling with vaibrator roller of capacity 80 to 100kn static weight and consolidating to required gradient and and camber complete all as specified and as directed.		6304.01 10 Sqm	211.40	13,32,667.71		
6	M&L Preparing WMM surface by brushing with wire brushes for removing caked mud etc and finally removing all loose dirt and finally Cleaning the WBM/WMM surface with power compressor & applying evenly priming/tack coat with bituminous primer of VG 10 grade paving bitumen @ 7.50 kg/Xsqm complete all as specified and as directed.		748.35 10 Sqm	211.40	1,58,201.19		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART V (Contd…)

1	2	3	4	5	6	7	8
7	M&L 50mm compacted thickness premixed bituminous macadam laid, spread using mechanical paver with 4% binder content by weight of total mix, using paving bitumen binder of grade VG-30 grade by weight of total mix, rolled and compacted to required gradient and camber using power roller of capacity exceeding 8 tonne but not exc 12 tonne complete all as specified and directed. **NOTE For Srl Item Nos. 7 & 8:-** (i) The actual binder content for BM & SDAC used shall be as per optimised content based on approved job mix formula irrespective of what ever indicated in Schedule Item. (ii) Price adjustment shall be done on MINUS side only @ 55.00 per KG (without considering the permissible tolerance on minus side) with reference to binder content indicated Schedule Item.		8915.70 Cum	105.70	9,42,389.49		
8	M&L 40mm consolidated thickness premixed semi dense asphaltic concrete (SDAC) with 5.5% binder content by weight of total mix, using mechanical paver/vibratory roller, Paving bitumen grade VG-30 grade by weight of total mix, rolled and compacted to required gradient and camber using power roller of capacity exceeding 8 tonne but not exc 12 tonne complete all as specified and directed.		3828.50 10 Sqm	211.40	8,09,344.90		
9	M&L Preparing new bituminous macadam black top surface by brushing with wire brushes for removing caked mud etc and finally removing all loose dirt and finally Cleaning the WBW WMM surface with power compressor & applying evenly priming/tack coat with bituminous primer of VG 10 grade paving bitumen @ 2.50 kg Xsqm		138.25 10 Sqm	211.40 .	29,226.05		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART V (Contd…)

1	2	3	4	5	6	7	8
10	M & L for preparing bituminous surfaces of road and marking 2.5mm thick centre lines, stop lines, dashes, arrows etc. and the like n. exc 10cm wide on roads pavements with hot applied thermo plastic road marking paint of approved colour confirming to BS 3262-1989 with special applicator machine all as per manufacturers instruction complete all as specified and directed.		447.05 RM	1,284.00	5,74,012.20		
11	M&L 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 course sand) including making joints except at sharp curve shall not t more than 5 mm) including necessary earthwork and making drainage opening wherever required complete all as specified and directed.		8514.90 Cum	77.04	6,55,987.90		
12	M&L Plain Cement Concrete Type C2 1:3:6 (using 40 mm graded stone aggregate) in foundations, filling and mass concrete complete all as specified and directed.		5862.00 Cum	2.63	15,417.06		
13	M&L Reinforced cement concrete M-30 (design mix) 20mm graded stone aggregate in foundations, including rafts, footings, foundation beans, plinth beams, bases for columns, etc, basement slabs, under reamed piles and mass concrete complete all as specified and directed.		7721.87 Cum	9.90	76,446.51		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART V (Contd…)

1	2	3	4	5	6	7	8
14	M&L Reinforced cement concrete M-30 (design mix) 20mm graded stone aggregate in walls, retaining walls, basement walls, ballast walls and the like, any thickness, above top of footing, including attached pillasters and buttresses complete all as specified and directed.		8240.42 Cum	10.84	89,326.15		
15	M&L Reinforced cement concrete M-30 (design mix) 20mm graded stone aggregate in Slab supported on walls, beams and columns in floors, roofs, landings, balconies canopies, deck slab and in shelves and the like complete all as specified and directed.		7592.53 Cum	7.09	53,831.04		
16	M&L Form work to sides of rough finished 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 complete all as specified and as directed.		316.72 Sqm	7.98	2,527.43		
17	M&L Form work to rough finished surfaces faces of walls, retaining walls, abutments, parapets and staircase rallings and similar work including attached pillasters, buttressed, etc vertical or batter sides complete all as specified and as directed.		493.55 Sqm	61.86	30,531.00		
18	M&L Form work to soffits of suspended slabs such as roof slabs, floor slabs, landings and similar work; exceeding 200mm thick (Horizontal or sloping) complete all as specified and directed.		561.78 Sqm	12.75	7,162.70		
19	M&L Form work to edges of concrete flats, treads, breaks in floors, window cills, concrete railings, openings in concrete walls, floors and roofs exc 20cm wide and sides of RCC/PCC bands in walls, horizontal or sloping and similar work with rough finished surfaces complete all as specified and directed.		479.68 Sqm	6.67	3,199.47		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART V (Contd…)

1	2	3	4	5	6	7	8
20	M&L TMT CRS Fe 500D bars 10mm dia and over as in reinforcement cut to length bent to shape required including cranking hooking ends and binding with mild steel wire (annealed) not less than 0.9mm dia or securing clips complete all as specified and directed.		82.60 KG	2,365.39	1,95,381.21		
21	M&L 150mm thick Cement concrete 1:2:4 type D2 using 40mm graded stone aggregate as in base course finished even and smooth without using extra cement complete all as specified and directed.		917.20 Sqm	15.00	13,758.00		
22	M&L Broken stone or boulders hardcore of gauge n exc 63mm, deposited, spread and levelled in layers n exc, deposited, spread and levelled in layers n exc 15 cm thick, watered and rolled & rammed to a true surface		2,614.90 CUM	153.15	4,00,471.94		
23	M&L Broken stone or boulders hardcore of gauge exc 63mm and not exc 100mm, deposited, spread and levelled in layers n exc, deposited, spread and levelled in layers n exc 15 cm thick, watered and rolled & rammed to a true surface		2,070.80 CUM	1.50	3,106.20		

Total of Schedule 'A' Part V C/O to BOQ **Rs. 74,96,735.04**

Signature of Contractor **Asst. Dir (Contracts)**

Dated:- **For Accepting Officer**

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART VI

(List of works & prices)

SEWAGE DISPOSAL

1 All excavation & earthwork required for items of works covered under this Schedule shall be measured & paid under relevant items of Schedule 'A' Part- II, unless otherwise specifically mentioned in the description of the items of Schedule `A'.

Srl No	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	M&L 150 mm Bore Reinforced concrete pipes of approved make, class NP3, laid and jointed complete with collars include for all necessary extra joints, waste, and cutting etc. complete all as specified & directed.		400.00 RM	380.00	1,52,000.00		
2	M&L 200 mm Bore Reinforced concrete pipes of approved make, class NP3, laid and jointed complete with collars include for all necessary extra joints, waste, and cutting etc. complete all as specified & directed.		460.00 RM	165.00	75,900.00		
3	M&L Plain Cement Concrete 1:4:8 type D-2, using 40 mm graded stone aggregate as in concrete bed to drain pipes, any type, of 150 mm bore pipe including packing under and hunching against the sides of the pipes after they are laid & tested complete all as specified and directed.		455.02 RM	157.64	71,729.35		
4	M&L Plain Cement Concrete 1:4:8 type D-2, using 40 mm graded stone aggregate as in concrete bed to drain pipes, any type, of 200 mm bore pipe including packing under and hunching against the sides of the pipes after they are laid & tested complete all as specified and directed.		611.19 RM	368.50	2,25,223.52		
5	M&L Plain Cement Concrete 1:4:8, type D2, using 40 mm graded stone aggregate as in foundation of manholes complete all as specified and directed.		5,483.10 Cum	17.13	93,925.50		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART VI (Contd…)

1	2	3	4	5	6	7	8
6	M&L Pre-cast cement concrete block masonry with solid blocks, type C-1 1:3:6 using 20 mm graded stone aggregate exc. 10 cm in width and setting in cement 1:6 mortar, complete all as specified and directed.		8,439.60 Cum	80.36	6,78,206.26		
7	M&L TMT bars 6 to 8 mm dia and over, cut to length, bent to shape reqd, including cranking, bending spirally for hooping for columns and binding with mild steel annealed wire of dia not less than 0.9 mm or securing with clips complete all as specified and directed .		85.18 Kg	309.96	26,402.39		
8	M&L Providing precast cement concrete (1:3:6) type C-1 using 20 mm graded stone aggregates set in cement mortar 1:6 as in landings, cover slabs (for man holes etc.) chullah hoods, chajjas, water troughs, mangers, shelves and similar articles with plain fair faces, including chamfers, weathering, throating etc. and setting in mortar complete with joints to match complete all as specified and directed.		10,366.80 Cum	4.43	45,924.92		
9	M&L Plain Cement Concrete 1:2:4 type B-2 using 40mm graded stone aggregate as in surface channels, drains and similar works etc, complete all as specified and directed.		6,586.10 Cum	2.46	16,201.81		
10	M&L Rendering 15 mm thick in CM 1:4 on brick, block or concrete surfaces including finishing the surfaces even & smooth without using extra cement complete all as specified and directed.		304.24 Sqm	67.09	20,411.46		
11	M&L Rendering 10 mm thick in CM 1:6 on stone, brick or concrete surfaces including finishing the surfaces even & smooth without using extra cement using WPC @ 3% etc, complete all as specified and directed.		230.47 Cum	159.39	36,734.61		
12	Supply only integral water proofing compound etc complete all as specified and directed by Engineer-in-Charge		46.10 Kg	17.53	808.13		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART VI (Contd…)

1	2	3	4	5	6	7	8
13	Cutting into existing manhole for connecting new drain 200 mm internal dia of pipe making good to pipe and rendering cutting out existing benching for good forming branch channel (1/2 round or 3/4 section) in cement concrete (1:2:4) type B1 using graded stone aggregates, smooth finished and reforming benching etc complete all as specified and directed by Engineer-in-Charge		1,120.00 Each	1.00	1,120.00		

Total of Schedule 'A' Part VI C/O to BOQ **Rs. 14,44,587.95**

Signature of Contractor
Dated:-

Asst. Dir (Contracts))
For Accepting Officer

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART VII

(List of works & prices)

AREA DRAINAGE

1 All excavation & earthwork required for items of works covered under this Schedule shall be measured & paid under relevant items of Schedule 'A' Part- II, unless otherwise specifically mentioned in the description of the items of Schedule `A'.

Srl No	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	M&L Plain Cement Concrete 1:4:8 Type D2 (40mm Aggregates) in foundations, filling and mass concrete complete all as specified and as directed.		5483.10 Cum	86.58	4,74,726.80		
2	M&L Brickwork with fly ash old size bricks, straight or curved on plan exc 6m mean radius, built in CM (1:4) complete all as specified and as directed.		6,094.37 Cum	131.56	8,01,775.32		
3	M&L Plain Cement Concrete 1:3:6 type C-0 (12.5 mm graded aggregate) in lintels upto 1.5m clear span, cills, steps; seismic and other similar bands, plinth courses, string courses, lacing courses, parapets and railings upto 60 cm in height, copings, kneelers, apex stones, bed plates, kerbs , water troughs and the like including weathering, slightly rounded or chamfered angles and throating complete all as specified and as directed.		8,629.40 Cum	11.96 .	1,03,207.62		
4	M&L Plain Cement Concrete 1:2:4 type B-0 (12.5 mm graded aggregate) in surface channels and drains etc complete all as specified and as directed.		6,638.10 Cum	11.70	77,665.77		
5	M&L Rendering 10 mm thick in cement plaster 1:4 on fair faces of PCC block work/concrete/ brick and finishing even and smooth using extra cement complete all as specified and as directed.		245.92 Sqm	1066.00	2,62,150.72		
	Total of Schedule 'A' Part VII C/O to BOQ				**Rs. 17,19,526.23**		

Signature of Contractor **Asst. Dir (Contracts))**

Dated:- **For Accepting Officer**

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART - VIII

(List of works & prices)

EXTERNAL WATER SUPPLY

NOTES :

1 All excavation & earthwork required for items of works covered under this Schedule `A' shall be measured & paid under relevant items of Schedule `A' Part II, unless otherwise specifically mentioned in the description of the items.

Srl No	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing	Remarks
1	2	3	4	5	6	7	8
1	S&F GI pipes, medium grade including necessary fittings such as sockets, elbows, tees, reducers, unions, nipples etc laid in trenches / walls / floors etc for following pipe of dia complete all as specified and as directed.						
1.1	80mm bore		760.50 RM	600.00	4,56,300.00		
1.2	50mm bore		421.20 RM	150.00	63,180.00		
1.3	20mm bore		158.60 RM	200.00	31,720.00		
2	S&F Gun metal gate valve/brass stop valve, high pressure both ends screwed down with crunch or butterfly handle with suitable size sockets on both ends nipples, unions, etc suitable for following GI pipe of dia complete all as specified and as directed.						
2.1	50mm bore		979.08 Each	4.00	3,916.32		
2.2	20mm bore		540.11 Each	12.00	6,481.32		
3	S&F Cast iron sluice valve of 80mm bore , Class PN1.6, ISI marked with stainless steel spindle, both ends flanged including rubber gasket, nuts, bolts and washers complete all as specified and as directed		9500.00 Each	1.00	9,500.00		

Total of Schedule 'A' Part X C/O to BOQ **Rs. 5,71,097.64**

Signature of Contractor **Asst. Dir (Contracts))**

Dated:- **For Accepting Officer**

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART - IX

(List of works & prices)

EXTERNAL ELECTRIC SUPPLY

NOTES :

1 All excavation & earthwork required for items of works covered under this Schedule `A' shall be measured & paid under relevant items of Schedule `A' Part II, unless otherwise specifically mentioned in the description of the items.

Srl No.	Description of items of works	Dr	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	Material & Labour connecting, testing and commissioning XLPE insulated screened PVC bedded galvanized steel strip or wire armoured, electric power earthed cable, 11 KV (E) grade with stranded aluminium conductor of cross sectional area 95 sq mm x 3 core. confirming to IS-7098(Part-II) laid in cable trenches /Duct /Wall /surfaces /Pipe etc complete all as specified and as directed.		1067.97 / RM	400.00	4,27,188.00		
2	M&L Cable jointing kit end termination for 11 KV (Earthed) grade 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 95 sqmm 3 core etc complete all as specified and as directed.		6150.70 / Each	4.00	24,602.80		
3	Supply and laying LT UG cable XLPE insulated screened PVC bedded, galvanised steel strip or wire armoured, electric power cable (heavy duty) 1100 volt grade with stranded aluminium conductor of size 95 sqmm 3.5 core complete all as specified and as directed.		526.72 / RM	20.00	10,534.40		
4	All as per item No - 3 above but 70 Sqmm 3.5 Core		443.89 / RM	50.00	22,194.50		
5	All as per item No - 3 above but 35 Sqmm 3.5 Core		269.75 / RM	70.00	18,882.50		
6	All as per item No - 3 above but 10 Sqmm 4 Core		174.68 / RM	400.00	69,872.00		
7	All as per item No - 3 above but 10 Sqmm 2 Core		143.61 / RM	100.00	14,361.00		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART IX (Contd…)

1	2	3	4	5	6	7	8
8	S&F True vertical position steel tubular poles 11.0 M long complete with cast iron base plate, finial taper plug, bolts, nuts and screws, type 410 SP-55, conforming to relevant IS, including one primer coat of red oxide and two coats of aluminium paint and two coats of bituminous paint inside and out side of bottom portion up to 1.8 mtr length all as specified and provide circular bend 1 No of width 2 cm complete all as specified and directed. **Note:** Excavation and earth work, foundation concrete and PCC coping shall be measured and paid separately).		17758.80 Each	2.00	35,517.60		
9	Supplying, install and erect in true vertical position steel tubular swaged welded pole complete with MS base plate 6mm thick and of size 300x300mm, final taper, pole cap, bolts, nuts, washers & screws etc. pole made out of ERW M.S. tubing conforming to 1S-2713 part-ll type 410 SP-31 (9.0 metre long) including of holes of reqd Nos and size for fixing of cross arms, painting with one coat of red oxide primer and two coats of aluminium paint for exposed surfaces and two coats of black bituminous paint for portion embedded in concrete, painting three signal red colour bends at lower portion of exposed pole starting from plinth block, each band of 300 mm height at 300 mm spacing, painting pole no the black paint by stencilled letters/figures of 8cm height complete all as specified and directed		11499.00 Each	10.00	1,14,990.00		
10	M&L Plain Cement Concrete 1:3:6 type C-1 using 20mm graded coarse aggregate for coping etc. including fair finishing the exposed surfaces even and smooth without using extra cement, including necessary formwork where required, complete all as specified and as directed.		8629.40 Cum	7.56	65,238.26		
11	M&L Plain Cement Concrete 1:4:8 type D-2 (using 40 mm graded stone aggregate) as in foundation filling and mass concrete for poles/struts, stay assembly etc. including necessary formwork complete all as specified and directed.		5483.10 Cum	0.90	4,934.79		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART IX (Contd…)

1	2	3	4	5	6	7	8
12	S&F HT 11 KV out door non-linear type lightening arrestor with mountings, accessories complete fixed on cross arms of two pole structure / GI flat strip and connect with same size of ACSR conductor encashed in PVC alkathine pipe with all fittings connected to earth strip with nuts, bolts and washers, transmission class having discharge capacity of 65 KA and rupturing capacity 5 KVA and suitable for working pressure 9 KV RMS complete all as specified and as directed.		10694.90 Each Set of 3	1.00	10,694.90		
13	M&L Danger notice plate of 1.6mm thick mild steel sheet, vitreous enamelled white, with letters, figures and conventional skull and bones in signal red colour and fixed with M.S. clamps, bolts and nuts of approved size, for LT, 25x20cm size complete all as specified and as directed.		131.60 Each	4.00	526.40		
14	M&L Cross arms, bracings, supports, clamps and back plates fabricated from structural steel sections including nuts, bolts, washers, welding bending cold or hot, drilling holes for bolts, in any shape or size as indicated or directed and inclusive of one coat of red oxide primer, one under coat and one finishing coat of aluminium paint complete all as specified and as directed.		11931.40 Quintal	0.50	5,965.70		
15	M&L Rendering 15 mm thick in CM 1:4 on brick, block or concrete surfaces including preparation of new plastered surface and applying two coat of cement base paint over a coat of primer all as specified and directed.		375.01 Sqm	17.20	6,450.17		
16	M&L Plain Cement Concrete 1:2:4 type B-1 using 20mm graded stone aggregate as in cills, steps; seismic and other similar bands, plinth courses, coping and similar works etc, complete all as specified and directed.		9,259.40 Cum	2.46	22,778.12		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART IX (Contd…)

1	2	3	4	5	6	7	8
17	S&F Sub main wiring with 1.5 Sqmm single core, 2 Run PVC insulated, unsheathed, FRLSH stranded copper conductor cable with 1.5 Sqmm, one run PVC insulated, unsheathed, FRLSH stranded copper conductor cable as earth wire drawn through and including PVC Conduit of suitable dia not less than 25mm Concealed in wall with its all necessary accessories and earth wire connected to common earth dolly etc complete all as specified and directed. **Note:** 3 Runs (2+1) of 1.5 Sqmm copper conductor cable and one run of PVC conduit of suitable dia shall be measured as one unit RM length.		163.32 RM	70.00	11,432.40		
18	S&F GI pipes, light grade including necessary fittings such as sockets, elbows, tees, reducers, unions, nipples etc laid in trenches/walls/floors etc for following pipe of dia complete all a s specified and as directed. 50mm bore		402.00 RM	20.00	8,040.00		
19	S&F GI pipes, light grade including necessary fittings such as sockets, elbows, tees, reducers, unions, nipples etc laid in trenches/walls/floors etc for following pipe of dia complete all a s specified and as directed. 25mm bore.		170.00 RM	20.00	3,400.00		
20	M&L Pre-cast cement concrete block masonry with solid blocks, type C-1 1:3:6 using 20 mm graded stone aggregate exc. 10 cm in width and setting in cement 1:4 mortar, complete all as specified and directed.		8,532.50 Cum	9.40	80,205.50		

Total of Schedule 'A' Part IX C/O to BOQ **Rs. 9,57,809.04**

Signature of Contractor
Dated:-

Asst. Dir (Contracts))
For Accepting Officer

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART - X

(List of works & prices)

HOT WATER SUPPLY

NOTES :

1 All excavation & earthwork required for items of works covered under this Schedule `A' shall be measured & paid under relevant items of Schedule `A' Part II, unless otherwise specifically mentioned in the description of the items.

Srl No	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	S&F Rotational moulded polyatheine water storage tank of capacity 500 ltrs (cylindrical vertical with closed top) hosted and fixed in position all as specified and directed.		4219.60 / Each	3.00	12,658.80		
2	M&L Including fabrication of staging/stand for cold water storage tank of capacity 1000 ltrs vertical type and for mounting solar water storage tank ,horizontal type, using structural steel sections, Fe 415-W (Grade-E-250) quality 'B' with connecting plates, bracings, supports, clamps and back plates, including nuts, bolts, washers, welding, bending cold or hot, drilling holes for bolts, in any shape or size as indicated or directed and erection all as per manufacturer's instructions, including painting two coats of black synthetic enamel paint over a coat of red oxide primer, complete all as specified and directed.		11931.40 / Quintal	0.80	9,545.12		
3	S&F Stop valve, cast iron copper alloy, screwed down, high pressure, with crutch or butterfly handle, screwed both ends for iron pipe or for unions and fixed to pipe of 25 mm bore complete all as specified and directed.		434.55 / Each	6.00	2,607.30		
4	M&L 25 mm GI tubing medium grade laid in floors or fixed to wall in any length with screwed and socket joints together with all galvanised GI fitting such as sockets, bends, elbows, tees, reducers, unions, jointing materials etc and pressure testing, Washing out complete all as specified and directed.		184.60 / RM	180.00	33,228.00		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART X (Contd…)

1	2	3	4	5	6	7	8
5	M&L Lagging and wrapping to pipes of 20 mm bore suitable for solar water heating system all around insulated with 20 mm thick bonded mineral wool performed SNAP ON pipe sections of density 144 kg/cum confirming to IS 9642 etc complete all as specified and directed.		95.10 RM	120.00	11,412.00		
6	Supply, Install, Testing and Commissioning of 'Solar Hot Water System' (Flat Plate Collector) based on indirect transfer of heat of capacity **200 LPD** complete all as specified and directed.		69235.30 Each	2.00	1,38,470.60		
7	Supply, Install, Testing and Commissioning of 'Solar Hot Water System' (Flat Plate Collector) based on indirect transfer of heat of capacity 100 LPD complete all as specified and directed.		36975.60 Each	1.00	36,975.60		

Note for Ser No 6 & 7:

1. The Rate quoted shall include the following accessories and system:
2. The cost of backup stainless steel hot water tank insulated of capacity as per recommendation of manufacturer.
3. The cost of electrical heating back up.
4. The cost of all accessories, piping system and electrical cable etc. as per standard details provided by the manufacturer.

Total of Schedule 'A' Part X C/O to BOQ **Rs. 2,44,897.42**

Signature of Contractor
Dated:-

Asst. Dir (Contracts)
For Accepting Officer

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART - XI

(List of works & prices)

RAIN WATER HARVESTING

NOTES :

1 All excavation & earthwork required for items of works covered under this Schedule `A' shall be measured & paid under relevant items of Schedule `A' Part II, unless otherwise specifically mentioned in the description of the items.

Srl No	Description of items of works	Drg Nos	Unit Rate and Unit Rs. Ps.	No of Units required	Amount Rs. Ps.	Period of completion of individual items from the date of handing over site	Remarks
1	2	3	4	5	6	7	8
1	M&L Plain cement concrete (1:4:8) type D2 (using 40mm graded aggregate) as in foundation /mass concrete etc complete all as specified and directed.		5483.10 Cum	8.20	44,961.42		
2	M&L Brickwork with modular fly ash bricks, straight or curved on plan exc 6m mean radius, built in cement mortar 1:6 etc complete all as specified and directed.		5731.64 Cum	21.00	1,20,364.44		
3	M&L Providing, cement concrete type C1 using 20 mm graded aggregate in lintels upto 1.5m clear span, cills, steps, seismic and other similar bands, plinth courses, string courses, lacing courses, parapets and railings upto 60 cm in height, copings, kneelers, apex stones, bed plates, kerbs, water troughs and the like including weathering, slightly rounded or chamfered angles and throating, complete all as specified and directed.		8629.40 Cum	0.70	6,040.58		
4	M&L Rendering 10 mm on fair faces of brick work or concrete surfaces in CM 1.6 cement sand mortar finished even and smooth without using extra cement complete all as specified and directed.		230.67 Sqm	42.00	9,688.14		
5	Extra for forming fair finished drain or channel 30 cm inner girth in cement concrete, using extra cement, including forms, moulds, mi-tred/stopped ends etc complete all as specified and directed.		43.35 RM	33.00	1,430.55		

In lieu of IAFW-2159 (Revised 1947)

SCHEDULE `A' PART XI (Contd…)

1	2	3	4	5	6	7	8
6	M&L Composite rainwater harvesting system, the unit rates for Composite Rain water Harvesting system include of the following (a) Underground water storage thak of 5000 Ltr capacity 01 Piece (b) First flush system 01 Set (c) Gravity Filter 01 Piece (d) Delivery pipes 25mm size 15 mtr (e) Down take pipes 100mm size 15 mtr complete all as specified and directed.		1,19,358.00 Each Job	5.00	5,96,790.00		
7	S&F UPVC Pipes 75 mm (SCH 40) (ISI Marked) include all fittings for connections, fixed to wall with necessary stay clamps or laid in trenches/floor etc complete all as specified and directed.		686.00 RM	330.35	2,26,620.10		
8	S&F UPVC bends 75 mm (SCH 40) without access door complete all as specified and directed.		110.00 Each	20.00	2,200.00		
	Total of Schedule 'A' Part XI C/O to BOQ				**Rs. 10,08,095.23**		

Signature of Contractor
Dated:-

Asst. Dir (Contracts)
For Accepting Officer

SCHEDULE `B'
ISSUE OF MATERIALS ETC TO THE CONTRACTOR
SEE CONDITION 10 OF IAFW-2249

Sl. No.	Particulars	Rate at which materials will be issued to the contractor. Unit	Rate	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 HIRED TO THE CONTRACTOR
(See condition 15, 34 and 35 of IAFW-2249)

Sl No	Quantity	Particulars	Details of MES crew supplied.	Hire charges per unit per working day.	Standby charges per unit per off day	Place of issue (by name)	Remarks
1	2	3	4	5	6	7	8
----------NIL----------							

SCHEDULE 'D'
TRANSPORT TO BE HIRED TO THE CONTRACTOR
(See Condition 16 and 35 of IAFW-2249)

Sl No	Quantity	Particulars	Rate per unit per working day.	Place of issue (by name)	Remarks
1	2	3	4	5	6
----------NIL----------					

Signature of Contractor
Dated:

Asst Dir (Contracts)
For Accepting Officer

NAME OF WORK: PROVISION OF SINGLE MEN BARRACKS FOR 250 AGNIVEERS UNDER GE (N) AHILYANAGAR

T E N D E R

To,

The President of India,

Having examined and perused the following documents: -

1. Specifications signed by the Asst Dir (Contracts).

2. Particular specifications and list of drawings.

3. BOQ, 'B', 'C' & 'D' attached hereto.

4. MES Standard Schedule of Rates Part I (2009) together with Amendment No. 1 to 3 and MES Standard Schedule of Rates Part II (2020) together with Amendment No. 1 to 122 and Section 30 [hereinafter referred to as MES Schedule].

5. General Conditions of contracts IAFW-2249 (1989 Print) together with Errata Nos. 01 to 20 and Amendments Nos. 01 to 49 including Amendment to Condition 70 as per Annexure 'I' enclosed.

6. **WATER:** Refer Condition 31 of IAFW-2249 (General Conditions of Contracts)
WATER WILL NOT BE SUPPLIED BY THE MES.

7.. Should this tender be accepted I / We agree: -

(a) **That a sum of **₹ 14,40,000.00** (Rupees Fourteen Lakh Forty Thousand only) forwarded as Earnest Money shall either be adjusted against Performance Security Deposit or refunded after receipt of Performance Security Deposit within the time specified in Condition 19 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 the Summary and to carry out such deviations as may be ordered vide condition 7 of IAFW-2249 up to a maximum of **(+/-)10% (Ten Percent)** and further agree to refer all disputes as required by Condition 70 to Arbitral Tribunal of a Sole Arbitrator having degree in Engineering or equivalent or having passed Final/Direct Final Examination of Sub Division II of Institution of Surveyors (India) or similar other Institutes recognized by the Government of India. The Arbitrator shall be appointed by the Engineer-in-Chief, or in his absence the Officer officiating as the Engineer-in-Chief, or the Director General of Works if specially delegated in writing by the Engineer-in-Chief, Army HQ, New Delhi within a period of thirty days of having received the notice from any of the parties to Contract, out of MoD Panel of Arbitrators, whose decision shall be final, conclusive and binding.

** To be deleted where not applicable

TENDER (Contd.)

Total brought forward from BOQ for the Lump Sum of ₹_____ /-
(Rupees _____
_____ only)
Signature _____ in the capacity of _____ duly authorized to sign the tender for and on behalf of Messer's
_____

(BLOCK CAPITALS)

Name of the Signatory (IN BLOCK CAPITALS) : _____
Date : _____

Postal Address :_____
_____
_____

Telegraphic Address : _____
_____
_____

Witness : _____

Address : _____
_____
_____

Telephone : _____

ACCEPTANCE

_____Alterations have been made in these documents and as evidence that these alterations were made before the execution of the Contract Agreement these have been initialled by the Contractor and **S'Shri/ Shri**_____

The said Officer/Officers is/are hereby authorized to sign and initial on my behalf the documents forming part of this contract.

The above tender was accepted by me on behalf of the President of India for the Lump Sum of ₹_____ **(Rupees** _____
_____ **only)**

Signature_____ dated this _____ day of _____ 2026.

(FOR AND ON BEHALF OF THE PRESIDENT OF INDIA)
Chief Engineer Pune Zone, Pune - 411 001
ACCEPTING OFFICER

MILITARY ENGINEER SERVICES
GENERAL CONDITIONS OF CONTRACTS
(IAFW-2249-1989 PRINT)
FOR
LUMPSUM TENDER AND CONTRACT (IAFW-2159)

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, as modified, if any, elsewhere in these tender documents.

It is hereby further agreed and declared by me/us, that the General Conditions of Contracts (IAFW-2249-1989 print) with Errata 1 to 20 and Amendments Nos. 1 to 49form part of these tender documents and I/We are in possession of the said conditions with errata and amendments.

The existing Condition 70 of IAFW-2249 is here by substituted with revised Condition 70 of IAFW-2249 as per enclosed Annexure ‘I’.

Note: -It is also agreed me/us that in case of any discrepancy in the interpretation of the contents between ENGLISH and HINDI version, ENGLISH version shall take precedence over HINDI version.

Signature of Contractor **Asst Dir (Contracts)**
Dated: **For Accepting Officer**

Annexure 'I'

The existing description of Condition 70 of IAFW-2249 shall be substituted by the revised description as under: -

70. **Arbitration**

(a) Arbitration Where Applicability of Section 12(5) of the Arbitration and Conciliation Act Has Been Waived Off: -

All disputes between the parties to the Contract (other than those for which the decision of the CWE or any other person is by the Contract expressed to be final and binding) shall, after written notice by either party to the Contract to the other of them, be referred to the Arbitral Tribunal of a Sole Arbitrator (in case of contract sum less than or equal to Rs. 100 crore) or to Arbitral Tribunal of three Arbitrators (in case of contract sum exceeding Rs. 100 crore) from MoD Panel of Arbitrators. The officers so considered for appointment of Arbitrator, either as sole Arbitrator or for Arbitral Tribunal, shall be having degree in Engineering or equivalent or having passed Final/Direct Final Examination of Sub-Division II of Institution of Surveyor (India) or similar other Institutes recognised by the Government of India.

In case of arbitration by Sole Arbitrator, the Arbitrator shall be appointed by the Authority mentioned in the contract document within a period of thirty days of having received the notice from any of the parties to Contract, out of MoD Panel of Arbitrators. In case of Arbitral Tribunal consisting of panel of three Arbitrators, both the parties will be asked by the Appointing Authority to suggest at least two names out of MoD Panel of Arbitrators within thirty days. The Appointing Authority will appoint two Arbitrators, one Arbitrator each out of the suggested names. The two Arbitrators so appointed will select one Arbitrator from the MoD Panel of Arbitrators who will be the 'Presiding Arbitrator'. The Serving Officer(s) so appointed as Arbitrator(s), either as Sole Arbitrator or as one of the here Arbitrators in the Arbitral Tribunal, can continue as Arbitrator even after retirement, provided both the parties to the Contract give written consent to this effect. In such case, however, the Arbitrator shall not be entitled for any fee even after retirement.

(b) **Arbitration where applicability of Section 12 (5) of Arbitration & Conciliation Act Has Not Been Waived Off**

All disputes, between the parties to the Contract (other than those for which the decision of the CWE or any other person is by the Contract expressed to be final and binding) shall, after written notice by either party to the Contract to the other of them, be referred to the Arbitral Tribunal of a Sole Arbitrator (in case of contract sum less than or equal to Rs. 100 crore) or to Arbitral Tribunal of three Arbitrators (in case of contract sum exceeding Rs 100 crore). The Officers so considered for appointment as Arbitrator, either as Sole Arbitrator or for Arbitral Tribunal, shall be having degree in Engineering or equivalent or having passed Final/Direct Final Examination of Sub Division II of Institution of Surveyor (India) or similar other Institutes recognised by the Government of India.

In case of arbitration by sole Arbitrator, the Arbitrator shall be appointed by the authority mentioned in the contract document from the MoD Panel of Arbitrators within a period of thirty days of having received the notice from any of the parties to Contract. In case of Arbitral Tribunal consisting of panel of three Arbitrators, both the parties shall be asked by the Appointing Authority to suggest at least two names out of MoD Panel of Arbitrators within thirty days. The Appointing Authority will appoint two Arbitrators, one Arbitrator each out of the suggested names. The two Arbitrators so appointed shall select one Arbitrator from the MoD Panel of Arbitrators who will be the 'Presiding Arbitrator'.

(c) **Common For All Arbitration**

Unless both parties agree in writing, such reference shall not take place until after the completion or alleged completion of the works or termination or determination of the contract under Condition Nos 55, 56 and 57 hereof.

Provided that in the event of abandonment of the works or cancellation of the Contract under Condition No. 52, 53 or 54 hereof, such reference shall not take place until alternative arrangements have been finalised by the Government to get the works completed by or through any other Contractor or Contractors or Agency or Agencies.

Annexure 'I' (Contd..)

Provided always that commencement or continuance of any arbitration proceeding hereunder or otherwise shall not in any manner militate against the Government's right of recovery from the Contractor as provided in Condition 67 hereof.

If the sole Arbitrator or one or more Arbitrators of the Arbitral Tribunal so appointed resign(s) from his/her appointment or vacate(s) his/her office or is unable or unwilling to act due to any reason whatsoever, the Authority appointing him/her will appoint a substitute Arbitrator to act in his/her place in the manner specified hereinabove. In case the Arbitrator resigning in this manner is the Presiding Arbitrator, the other two Arbitrators of the Arbitral Tribunal shall appoint the substitute Presiding Arbitrator.

The Arbitral Tribunal may proceed with the arbitration, exparte, if either party, in spite of a notice from the arbitrator fails to take part in the proceedings.

The Arbitral Tribunal may from time to time with the consent of the parties, enlarge the time for making and publishing the award subject to the limit laid down in the Arbitration & Conciliation Act 1996 as amended upto the date on which arbitration proceedings commence.

The Arbitral Tribunal shall make the award within the period as provided in the Arbitration & Conciliation Act 1996 (as amended upto the date on which arbitration proceedings commence) from the date of entering on the reference or within the extended period as the case may be on all matters referred to it and shall indicate findings along with sums awarded separately on each individual item of dispute. The Arbitral Tribunal shall give reason for the award in each and every case irrespective of the value of claims or counter claims.

The venue of Arbitration shall be such place or places as may by fixed by the Arbitral Tribunal in its sole discretion.

The award of the Arbitral Tribunal shall be final and binding on both parties to the Contract.

Signature of Contractor
Dated:

Ast Dir (Contracts)
For Accepting Officer

SCHEDULE OF MINIMUM WAGES

1. It is hereby agreed that the "Schedule of Minimum Fair Wages" as published by Govt of India/ State Govt/ Govt local authorities whichever is highest and which specifies minimum rates of wages for various categories of workman as applicable on the last due date of receipt of this tender shall form part of these tender document.

2. The minimum rates of wages shall consist of all-inclusive rates and include the wages for weekly day of rest.

3. My/our signature here under amount to my/our having signed the aforesaid documents forming part of this tender.

Signature of Contractor
Dated:

Asst Dir (Contracts)
For Accepting Officer

SPECIAL CONDITIONS

1.0 **GENERAL**

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

1.2 The work under this Contract shall be carried out in accordance with Schedule `A', Particular Specifications, drawings and other provisions made in MES Schedule.

1.3 The term 'General Specifications' referred to hereinbefore/ here in after as well as referred to in IAFW- 2249. (General Conditions of Contracts), shall mean the Specifications contained in MES Schedule.

1.4 General rules, specifications, special conditions and all preambles in MES Schedule shall be deemed to apply to the works under this Contract unless specified otherwise in these tender documents, in which case the provisions in these tender documents shall be deemed to take precedence over the provisions made in MES Schedule.

2.0 **VISIT TO SITE BY CONTRACTOR**

2.1 The tenderers shall contact concerned GE for the purpose of inspections of site (s) and examination of relevant document other than those sent herewith, who will extend reasonable facilities for the purpose. The tenderers shall also make themselves familiar with working conditions, accessibility to site (s), availability of materials and other cogent conditions before quoting his offer.

2.2 The tenderer shall be deemed to have inspected the site of work and make themselves familiar with working conditions, accessibility to site (s), availability of materials and other cogent conditions, irrespective whether he has actually inspected them or not.

3. **THE WORK LIES IN RESTRICTED AREA**

3.1 **CONDITIONS FOR WORKING IN RESTRICTED AREA**

All works lie in **Restricted Area.** The restrictions for entry to work site and conditions of working in restricted area shall be as under: -

(a) **Entry and Exit**. The contractor/his agents/representatives/workmen etc. and his materials, carts, trucks or other means of transport etc will be allowed to enter through and leave from only such gate or gates and at such times as the GE or authorities in charge of the restricted area may at their sole discretion permit to be used. Contractor's authorised representative is required to be present at the places of entry and exit for the purpose of identifying his carts, trucks etc to the person in charge of the security of the restricted area.

(b) **Identity of Workmen**: -

(i) Every workman shall be in possession of an identity card. The identity card shall be issued after a thorough investigation of antecedents of the labourers by the contractor and attested by Officer-in- charge of the unit concerned in accordance with the standing rules and regulations of the unit. Contractor shall be responsible for the conduct of his workmen, agents or representatives.

(ii) **Identity Card or Passes**. The contractor, his agents and representatives are required individually to be in possession of an identity card or pass which will be examined by the security staff at the time of entry into or exit from the restricted area and at any time or number of times inside a restricted area.

(c) **Search**. Thorough search of all persons and transport shall be carried out at each gate and for as many times the gate is used for entry or exit and may also be carried out any number of times at the site within the restricted area.

(d) **Working Hours**. The units controlling restricted areas usually work during six days in a week and remain closed on the 7th day. The working hours available to the contractor's labour and staff are however appreciably reduced because of the time of entry and exit during working hours. The exact working hours, working days and number of working days observed for these restricted area(s) where works are to be carried out shall be deemed to have been ascertained by the contractor before submitting his tender. The tenderer's attention is invited to the fact that the number of working hours for a unit are prescribed in regulations and that these cannot be increased by the Garrison Engineer or authorities controlling the restricted area. The definition of "working days" as given under

SPECIAL CONDITIONS

Condition 1(t) of IAFW-2249 does not apply in cases where the works are carried out in restricted areas.

(e) **Working on Holidays**. The contractor shall not carry out any work on gazette holidays, weekly holidays and other non-working days except when he is specially authorised in writing to do so by the Garrison Engineer. The GE may at his sole discretion declare any day as holiday or non-working day without assigning any reasons for such declaration.

(f) **Fire Precautions**. The contractor, his agents, representatives, workmen etc shall strictly observe the order pertaining to fire precautions prevailing within the restricted area. Motor transport vehicles, if allowed by the authorities to enter the restricted area, must be fitted with a fire extinguisher in working condition.

(g) **Female Searcher**. If the contractor desires to employ female labour for works to be carried out inside the area of factory, depot, park etc and a female searcher is not borne on the authorised strength of the factory, depot, park etc. at the time of submission of tender, he shall be deemed to have allowed in his tender for pay and allowances etc. for a female searcher (Group D employee) calculated for the period female labour is employed by him inside that area. If more than one contractor employs female labour during any month and female searcher (s) has/have to be employed in addition to the authorised strength of the factory, depot, park etc, the salary and allowances paid to the additional female searcher(s) shall be distributed on equitable basis among the contractors employing female labour taking into consideration the values and periods of completion of their contracts. The GE's decision in regard to the amount payable on this account by any contractor shall be final and binding.

4.0 CONTRACTORS REPRESENTATIVES, WORKERS AND AGENTS

4.1 Tenders attention is invited to Condition 25 of IAFW-2249. Tenderer shall employ only Indian Nationals as his representative, servants and workers and verify their antecedents and loyalty before employing them for the works. 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 is unavoidable, the tenderer shall furnish full particulars to this effect to the Accepting Officer at the time of submission of his tender.

4.2 The Contractor shall on demand by the Engineer-in-charge, submit list of his agents, employees and work people, concerned and shall satisfy the Engineer-in-charge as to the bonafide of such people.

5.0 MINIMUM WAGES PAYABLE

(a) Refer Condition 58 of IAFW-2249. The contractor shall not pay wages lower than minimum wages for labour as fixed by the Government of India/State Govt/Union territory, whichever is higher.
(b) Contractor's attention is also drawn, amongst other things, to the 'explanations' to the schedule of minimum wages referred to above.
(c) The fair wages referred to in Condition 58 of IAFW-2249 will be deemed to be the same as the minimum wages referred to above as updated from time to time.
(d) Schedule of minimum wages are not enclosed along with tender documents. However, the contractor shall be deemed to have verified the minimum fair wages payable as on the bid submission end date.
(e) 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.

6.0 LABOUR (REGULATION AND ABOLITION) ACT

Contract labour (Regulation & Abolition) Act 1970 is applicable to MES contractors. Rates quoted by the tenderer 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.

7.0 ROYALTIES

Reference Condition 14 of IAFW-2249. No quarries on defence land are available.

8.0 LAND FOR STORES & WORKSHOP ETC.

8.1 Delete the lines 5 to 9 of para 1 of Condition 24 of IAFW-2249. General Conditions of Contracts reading "In the event of area of land.....land allotted to him" and in lieu insert as under: -

SPECIAL CONDITIONS

"The Contractor shall be allotted the area by the GE, before execution near work site for the purpose of storage of materials, erection of temporary workshop, stores, etc. The Contractor shall pay nominal rent of Rs 1/- per year or part of a year in respect of each and every separate area of land allotted to him. No defence land is available for accommodation of labour for which the Contractor shall make his own arrangement at his own expense."

9.0 **BLASTING**

Blasting is prohibited.

10.0 **WATER SUPPLY**

10.1 Refer Condition 31 of IAFW-2249. **Water will not be supplied by MES**.

10.2 The Contractor shall make his own arrangement for supply of water, he will be permitted to drill bore well (s) in the area at his own cost. The well (s) dug/drilled by the contractor shall become the property of Govt. after the completion of the work under this Contract without any cost reimbursement to the Contractor. However no recovery shall also be made for water charges in case the Contractor digs his own well(s). The Contractor shall at his own cost get the water tested from recognized Govt. laboratory for its portability and produce the certificate to the GE on demand.

11.0 **ELECTRICITY SUPPLY**

11.1 Electricity will be supplied by MES on payment. It is however optional for the contractor to buy it from MES or make his own arrangement at his own cost. In the event of the contractor deciding to buy it from MES, he shall be charged for its consumption at all-in-cost rate of **Rs. 13.86 per unit** for lighting as well as for power. The condition given in succeeding sub paras, shall be applicable for electric supply by MES.

11.2 Electric supply shall be made available by MES at the point (s) tentatively marked on site plan/ decided by GE. However the exact location of the electric point (s) shall be shown by the GE.

11.3 The main switch and Pre-paid KWH meter to register the power supplied shall be provided and installed by MES. Contractors shall provide all necessary connections/ cables, fittings etc from the main switch and meter, in order to ensure a proper and suitable supply of electricity of execution of the work.

11.4 The MES does not guarantee for continuity of supply and no compensation what so ever shall be allowed for supply becoming intermittent or for breakdown in the system.

11.5 GE or his representative shall be free to inspect all the power consuming devices. Any electric line provided by the contractor which is not to the satisfaction of the GE and conforming to IE rules shall be disconnected from the supply, if so directed by him.

11.6 It is the responsibility of Contractor to maintain the unit power factor of electric supply. For this contractor shall provide capacitor of appropriate capacity to each connection for installation of his construction equipment.

12.0 **CO-OPERATION WITH OTHER AGENCIES**

12.1 Refer Condition 24 of IAFW-2249. The Contractor shall permit free access and generally afford reasonable facilities to other agencies and departmental workmen engaged by the Govt to carryout their part of the work if any, under separate arrangements. The Contractor is expected to have general procedural knowledge of local metropolitan / municipal rules of construction.

13.0 **MATERIALS**

13.1 Refer Condition 10 of IAFW-2249.

13.2 Items/ materials conforming to Indian Standard Specifications and bearing ISI mark shall only be accepted. Where ISI marked items/materials are not manufactured, items/materials superior to IS specifications may be used without any extra cost to Government. However, before incorporating such materials /items, the contractor shall produce necessary test certificates as required by the GE for approval of materials/items. GE may insist independent testing of such a material in CTL/Govt Engineer College (Degree)/CSRL/SEMT wing/National Test House or any other NABL accredited Lab/Govt. approved lab. The cost of such testing shall be borne by the contractor.

13.3 Indian Standard of the year of publication (Edition) as referred to in the MES Schedule shall

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be followed. Where any IS referred has been amended, or revised or superseded, the Contractor shall follow amended/ revised/superseded provisions as applicable on the date of receipt of tender without any adjustment to quoted rates / prices. However, for execution latest codes will be followed.

13.4 A list showing some of items/ articles which are having IS certification mark and are readily available is given below. It is mandatory that ISI certified marked items/ articles are only incorporated in the works. (For items which are applicable to this tender).

1. Integral water proofing compound
2. **Joinery**
   - (a) Solid core of wooden flush door shutters
   - (b) Particle board panel inserts of factory-made panelled shutters.

3. **Builders Hardware**
   - (a) Steel Butt Hinges
   - (b) Ferrous Tower Bolts
   - (c) Non-ferrous Tower Bolts
   - (d) Door handles (Non-ferrous)
   - (e) Parliament Hinges
   - (f) Continuous Piano Hinges
   - (g) Non-ferrous Metal Sliding Door Bolts
   - (h) Tee and Strip Hinges
   - (i) Mild steel sliding Door Bolts

4. **Ceiling and Lining**
   - (a) Ply wood for general purposes
   - (b) Block boards
   - (c) Veneered / decorative ply wood
   - (d) Fibre hard board/ Prelaminated Particle board.

5. **Flooring**
   White Portland cement

6. **Water supply plumbing, drains and sanitary appliances.**
   - (a) Concrete pipes with or without reinforcement
   - (b) Salt Glazed stone ware pipe and fittings.
   - (c) Flushing Cisterns for water closets and urinals other than plastic.
   - (d) Cast copper alloy screwed down pipe taps and stop valve for water services.
   - (e) Galvanized mild steel tubes, stop cock, bib cock.
   - (f) Sand cast CI spigot and socket soil, waste and ventilation pipe and fittings.
   - (g) Centrifugally cast (spun) CI spigot and socket soil, waste and ventilation pipes, fittings and accessories
   - (h) Ball valves (Horizontal plunger type) including floats for water supply purposes.
   - (i) Cast iron manhole covers and frames.
   - (j) Plastic WC seats and covers.
   - (k) Pillar taps
   - (l) Vitreous China sanitary appliances
     - (i) Wash down water closets.
     - (ii) Squatting pans.
     - (iii) Wash basins.
     - (iv) Foot Rests.

7. **ELECTRICAL WORKS**
   - (a) Ceiling rose.
   - (b) Switches
   - (c) Socket outlet 3 pin plug and socket.
   - (d) Switch fuses (Main Switches).
   - (e) Rigid steel conduit.
   - (f) Single core cable polyethylene insulated and PVC sheathed cable.
   - (g) Starter for tube light.
   - (h) Fluorescent lamps.
   - (i) ACSR conductor.

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13.5 A list of items/ articles commonly available in market and which are superior to IS marked items is given below: (Items which are not applicable / required in this contract shall be deemed to have been deleted.)

(a) Glazed Ceramic earthenware tiles.
(b) AC rain water pipes.
(c) Paint synthetic Enamel.
(d) Distempers (Oil emulsion and dry type).
(e) Chromium plated cast copper alloy Fancy type bib taps, stop valves and pillar taps.

13.6 The tenderer is advised to inspect samples of materials which are displayed in the sample room in the office of CE Pune Zone/ 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 whether he has actually inspected them or not. The materials to be incorporated in the work by the contractor shall conform to, or shall be superior in quality to, samples displayed and shall comply with the specifications, mentioned in particular specifications.

13.7 The Contractor shall not procure materials in bulk unless the samples are approved by the Garrison Engineer in writing.

13.8 The quantity of materials such as paint, water proofing compound, chemicals for anti-termite treatment, bitumen and the like (as applicable) and directed by the Engineer-in-Charge, the quantity of which cannot be checked after incorporation in the work shall be recorded in the Measurement Book as “NOT TO BE ABSTRACTED” and signed by the contractor and the Engineer-in-charge as a check to ensure that the required quantity had been brought to site for incorporation in the work. The materials brought to site shall be stored as directed by the Engineer-in-charge and those already recorded in the Measurement Book shall be suitably marked for identification.

13.9 The Contractor shall ensure as far as practicable that the materials are brought to site, in original sealed containers/ packing, bearing manufacturers marking except in the case of the requirement of materials being less than the smallest available commercial packing.

13.10 The Contractor shall produce original receipted purchase vouchers/bills alongwith Test Certificates wherever applicable in respect of supplies for the following items (as applicable) to the Engineer-in-charge in addition to any other items as directed by Engineer-in-charge alongwith RAR against claim for material lying as site raised in the RAR. Production of original voucher is mandatory in case of claim against material lying at site & also when demanded by GE: -

(a) Water proofing compound.
(b) Chemicals for anti-termite treatment.
(c) Paint, distempers and cement base paints.
(d) G I and CPVC Pipes and fittings.
(e) Sanitary fittings and fixtures.
(f) All grades of bitumen.
(g) Steel windows / ventilators.
(h) Factory made Panelled door shutters.
(i) Floor/ dado/ skirting tiles.
(j) Builders Hardware.
(k) Salt glazed stone ware pipe.
(l) Electrical fittings, fixtures, cables, conductors, equipment, etc.
(m) Steel reinforcing bars and structural steel which are not issued under Sch `B’.
(n) Cement.
(o) CI pipes.
(p) PVC pipes
(q) DWC pipes.
(r) Precast Manhole cover slabs.
(s) Cast Iron Steps (Rungs).
(t) Any other proprietary articles.

13.11 The purchase documents shall be endorsed, dated and initialled by the Engineer-in-charge duly verified giving contract number and name of work. A certified true copy of each of such

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documents shall be kept on record.

14.0 **NET WORK ANALYSIS**

14.1 The time and progress chart to be prepared as Condition 11 of IAFW-2249 (General Condition of Contracts) shall consist of detailed network analysis and a time schedule. The critical path network will be drawn by the contractor & to be submitted for approval of GE through Engineer-in-charge soon after but before the date of commencement as per work order No.1. 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 calendar date schedule will be submitted in four copies within two weeks from date of handing over the site.

14.2 During the currency of the work the Contractor is expected to adhere to the time schedule and this adherence will be one of the main parameters of the Contractor's performance under this contract. During the execution of the work the Contractor is expected to participate in the reviews and updating of the network as and when called for by the GE. These reviews may be undertaken at the discretion of the GE either as a periodical appraisal measure of when the quantum of work ordered on the contractor is substantially changed through deviation orders or amendments. Any revision of time schedule as a result of the review will be submitted by the Contractor to the GE within a week for his due scrutiny and approval.

14.3 The Contractor shall adhere to the revised schedule thereafter. In case of Contractor disagreeing with the 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.

14.4 The Contractor shall mobilise and employ sufficient resources to achieve the detailed schedule within the broad framework of the accepted method of working and safety. No additional payment will be made to contractor for any multiple shift work or other incentive methods of achieving the target dates.

15.0 **RECORD OF CONSUMPTION OF CEMENT**

15.1 For the purpose of keeping a record of cement consumed in the works, the Contractor shall maintain a pucca bound register with serially numbered pages duly initialled by Engineer-in-Charge, showing daily receipt, quantity used in works and balance in hand at the end of each day. This register shall be signed daily by the Contractors representative and MES representative in token of their verification of its correctness. This register shall be checked by Engineer-in-Charge at least once in a week and on the day, cement is brought by the contractor.

15.2 The register shall be kept at site in the safe custody of the Contractor during progress of the work and he shall on demand produce the same for verification of inspecting Officer. On the completion of the work, cement register shall be handed over to the Engineer-in-Charge for record with MES.

16.0 **VALIDITY OF TENDER:** This tender shall remain open for acceptance for a period of **90 days** (**Ninety days) commence from the next date subsequent to last date of bid submission.**

17.0 **VALUATION OF DEVIATIONS:** Condition 62 of General Conditions of Contracts (IAFW-2249) shall be referred.

18.0 **OFFICIAL SECRET ACT** : In reference to Condition 2-A of General Conditions of contracts IAFW-2249, the Contractor shall be bound by the Indian Official Secret Act 1923 and particularly, section 5 thereof.

19.0 **CONTRACTORS PLANTS/EQUIPMENT AT SITE:** The Contractor alongwith his labour return shall furnish to the Engineer-in-Charge every morning distribution return of his plants/equipments on the site of work stating full particulars, capacity, make etc.

20.0 **DAMAGE TO EXISTING WORK:** Any damage done to any existing structures, underground cable, pipe lines road surfaces, drains and fixtures etc. during execution of works shall be made good by the contractor at his own expense. Rectification, reinstatement, making good and touching

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up shall be carried out according to the materials and workmanship originally provided and to the entire satisfaction of the GE.

21.0 **PRODUCTION OF VOUCHERS FOR MATERIALS**

21.1 Contractor shall produce original purchase vouchers/Invoices challans along with Test Certificates wherever applicable from the manufacturers and or their authorized agents for the full quantity of the materials as applicable as a pre requisite document for payment for advance on account of materials collected, in accordance with Condition 64 of IAFW-2249, General Conditions of Contracts alongwith RAR. However, vouchers in respect of cement, steel, major E/M equipments e.g. Transformers, DG sets, pumps, motors, AC and all equipments shall be submitted invariably.

22.0 **ADVANCE ON ACCOUNT OF MATERIALS APPLICABLE TO CONTRACTS WHOSE ESTIMATED COST AT MARKET RATE EXCEEDS RS. 50 LAKHS**.

(Also refer Condition 64 of IAFW-2249)

22.1 For the purpose of such contracts, the following shall be deemed to be added in continuation of para 5 of Condition 64 of IAFW-2249 : " provided further the contractor may be paid advance on account to the full value of the under mentioned materials brought on the site, on his furnishing guarantee bond in the prescribed form from a schedule bank for the amount of the retention money which should otherwise be recoverable from him under the contract.

(a) Factory made panelled shutter
(b) Steel windows/ ventilators
(c) PVC soil/ waste/ vent pipes, nahani traps/ Gully traps
(d) Builders' hardware (Iron mongery)
(e) Cement tiles, terrazzo tiles, Shahabad stone tiles, Kota stone tiles, granite stone, marble stone, Non-skid ceramic tiles and other floor tiles
(f) Water supply pipes and fittings/ fixtures
(g) Electric tools/ wire/ fittings/ fixtures
(h) Pressed steel door frames
(i) Sanitary fittings
(j) DWC pipes.
(k) Precast Manhole cover slabs
(l) Cast Iron Steps (Rungs)
(m) Any other non- perishable materials as decided by GE.

22.2 The bank guarantee bond (s) shall be executed for a minimum period of six months and on a form as directed by the Accepting Officer. The contractor shall further arrange to extend the period of guaranteed bond (s) as and when necessary, and as directed by the Accepting Officer or shall furnish fresh guarantee bond (s) if any when necessary and as directed by the Accepting Officer of similar value in lieu.

22.3 It shall be noted that, advance on account of the full value of materials brought to the site is permissible only in respect of fittings and fixtures and either manufactured item which do not loose their identity after incorporation in the works. Materials like bricks, aggregate, precast concrete and similar items are not be taken in the list.

22.4 Refer condition 64 of IAFW 2249. The contractor may at interval of not less than **15** days submit claims for payment of advances on account of work done on IAFW 2263.

23.0 PERFORMANCE SECURITY AND REFUND OF PERFORMANCE SECURITY

23.1 (A) PERFORMANCE SECURITY

(a) 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 of an amount equal to **5%** of the Contract sum:

i) A Bank Guarantee in the prescribed form.
ii) Government securities, FDR, Insurance Surety Bonds or any other Government instruments stipulated by the Accepting Officer.

23.2 If the Performance Security provided by the successful Contractor in the form of 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.

23.3 The period of validity of the Bank Guarantee Bond against Performance Security shall be

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initially valid upto stipulated date of expiry of Defects Liability Period plus minimum 60 days beyond that. In case final bill is not paid during this period, the contractor shall get the validity of performance guarantee extended to cover such enlarged time required for payment of final bill.

23.4 Failure of the successful Contractor to comply with the requirements of sub clause 23.1 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 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 unenlisted Contractors. In case of MES enlisted contractor, issue of tenders shall remain suspended till deposit of EMD or six months from date of cancellation whichever is later.

(B) **REFUND OF PERFORMANCE SECURITY**

The Performance Security Deposit mentioned in Condition 19 of IAFW-2249 will be refunded to the Contractor after the expiration of the Defects Liability Period (stipulated in Special Condition 38.0) 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).

24.0 **- Blank -**

25.0 **ACCEPTABLE QUALITY OF WORK AND FINISHES**

To determine the acceptable standard of workmanship, the Garrison Engineer may order the Contractor to execute certain typical portion of works and services such as some length of wall, portion of different type of floors, plaster, pointing, painting any other finished/items, sanitary fittings, plumbing, electrical fittings etc under strict and constant supervision of MES staff and label these works as guiding samples so that further works shall be executed to conform these samples.

26.0 **WATCH, WARD AND LIGHTING**

26.1 The Contractor shall provide and maintain all necessary watch, ward and lighting arrangements to keep the traffic off the trenches. Necessary boards and sign posts shall be provided and set up to the entire satisfaction of the Engineer-in-charge.

26.2 The Contractor shall reimburse the loss to the Govt. on account of any damage, that may occur on this account.

27.0 **PRECAUTION AGAINST RISKS**

The Contractor shall be responsible at his own expense in taking precaution to prevent any damage from what so ever cause arising, other than out of accepted risks and to minimize the amount of any such loss or damage and for adoption of necessary protective measures required for the purpose in compliance with Condition 38 of IAFW-2249 and Rule 5 of the MES SAFETY CODE vide (Annexure `B') of IAFW-2249 until the works have been handed over duly completed to the Engineer-in-charge.

28.0 **CLEANING DOWN**

Refer Condition 49 of IAFW-2249 General Conditions of Contracts. The Contractor shall leave the whole premises clean and tidy before handing over the works.

29.0 **APPROACHES**

The Contractor shall provide at his own cost all temporary approaches to the site (where not existing) for the use of his labour and transport of materials, tools and plants.

30.0 **OUTPUT OF ROAD ROLLER**

30.1 In reference to Condition 15 of General Conditions of Contracts IAFW-2249 (1989 Print) a log book for each road roller shall be maintained by the contractor for recording hours of working of road roller. Entries in the log book shall be signed by the contractor or his authorized representative and by the Engineer-in-Charge.

30.2 To ensure proper consolidation, Road rollers must work for at least the number of days assessed on the basis of output given hereunder. If the road roller has not worked for the number of days falling short of the days assessed on the basis of output stipulated. The recovery shall be at Rs. 2000/- per working day (8 hours).

30.3 The output of Road Roller required for the work for different items are as under: -

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Sl No	Item of work	Output per day of 8 hours work
(i)	Consolidation of formation surfaces/sub grade	1850 Sqm
(ii)	Consolidation of soling (bottoming) of crushed or broken stones, spread thickness 150 mm.	800 Sqm
(iii)	All as per (ii) above but 200 mm	600 Sqm
(iv)	All as per (ii) above but 230 mm	518 Sqm
(v)	Consolidation of water bound macadam using stone stone metal, 7.5 cm thickness of each layer.	372 Sqm
(vi)	All as per (v) above but 10 cm thick	248 Sqm
(vii)	Consolidation of 40 mm thick Asphaltic dense/Semi-dense concrete with seal coat.	300 Sqm
(viii)	Consolidation of 25 mm thick premixed Carpet with seal coat.	600 Sqm
(ix)	All as per (viii) above but 20 mm thick	744 Sqm
(x)	Consolidation of Bituminous macadam	15 Cum
(xi)	GSB consolidation 250mm thick	500 Sqm
(xii)	WMM consolidation 250mm thick	100 Sqm

Note: For the thickness other than given above, the output shall be calculated on proportional basis. The output of road roller other than above shall be as per MOST specifications.

30.4 The above provision shall not however absolve the contractor of his responsibility of properly consolidating surfaces as required under the provision of the contract.

31.0 **SECURITY OF CLASSIFIED DOCUMENTS**

31.1 Contractors special attention is drawn to Condition 2-A and 3 of IAFW-2249 (General Conditions of Contracts). The contractor shall not communicate any classified information regarding the works, either to sub-Contractor or others, without the prior approval of the Garrison Engineer. The Contractor shall also not make copies of the design / drawings and other documents furnished to him in respect of the work and he shall return all documents on completion of work or earlier on termination of the contract. The contractor shall alongwith the final bill attaches a receipt from the Engineer-in-charge in confirmation of his having returned the classified documents as per Condition 3 of IAFW-2249.

32.0 **MINOR CONSTRUCTION DETAILS:**

32.1 Lump sum /rates quoted by the Contractor shall be deemed to allow for all minor constructional details which are not specifically shown on drawings or given in the Particular specifications but are essential and finally intended for the execution of work and services in workmen like manner and sound construction. In case opinion between contractor and GE, as to whether or not certain items of works constitutes “Minor constructional details” which is deemed to have been included in the Contractor’s quoted lump sum / rate the decision of the Accepting Officer shall be final, conclusive and binding.

33.0 **ESTABLISHMENT OF SITE LABORATORY (MANDATORY FOR CONTRACT WHOSE ESTIMATED COST AT MARKET RATES IS ONE CRORE AND ABOVE)**

33.1 **Testing of Materials**

33.1.1 All the materials to be incorporated in the work shall be subject to quality control tests as per the testing procedure and frequency as laid down in relevant IS and as indicated in the tender.

33.1.2 Irrespective of whatever is indicated elsewhere in the tender documents the modalities of testing arrangements shall be as given here in after.

33.1.3 The Contractor shall set up a site laboratory fully equipped to the satisfaction of GE to carryout the ‘A’ type tests as given in Appendix ‘D’ to the tender documents. The Garrison Engineer shall be at liberty to increase frequency of the tests and also to get additional tests done depending upon the nature of work without any price adjustment on this account. In addition, GE may also get certain random tests carried out independently in Govt Engineering College (Degree)/National Test House/Command testing laboratory Pune or any other NABL accredited laboratory/Govt.approved

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Lab. The expenditure for such test shall be borne by department but cost of samples shall be borne by Contractor. The laboratory shall be set up in all respects before any activity requiring tests as indicated above is physically commenced. Contractor shall employ a competent person technically qualified and approved by the GE to conduct all applicable tests. All the tests shall be carried out in the presence of Engineer-in-Charge and records shall be jointly signed by the Contractor and Engineer-in-Charge to ensure that the tests have been carried out all as per laid down procedure and meets the requirements of CA.

33.1.4 Entire cost of establishing laboratory and its functioning including cost of samples will be borne by the Contractor in all respects and no separate recovery for testing charges shall be effected from Contractor for tests/retests carried out at site laboratory. However if in the opinion of GE (whose decision in this regard shall be final) any of the tests as given in appendix 'D' to these specifications cannot be satisfactorily carried out in the site laboratory at any stage due to any reason, the same shall be got done in Command testing laboratory Pune/Govt approved lab/Engineering college/National Test House/SEMT Wing Pune as approved by GE in respect of which all expenditure thereof shall be borne by the Contractor. Recovery shall also be effected from the Contractor for less number of tests carried out than specified.

33.1.5 All testing Equipments to be installed in site Laboratory for conducting the tests shall meet the applicable IS requirements and shall be got approved by GE. Contractor shall also ensure periodical calibration of testing Equipments. All administrative and technical arrangements to conduct applicable tests at site shall be done by the Contractor without any additional cost to the department. The equipments to be installed by the contractor in site for conducting the 'A' type tests as given in Appx' D' are listed below: -

Sl No	Description
1.	Liquid limit device
2.	Soil Densities (a) Core Cutter (b) Sand replacement
3.	Proctor compaction apparatus
4.	Rapid moisture meter
5.	Hammer 4.89 kg for heavy compaction
6.	Sand bath apparatus
7.	Sieve sets (0.075 mm to 80 mm) (0.075, 0.150, 0.300, 0.600, 1.18, 2.36, 4.75, 10.00, 12.5, 16.0, 20.0, 25.0, 40.0, 63.0, 80.0.
8.	Cube moulds 15x15x15 cm -09 Nos
9.	Slump cone, Tamping rod
10.	Vicat's Apparatus
11.	Bulk density apparatus
12.	Measurement cylinder 25 ml, 100 ml
13.	(a) Electric oven (b) Field oven heated with oil stove
14.	Weigh balance (a) 250 gms (b) 10 kg
15.	Moisture Meter
16.	Thermometer (a) Digital (b) Bitumen
17.	Slump test apparatus
18.	(a) Compression testing machine (b) Flexural strength testing attachment
19.	Stop watch
20.	Balance 20 kg
21.	Specific gravity bottles (a) 50 ml (b) 100 ml
22.	Any other equipment as required by Engr- in- Charge

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33.1.6 Any tests marked as type 'A', 'B' or 'C' in appendix 'D', if got done at Govt Engineering college (Degree)/SEMT Wing/National test house/Command testing laboratory Pune/CSRL, or any other NABL accredited laboratory/Government approved Lab, testing charges as indicated against them will be recovered from the contractor. In addition to this, the contractor shall arrange for samples and its handling/transportation to the concerned labs at his own cost.

33.1.7 The tests marked as type 'B' and 'C' in Appendix 'D' will not be carried out in the site laboratory. These tests shall be carried out only in CTL/Govt Engineering College (Degree)/ CSRL/SEMT Wing/National test house or any other NABL accredited lab/Govt approved Lab as approved by the GE. Incase of type 'B' and 'C' testing is done in Command testing laboratory Pune/SEMT wing the testing charges shall be recovered from Contractor at rates as indicated in the appendix 'D' against each test. However, if testing is done in other places as given above the actual cost will be directly borne by the Contractor.

33.1.8 In case Contractor fails to carry out the requsite tests at the site laboratory, the tests shall be carried out in Govt Engineering college (Degree)/SEMT Wing/National test house/Command testing laboratory Pune and cost towards the same shall be borne by the contractor. However, the recovery shall be effected from Contractor at rates indicated in Appendix 'D'.

33.1.9 The Contractor shall construct suitable shed accommodation for establishing the site lab at a place as directed by GE.

33.1.10 After the work is completed and completion certificate is issued by GE, the shed/ accommodation for site lab shall be demolished, and the site shall be left neat and clean. The demolition and removal of materials shall take place after the written permission of GE. The Contractor may set up site laboratory for works costing less than one crore at his option.

34.0 **QUALIFIED TRADEMEN: (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)/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 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, leading to unsatisfactory workmanship, the contractor shall make good the defective work to the entire satisfaction of GE without any extra cost to Govt and also 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's decision whether a particular tradesmen processes requisite qualification, skill and expertise commensurate with nature of work, shall be final and binding. No compensation whatsoever on this account shall be admissible.

35.0 **PERFORMANCE EVALUATION OF CONTRACTS**

35.1 Performance evaluation of the works shall be carried out at following laid down stages of the work. The contractor shall give on-site presentation in this evaluation to the Accepting Officer himself in, presence of CWE, GE, AGE, Staff Officers of CEs. These shall also be attended by representatives of CFA, PMG, user, audit and references quoted in the minutes of meeting (MoM), which shall be issued by the CE.

(a) **First Evaluation**

(i) First evaluation shall be carried out at the end of mobilization but not later than two months from date of commencement of work indicated in the work order No-1. The Contractor and GE shall finalize the works programme (CPM or PERT or any other method mentioned in CA) which shall be discussed threadbare, during the meeting. The following shall be ensured and bottlenecks removed: -

(aa) Clear approach to the site.
(ab) Availability of clear site.
(ac) Site preparation for dumping of building material such as hard standing/bins.
(ad) Cordon-off of the work site with due regard to security, environment, dust pollution etc.

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(ae) Hindrances such as trees and building to be demolished, if any.
(af) Contrasting/conflicting provisions of CA and drawings if any to be highlighted by the contractor.
(ag) Site documents to be maintained including Hindrance Register.
(ah) Site office, labour camp, adherence to the Labour laws including safety measures.
(aj) Verification of soil data, earthwork levels, design mix and confirmation of design parameters.
(ak) Setting of Test Lab at site.
(al) Details of engineers employed. They will be present on site and their employment/contract papers with the contractor will be verified.
(am) The minutes of the evaluation shall be recorded and signed by the Accepting Officer, CWE and GE as well as the Contractor attending the meeting. This shall become the action plan agreed to by both the parties and will be contractually binding.

(b) **Second/Intermediate Evaluation**

Contracts having period of completion more than twelve months shall have these meeting at intervals of every six months from the date of commencement indicated in Work Order No1. These shall be held at the work site on a date fixed well in advance to ensure presence of all concerned. This meeting shall be attended by the Accepting Officer, CWE, GE, AGE, representatives of CE's office, Contractor and the PMG. The present progress of work and reasons for any delay shall be analysed and time-bound action plan to remove any encumbrances/bottlenecks discussed in detail. In case extension of time is contractually and circumstantially due, it shall be deliberated upon. The following action under the contract conditions shall be taken: -

(i) Grant extension of time, as is logically and contractually due, within 15 days of the meeting for the reasons of delay seen in these evaluations. The Accepting Officer shall categorically, simultaneously reply to the Contractor intimating him reasons of delay and days of extension considered due or not due.
(ii) In case extension is not due, contractor shall be informed by the Accepting Officer in writing.
(iii) The evaluation meeting done at about 50% of completion period or near thereto, shall be decisive on whether contract will be heading towards completion or failure thereof within stipulated date/extended date.
(iv) Progress achieved at end of six months to be compared to adjusted CPM/PERT for analysis of trend working.

(c) **In addition, the following shall be finalized and confirmed**

(i) Deviations and approval in principle for all changes viz changes by users, technical requirement, change in design, etc and any other pending decisions shall be dealt with and decided there itself. Nothing will be kept pending beyond maximum one periodic evaluation.
(ii) All formal paper work related to contractual decisions pending till date shall be completed one month prior to the evaluation.

(d) **Evaluation one month prior to original/extended date of completion**

Like six monthly meeting mentioned above, this meeting will evaluate progress achieved one month prior to original date of completion vis-à-vis extended date of completion. In case progress is not satisfactory on account of the Contractor's deficiencies, these will be informed of decision of compensation leviable from original or extended date of completion and contract may be considered for cancellation on expiry of extended date of completion. However, if extension is again considered due, the same shall be granted and fresh completion date shall be fixed. This exercise shall continue till contract is completed or cancelled.

(e) **Final Evaluation**

Final evaluation shall be held at work site one month after actual date of completion. This meeting shall be attended by the Accepting Officer, CWE, GE, AGE and the Contactor. The progress of pending issues if any shall be analysed and timelines arrived at in detail for ensuring preparation and submission of final bill by the contractor within three months from the date of completion.

Note: -The performance evaluation shall be carried out for contracts of value more than Rs. 5 Crore by CEs Zone. For contracts below Rs. 5 Crore concerned CWE will do the performance evaluation in respect of CE's contracts and send the report to CE Zone for his perusal and approval.

36.0 **RECORD DRAWING & PSMBs**: -

SPECIAL CONDITIONS

The Contractor shall submit four sets of digital record drawings of buildings/structures & one set of PSMBs duly recording quantities of items required for the periodical maintenance of buildings/structures duly signed by the contractor & concern AGE to the GE immediately alongwith completion letter of work. The Lumpsum amount quoted for Schedule 'A' Part I is deemed to be included for this provision.

37.0 **DEFECTS LIABILITY PERIOD (Refer Condition 46 of IAFW-2249)**

Defects liability period for this work shall be 24 (Twenty-Four) months.

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

38.1 The rates quoted by the Contractor shall be deemed to be inclusive of all taxes (including GST on materials, GST on works Contracts, Turnover Tax, Labour welfare cess/tax etc), Royalties and other levies payable under the respective Statutes. No reimbursement/refund for variation in rates of taxes, Royalties and other levies, and/or imposition/abolition of any new/existing taxes, Royalties, and other levies shall be made except as provided in 38.2 herein below.

38.2 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 GST on works Contracts, 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 last due date for receipt of tenders. Any increase in percentage rates of "taxes directly related to Contract value" with reference to prevailing rates on last due date for receipt of tenders 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 last due date for receipt of tenders 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 last due date for receipt of tenders shall be reimbursed to the Contractor and abolition of any "taxes directly related to Contract value" prevailing on last due date for receipt of tenders shall be refunded by the Contractor to the Govt/deducted by the Govt from the payments due to the Contractor.

38.3 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 there of 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. The Contractor shall submit the other documentary proof/information as the GE may require.

38.4 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 duly authorised 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.

38.5 Reimbursement for increase in percentage rates/imposition of "taxes directly related to Contract value" shall be made only if the Contractor necessarily and 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".

39.0 & 40.0 -**Blank-**

41. **DISPUTE RESOLUTION BOARD (DRB) (Condition 71 of IAFW 2249 General Conditions of Contracts Refers) (Applicable for all contracts of value more than Rs.10 Crores)**

41.1 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 is 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.

SPECIAL CONDITIONS

41.2 The Constitution of the DRB shall be a three number body as under: -

(i) Chairman: Joint DG (Contracts) of the concerned Command Chief Engineer. Where Jt DG (C) is not posted in the Comd, any Other Chief Engineer /Brig level Offr posted in CE Comd shall be nominated by Comd CE at his sole discretion.

(ii) Member 1 } Col/Director rank officers of Comd CE or of any other Zonal CE to be nominated by Comd CE.

(iii) Member 2 }

41.3 The name of chairman and members shall be notified by the Accepting officer within one month of the date of acceptance of contract.

41.4 Once the DRB is constituted the members and Chairman shall disclose in writing their neutrality and impartiality about any personal interest in the work.

41.5 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.

41.6 The DRB shall decide the dispute in accordance with the terms of the contract, principle of natural justice, equity and fair play.

41.7 The DRB may fix oral hearing at a place, date and time as decided by the Chairman.

41.8 The requisite administrative support to the DRB shall be provided by the Accepting Officer.

41.9 All the contract documents pertaining to the case shall be provided by the Accepting Officer for reference by the DRB.

41.10 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.

41.11 All the decisions given by the DRB shall be by majority and such decisions shall be communicated in writing by Chairman to the parties.

41.12 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.

41.13 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.

41.14 The mandate of the DRB shall terminate on completion of one year from the date of completion/determination/cancellation/termination of the contract.

41.15 If any member or Chairman of the DRB is unable to function due to any reason whatsoever, or he resigns his appointment, Chief Engineer Command as the case may be, shall fill the vacancy so caused within 15 days of happening of such vacancy.

41.16 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.

41.17. 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 12 above.

41.18 Findings and decision of DRB shall be admissible as evidence, to the extent permissible as per law, in the subsequent Arbitration and/or litigation.

41.19 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.

SPECIAL CONDITIONS

41.20 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/cancelation/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.

41.21 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 (Contract), 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.

42. **ENGINEER ESTABLISHMENT**:

Refer condition-25 of General Conditions of Contract IAFW-2249 for supervision of work at site. Contractor shall employ the following Engineers. This provision shall be applicable irrespective of whether contractor himself is a qualified Engineer or not: -

(a) Three Graduate Engineers from a Government recognized Institution with minimum experience of 5 years. One of the engineers should have capability to use Project Management Software like MS Projects/ Primavera in all Projects.

(b) Five Diploma Engineers from Government recognized Institutions with minimum experience of 8 years.

Signature of Contractor **Asst Dir (Contracts)**
Dated: **For Accepting Officer**

PARTICULAR SPECIFICATIONS

1.0 GENERAL

1.1 Work under this contract shall be carried out in accordance with Schedule 'A', Special Conditions, Particular Specifications, drawings including notes thereon (unless specified otherwise) and general rules and specifications given in MES SSR Part I–2009 as well as general rules, Special Conditions and preambles to the various rates given in MES SSR Part-II: 2020 (MES SSR Part-I and Part-II hereinafter called MES Schedule).

1.2 The term 'General Specification' referred to hereinbefore as well as referred to in IAFW-2249 (General Conditions of Contracts) shall mean the specifications contained in the MES Schedule Part I.

1.3 General Rules, Specifications, Special Conditions, method of measurements, preambles in the MES Schedule shall be deemed to be applicable to the work under this contract, unless specifically mentioned otherwise in these documents.

1.4 The term "as specified", wherever appears in tender documents and drawings, relates to relevant particular specifications and in its absence general specifications.

1.5 Particular specifications in this section given hereinafter shall be generally applicable to all works covered under Schedule A' /BOQ. The particular specifications are brief and are only to particularize, amend and emphasize the specifications given in MES Schedule, which are not repeated.

1.6 Where specifications/provisions given in these particular specifications are at variance with the provisions/specifications given in MES Schedule, specifications/provisions given in these particular specifications, hereinafter, shall be followed.

1.7 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 or Code of practice shall be followed.

1.8 The drawings forming part of these tender/Contract documents are listed here-in-after. All these drawings and in addition any other drawing if referred in any of the documents forming part of this contract, the same shall be deemed to form part of this contract, though the same may not have been enclosed. The tenderers are instructed to inspect the said drawing (s) in the office of GE/CWE/CE and consider the details included therein while quoting his offer. Irrespective, whether the tenderers have inspected the said drawing (s) or not, it shall be considered that the said drawing (s) deemed to have inspected and the contractor is not entitled for any claim of whatsoever nature on this account.

1.9 The buildings/structures have been designed based on bearing Capacity of Soil indicated on drawings. In case of change in SBC at site during execution, GE shall refer the case to the Accepting Officer for revision in design, if any.

2.0 LAYOUT

2.1 In laying out buildings Centre line dimensions mentioned in the drawings or reduced there from shall be strictly followed.

3.0 MATERIALS

3.1 All materials to be supplied by the contractor for incorporation in work shall conform to relevant specifications/IS.

3.2 In case specification of materials needed for incorporation is not contained anywhere in the contract documents, the specification of such materials proposed to be incorporated in work shall be got approved in writing from the GE before incorporation in the work. Contractor is advised to check availability, lead, time of procurement from these suppliers before quoting.

3.3 As far as practicable all manufactured articles other than those manufactured in contractor's workshop at site shall bear ISI certification mark and which are readily available in the market and are given in Special Condition. It is mandatory for the contractor that ISI certified marked items/ articles as listed therein shall only be incorporated in the work. Names of manufactures/ suppliers of certain items/ materials is given in **Appendix 'C'**

PARTICULAR SPECIFICATIONS (Contd…)

The Contractor is advised to check availability lead time of procurement from these suppliers before quoting.

3.4 Materials such as stone aggregate, sand, lime etc shall generally conform to the sample kept in GE's office in addition to their conformity with relevant specifications given in the tender documents. The samples of such materials shall be got approved from GE in writing before the materials are brought at site in bulk. The contractor shall submit samples of materials to GE through Engineer-in-Charge for approval.

3.5 Letters conveying approval of samples/materials by GE will interalia mention source of supply/name of manufacturer, trade name/brand (if applicable) and reference to clause of the tender documents containing specification of particular materials.

3.6 The contractor and executives will ensure that the materials incorporated in the work are identical with the approved samples.

4.0 **EXCAVATION AND EARTHWORK**:

4.1 **PREPARATORY WORK/ SITE CLEARANCE**

4.1.1 Before commencement of excavation work, the contractor shall take the existing ground levels of the entire site at an interval of 3.00 m grid. Permanent bench marks at floor level of existing permanent buildings or any permanent structures shall be taken and permanently marked. Intermediate bench marks as required shall also be marked in the existing or any permanent structures and recorded for reference purpose. Photographs showing these marks shall be taken and kept on record.

4.1.2 The level sheets shall be prepared for each building site in separate level sheets showing original ground levels at 3 m grid intervals. Building location shall be marked on these level sheets showing the proposed GL to be achieved for construction of building/Structures. The proposed finished GL (after cutting or filling) shall be finalized, in such a way that earth work in cutting/filling are balanced.

4.1.3 Proposed GL and FFL for each building and external services such as roads, culverts, sewage disposal, area drainage and information such as invert level of manholes, drains, culverts etc, required for proper execution of the work shall also be marked in the level sheet in different colours for easy identification. Calculation of approximate quantities of filling and cutting shall be worked out separately taking the average GL for filling/cutting areas and considering the proposed GL to be achieved. Approximate quantities shall be worked out based on average levels at this stage for obtaining approval of building levels/ layout expeditiously. However, after execution of work for the purpose of payment final calculation for arriving the quantity of earth work shall be worked out using Simpson's formula.

4.1.4 Detailed photographs of site shall be taken including permanent/intermediate bench mark locations and prints made for record showing the existing site duly marking the layout of buildings with flags on all boundaries/four corners.

4.1.5 Level sheets as described here in before duly signed by both parties i.e., Engineer-in-Charge, GE and the contractor shall be submitted duly countersigned by CWE to the Accepting Officers for approval.

4.1.6 Final decision of the Accepting Officer on proposed levels shall be decided based on the quantities so calculated. Existing ground levels will not be altered till written approval of Accepting Officer on the levels to be followed is given, based on the level sheets and calculation of approximate quantities of earth work submitted as above.

4.1.7 Finalisation and approval of building levels shall be completed as Phase-I of the work within a period of 02(Two) months as per phasing given under Sch 'A' Notes. Accordingly, the level sheets as mentioned here-in-before shall be submitted to Accepting Officer for approval

PARTICULAR SPECIFICATIONS (Contd…)

within 03 weeks prior to the completion period of 02 (Two) months for Phase-I, leaving adequate time for scrutiny and approval.

4.1.8 The cost of above shall be deemed to be included in the lumpsum quoted for the entire work."

4.2 **SURFACE EXCAVATION**

4.2.1 Before starting excavation work, the contractor shall carry out surface excavation in any type of soil not exceeding 30 cm deep and averaging 15 cm (average) deep surface excavation in any type of soil and removal of vegetation, including grubbing of roots etc for the area covered by buildings, aprons, plinth protection and 3 meters beyond outer edge of plinth protection and removing the same to a distance exceeding 250 but not exc. 500 metres. The levels shown on drawings are ground level after surface excavation. The site shall be dressed to slope away from the structure. Lump sum amount quoted by the contractor against works covered under Sch 'A' Part-I shall include this aspect while quoting their offer.

4.2.2 Surface excavation shall be carried out before the excavation for foundation is started.

4.2.3 Depth of foundation shown in drawings for the buildings is the depth after surface excavation. GL marked on drawings shall be average GL as fixed by GE after surface excavation.

4.3 **EXCAVATION**

4.3.1 **Lump sum /Unit Rate quoted by the Contractor against works covered under Schedule `A' Part-I shall include cost of excavation and earth work in Black Cotton Soil (Soft/ loose soil) not suitable for back filling upto average 0.60 m and further in any kind of soil (except BC soil). Any change in strata during excavation than mentioned hereinbefore shall be regularized through a deviation order. In case of deviation, rate of excavation as per relevant items of SSR Part-II shall be considered in OMIT part of deviation order adjusted by percentage quoted by the tenderer for Schedule 'A' Part-I**

4.3.2 **The pricing for excavation and earthwork shall be based on the rates applicable for mechanical means of excavation, regardless of whether the contractor carries out the work manually or by mechanical means. The bidder shall quote rates accordingly. No additional payment or compensation shall be admissible on this account.**

4.3.3 **For earthwork excavation in trenches/drains under SSR Item No. 03009C, the corresponding rates of Item No. 03009B shall be applicable for each additional 1.5m or part thereof in depth beyond the initial 1.5m.**

4.3.4 Decision of the Garrison Engineer shall be final, conclusive and binding as regards classification of soils and rocks.

4.3.5 Excavation shall be done to the depth as shown on drawings/as required at site and as directed by Engineer-in-Charge for Schedule `A' Part-I. The excavation shall be restricted to dimensions shown on the drawings and as specified in MES Schedule. Excavation made, if any, in excess of required depth/width shall be made good by the Contractor with cement concrete 1:7:12 type F2 without extra cost to the Government.

4.3.6 Before execution of excavation works for Schedule `A' Part-I, it shall be ensured that the Soil Investigation to be carried out to ascertain the SBC at the given location. The cost of the same shall be included in the sum quoted by tenderer.

4.3.7 **Due to presence of very high swelling characteristic soil, the same shall be removed as specified above to any distance outside MD land for the entire area of building including plinth protections and 2.0 m projections beyond plinth protection and shall be filled with moorum brought from outside MD land (any lead). The quoted lumpsum shall include this provision including the cost of moorum required to be brought for filling up to MGL as shown in contour plan such excavated area, returning filing and filling in floors etc**.

4.3.8 If hard rock is met with site, contractor shall immediately notify the fact to GE in writing, who will after due verification regularize the change through a proper deviation order. Blasting of

rock is prohibited. It shall be excavated by chisel cutting or by use of mechanical plant or by any other suitable method/techniques which have been evaluated by the Contractor. Payment shall however be made as per respective items of SSR 2020 as per the actual method of excavation in hard rock evaluated by the Contractor.

4.3.9 Excavated hard rock shall be tested for its petro graphical properties to ascertain whether hard rock is 'Manjra' rock (classified under category of hard rock). The BOO shall be ordered by CWE, to test and find whether the excavated rock is Manjra rock or not. All testing charges in this regard shall be borne by contractor only. Pieces of Manjra rock can be easily weathered in to soil form, due to its inherent properties. Hence, if excavated rock is found to be Manjra rock, no recovery shall be made, the same can be used for returning and filling and shall be paid against relevant items of Sch 'A'/BOQ, and otherwise the contractor shall remove the same from site at a distance as directed by the Engineer-in-Charge without any extra cost to the govt.

4.3.10 Stones obtained from excavation in hard rock (if met with during excavation other than by chiselling) shall become property of contractor. The contractor shall pay sum **Rs. 1100/- per cum** of measured quantity of stone obtained in excavation and shall remove it off the site with prior permission of GE / Engineer in charge. No lead shall be payable for removal of stone from site. The contractor may use the stone obtained from excavation in filling under floors or road work if permitted by the GE. In case the excavation is hard rock is carried out by chiselling then the excavation material shall be used in filling as specified hereinafter in floors or road work. The recovery of **Rs. 1100 /- per cum** of stack measurement (without any deductions for void) of hard rock shall be affected from the contractor to the extent of material used in filling. Surplus excavated material shall be disposed of as directed without any extra to govt.

4.3.11 The site was previously occupied by an old structure founded on reinforced concrete piles and pile caps. Although the said structure has been declared unfit and demolished, remnants of piles, pile caps, or other buried concrete obstructions may still exist below ground level.

Excavation in Black cotton soil (Soft/ Loose soil) up to a depth of 4.0 meters and beyond 4.00 meters in ordinary rock is included in the lump-sum scope of work under the relevant excavation item and shall be deemed to cover all normal strata such as earth, sand, silt, clay, gravel, or filled-up soil. No extra payment shall be admissible for excavation in such materials within this depth.

The Contractor shall exercise due care during excavation to identify any remnants of old piles or pile caps. Any such obstruction encountered for placing foundation shall be immediately brought to the notice of the Engineer-in-Charge and shall not be removed or damaged without written instructions.

Removal of any existing reinforced concrete pile, pile cap, or other buried obstruction shall be carried out strictly as directed by the Engineer-in-Charge and shall, inter alia, include.
(a) Careful excavation around the obstruction to expose it safely,
(b) Cutting, breaking, or coring of reinforced concrete by approved mechanical means,
(c) Removal of reinforcement, if required,
(d) Removal and disposal of debris to the approved dumping location,
(e) Backfilling of the resultant cavity with approved soil in compacted layers, and
(f) Sealing or grouting of the exposed concrete surface, where directed.

The quantity of such work shall be measured as the volume of reinforced concrete obstruction actually removed, as jointly recorded before and after removal. The corresponding volume of soil occupied by the obstruction shall be excluded from the measurement of excavation to avoid double payment.

Payment shall be made separately under the item "Removal of Existing Reinforced Concrete Piles / Pile Caps (Composite Item)" at the rate entered in BoQ. The rate shall include all labour, materials, tools, plants, cutting/breaking equipment, dewatering, disposal, and backfilling. No extra payment shall be made for excavation necessary to expose the obstructions, which shall be deemed included in the lump-sum excavation item. No deduction shall be made from the earthwork excavation for the volume of piles or any other buried obstructions which remain in situ and have not been removed. No claim shall be admissible for delay, idling, or loss arising out of encountering such obstructions. All such operations shall be carried out with due precautions conforming to IS Codes, departmental safety regulations, and environmental requirements. Debris shall be disposed of only at approved locations.

4.4 **FILLING**

PARTICULAR SPECIFICATIONS (Contd…)

4.4.1 Soil obtained from excavation (except earth / spoil obtained from surface dressing/ surface excavation) may be used for filling, if approved by Engineer-in-Charge in writing.
Note: In no case Expansive soil shall be used for filling purpose.

4.4.2 Approved soil obtained from excavation (other than BC soil), soft/ disintegrated rock, hard rock etc. as obtained from excavation shall be utilised for returning, filling in as well as for filling under floors and in any other situations after removing big stones, grass, roots, vegetables and other organic matters as directed by GE. The filling shall be well rammed, watered and consolidated in layers all as specified. Any additional earth after utilization of approved soil, if required for filling shall be either moorum or earth considered suitable for filling by GE and shall be brought from outside MD land and from source(s) as approved by GE. The cost of additional moorum or earth, required for filling, brought at site from any lead from outside MD land shall be deemed included in lumpsum amount quoted by the contractor and nothing extra shall be admissible/ paid on this account.

4.4.3 The use of black cotton soil, vegetable soil, turf, mud, peat etc, in filling shall not be permitted.

4.4.4 Hard rock when used for filling shall be duly mixed with approved earth without any extra cost to Govt.

4.5 REMOVAL OF SPOIL

4.5.1 Spoil obtained from excavation, remaining unutilized after filling in foundation trenches / filling under floors or elsewhere or the part/entire excavated soil, if not approved for use, shall be removed and disposed off at a distance exc. 250 m but n. exc. 500 m and deposited where directed at place and in the manner as directed by the Engineer-in-charge. Rubbish shall be cleared away from site from time to time as directed by Engineer-in-Charge.

4.6 DEWATERING

4.6.1 Bailing and pumping of water, if required, shall be done as described in para 3.17 of MES Schedule Part–I. GE shall specifically order the dewatering works in writing and the applicability of deviation, if any, which shall be only if the causes and requirement of bailing and pumping of water are not as per provisions of general specifications included in rates of excavation.

4.7 TIMBERING

4.7.1 Where GE specifically orders timbering to excavation in writing, it shall be considered as a deviation and payable extra.

4.7A EMBANKMENTS:

Work shall be carried out all as per relevant sub paras of clause 3.22, 3.22.1 to 3.22.12 of MES SSR Part I. Levels of existing ground level and final finished levels shall be taken at 1 m internal longitudinal and across section wise. The compaction of earth filling in embankments shall be carried out under optimum moisture content so as to obtain 95% of standard proctor density of each layer and testing of each layer shall be done by contractor to entire satisfaction of GE.

4.7B HARD CORE:

Refer Clause 3.27 of MES Schedule Part-I. Hard core shall be of broken trap basalt/granite stone of gauge not exceeding 63 mm, well graded to provide dense and compact sub grade. Unless otherwise indicated or shown in drawings/specifications, the thickness of hard core shall be 100 mm consolidated. Hard core filling where indicated on drawings shall be spread, levelled in layers not exceeding 15 cm thick well rammed, watered and consolidated. Moorum may be used to fill interstices in hard core. Thickness wherever shown on drawings/schedule of finishes shall be treated as consolidated thickness.

4.8 PRECONSTRUCTION ANTI-TERMITE TREATMENT TO BUILDINGS/STRUCTURES

4.8.1 Antitermite treatment shall be carried out to buildings at Sch ‘A’ Part-I Item No. 1, 2 & 3.

4.8.2 Pre constructional anti termite chemical treatment, which includes treatment of bottom and sides of foundation trenches/pits, filling in trenches/pits, and below floors, junctions of walls and floors, external perimeter of building(s) and surroundings of conduits/pipes, shall be carried out all as specified in Clause 3.26 of MES Schedule Part-I.

PARTICULAR SPECIFICATIONS (Contd…)

4.8.3 Antitermite treatment shall be got done through approved specialist agency who shall be a member of Indian Pest Control Association holding valid license as per clause 13 of Insecticides Act 1968. Persons employed to do the antitermite treatment shall be qualified as per rules of 1971. Prior approval of GE shall be obtained before engaging the specialist agency duly supported with the necessary documents viz. valid license, qualified persons, past experience etc.

4.8.4 Antitermite treatment shall be carried out with emulsion of Chloropyriphos 20 EC purchased directly from the manufacturer or his authorised agent. Original purchased vouchers shall be produced to the GE for verification and defacement by Engineer-in-Charge against this contract. Chemicals banned by the Government for use in antitermite treatment shall not be used. In the event of deviations, the rates given in MES Schedule Part-II 2020 for the treatment shall be applicable for pricing deviation. Chemical brought by the contractor shall be tested before incorporation in the work and cost of testing shall be borne by the Contractor.

4.8.5 The Contractor shall be responsible to keep the entire buildings free from termite infection for a period of 10 years after the date of taking over the completed buildings from the contractor. The contractor may obtain a similar guarantee from the specialist firm engaged by him for the purpose. The defects liability period of antitermite treatment works shall be 10 years and the period of defect liability mentioned elsewhere shall be deemed to be amended accordingly. The Contractor shall have to submit the guarantee in writing as well as Security deposit as specified.

4.8.6 Should the GE at any time during construction or reconstruction or prior to the expiry of the Guarantee period, finds that the buildings have been infected with termites, the contractor shall , on demand in writing from the GE specifying the building (s) complied of, notwithstanding that the same may have been inadvertently passed certified and paid for, undertake to carryout forth with such treatment as may be necessary to render the building (s) free from termite infestation at his own expense, till expiry of the guarantee period. In the event of his failure to do so, within the specified period to be specified by the GE in his demand aforesaid, the GE may undertake such treatment at the risk and expense in all respect of the Contractor. The liability of the Contractor under this condition, however 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 to rectify the defects.

4.8.7 For the purpose of working out amount of security deposit, the cost of anti termite treatment at contract rate shall be at applicable rates in SSR with addition of contract percentage for valuation of deviation for the relevant schedule of the contract. The amount of security deposit to be held back from the Contractor's bill against the guarantee period for anti termite treatment shall be calculated on the amount of anti termite treatment at contract rates as per the scales given below. This shall be worked out by GE and intimated to the Contractor. This amount shall be refunded to him after the expiry of the guarantee period. Alternatively, the Contractor may give a separate interest-bearing security deposit to GE valid for 10 Years for this amount. The scales of calculating such security deposit shall be as per table given below:

Sl No	Cost at contract rates	Amount of Security Deposit
(i)	Upto 15 lakhs	2% of the amount subject to minimum of Rs 30000/-
(ii)	Over 15 lakhs and upto 30 lakhs	2% of the amount subject to minimum of Rs 45000/-
(iii)	Over Rs. 30 lakhs and upto Rs. 150 lakhs.	1.5 % of the amount

4.8.8 The '*Performance Security Deposit'* referred to in Condition 19 of General Conditions of contract (IAFW-2249) is independent of this Guarantee amount, referred to under Condition 23 & 24 here in before. Condition 10 & 46 of the General Conditions of contract (IAFW - 2249) shall be deemed to be amended to the extent as mentioned above.

4.8.9 **GRANITE STONE PLATE FOR GUARANTEE**

The contractor, within four weeks from the certified date of completion, shall provide a black granite stone plate of size 90 cm x 60 cm x 1.5 cm at a prominent place/location of each building as directed by the GE having engraved the following information/details on the plate. Granite stone plate shall be fixed over 15 mm thick cement screed in cm (1:3). All figures /words engraved shall be painted with golden paint of approved make. The cost of same is deemed to be included in the lump sum amount quoted by the contractor against Schedule 'A' Part-I.: -

PARTICULAR SPECIFICATIONS (Contd…)

(a) Job No
(b) CA No & year
(c) Name of work
(d) Name of contractor
(e) Name of GE
(f) Name of Engineer-in-Charge
(g) Date of commencement
(h) Detail of completion (phase-wise)
(j) Date of expiry of defect liability period
(g) Date of expiry of guarantee period given against ATT & water proofing treatment over roof/terrace

5. **CONCRETE**

5.1 **MATERIALS**

5.1.1 CEMENT:

(a) Cement required for the work under the contract shall be procured, supplied and incorporated in the works by the Contractor under his own arrangement. Cement shall be of tested quality and shall comply with the requirements mentioned in SSR, IS Specifications as amended and as specified in Appendix- 'A' to Particular Specifications given hereinafter.

(b) Type of cement for the subject work shall be ordinary Portland cement grade 43 (forty-three (25% replacement of cement by fly ash / use of PPC instead of OPC with max. 25% fly ash content while ensuring quality of fly ash as per IS) in accordance with IS: 8112-1989 unless otherwise mentioned. The Contractor may be permitted to use OPC/PPC cement grade 53 (Fifty-three) also without any extra cost to the Government with prior approval of the GE.

5.1.2 FINE AGGREGATE:

(a) Fine aggregate for concrete works shall be crushed stone sand conforming to IS-383 with limits of deleterious materials as per Table 2 of IS:383, gradation as per Table 9 of IS:383 and all as specified in Clause 4.4 of MES Schedule.

(b) Natural river sand may be used if available without any extra cost confirming to IS:383 and grading within limits of Grading Zones II to III all as specified in Clause 4.4 of MES Schedule. Sand conforming to grading zone IV of IS-383 shall not be used for RCC work.

(c) The sand shall be hard, dense, strong, durable, clear and free from veins and adherent coatings and free from injurious number of disintegrated pieces, alkali, vegetable matters and other deleterious substances. As far as possible, flaky and elongated pieces should be avoided.

(d) Natural river sand/crushed stone sand shall be obtained from the permanent river sources/quarry locations as approved by the GE.

5.1.3 **COARSE AGGREGATE:**

(a) Coarse aggregate for all cement concrete work shall be graded broken/ crushed trap stone obtained from approved quarries as specified in clause 4.4 of MES Schedule. Mixture of the two types shall however not be used.

(b) Coarse aggregate shall be obtained from the sources as approved by the GE.

5.1.4 **GRADING OF COARSE AGGREGATE:**

Graded Aggregate of nominal sizes given hereunder shall be used, unless specified otherwise, in the specifications hereinafter:

(a) Plain or reinforced cement concrete except in foundation of brick or stone walls/pillars, floors and sub base to floors.

(i) For structural elements of depth/thickness more than and including 100 mm: 20 mm
(ii) For structural elements of depth/thickness less than 100 mm: 12.5 mm

Note: However, in no case the nominal size of aggregate shall be greater than one fourth the minimum thickness of the member.

(b) Plain concrete in foundation of brick or stone walls, pillars, floors and sub-base to floors.

(i) Under 34 mm thickness: 12.5 mm
(ii) 34 mm to 80 mm thickness: 20 mm
(iii) Exceeding 80 mm thickness: 40mm

PARTICULAR SPECIFICATIONS (Contd…)

5.1.5 **WATER**

Water shall conform to requirement stipulated in IS-456 and as per clause 4.9 of MES Schedule Part-I.

5.2 **CEMENT CONCRETE MIXES**

The proportions/type of cement concrete required for works in various situations shall be as under: -

Situation		Types of Concrete
(a) Foundation concrete for all buildings, under brick/ stone walling and lean concrete under plinth/grid/toe beam and steps, in gaps between plinth/column under footing		M10 nominal mix
(b) Foundation concrete under column footing if not shown in drawings		M10 nominal mix
(c) PCC in sub floors (base concrete) for PCC / tiles floor		M 7.5 nominal mix
(d) PCC in plinth protection, drain and channel, PCC Cills and PCC block for holder-bats, and plugging for scaffolding holes		M10 nominal mix
(e) All RCC work		RMC grade M-25 and above
(f) PCC in bed plate, benching, splash stones, coping, DPC and pre-cast articles		M15 nominal mix
(g) Cement concrete in any other situation not mentioned above		M15 nominal mix

****Note: Incase higher design mix concrete is mentioned for any location in the drawings, the same shall be provided by the contractor without any extra cost to the department and specification shall be followed as given in relevant IS codes.**

5.2.1 Cost of materials, labour and incidental charges including transportation charges for all tests of concrete, shall be borne by the contractor. Contractor may procure concrete from RMC Plant without any additional/extra cost to the Govt.

5.3 **DESIGN MIX CONCRETE:**

5.3.1.1 Design mix concrete shall be as per clause 4.11.2.1 of SSR Part-I and IS-456. Proportions of cement and aggregates with water to obtain required strength specified shall be determined by weight by the contractor. The contractor shall prepare a trial mix and get the same tested to verify the required workability and characteristic strength. The contractor shall ensure the achievement of the defined strength of the concrete and no laxity shall be allowed on this account.

5.3.1.2 LABORATORY MIX DESIGN AND TESTS

As soon as possible, after receiving the order to commence work, the contractor shall procure sufficient quantities of required type of aggregates, cement and water and find their characteristics for suitability of the specifications. Based on the result of such verification, he shall carry out number of trials to determine the optimum mix to produce the specified slump and 28 days target mean strength. Each of these cubes shall also be tested simultaneously for 7 days as guidance for job user. If the contractor so desires, he may commence the works based on test results of 7 days strength to be commensurate with the corresponding 28 days strength at his own responsibility. The trials shall be jointly carried out in the laboratory as detailed below. The mix shall finally be approved by GE. Cost of materials, labour and other incidental including transportation charges for all test including the routine work test specified hereinafter shall be borne by the contractor. However, the departmental laboratory facilities where available will be extended with the payment of specified charges. Following data and results thereof shall be submitted to the GE by the contractor for approval of mix design prior to commencement of the actual works: -

(a) Grading and density of coarse and fine aggregates proposed to be used.
(b) 7- & 28-days compressive strength of the cement concrete.
(c) Mix proportion of aggregates, cement, any admixture and water for consistency (slumps) tests and their results.

PARTICULAR SPECIFICATIONS (Contd…)

(d) Strength characteristics obtained both for 7- and 28-days compressive strength for the selected trial mixes, using minimum water cement ratios.
(e) Results of additional trials till the desired slump value was reached and the target mean strength is obtained to achieve the specifications.

5.3.1.3 For design mix, it will be express condition that only weigh- batching shall be followed and no conversion of weights into volumes shall be permitted.

5.3.2. MIX PROPORTION AND STRENGTH FOR DESIGN MIX CONCRETE M-25 & Above

Unless otherwise specified on structural drawings, the mix proportion and strength criteria for design mix concrete of grade M-25 shall be as per IS 456:2000 including upto latest amendment for "Moderate" exposure conditions. Wherever higher grade of design mix concrete mentioned same shall be provided as per IS 456:2000 including upto latest amendment for "Moderate" exposure conditions.

5.3.3 For design mix, it will be express condition that only weigh-batching shall be followed and no conversion of weights into volumes shall be permitted.

5.4 **Quantity of cement for pricing of tender**

The mix design shall be carried out from **NIT/IIT/Govt Engineering College/ National Test House/Regional Research Laboratories/other test houses having NABL accreditation for carrying out such tests.** Works shall be executed accordingly, keeping in view the requisite strength criteria of concrete and structural stability and the contractor shall be fully responsible for the same. The contractor shall be responsible for the use of requisite quantity of cement to achieve the quality and strength of the concrete as per various provisions of IS 456-2000. The contractor is deemed to have verified and obtained details applicable to this effect at a particular station before quoting tender and no claim whatsoever, shall be entertained on account of variation in the quantity of other ingredients of concrete.

5.5 **READY MIX CONCRETE (RMC)**

Ready Mix Concrete shall be provided for design mixes as specified in CA for RCC M-25. Specification for RMC shall be as given below and contractor's quoted rates shall be deemed to include these provisions. Location(s) where quantity of concrete is less, Design mix concrete in mechanical weigh batcher concrete mixer shall be permitted with written approval of GE. Contractor shall submit concrete calculations to GE in support of his request for approval.

(a) Supply of RMC shall be conforming to IS-4926-2003 and shall be manufactured by any of the firms mentioned in Appx 'C'.
(b) Before actual incorporation of RMC at site, the contractor shall get the name of firm approved by CWE from where the contractor proposes to get the RMC. Before approving the name of the firm, the CWE shall visit the manufacturer's site for inspection of the following: -

(i) Infrastructure in terms of storage of aggregates, sand/crushed sand and cement.
(ii) Sources of supply for aggregates, sand/crushed sand and water.
(iii) Adequacy of testing facilities for water, materials, cement, concrete, alkali aggregate reaction, etc at manufacturing yard.
(iv) Batching and weighing arrangements including arrangements for adding calculated quantity of water.
(v) Mixing mechanism.
(vi) Quality of engineer supervision and skills of workers.
(vii) Record, test registers, etc being maintained.
(viii) Capacity of the installed plant and adherence to time schedules.
(ix) Data showing periodic calibration of all equipment.
(x) Details of batching showing quantity of input items in production of concrete. Only after CWE himself gets satisfied on inspection of the above points he will approve the firm.

(c) The agency of RMC shall be got approved prior to commencement of concrete work. However, the responsibility of maintaining quality and grade of concrete fully rests with contractor.

(d) RMC shall be supplied as per the following information supplied by the GE: -

(i) The type of cement to be used.
(ii) Maximum size, type of aggregate and its strength determined from samples of

PARTICULAR SPECIFICATIONS (Contd…)

plastic concrete taken at the place and time of delivery in accordance with the requirement of IS 456-2000.

(iii) The minimum acceptable compressive strength determined from sample of plastic concrete taken at the place and time of delivery in accordance with the requirement of IS-456-2000.

(iv) The slump or compacting factor or other requirement of consistency or workability.

(v) The ages at which the test cubes or beams are to be tested and number of tests to be made.

(vi) Any other requirement.

(vii) Use of "MINERAL ADMIXTURES" such as fly ash (or pulverized fuel ash) or ground / granulated basalt Furnace slag shall be permitted as per IS 456:2000. Use of Chemical Admixtures as per IS 9103 shall be permitted to be mixed with cement to improve the performance of the concrete. Doses of 'retarders', 'plasticizers' and 'super plasticizers' shall be restricted to 0.5, 1.0 & 2.0 % respectively by weight of cementitious material in conformance with clause No 10.3.3 of IS 456: 2000.

(e) Concrete mix design shall be carried out preferably by RMC manufacturer complying with the relevant IS specifications for all the ingredients as listed below: -

Sl No	Material	BIS Specification
(i)	Coarse aggregate	IS 382- 1970
(ii)	Fine aggregate	IS 383- 1970
(iii)	Crushed Sand for mortar	IS 2116- 1980
(iv)	Cement	IS 269-1989, IS 8112-1989, IS 12269-1989
(v)	Admixture if permitted (Only ISI marked admixtures shall be used.)	IS 9103-99(Rev)
(vi)	Fly ash- Grade-I	IS 3812

(f) The initial mix design report properly bound in quadruplicate shall be submitted by the contractor to GE for approval. Before submission of report to GE for approval trial shall be carried out by contractor and GE at the RMC plant Laboratory under controlled conditions. Contractor shall make six cubes of each trail mix as per mix design report in the presence of Engineer in charge using same ingredients as adopted for design mix and get them tested at 7 days and 28 days. For each design mix, a set of six cubes shall be prepared and from each set, three cubes shall be tested at the age of 7 days and three cubes at the age of 28 days.

The cubes shall be made, cured, transported and tested strictly as per IS requirement. The average strength of three cubes at the age of 28 days shall exceed the specified target mean strength for which design mix has been recommended in design mix report. GE shall approve the mix design based on results of design mix and trials carried out by GE. The RMC incorporated in the work shall be in accordance with the approved mix design. Any correction/deviation from approved mix design for any reasons would also need approval of CWE. Any consignment of RMC at the time of delivery at site if not acceptable to the GE, shall be removed from the site at the cost of contractor. The decision of GE in this regard shall be final and binding. Some of the conditions under which GE can reject RMC are enumerated here-in-below: -

(i) Initial setting of concrete due to transit delay.

(ii) Segregation of aggregates due to excess rotation of mixer drum during transit.

(iii) The RMC supplied does not give required slump.

In addition to above, GE may further decide the rejection of RMC on any other technical ground which he decides necessary.

(g) A register shall be maintained at site duly signed by the competent representative of RMC manufacturer/supplier, contractor's authorised representative and Engineer-in-charge recording the following details: -

(i) Date of delivery

(ii) Time of mixing.

(iii) Time of delivery at site.

(iv) Quantity and grade of RMC.

(h) In case of rejection of supply of RMC supplied by the manufacturer at site, the contractor shall be responsible for making good the same without extra cost to the Govt. The GE/Engineer-

PARTICULAR SPECIFICATIONS (Contd…)

in-Charge and other officers authorised by the Accepting Officer shall have access to check on the quality of production in RMC suppliers manufacturing yard as and when they desire so. The contractor shall make all arrangements for such inspections. In case of payment of RAR/deviation pertaining to RCC work, M-25 and M-30 RMC shall be priced at rates relevant in MES Sch 2020 for Reinforced Cement Concrete M-25 and M-30 respectively as per deviation condition. No advance payment will be made towards payment made by contractor to RMC manufacturer. **No advance on account for cement, coarse aggregate and fine aggregate required for RMC shall be made to the contractor.** Type and quality of cement used in RMC shall be in accordance with the specifications as already specified for design mix in the contract agreement here-in-before. It will be the responsibility of the contractor to ensure that the RMC Manufacturer uses in manufacturing RMC the cement/aggregates of grade and quality as described here-in-before. He shall also be responsible to produce necessary paid vouchers and test certificate for the above materials as and when called for by GE for verification to ascertain the correctness of type and quality of materials used by the RMC manufacturer. Paid voucher of RMC shall also indicate details of make/brand of cement used besides batch No, consignment details and test certificate details of procurement of cement. Please note that if cement has been procured by contractor and given to RMC manufacturer, then original paid vouchers and test certificates of cement shall be given to GE along with paid vouchers of RMC for claiming payment. However, in case of cement used in RMC has been procured directly by RMC manufacturer, in such case certified photo copy of paid vouchers and test certificate of cement purchased shall be also enclosed along with paid vouchers of RMC for claiming payment. He shall also be responsible to ensure that the cement used in RMC is of approved make/brand as described here-in-before.

(j) Requisite facilities for verification and check of the raw material shall be made available to GE by the RMC manufacturer. GE will have easy access to the RMC plant to check quality of concrete being produced at the plant at intervals as decided by GE. The GE shall independently carry out the following tests at random at site lab established by the contractor.

(k) Flexural strength test and cube tests shall be carried out as per IS-456-2000 at site from samples collected by the contractor during placing of the concrete. Cost of the collection of samples and testing shall be deemed to be included in the quoted rate. Acceptance criteria for the RMC shall be all as specified in the IS-456-2000. In Case RMC supplied by the approved firm fails to meet the strength requirement as per acceptance criteria laid down in IS-456-2000 and rejected by GE, the Contractor shall make necessary arrangement for removal of such rejected quantity of RMC and will redo the work at his own cost.

(l) Conveying equipment's for concrete shall be water tight, well maintained and thoroughly cleaned before commencement of concrete mixing. The contractor is free to adopt either centrally mixed concrete incase the plant is installed at site or truck mixed concrete. The temperature of concrete mass on delivery shall not exceed 40°C. RMC so brought at site either from plant at site or by Transit mixers shall be pumped to all the locations to be cast except at locations where not feasible, which may be done all as specified in MES Schedule.

(m) Concrete shall not be dropped from a height, thrown or otherwise treated so that segregation, undesirable finish, or defective structural quality results. **The maximum drop shall be 1.2 m unless otherwise approved by the Engineer-in-Charge.**

(n) No extra water shall be added to the concrete after it has left the batching plant.

(o) All equipment's pump chamber, hoppers, lines and rubber noses shall be kept clean at all times. Any build up in the lines of materials from previous operations shall be cleaned out properly.

(p) In the event of breakdown of the equipment causing delay not exceeding 20 minutes, within which time concrete cannot be placed, the following procedure shall be adopted: -

> *'With approval of Engineer-in-Charge, the concrete already in place shall have the 'Wet edges' maintained by depositing small quantities of hand mixed concrete placed by hand against the 'Wet edge" and vibrated into the gaps. Where atmospheric temperature exceeds 34 degrees centigrade, the receiving hopper and line shall be cleaned out and concrete contained therein discarded and immediately removed from the site. The concrete shall be discarded if initial setting of the concrete has begun in the hopper or discharge lines. All lines shall be cleaned free of concrete prior to*

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resumption of pumping after each break down. Concrete in the lines shall be pumped at approximately 8 minutes intervals to ensure the concrete in the line is live. Whenever delivery of concrete to the pump is delayed, the pumping interval shall be reduced to 5 minutes during extra hot weather conditions. Delivery lines where exposed to hot sun shall be protected by covering with bags, wet hessian or other approved means.

(q) No concreting shall be commenced until the form work, reinforcement and all other preparation require for placement of concrete are inspected by the Engineer-in-Charge and approved.

(r) Contractor shall take every precaution to strengthen the shuttering as required to withstand the additional pressure that may be created due to pumping of concrete. Workability of concrete shall be as specified in IS-456-2000.

(s) If certain admixtures are required to be added to RMC either in plant or at place of delivery to improve the workability, the same shall be added as per manufacturer's instructions with prior approval of Garrison Engineer without any extra cost to Govt. Quantity of admixture at any stage should not exceed the maximum limit as specified by manufacturer. Admixture if any to be used should be compatible with cement Contractor if desires to use admixture shall conduct the test for cement, admixture etc., in an independent testing lab approved by Garrison Engineer without extra cost to the Govt.

(t) Revision of design mix due to change in aggregate proportions due to change in size and relative density/bulk density of aggregate shall be immediately brought to the notice of the Garrison Engineer and in all cases provisions contained in ISS-456-2000 for mix considerations/acceptance criteria shall be complied with.

(u) The time between mixing of concrete at manufacturer's yard and transportation and delivery at site shall not be more than 1 ½ hours. In case longer time is unavoidable the same can be permitted by Garrison Engineer adopting using admixtures all as permissible as per IS without any extra cost to the Govt.

Delivery challan/ticket for truck should show cement content used by the manufacturer type of cement, admixture used and locations of concreting etc.

(v) RMC shall be supplied as per IS 4926-2003 and concrete cube shall be casted as per IS-456-2000. Minimum quantity of cement shall be as per provision of IS: 456-2000 meeting the requirements from durability point of view and the details regarding proper training and works quality control shall be in accordance with IS:456-2000 and IS:4926-2003. However, if extra quantity of cement is used for whatever reasons, the same shall be at no extra cost to Government.

5.6 **ESTABLISHMENT OF RMC PLANT AT SITE**

If any contractor wishes to establish his own RMC plant at work site, he will be allowed to establish **Mobile digital mini batching machine of minimum capacity 15 Cum/Hr** without any price adjustment provided the contractor has got following T & P and provisions catered in IS-4926 are compiled in toto: -

(a) **Mobile digital mini batching machine of minimum capacity 15 Cum/hr** as per IS: 4925 and 4926 including aggregate hoppers, cement & admixture silos, water tank etc.

(b) Transit mixer for mixing and transporting concrete from batching plant to work site.

(c) Concrete pumping arrangement suitable for pumping concrete at required level which should essentially include concrete hopper, adequate length of pipe line, pumps.

(d) Material feeding arrangement such as conveyer belt etc suitable for constantly supplying the aggregate into batching plant hoppers.

(e) A well-equipped laboratory having all arrangement for testing all ingredients of concrete as well as tests on plastic and hardened concrete as per relevant IS requirement.

(f) Any other T&P required for production and placement of RMC as per IS- 4926: -

(i) The permission for establishment of RMC plant by contractor at site shall be accorded by the CWE after duly verification that complete plant machinery & set up brought out here-in-above is functional and capable to deliver desired quality concrete as per IS- 456-2000.

(ii) Initial setting on the computerized panel of RMC plant shall be sealed by the GE as

PARTICULAR SPECIFICATIONS (Contd…)

per the approved mix design. In case of army change/variation in the source of ingredients of the concrete mix, GE shall only be authorized to re-set the readings of the computerized RMC plant as per the revised approved mix design. GE shall also ensure the tamper proof arrangements for settings of various components of the RMC plants.

(iii) In case of breakdown of RMC plant established by the contractor, he shall arrange RMC of required specification from the approved RMC manufacturer mentioned here-in-before without any extra cost to the Govt. The contractor should note that at no stage during execution, the progress of work should suffer in case of any break down of the RMC plant installed by him.

(g) All other requirements given here-in-before shall remain applicable whether the RMC is procured from RMC manufacturer or from the RMC plant established at site.

5.7 MIXING (Concrete other than RMC):

All concrete shall be mixed in mechanical concrete mixer. Where only small quantity of cement concrete is involved, hand mixing may be adopted if approved by the Engineer-in-Charge. The contractor should arrange to wash out and clean the mixing drum on completion of work and or on stoppage of work if stoppage is for more than 20 minutes.

5.8 Transporting depositing and compacting generally shall be carried out as specified in Clause 4.11.9, 4.11.10 and 4.11.11 of SSR Part-I.

5.9 **PROTECTION AND CURING OF CONCRETE:**

This shall be carried out in accordance with specifications, given in clause No. 4.11.13 and 4.11.14 of MES Schedule Part I.

5.10 **STRIPPING TIME FOR FORM WORK:**

The contractor's attention is invited to the stipulation in Clause 4.11.6.3 of SSR (2009) Part-I regarding stripping of form work. The periods stipulated therein are for concrete using ordinary Portland cement.

5.11 **CURING:**

Curing shall be carried out using pump of suitable capacity at no extra cost to the Govt. all as directed by Engineer-in-Charge.

5.12 **LEAVE/FORM HOLES AND CHASES:**

The contractor as the work proceeds should leave/form holes/chases in concrete/masonry and RCC where and as directed by the Engineer-in-Charge and make good in cement and sand mortar (1:3) when ordered to do so.

5.13 **FINISH TO CONCRETE SURFACE:**

Finish to exposed surface of all concrete works shall be as specified below: -

a) Exposed surface of RCC lintels, beams, pardi/walls, Parapets columns etc, which are continuous with the adjoining plastered surfaces of walls shall be plastered, specifications of plaster being same as that adopted for wall plastering. Plaster shall be applied all over the exposed surfaces of such concrete including projected portion of columns, beams/brackets etc.

b) Exposed RCC/Concrete surfaces such as soffits of floor/roof slabs, chajjas, canopies, parapets etc shall be finished fair and even by plastering as specified in Clause 4.11.16.2 (b) of SSR Part I. Further soffits of floor/roof slabs internally shall be treated with wall care putty as directed by the Engineer-in-Charge.

c) Exposed surfaces of concrete other than those referred above shall be finished as specified in clause 4.11.16.2 (a) of SSR Part I.

5.14 **BEARING PLASTER AND WATER PROOFING PAPER**

Provide bearing plaster and building paper as per Notes on TD drawing for Notes on RCC work and to the following specifications: -

(a) Plaster shall be 20 mm thick in cement mortar (1:4) finished even and smooth without using extra cement. Sand shall be same as specified for plaster to walls.

(b) Water proofing building paper shall be bituminous impregnated laminated water

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proof paper complying with the requirements of IS-1398 type II jute lines (not less than 60 grams per square metre) and laps at joints shall be 60 mm minimum.

5.15 **SAMPLING AND TESTING OF CONCRETE:**

(a) Refer Clause No. 4.11.17 of MES Schedule Part-I, which shall be read in conjunction with clause 16 of IS-456.

(b) Tests will be carried out on 15 cm cubes all as per relevant IS. Minimum Six cubes per sample shall be supplied by the contractor for testing.

(c) For relatively small and unimportant works even though testing may be waived off by the GE, the contractor shall be responsible to achieve the desired strength of concrete.

(d) The contractor shall provide all necessary materials (including moulds etc) and labour for mixing and casting of cubes, transporting the cubes to the testing laboratory and bringing back the same and any other assistance that may be required for getting the samples tested in the laboratory without any extra cost. The charges for testing & transportation of cubes shall be borne by the contractor. The charges for testing of cubes for slump test for compacting factor test or vee bee time test and compressive strength (including transportations if any) shall be as indicated in Appendix 'D'.

(e) The concrete which is not upto the desire strength shall be rejected and the same shall be made good by the contractor without any extra cost to Government.

5.16 **NON-DESTRUCTIVE TESTING OF HARDENED CONCRETE**

(a) The Contractor shall provide a calibrated Rebound Hammer for testing of hardened concrete at site. The Rebound Hammer tests shall be conducted on all types of concrete members such as columns, beams, and soffit of slabs. The members to be tested shall be selected by Engr-in-Charge randomly but shall represent a fair sampling. At least 20% of the total number of members in each category may be tested. In order to have a mean value of the strength, the members shall be tested at least at 12 locations. The tests shall be conducted in the presence of GE/AGE(I). The results shall be recorded in a register showing the following data:

(i) Date of casting of the members.
(ii) Date of testing.
(iii) Type of member and location/identification of the members.
Results.
Inference/Remarks.
Signature of JE/AGE and GE.

(b) The test shall be conducted as per IS 13311(Part 2):1992. The test shall be conducted only after proper hardening of concrete.

(c) The Hammer shall be calibrated at regular interval as specified

5.17 **PCC COPING**:

PCC coving with PCC (1:2:4) type B-0 mixed with integral water proofing compound shall be provided at junction of RCC chajja with wall/lintel/beam to the radius of 75 mm irrespective whether shown or not shown on drawings. Coving shall be 15 cm high on wall and to the full length of chajja.

5.18 **PRECAST CEMENT CONCRETE**

Lintels (without chajja) with a span of less than 1.5 m clear and PCC bed blocks, copings and the like may be precast at the discretion of the contractor all as specified in Clause 4.20 of SSR Part I as applicable. All precast articles shall be set in CM (1:3) with joint to match.

5.19 **FILLETING:**

Provide triangular filleting to skirting / dado as directed by Engineer-in-Charge with CM (1:3) finished even and smooth without using extra cement.

5.20 **CONCRETE PADDING:**

Padding under bearing of RCC lintels to make up the height of opening in wall wherever required shall be done with PCC (1:3:6) type C-1. PCC blocks shall not be cut to under sized dimension and used to make up the required height in such positions.

PARTICULAR SPECIFICATIONS (Contd…)

5.21 **RCC LINTELS**:

(a) The bearing of lintels shall be 15 cm or effective depth (whichever is more), unless otherwise shown on drawings.

(b) Lintels (without chajja) for opening not exceeding 1.50 metres clear span may be precast at contractor's option. However, these shall be priced as cast-in-situ lintels in the event of deviation if any. All other lintels and bands shall be cast-in-situ.

5.22 **DRIP COURSE/ THROATING / WEATHERING**:

Following works shall be executed whether shown on drawings or not: -

i) Provision of proper drip course and / or throating and weathering to all chajja, roof, cills, coping and the like.

ii) All flat surfaces exposed to weather shall be finished with imperceptible slope for smooth run of rain water. (In cases no slope is mentioned in drawings or specified).

5.23 **WINDOW CILL**

(a) Where granite stone window Cill is shown in drawing, the same shall be of polished black granite stone in one piece 18 to 20mm thick over 20 mm thick bedding layers in cement mortar (1:4) and jointed in cement slurry over 100mm thick PCC (1:2:4) type B1 over wall/slab. Edges of the granite cill shall be moulded.

(b) Where Kota stone window Cill is shown in drawing, the same shall be of polished Kota stone in one piece 18 to 20mm thick over 20 mm thick bedding layers in cement mortar (1:4) and jointed in cement slurry over 100mm thick PCC (1:2:4) type B1 over wall/slab.

(c) Where green marble window Cill or Where no/any type of cill is shown in drawings, the same shall be of green marble in one piece 18 to 20mm thick over 20 mm thick bedding layers in cement mortar (1:4) and jointed in cement slurry over 100mm thick PCC (1:2:4) type B1 over wall/slab. Edges of the green marble shall be moulded.

5.24 **JAMB**

Where green marble in Jamb is shown in drawing or where no type of Jamb, provide polished green marble (not more than in two pieces), 18 to 20mm thick over 10 mm thick bed in CM (1:3) and jointed in neat cement slurry.

5.25 **PCC PLINTH PROTECTION:**

Irrespective whatever shown on drawings PCC plinth protection shall be 900 mm wide, with 75 mm thick PCC (1:3:6) type C1 over 100 mm thick consolidated bed of hard core over rammed approved earth filling. Plinth protection shall be laid to a slope of 1:50. Exposed edges of plinth protection provided with triangular filleting in CM (1:3). The top surfaces and edges shall be finished fair without using extra cement. PCC shall be laid in alternate bays and the joints in bays in plinth protection shall be filled with mastic filling comprising 1 part of mastic bitumen and 3 parts of sand (all by weight).

5.26 **DAMP PROOF COURSE**:

(a) Damp proof course shall be 40 mm thick in PCC 1:2:4 type B0 using 12.5 mm graded stone aggregates mixed with liquid waterproofing compound as per manufacturer's recommendation over which a coat of blown bitumen of grade 85/25 and 1.5 Kg per Sqm blended with clean sand 0.05 Cum/Sqm shall be provided. The percentage of water proofing compound shall be taken as 3% (by weight of cement) while pricing of any deviation order in omit portion.

(b) Damp proof course shall be laid to the full width of walls where plinth beam is not shown at FFL including under door and other opening at plinth level. Damp proof course shall not be provided for portion below door for 100 mm thick walls, dwarf walls and at locations where RCC / PCC plinth band or RCC plinth beams are provided.

6. MASONRY WORKS

6.1 AAC BLOCK MASONRY:

(a) Wherever AAC (Autoclaved Cellular (Aerated) Concrete) block masonry is specified on drawings, it shall be provided in building works for items of Schedule 'A' Part-I and as per locations shown in drawings / wherever mentioned in the drawing.

(b) AAC block masonry shall be of grade I (Min compressive strength 5 N/Sqmm), Density 651-750 Kg/Cum, IS: 2185 (Part-3) marked. Size of AAC blocks shall be 650mm x 240mm x

PARTICULAR SPECIFICATIONS (Contd…)

200mm/ 600mm x 200mm x 200mm for main wall and 650mm x 240mm x 100mm/ 600mm x 200mm x 100mm for partition wall respectively.

(c) AAC blocks shall be laid using polymer modified and curing free Ready Mix Jointing mortar of joint thickness 3mm to 4mm**.** Makes/brands of Ready-Mix Jointing Mortar shall be "Speed Dry Mix"/ "DUBOND"/ "MAGIC BOND"/ BUILDWELL" or the Makes/manufacturers of AAC blocks shall be as mentioned in Appendix 'C'.

6.1.1 PHYSICAL REQUIREMENTS OF AAC BLOCKS

As per IS-2185 (Part-III), AAC blocks used for the masonry work should be free from cracks or other defects. It should impair the good strength or performance. The important requirements are listed below.

(a) Block density: The block density of AAC block should be as per IS-2185 (Part-III): 1984. The minimum density should be 651-750 kg/cum

(b) Compressive strength: The minimum Compressive strength, being the average of twelve units when determined as described in IS-6441(Part-V): 1972 should not be less than 5 N/sqmm.

(c) Thermal conductivity: The thermal conductivity of AAC should not be more than the values as specified in Table 1 of IS 2185(part III):1984.

(d) Drying Shrinkage: The drying shrinkage of AAC block when conducted shall not be more than 0.05% for grade 1 block. Grade 1 blocks are to be provided.

(e) Tolerance: Size tolerance is allowed up to +5mm in length and +3mm in width and height.

6.1.2 MATERIALS

(a) Cement: Cement should conform IS 269:1976 (OPC) with 40% fly ash by volume or IS-1489-1976 (PPC) with min.40% flyash by volume.

(b) Lime: Lime to be used should conform to IS-712: 1984.

(c) Fly ash: FA shall conform to IS-3812:1981 (min. 40% volume)

(d) Calcined Clay Pozzolana: It is used as per IS-1344:1981

(e) In case of RCC, reinforcement requirements should be as per the provision in IS-6041: 1985

(f) Water: Water to be used should conform to IS 456:1978.

(g) Manufacturing of blocks is carried out as per the provision in the IS-2185(Part-3):1984.

6.1.3 DESIGN CONSIDERATIONS

Use of AAC block in the foundation and below damp-proof course should be avoided.

(a) Wall thickness: The wall thickness shall be designed in accordance with the provisions of IS: 1905–1980 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 loadbearing wall, it should not be less than 150mm and 200mm for internal and external walls.

(b) The maximum horizontal and vertical dimension of walls should be in accordance to IS 1905:1980. It is not recommended to have long span AAC block wall without RC/ stiffeners.

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

(i) Nominal Bond beams of to be provided of wall thickness, with two 8mm Fe 500D/ Fe 550D bars spaced every 1200mm along the height will be provided in the IS-604: 1985 (ref drawing attached)

(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 sill of the opening. The grade for the bond beam in this case should not be lower than M-25 and the reinforcement should be two 12mm as described in clause 4.7.2 of IS 6041: 1985 unless specified otherwise in the drawings.

(iv) RC bond beams as shown in the drawing attached to be provided at sill level window frames

(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) 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 Cl. 6, 6.1).

PARTICULAR SPECIFICATIONS (Contd…)

(vii) Vertical reinforcement 12mm Fe500D/ Fe 550D bar @450 mm C/c will be provided when gap between two columns exceeds 3 meters.

(d) Avoidance of heavy loads: Heavy loads due to heavy fittings like huge commode to 100mm AAC wall shall not be provided.

(e) 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 block 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 blocks shall be laid using polymer modified and curing free Ready Mix Jointing mortar of joint thickness 3mm to 4mm**.** Makes/brands of Ready-Mix Jointing Mortar shall be “Speed Dry Mix”/ “DUBOND”/ “MAGIC BOND”/ BUILDWELL” or the Makes/manufacturers of AAC blocks shall be as mentioned in Appendix ‘C’.

(v) The proper construction workmanship should be followed as described in clause 7.2.1- 7.2.4 of 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 block 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 Block shall be set and jointed in polymer modified ready mix jointing mortar for both 100mm & 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.

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

(ii) Lintel bond beam as per the drawing attached 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.

(g) Roofing: The roof finish should be done with thin layer of 1:3 cement mortar (refer clause 9 of IS 6041: 1985)

(h) Maintenance: The exposed walls shall be inspected every year before monsoon and cracks.

(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 as per described in the IS 6441(part I) - 1972. A specimen of size 100×200×50 mm is prepared for the test.

(ii) Compressive strength: Compressive strength test should be carried out as per the provision in IS-6441(Part-V): 1972.15cm edged cubes shall be tested under compression testing machine.

(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): 1978.

(iv) Drying shrinkage: Drying shrinkage test on AAC block is performed as per the provision in the code IS 6441(PART II): 1972. Prism of size 40×40×150mm without reinforcement shall be used for this test.

PARTICULAR SPECIFICATIONS (Contd…)

(k) Corrosion protection:
Corrosion of the reinforcing bars in the AAC specimen should be checked as per the IS code 6441(Part-IV): 1972. The test result is compared with the reference bars to estimate the corrosion. It should not occupy more than 5% of total surface area.

(l) Strength, Deformation, Cracking (bending- short duration):
The deflection, strain and crack width of the flexural members made of AAC are determined as per IS 6441(part VI): 1973.

(m) Strength, Deformation, Cracking (bending-sustained loading):
The flexural members made of AAC are tested under sustained loading to determine deflection, strain, and crack width in accordance with IS-6441(Part-VII): 1973.

(n) Test in diagonal tension: Tests are done as per the code IS-6441(Part-VIII): 1973 to determine deflection, crack width, movement of the end of flexural member subjected to diagonal shear loading.

(o) Jointing: The testing of jointing of AAC flexural member (i.e. floors, floor slabs) is done as per IS- 6441(Part-IX): 1973.

(p) *Codes to be followed*:
- (i) IS-2185 (Part-3): 1984- Specification for concrete masonry units (Autoclaved Aerated Concrete)
- (ii) IS 6441 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

6.1.4 **WORKMANSHIP:**
(Refer IS 6041: 1985 Reaffirmed 1996 for Storage & handling of materials, Mortar, Design Considerations, Avoidance of Crack formation, Laying of AAC block in Superstructure, Provision of Doors & Windows frames, intersecting wall, Pilasters & Piers, Rendering & other finishes)

(a) When full depth of block course is not available, the gap shall be filled with PCC M-10 (nominal mix) using 20mm graded aggregate all as directed by Engineer-in-charge.

(b) AAC Block shall be set and jointed in polymer modified ready mix jointing mortar for both 100mm & 200mm thick wall.

(c) For the walls of any thickness irrespective of whatever shown in the drawings, horizontal coping at 0.9 to 1.2 m height & Vertical coping in center if wall length is more than 3m, with 2Nos. of reinforcement, M-20 concrete. (refer IS 6041-1985 Para 4,4.6.5.1 & 2). 100mm thick walls shall be constructed from the sub-base of floors in case of ground floor and from RCC slabs in case of upper floors.

(d) AAC blocks shall be embedded with a mortar, the strength of which is relatively lower than that of the mix used for making blocks in order to avoid the formation of cracks. 1:6 cement-sand mortars may be used. (refer IS 6041-1985 Para 3,3.9.2). Blocks need 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 Para 6, 6.1)

(e) AAC Blocks shall be stored in such a way so as to avoid any contact with moisture on site. (refer IS 6041-1985 Para 5,5.1)

(f) Mortar thickness must be limited to 3 to 4mm in ready mix mortar

(g) For RCC, masonry joints & coping, use wire mesh/ fiber mesh or all as specified in the drawings

(h) 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 (20mm graded aggregate) and mixed with WPC as per Manufacturer’s instructions.

6.1.5 **TESTING OF MATERIALS**

PARTICULAR SPECIFICATIONS (Contd…)

(a) 'A' Level Tests: The Contractor shall set up site laboratory for testing of materials for 'A' level tests as listed in Annexure-I hereto. The Contractor shall arrange all equipment / machines for the tests specified in Annexure-I as 'A' level tests at his own cost with prior approval of the Accepting Officer. This cost shall be included in the lump sum / item rates quoted by the Contractor.

(b) The Contractor shall employ a competent technical representative as approved by the Engineer-in-charge for the purpose of testing and all such tests shall be carried out in the presence of the Engineer-in-Charge. The successful tests result thereof shall be recorded and signed jointly by the contractor and the Engineer-in-Charge. The 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 the Accepting Officer, the recovery shall be made at rates applicable i.e. as given hereinafter.

(c) 'B' & 'C' Level Tests: For tests of 'B' and 'C' level as indicated in Annexure-I, the contractor shall provide all facilities for testing of materials at Zonal laboratory/Govt. approved laboratories or test house/Engineering Colleges 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 Laboratory of MES are indicated in Annexure-I. The Contractor shall bear the actual charges of 'C' level tests (to be done in labs other than MES labs) irrespective of rates indicated in Annexure-I. Wherever it is convenient to get 'B' level test done at approved test house/Engineering College, the same can be done at the cost of the Contractor and no separate recoveries will be made by the Department for the same.

(d) 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.

(e) Testing criteria: It shall be as per IS 6441 (Part-I to Part-IX)

6.1.6 **AAC BLOCK WALLING**

(a) Mortar for walling -20 cm and 10 cm thick AAC block wall shall be in polymer modified ready mix jointing mortar.

(b) Laying -The blocks shall be slightly wetted before and/or during laying in the wall. The blocks shall be laid with joints completely filled without any void left in the masonry. The thickness of the horizontal and vertical joints shall not exceed 1cm. The 1/2, 1/3 and 2/3 block shall be used for breaking the joints. The face joints shall be raked to a depth of 1cm by raking tool during the progress of the work when the mortar is still green, so as to provide proper key for plaster or to facilitate pointing to be done later. Where plaster or pointing is not required, the joints shall be struck flush and finished side by side.

(c) Scaffolding for walling -Only double scaffolding shall be used. The scaffolding shall be strong and sound. No holes in the masonry for supporting scaffolding shall be allowed.

(d) Unless otherwise specified or shown on drawings, all 10cm thick partition walls on ground floor shall rest on sub base of the floor and on first floor shall rest on RCC slab. 10cm thick partition walls/columns shall be properly bonded at ends into adjoining walls/columns irrespective of whether shown in drawings or not, 10cm thick partition walls shall be provided with the following:

(i) 02 Nos. 8 mm dia MS bars at every fourth course.

(ii) RCC band at lintel level for the entire length (including over openings) unless otherwise shown on drawings, the RCC band shall be 100x100 mm size reinforced with 4 No 8 mm dia TMT bars as longitudinal bars and 8mm dia TMT bar stirrups at 150 mm c/c.

PARTICULAR SPECIFICATIONS (Contd…)

6.2 **FLY ASH BRICK MASONRY WORK:**

6.2.1 Wherever Fly Ash Brick masonry mentions, it shall be provided at the locations as shown on drawings/other schedules (except Building Items of Schedule 'A' Part-I) and shall be provided as per specification given here-in-under.

6.2.2 Fly ash bricks shall be cement bonded and factory made. Visually, the bricks shall be sound, compact & uniform in shape and free from visible cracks, warpage & organic matters. The bricks shall be solid with frog 10 to 20 mm deep on one of its flat sides. The bricks shall have smooth rectangular faces with sharp corners & shall be uniform in shape & colour. Bricks shall be manufactured by using standard & latest technology with indigenous fly ash brick making machine and shall be of the following specifications: -

6.2.3 **Technical Specifications**

(a) Size: 230 x 110 x 70 mm

(b) Compressive Strength: Avg 7.5 N / Sq.mm. Tolerance shall be as per clause 5.2 of IS: 12894:2002.

(c) Water Absorption: Maximum 20 %

(d) Efflorescence: Nil

(e) Density: Approx. 1700 Kg/m^3

(f) Composition by weight: -

(i) Cement: –10 %

(ii) Fly Ash: Thermal Station Fly Ash (Gde-II) confirming to IS: 3812:1981 for physical & chemical properties to be tested in accordance with IS: 727:1967- 40-45%.

Crushed Sand / Stone: VSI machine make Grade I contain in ground shape particles – 50 – 55%.

(iii) Admixtures: Construction chemicals as per manufacturer's instructions.

(g) Thermal Conductivity: 0.90–1.05 W/m^2 ˚C (0.75 – 0.90 K cal/m^2hr) °C

(h) Drying Shrinkage**:** Maximum Average drying test shrinkage 0.035–0.04 % to be tested as per IS:4139.

(j) Brick Colour**:** Grey

(k) Bricks shall be tested in accordance and as described in IS: 3495 (Part I to IV). Sampling criteria for conformity of the bricks shall be as given in IS: 5454. Each brick shall be marked in a suitable manner with manufacturer's identification mark or initials.

(l) Bricks shall be procured from reputed manufacturer of fly ash bricks satisfying following criteria:

(i) Manufacturing capacity of 25000 bricks / day.

(ii) Experience of min. five years in supply of bricks to Govt projects/reputed projects.

(iii) Avg. Annual turnover of Rs.1.5 Crores for last two consecutive years.

(m) Contractor shall intimate to GE, the name of manufacturer satisfying above conditions from whom he intends to procure the bricks. GE, after verifying the credentials shall approve the name of the manufacturer which shall be binding on the contractor.

6.2.4 WORKMANSHIP

(a) Fly Ash Brick masonry 230 mm thick and above shall be built in cement mortar 1:6 and that 115 mm thick shall be built in cement mortar 1:4 with 10 - 12 mm thick joints. 115 mm thick brick walls shall rest on PCC sub floor/RCC slab unless otherwise specified.

(b) In case of pilasters, suitable construction of these bricks shall be used and duly got approved from GE. Necessary use of half bricks shall be made in the masonry work in the appropriate places to ensure break in joints. If, any gap is left which is less than 15 cm, same shall be filled in with cast-in-situ concrete (1:3:6) type C-1 in case of wall/beam gap filling, the size of aggregate shall be decided to suit the thickness of filling.

(c) In case where the height is less than the height of bricks (i.e. space below lintel over door/windows, ventilator cills and bottom of beam/slab etc), the portion of the walls upto the nearest vertical joint of the adjoining course shall be filled with PCC (1:3:6) type C-1 cast-in-situ and care taken so that the volume of PCC fill is kept minimum.

(d) The sloping of walls below slab/beam lintel etc shall be done with PCC (1:3:6) type C-1 cast-in-situ where required over and above full height of brick.

PARTICULAR SPECIFICATIONS (Contd…)

(e) As the brick masonry work progresses, joints in the masonry work should be raked properly with suitable tool.

(f) Necessary flat-iron holdfast of size 150 x 150mm at every fourth course in brick work shall be provided.

(g) For Half brick work, two bars of 8mm dia with crank @ 150mm c/c at every fourth course in brick work shall be provided.

7.0 **FORM WORK**

7.1 Refer Clause No. 7.15 (7.15.1 to 7.15.12) of MES Schedule Part I. All the form work required for the work shall be of steel. Application of non-adhering oils such as used engine oils or bitumen-based paints to inside of forms is not permitted.

7.2 Steel props/spans/ bracings of sufficient strength such as ACROW props, ACROW spans from ACROW Indian Ltd. Bombay or similar as approved by the Garrison Engineer shall be used. Props shall be rested on firm and stable surface after full compaction of earth under filling floors and PCC for sub base is laid. Formwork shall be designed as per IS 14687 erected and removed of formwork shall be as per clause 11 of IS 456-2M SBC as per soil report. Use of conventional wooden ballies (Posts), struts are not permitted

(a) Steel props screw type height adjustable with steel base shall be used. All connection shall be forged steel couplers.

(b) For all beams and soffits of slab, PU coated plywood shall be used. Shuttering shall be supported on adjustable steel spans.

(c) For all columns, prefabricated steel box type formwork shall only be used.

(d) Readymade steel walk boards shall be used for movement of labour and material on slabs while concreting.

(e) For building of more than two storey, motorized concrete/material lift shall be used.

7.3 Formwork shall be of adequate length and strength and shall be adequately designed, fabricated, erected, supported, braced by contractor and approved by GE and maintained to safely support all vertical and lateral loads that might be applied until such loads can be supported safely by the concrete structure and such loads include: -

(a) Dead weight of forms.
(b) Deadweight of freshly placed concrete and steel reinforcement provided.
(c) 100% impact for dumping of fresh concrete on forms.
(d) General construction live load.
(e) Load carrying capacity of the props.
(f) Lateral wind or earthquake force.
(g) Forces due to operation of construction equipment and compaction equipment.
(h) Lateral pressure of fresh concrete.
(j) Any other criteria as considered necessary by GE.

7.4 Forms shall be suitably stiffened at edges with angle iron or like and shall be new or in new condition free from kinks. Form joints shall not permit leakages and shall be morton tight and neatly fitted and fastened. Deformed steel sheet shall not be used or permitted for use as forms.

7.5 **Cover blocks**

Cover block for slabs, beams, columns, walls etc. shall be factory made covers made of fiber reinforced concrete of strength not less than 30 MPa or readymade polypropylene blocks and PVC ring type cover blocks for columns.

7.6 Props should be straight and placed in true vertical position. Vertical props should be provided with braces in both directions. Number of vertical intervals at which braces are to be provided shall be decided and approved by GE depending upon height of the structure and horizontal loading. Bracings and supports may be of steel at the option of the Contractor and shall be properly and adequately tied to form firm joint. All forms and supporting structure must be braced laterally by cross bracing and securing with the previously constructed un-yielded portion of structure. The supporting structure so provided should become a rigid and solid unit.

7.7 Moving loads in the form of workers on the top of the formwork should be minimized by pumping the concrete and restricting the number of workers. The impact and horizontal loads due to movement of workers should be minimized by keeping them stationery and just moving concrete containers from one person to other up to the place of pouring. It should be ensured that

PARTICULAR SPECIFICATIONS (Contd…)

sub base of the floor is completed and cured after consolidating the earth underneath so that it gives firm base to the props. Vertical props should be provided with braces in both directions. Number of vertical intervals at which braces are to be provided will depend upon height of the structure and horizontal loading as decided and approved by GE.

7.8 Safety of the workmen and structure shall be ensured by through checks that scaffolds are safe, the spacing of verticals, horizontals and braces are carefully designed, making safe access arrangement, preferring steel scaffolds to wooden scaffolds, no bamboo scaffolds shall be used, taking adequate measures against fire, use of safety helmets and safety belts, providing sufficient illumination of work area if work is in progress at night, special attention should be given for female workforce for loose garments etc. The decision of GE in this regard shall be final and binding.

7.9 After erecting, the contractor for inspection of EIC will place the formwork generally for the following aspects: -

(a) Footing or supports under every post of the centering are sound.
(b) All lower arrangement screws or wedges are snug against legs of panels.
(c) All upper arrangement screws or heads of jacks are in full contact with forms.
(d) Panels, props, braces, scaffold etc. are sufficient strong.
(e) Panels are plumb in both directions.
(f) All props and cross braces are in position in place and locking devices are closed and secured in position. In case of chajjas, balcony etc. cantilevers, the props are adequately secured and placed firmly to transfer the load to the supporting point.
(g) The sequence of casting and pouring of concrete will not affect total stability of entire formwork.

EIC after checking will propose the same for approval of GE. Only after approval of GE, the reinforcement will be placed in position as per drawings and specifications.

7.10 The contractor's attention is invited to the stipulation in Clause 4.11.6.3 regarding stripping of formwork. The periods stipulated therein are for concrete using ordinary Portland cement. Forms shall not be removed earlier than as laid down in MES Schedule / IS or as per good practice and until it is certain that the concrete has developed sufficient strength to support itself and all loads that will be imposed on it.

7.11 In case of deviation involving formwork, rates given in SSR Part-II for wooden form works for fair finished surfaces of concrete shall be applicable irrespective of actual formwork materials provided in the work. Nothing extra shall be paid for use of steel or plywood or other type of formwork.

8.0 **WOOD WORK AND JOINERY**:

8.1 **TIMBER AND JOINERY**

Timber for all wood work and joinery (Carpenter's work) and joinery (except factory made Panelled door shutters, Flush door shutters, particle boards, MDF board, block boards and plywood) unless otherwise specified hereinafter shall be **Ist class hard wood 'Teak'** conforming to the sample kept in GE's office. The timber for various purposes is stipulated in IS-287 and also refer Clauses 7.6 and 7.7 of SSR Part I.

8.2 **PRESERVATION OF TIMBER:**

(a) Preservative antitermite treatment shall be carried out to all wood work before incorporation in the work and fabricated by the contractor at site. Factory made plywood/boards are to be treated with approved chemical at site.

(b) Chemical used for antitermite treatment to wood work and joinery fabricated at site shall be copper naphthenate or any other chemicals as specified in IS-401 and applied in any one of the manners as specified in IS-401.

8.3 **SURFACE FINISH:**

Unless otherwise specified all exposed faces of carpenter's work and joinery shall be wrought. All wrought surface shall be finished smooth with sand paper.

8.4 **TOLERANCE**

Tolerance for wrought faces of carpenter's work and joinery shall be as given in MES Schedule, except the following, in which case no tolerance shall be allowed: -

a) Styles and Rails for Panelled joinery.

PARTICULAR SPECIFICATIONS (Contd…)

b) Where the work is indicated in drawings to be of finished sizes.

8.5 **PELLETING:**
Counter sunk holes for bolts and screws in wrought surfaces shall be plugged with tightly fitting plugs and finished plane with surrounding surfaces.

8.6 **PLUGGING:** Plugging to wall shall be as per Clause 7.29 of SSR Part I.

8.7 **SCREWING ETC:**
Use of nails to joinery is prohibited, all planks/shelves, fillets, moulding and the like shall be fixed with screws. The minimum length of screws etc and their intervals shall be as per Clause 7.21 of SSR Part I. Wood screws shall be bright finished. The size and designations shall be as directed by Engineer-in-Charge.

8.8 All the toilet / bath / WC door shutters shall be PVC door all are specified hereinafter as indicated on drawing / directed by GE.

8.9 **PARTICLE BOARD:**
Particle Board where shown in drawing shall be of wood particle three layered, flat pressed, solid core exterior grade BWR type, bonded with phenol formaldehyde synthetic resin adhesive conforming to IS-3487 all as specified in Clause 12.13 of SSR Part I.

8.10 **VENEERED PARTICLE BOARD (OTHER THAN DOOR SHUTTERS)**
Veneered particle board where indicated/shown in drawing shall be three layered flat pressed solid cores exterior grade BWR type with commercial or teak veneer (One side or both sides as shown on drawing) and shall be BWR grade bonded with phenol formaldehyde synthetic resin adhesive conforming to IS-3497 as specified in Clause 12.14 of SSR Part I.

8.11 **PRELAMINATED PARTICLE BOARD**
Pre laminated particle board where indicated/shown in drawing shall be three layered medium density particle board bonded with phenol formaldehyde synthetic resin adhesive with melamine finish, conforming to IS-3487 and IS-12823 Type I and of colour shade, tint and design of the lamination shall be as approved by the GE. Thickness of the board shall be 18 mm if not indicated on drawings. The prelaminated particle board shall be of desired colour/shade on one side as approved by GE and other side is balancing white.

8.12 **PLYWOOD FOR GENERAL USE:**
(a) Plywood where indicated/shown in drawing shall be BWR grade bonded with phenol formaldehyde synthetic resin adhesive conforming to IS-343 for general purposes plywood and IS-1328 for decorative face plywood and as specified in Clause 12.10 and 12.11 of SSR Part I. Face veneer shall be of teak veneer or commercial veneer as shown on drawing.
(b) Unless otherwise shown on drawings outer edge of particle boards shall be sealed with 6 mm thick teak wood beading all round and beading shall be of Teak Wood.

8.13 **MDF BOARD:**
MDF Board where indicated/shown in drawing shall conforming to IS-12406-2003 and as specified in Clause 12.6 of SSR Part-I. Face veneer shall be of teak veneer or commercial veneer as shown on drawing.

8.14 **MARINE PLYWOOD:**
Marine Plywood where indicated/shown in drawing shall be BWP grade marine plywood conforming to IS-710: 2010 (Marine Plywood-Specification).

8.15 **PLASTIC LAMINATED SHEETS:**
Plastic Laminated sheets shall be conforming to IS-2046. The shade/colour of Laminated sheets shall be as approved by Garrison Engineer. Thickness shall be 1.25 mm and shall be glued adhesion as per manufacturer's direction without air pockets. Sheets shall be in one piece without joints. Laminated sheets shall be of brand as specified in Appendix 'C'.

8.16 **FACTORY MADE PANELLED/ GAUZED/ GLAZED DOOR SHUTTERS**
(a) Factory made timber panelled/ gauzed/ glazed door shutters shall be provided all as per details shown in drawing No. CEPZ/94/TD/29 sheet 1/1. Factory made timber panelled/ gauzed/ glazed door shutters shall be provided to the overall sizes indicated on drawings and to the specifications generally conforming to IS-1003.

PARTICULAR SPECIFICATIONS (Contd…)

Sample approval of finished doors shall be taken from GE in writing before placing purchase order in bulk to supplier/manufacturer.

(b) The timber for manufacture of styles and rail /factory made panelled shutters shall be of Class `C' of table-I of IS-1003 Part-I non-coniferous timber other than teak. The species of timber chosen for styles and rails by the manufacturers shall have criteria of strength and coefficient. Weight, durability, workability drying class and %age shrinkage not less than mango timber, as given in group II of Annexure C of IS–12896-1990).

(c) Tenderers are advised to note that the criteria given in clause 7.4.2, 7.7.3 of SSR Part-I shall also be adhered to for this species of timber used. It shall be ensured that the timbers are kiln seasoned and ASCU treated. ASCU treatment shall be vacuum pressure treatment conforming to IS-401. Each style and rails shall be of the same species and sizes indicated in the drawing and each shall be out of one piece of timber only.

(d) 12 mm thick panel inserts shall be flat pressed three-layered veneered particle board (commercial veneer) with BWR grade synthetic resin adhesive exterior grade conforming to IS-3497 with ISI mark.

(e) All members of the Panelled shutter shall be straight without any warp or bow and shall have smooth well-planed faces at right angles to each other. The contact surface of tenon and mortise joints shall be treated before putting together with synthetic resin adhesive conforming to IS-351 suitable for construction work in wood.

(f) The factory made Panelled/Gauzed/Glazed shutters shall be obtained from any of the approved manufacturers listed in Appendix 'C'.

(g) However, it shall be the responsibility of the contractor to ensure that the shutters comply in all respects with the contract specifications.

(h) All surfaces of door shutters required to be painted ultimately, shall be covered evenly by brush painting with a priming coat of suitable pink primer. The painting of primer shall be carried out after the door shutter is manufactured and before incorporation in the work. The application of paint shall be as approved by GE.

8.17 **FLUSH DOOR**

(a) Flush door shutter where ever shown on drawing shall be solid core type with block board commercial type 35 mm thick with 5 mm thick teak wood lipping all round shutter, conforming to IS-2202 (Part I) 1983, all as specified in clauses 8.21.1 to 8.21.6 and 8.22.1 of SSR-2009 Part I. Factory made Flush door shutters shall be provided all as per details shown in drawings.

(b) The factory-made Flush door shutters shall be obtained from any of the approved manufacturers listed in Appendix 'C'. Sample approval of finished flush doors shall be taken from GE in writing before placing purchase order in bulk to supplier/manufacturer**.**

(c) The timber for Chowkhats/frames where specified shall be of Class `C' of Table-I of IS-1003 Part-I non- coniferous timber other than teak. The species of timber chosen for styles and rails by the manufacturers shall have criteria of strength, coefficient. Weight, durability, workability drying class and %age shrinkage not less than mango timber, as given in group II of Annexure C of IS–12896-1990).

(d) The flush door shutter shall be fixed to frame/chowkhat with the help of four Nos stainless steel butt hinges 100 mm size. All builder's hardware shall be of MI anodized. One tower bolt 250 mm, one aldrop bolt 340 mm size and one handle 150 mm long shall be provided to each shutter.

(e) All surfaces of door shutters required to be painted ultimately, shall be covered evenly by brush painting with a priming coat of suitable pink primer. The painting of primer shall be carried out after the door shutter is manufactured and before incorporation in the work. The application of paint shall be as approved by GE.

8.18 **FLUSH DOOR WITH FLY PROOF**

PARTICULAR SPECIFICATIONS (Contd…)

(a) Fly proof Flush door shutter where ever shown on drawing shall be solid core type with block board commercial type 35 mm thick with 5 mm thick teak wood lipping all round shutter, conforming to IS-2202 (Part I) 1983, all as specified in clauses 8.21.1 to 8.21.6 and 8.22.1 of SSR-2009 Part I. Factory made Flush door shutters shall be provided all as per details shown in drawings.

(b) The factory-made fly proof Flush door shutters shall be obtained from any of the approved manufacturers listed in Appendix 'C'. Sample approval of finished flush doors shall be taken from GE in writing before placing purchase order in bulk to supplier/manufacturer**.**

(c) The timber for styles and Chowkhats/frames shall be of Class `C' of Table-I of IS-1003 Part-I non- coniferous timber other than teak. The species of timber chosen for styles and rails by the manufacturers shall have criteria of strength, coefficient. Weight, durability, workability drying class and %age shrinkage not less than mango timber, as given in group II of Annexure C of IS–12896-1990).

(d) Fly proofing shall be provided with stainless steel mosquito proof jali (wire cloth) of approved quality. Stainless steel wire cloth shall be of 0.36 mm nominal dia of wire and 1.18 mm average width of aperture.

(e) The fly proof flush door shutter shall be fixed to frame/chowkhat with the help of four Nos stainless steel butt hinges 100mm size. All builders' hardware shall be of aluminium anodized. One tower bolt 250mm, one aldrop bolt 340mm size and one handle 150mm long shall be provided to each shutter.

(f) All surfaces of door shutters required to be painted ultimately, shall be covered evenly by brush painting with a priming coat of suitable pink primer. The painting of primer shall be carried out after the door shutter is manufactured and before incorporation in the work. The application of paint shall be as approved by GE.

8.19 FIXING OF SHUTTERS

(a) The size of the openings and the frames shall be checked and also the verticality of the side frames and the level position of the floor and the wall. Any adjustment necessary shall be made before installation of the shutters. The shutter shall be installed only after the walls on either side have dried.

(b) Any transit defects or storage defects in shutter shall be filled up with a good putty. Any corner opening may be rectified by the use of glued and pressing by 'C' clamps. Any damage to molding or glazing bars or other fixtures shall be rectified at site by use of similar materials.

(c) Width of hinges shall suit the shutter thickness. Cleats, where indicated, shall properly fit in the rebates of the chowkhat to effectively stop the shutter from closing.

(d) When driving screws, it is advisable that in case of hard timbers pilot holes are drilled before fixing the screws. The screws shall be driven tight fit and straight.

(e) Shutters shall be checked after fixing for proper location alignment and swinging. After all the fixtures have been fitted, the shutters shall be tried again for proper closure, handling and movement. Any rectification necessary shall be done.

8.20 MOULDED PVC DOORS WITH PVC FRAME

(a) Where shown on drawings, all door shutters and frames of WCs, Bath and toilet shall be of PVC. The dimensions and overall sizes of doors shall be as shown on drawings. PVC door shutters shall be obtained from any one of the manufacturers listed in Appendix 'C'.

(b) The PVC door shutters shall be as shown in drawing No. CEPZ/2005/TD/03 sheet 1/1 and shall be fixed as per manufacturer's instruction. In case dimensions are not specified/shown in drawing, the same shall be 34mm thick Factory-made solid panel PVC Door Shutter using prelam PVC sheet consisting of frame made out of MS tubes of 19 mm x 19mm for stiles & 15mm x 15mm for top & bottom rails. MS frame shall be covered with 5mm thick heat moulded PVC sheet 'C' channel having a 5mm thick PVC sheet strip of 20mm width stuck inside with solvent cement, forming stiles and 5mm thick PVC sheets for top rail, lock rail & bottom rail on either side and 10mm (5mm x 2) thick 20mm wide cross PVC sheet as gap inset for top rail & bottom rail. Panelling of 5mm thick PVC sheet to be fitted in the MS frame welded/sealed to the stiles & rails with PVC sheet beading and joined together with solvent cement adhesive etc. shall be complete.

PARTICULAR SPECIFICATIONS (Contd…)

The width of stiles & rails shall not be less than 75mm and 100mm respectively. The door shutter shall be fixed to PVC door frame as per manufacturer's door frame as per manufacturers instructions.

(c) Shutters shall be in depressed panel design and of colour as approved by GE and shall be include extra reinforcement on edges. The whole shutter shall have resistant to mild acid /alkali. Aluminium/Stainless steel mongry to PVC shutter shall be fixed as per manufacturer's instructions. Any tenderer offering PVC shutter with more thickness of PVC will not be paid any extra cost by the Government.

8.21 **PVC DOOR WITH FLY PROOF:**
Wherever shown on drawing, provide PVC fly proof doors of size as shown on drawings and as specified hereinbefore except that provided with stainless steel mosquito proof jali (wire cloth) of approved quality. Stainless steel wire cloth shall be of 0.36 mm nominal dia of wire and 1.18 mm average width of aperture.

8.22 **PRESSED STEEL FRAMES FOR DOORS AND CUPBOARD:**
Pressed steel door frames where mentioned in BOQ, shall be as specified in Clause 10.27 of SSR Part-I. Filling in pressed steel frame shall be with PCC (1:3:6) Type C-0 concrete. Mild steel pressed/sheet shall be 1.25 mm thick. Pressed steel frames shall be factory made and shall not be manufactured at site and shall be procured from the manufacturers as mentioned in Appendix 'C'. Each door frame shall be provided with Flat iron stiffener.

8.23 **FACTORY MADE PRESSED STEEL WINDOWS / VENTILATORS (BOX SECTION TYPE):**
Wherever shown in drawings, the steel windows/ventilators shall be provided with box section type steel windows/ventilators of sizes and pattern as per details shown in TD drawing No. **CEPZ/2016/TD/03** sheet 1R/3 to 3R/3 and as specified here-in-below. **Sample approval of finished windows/ ventilators shall be taken from GE in writing before placing order in bulk to supplier/manufacturer: -**

(a) All section of windows and ventilators shall be of rolled framed section made of Galvanised steel colour coated (base steel as per IS 513- "D" quality. Galvanised as per IS277 with zinc of 120 grams/Sqm with total coated thickness of 0.6 mm.

(b) Each glazed shutter/mesh shutter shall be provided with SS pivot hinges –one set poly propylene handle 75 mm, Aluminium tower bolt with receivers –two nos & Aluminium powder coated peg stay-one no. for glazed shutter alone.

(c) Wherever glass used in the window/vents shutters except toilets/WC/Bath, shall be 5mm thick plain sheet glass of makes as mentioned in Appendix 'C'. 5mm thick Pin headed of specified pattern white figured glass/frosted glass shall be provided in the window/vents of toilets/WC/Bath.

(d) Fly proof shutter shall be provided with stainless steel 32-gauge fly mesh of 344 grade with 144 holes per square inch. Window shall be provided with powder coated grill made of 10mm Square MS bars welded at 100 mm c/c to 25 mm x 5 mm MS flat. Total grill unit shall be powder coated and fixed to window frame/ mulligan with screws

(e) Exposed surface of galvanized steel shall be powder coated as under: - Coated sections shall be primed with a coat of epoxy primer of 5-7 microns thick, finish painted with polyester paint of 12 -16 micron thick. Back coated with alkaline back of 5-7 microns or powder coated with pure polyester powder minimum 50-60 micron thick.

(f) Window frame shall be fixed to brick work /RCC / PCC by using nylon self-expanding caps and driving MS electroplated 80 mm long screws in to caps through frame.

(g) Rest all as per details shown on drawings.

(h) TESTING: - The number of steel windows/vents to be subjected to independent destructive testing in reputed testing house/laboratory by GE & shall be as per Appendix to IS-1038. In case results are not satisfactory, the entire lot shall be rejected. Cost of destructive testing including the requisite number of steel windows/ventilators required as

PARTICULAR SPECIFICATIONS (Contd…)

per lot size is deemed to be included in the quoted lumpsum by the tenderer.

(j) Box section type steel windows/ventilators shall be procured from the manufacturers as mentioned in Appendix 'C'.

8.24 **STEEL DOOR:**

Steel doors where shown on drawings shall be provided all as per details shown in TD drawing.
(a) The steel door shall be fabricated at site and shall be installed at locations all as shown on drawings. The leaf of steel door shall be all as shown on drawing. All materials and workmanship must meet the specified quality hereinbefore. The different type of members of steel doors, sheet and frame for doors shall be all as shown on TD drawing forming part of the contract. Vertical and horizontal stiffeners shall be of thickness and spacing all as per TD drawing.

(b) Hinges, minimum 3 hinges per door or as shown on drawing, locks, handles, bolts and fasteners shall be all as shown on drawing or as directed.

(c) The steel door shall be finished with one coat of anti-corrosive primer coating and finishing shall be with two coats of synthetic enamel paint.

(d) It shall be ensured that the steel doors shall have proper alignment for smooth operation of the door. The specified clearances between door leaf and frame shall be maintained. The steel doors shall be carried out Pre-installation inspection of materials and finishes, functional testing of hardware and door operation before installation.

8.25 **ALUMINIUM SLIDING WINDOWS/VENTILATORS**

Aluminium sliding windows/vent where shown on drawings shall be provided all as per details shown in TD drawing No. CEPZ/2013/TD/01 sheet 1/2 to 2/2. Aluminium members shall be as shown on drawings and as approved by GE of makes as given in Appx C'. In case the thickness of aluminium member/sections not shown on drawings the same shall be minimum 2mm thick. The fittings associated with windows and fixing thereof shall be as per manufacturer's instructions: -

(a) PVC neoprene gasket shall be used in the glazing beads and all-round the shutters of windows and ventilators.

(b) Where shown in drawing, Aluminium windows shall be provided with stainless steel mosquito proof jali of approved quality. Stainless steel wire cloth shall be of 0.36mm nominal dia of wire and 1.18mm average width of aperture.

(c) Glass panes for windows: Glass panes for windows /ventilators shall be of 5mm thick sheet tinted glass of standard makes as specified.

(d) Standard Aluminium grill (Design No. DG 916) shall be fixed to all windows/ ventilators all as per details shown in drawings, as per manufacturer's instructions and as directed.

8.26 **ALUMINIUM DOORS**

(a) Aluminium door where shown on drawings shall be provided all as per details shown in TD drawing No. CEPZ/2010/TD/06 sheet 1/3 to 3/3. Aluminium members shall be as shown on drawings and as approved by GE of makes as given in Appx C'. In case the thickness of aluminium member/sections not shown on drawings the same shall be minimum 2mm thick. The fittings associated with doors and fixing shall be as per manufacturer's instructions.

(b) The glazing shall be provided all as shown on drawings, the thickness of glazing shall be minimum 6.0 mm. Where panel insert is shown as pre-laminated particle board in lieu of sheet glass, the same shall be 12mm thick pre-laminated particle board as specified here-in-before of desired colour/shades on both sides as approved by GE.

(c) PVC neoprene gasket shall be used in the glazing beads and all-round the shutters of windows, ventilators.

(d) All Aluminium doors shall be provided with heavy duty floor spring to each leaf of door shutters. The make shall be Everite or equivalent as approved by GE.

PARTICULAR SPECIFICATIONS (Contd…)

8.26 **WPC DOORS/WINDOWS WITH WPC FRAME**

(a) WPC door shutter with WPC door frame shall be provided as shown in drawings. The dimensions and overall sizes of doors shall be as shown on drawings.

(b) The WPC frame and WPC door shutters shall be fixed as per manufacturer's instruction and shall be obtained from any of the approved manufacturer listed in the Appx 'C'. In case dimension are not specified/ shown in drawing, the same shall be provided as under:-

(i)	Factory made single extruded WPC (Wood Polymer Composite) solid door frame/ chowkhats (Decorative type).	Providing and fixing Factory made single extruded WPC (Wood Polymer Composite) decorative 100% solid door/ window/ Ceosetory windows & other Frames/ Chowkhat of size 65x125 / 65x100 mm (as shown in drawings) comprising of virgin PVC polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibres (wood powder/ rice husk/ wheat husk) and non-toxic additives (maximum toxicity index of 12 for 100 gms) fabricated with mitre 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, modules 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 and as per manufacturer instruction.. 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.
(ii)	WPC Flush Shutters (Single Leaf/ Double Leaf) (Decorative type).	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) 100% solid decorative type flush door shutter of size 35mm thick comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibres (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. WPC to be laminated with PVC foil of minimum 14 microns thick of approved design pasted with hot melt adhesive on both faces of shutter 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 and as per manufacturer's instructions.
(iii)	WPC Wire Gauged Shutter (Single/Double Leaf) (Decorative type).	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) 100% solid decorative type multipaneled wire gauge door shutters 35 mm thick, having integrated ventilating panels (03 No.) fitted with stainless steel wire gauge of average width of aperture 1.40mm in both directions and wire of dia 0.36 mm fixed within extruded aluminium sub-frames (20mm x 20mm x 1mm thick)recessed into the WPC frame for additional strength and safety purpose. The shutter shall have WPC top & bottom rails of width not less than 100 mm and 200 mm respectively and intermediate rails of width not less than 160 mm. Vertical stiles for shutter shall be minimum 100mm wide from the sides The WPC door shutter shall be made from virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibres (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. WPC to be laminated with PVC foil of minimum 14 microns

PARTICULAR SPECIFICATIONS (Contd…)

		thick of approved design pasted with hot melt adhesive on both faces of shutter 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 and as per manufacturer instructions.

9.0 **BUILDER'S HARDWARE**

9.1 **GENERAL**

(a) All articles of builder's hardware shall be new, sound and strongly made, finished to correct shape, free from defects or flaws of any type, shall have smooth action and conform to sample kept in the office of the GE.

(b) Samples of builder's hardware shall be submitted to the GE for approval before ordering in bulk.

(c) All articles of builder's hardware shall bear ISI marking. In case any item/fitting with ISI mark is not manufactured then it shall conform to the relevant ISI specifications and/or specifications given in MES Schedule for the relevant item.

(d) The material, type and pattern of builders' hardware shall be as specified on relevant drawings. The following specifications are for General guidance and shall be followed if relevant details are not mentioned on drawings and hence will not supersede the details given on drawings.

9.2 Irrespective of what is shown on drawings, articles of iron mongery (Builder's Hardware) shall generally conform to the specifications given in section 9 of MES Schedule Part I. The contractor shall produce the samples of each article of builder's hardware, which he proposes to use and get the same approved in writing by the Garrison Engineer. Articles of builder's hardware shall bear ISI mark, wherever available.

9.3 The type of builder's hardware shall be as follows: -

(a) Butt hinges shall be of stainless steel (with stainless steel pin) and shall be of bright finish with smooth surface.

(b) Double / single action spring hinges and catches shall be of mild steel.

(c) Coat hooks/pegs shall be of brass chromium plated.

(d) Irrespective of what is shown on drawings all other articles / fittings of builder's hardware shall be of extruded sections, aluminium anodized white. Thickness of anodizing shall be 15 microns.

(e) All hardware shall be fixed with steel cadmium plated screws.

9.4 The type pattern and size of aluminium anodized fittings shall be as follows:-

(a) Aldrop bolts (sliding door bolt) shall be provided to doors where indicated on drawings. These shall be with hasp and staples (bolt type) and fixing clips etc. complete and shall conform to IS-2681. Aldrop bolts shall be fixed with nuts and bolts only.

(b) Hasp and staples shall be of safety pattern plate type.

(c) Hooks and eyes shall be plate type and the hooks shall be out of extruded section.

(d) Door handles shall be of plain pattern with back plate with diameter of bar 10 mm.

(e) Barrel bolt/tower bolts shall be with 10 mm dia shoot up to 150 mm and 12 mm dia shoot above 150 mm.

(f) Sliding latch shall be 200 mm long of 15.5 x 9 mm flat slide.

(g) Where shown on drawing, magic eye shall be provided in the main entrance door of each quarter as approved by GE.

PARTICULAR SPECIFICATIONS (Contd…)

(h) Screws for all fittings shall match the respective fittings, both in materials and finish except that screws for anodized aluminium fittings shall be of steel cadmium plated.

(j) Piano type hinges shall be continuous type and shall be of stainless steel, bright finish.

(k) Floor door stoppers wherever shown/indicated in drawing shall be aluminium alloy pressure die cast body and tongue with hard drawn steel spring and all as specified in clause 9.15.1 of MES schedule Part I and conform to IS 1823-1980. The aluminium stopper shall be provided to all doors except WC/bath and toilets.

(l) Door spring rat-tail type shall conform to specifications given in clauses 9.7.8 of MES Schedule and conforming to relevant IS.

9.5 **WIRE CLOTH**

GI Wire cloth wherever shown on drawings shall be provided as per Clause 9.23 of SSR Part-I having 0.56 mm nominal dia of wire and 1.18 mm average width of aperture.

9.6 **STAINLESS STEEL WIRE CLOTH**

Stainless steel Wire cloth wherever shown on drawings shall be provided having 0.36 mm nominal dia of wire and 1.18 mm average width of aperture.

9.7 **HYDRAULIC DOOR CLOSER**

Where indicated / mentioned on drawing door closers hydraulically regulated designation No 2, universal type aluminium body suitable for door shutter of weight between 36 to 60 Kg shall be provided as specified in clause 9.16 of SSR Part-I. Provide one number hydraulic door closer to each door in all aluminium doors.

10.0 **STEEL AND IRON WORK**

10.1 **GENERAL**

All steel required for the work under the contract shall be procured, supplied and incorporated in the works by the contractor under his own arrangement.

10.1.1 **Grade and Quality**

Steel supplied by the contractor shall conform to the following grades and quality: -

(a) Steel for concrete reinforcement

(i) Reinforcement bars High strength deformed steel bars produced by Thermo Mechanical Treatment Process (**TMT steel bars of grade Fe 500 D/ Fe 550 D**) meeting all other requirements of IS:1786.

(ii) Minimum percentage elongation should be 18% for Fe-500D/ Fe 550D.

(b) Structural Steel

(i) Structural Steel of Standard Quality shall conform to IS-2062 and Grade E 250 (Fe 410 W quality ‘A’). This type of steel shall be provided for all structural steel works in the locations mentioned in drawings and in clause 10.4.1 of MES Schedule Part-I.

(ii) Structural Steel “Ordinary Quality” shall be used in guard bars, grills and like and shall conform to E 165 (Fe 290). This type of steel shall be provided in the locations specified in drawing and in clause 10.4.2 of MES Schedule Part- I.

(c) Hard drawn steel wire fabric for concrete reinforcement / Fabric reinforcement shall conform to IS-1566.

(d) Galvanised steel sheets (Plain and Corrugated) shall conform to IS-277 and having minimum zinc coating of 120 gm per Sqm, Grade ‘B’ corrugation.

Note: Any items of steel specified in clause No. 10.1.1 (a) to (d) above not conforming to grade and quality shall be rejected and the rejected steel items under the particular consignment shall be removed from the site by the Contractor at his own cost within 7 (Seven) days. The contractor will have no claim whatsoever on this account.

PARTICULAR SPECIFICATIONS (Contd…)

10.2 **SOURCE OF PROCUREMENTS**

(A) **REINFORCEMENT STEEL (TMT BARS)**

Irrespective of whatever is shown on drawing, Reinforcement bars shall be high strength deformed steel bars produced by Thermo Mechanical Treatment process (TMT) meeting all the requirement of relevant IS, shall be provided. The contractor shall procure TMT Bars produced from micro alloyed billets directly from main producer approved by E-in-C's Branch given in subsequent para or Steel may be procured from any other manufacturer approved by E-in-C's branch, New Delhi even after issue/submission of bid and the approved manufacturer's validity shall not be expired at the time of procurement. List of manufacturers are as under: -

Sl No	Company Name & Brand	Address	Type of steel
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 Street Mumbai- 400 001, India Tel: (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)	All
3.	Steel Authority of India Limited (SAIL) **Brand: "SAIL"**	Central Marketing Organization, Northern Region 17th Floor, scope Minar, Laxmi Nagar Distt. Centre, Delhi – 110092	All
4.	M/s SPS Steel Rolling Mills Ltd. (WB) Brand: **"ELEGANT TMT"**	M/s SPS Steel Rolling Mills Ltd. (WB) Regd Office: "Diamond Heritage" 16, Strand Road, Room No H523 A, 5th Floor, Kolkata - 700001 Corp Office: Diamond Prestige, 41 A, A.J.C Bose Road, 9th Floor, Room No 801, Kolkata - 700 017 Mob – 9831058567/9830821273 Email – info@spsgroup.co.in Website – www.spsgroup.co.in	TMT Bars of Gde Fe 500D (8-32mm)
5.	M/s Sugna Metals Limited, Hyderabad Brand: **SUGNA TMT**	M/s Sugna Metals Limited Plot No 76, Vemulawada End Road No 12, Banjara Hills, Hyderabad – 500034 (Telangana) Tele: 040-27665402/27635227 Email – info@sugnatmt.com	TMT Bars of Gde Fe 550D with (Sizes 8mm to 32mm)
6.	M/s Shyam Metalics & Energy Ltd. **Brand: "SEL TIGER"**	Viswakarma, 1st Floor, 86 C, Topsia Road, Kolkata-700046 Ph: +91 33 2285 2212 Website: www.shyamgroup .com	TMT Bars of Gde Fe 500, (Size 8-32mm)
7.	M/s Jindal Steel and Power Ltd, Haryana Brand: "**JINDAL PANTHAR"**	M/s Jindal Steel and Power Ltd, Haryana OP Jindal Road, Hissar, Haryana, Pin-125005 Tel: +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)

PARTICULAR SPECIFICATIONS (Contd…)

8.	M/s Tulsyan NEC Limited **Brand "TULSYAN TMT"**	APEX Plaza, 1st Floor, Old No. 3, New No. 77, Nungambakkam High Road Chennai – 600 034 (TN) Website – www.tulsyannec.in Tele – 044-61991060/61991045 Mob – 9840354010, 9677088334	TMT Bars of Gde Fe 500, Fe 500D & Fe 550 (size 8-32mm)
9.	M/s Electrotherm (India) Ltd **Brand "ET TMT"**	Survey No. 72, Palodia, Via-Thaltej, Ahmedabad Gujarat- 382115 Tel- +91-2717-660649/660550 Fax- +91-2717-234866 Website- www.electrotherm.com	TMT Bars of Gde Fe 500 Fe 500D, & CRS (size 8-32mm)
10.	M/s Steel Exchange India Ltd (A.P.) **Brand "SIMHADRI TMT"**	D. No. 1-65/K/60, Plot No. 60 Abhis Hiranya, Ist floor Kavuri Hills, Hyderabad-500081 (Telangana) Tele – 040-23403725 Fax – 040-23413267 Email: info@seil.co.in	TMT Bars of Gde Fe 500D and Fe 500D HSCRM (size 8-32mm)
11.	M/s Gallantt Ispat Ltd **Brand: "GALLANTT TMX"**	Ward 10BC, Plot No.123, Ground Floor, Gandhi Dham Kutch, Gujrat-370201 Tel:+91-2836-228164 Fax:+91-2836-235787 E-mail: gml@gallantt.com Website: www.gallantt.com	TMT Bars of Gde Fe 500, Fe 500D Fe 500D CRS (size 8-32mm)

(B) **STRUCTURAL STEEL:**
The contractor shall procure all structural steel directly from the main producers namely: -

S.No.	Company Name and Brand	Address	Type of Steel
1.	Rashtriya Ispat Nigam Limited (RINL) **Brand: "RINL"**	Visakhapatnam Steel Plant Visakhapatnam-534 031, India Tel: (91 891) 518226, 518376 Fax: (91 891) 518316 Email: cmdvsp@itpvis.ap.nic.in	Structural Steel (Angle, Beam, Column, Channel, Plate)
2.	Tata Iron & Steel Company (TISCO or Tata Steel) **Brand: "TATA"**	Bombay House, 2, 4 Homi Modi Street Mumbai-400 001, India Tel:(91- 22) 204 9131, Fax:(91- 22) 204 9522, 287 0840 Email: corpcomm@jsr.tatasteel.com	Structural Steel (Angle, Beam, Column, Channel, Plate)
3.	Steel Authority of India Limited (SAIL) **Brand: "SAIL"**	Central Marketing Organization, Northern Region, 17th Floor, scope Minar, Laxmi Nagar Distt. Centre, Delhi-110092	Structural Steel (Angle, Beam, Column, Channel, Plate)
4.	M/s Jindal Steels 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	Structural Steel (Angle, Beam, Column, Channel, Plate)

(C) **Non-structural steel as for guard bars, holdfast, railing, grill, chowkhat etc galvanized steel sheets and structural steel (where total requirement under the contract is less than 5.00 Tonnes) may be procured from authorized dealers of main producers.**

(D) The contractor shall produce original vouchers & test certificates from main producers in case of structural steel for the total quantity of steel supplied, under each consignment. The original vouchers shall be kept on record of the GE duly defaced by Engineer-in-Charge and authenticated.

PARTICULAR SPECIFICATIONS (Contd…)

(E) Steel sections for railing, gates (other than Hanger gates), fencing, guard bars, grills, steel chowkhats, hold fasts etc which do not constitute structural members can be procured from main producers, secondary producers/BIS marked manufacturers or their authorized dealers without any minus price adjustment. Tests will not be insisted upon for such steel sections.

(F) Galvanized iron sheets and fabric reinforcement for concrete to be supplied by the contractors shall be ISI marked and shall be procured from main manufacturers viz. SAIL, RINL, TISCO, JINDAL Steels Power Ltd. as brought out in para 10.1.2 B hereinabove.

10.3 **TESTING AND TEST CERTIFICATE**

(a) The contractor shall produce 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 supplied as specified in relevant IS codes, duly signed by the manufacturer with each consignment.

Note: Production of the test certificate in respect of steel required for guard bars, hold fasts, grills and like by the contractor may not be insisted upon.

(b) The original test certificate shall also be kept on record in the office of GE duly defaced by Engineer-in-Charge and authenticated

(c) In addition to production of test certificate as mentioned in clause 10.1.3 (a) and (b) above, the contractor shall also provide all facilities to the department for independent testing of steel in Government approved Laboratories without any extra cost to the department and testing charges shall be borne by the contractor as stated.

10.4 **Minimum frequency of testing for each source and each consignment**

(a) Steel for concrete reinforcement**:**

(i) Bar size less than 10 mm dia : One sample (3 specimens) for each test for every 25 tonnes or part thereof.

(ii) Bar size 10 mm dia to 16 mm (inclusive): One sample (3 specimens) for each test for every 35 tonnes or part thereof.

(iii) Bar size over 16 mm dia : One sample (3 specimens) for each test for every 45 tonnes or part thereof

(b) Structural Steel:

(i) Tensile test : One test for every 25 tonnes of steel or part thereof.

(ii) Bend test : One test for every 10 tonnes of steel or part thereof.

(c) Chemical Test: Contractor shall submit manufacturer's test certificate to confirm chemical composition laid down in relevant IS-Codes.

Note: For Various tests, Acceptance Criterion, Tolerance etc. refer to Appendix 'A' & relevant BIS Code.

(d) Bend test and tensile test for structural steel shall be carried out as per IS-2062. For high strength deformed bars tensile, bend test and re-bend test shall be done as per IS-1786. For MS bars tensile and bend test shall be carried out as per IS-432.

(e) Minimum percentage elongation should be **18%** for Fe-500D/ Fe 550D.

(f) GE has the right to get one more sample (3 specimen) tested if he is not satisfied with the consignment. However, testing charges for the additional sample over and above frequency given in clause 10.4 above shall be borne by the department.

(g) All testing charges shall be borne by the contractor in case the test results as per independent testing of random samples are not as per criteria laid down in the approved laboratory / test house. However, in any case cost of transportation of samples (to and fro) to the approved laboratory shall be borne by the contractor.

10.5 **RING TEST FOR TMT BARS:**

Ring test for the nitric acid and methanol for 24 hours immersion shall be carried out for all diameters of TMT bars as specified in IS and as directed by GE.

10.6 **STORAGE:**

PARTICULAR SPECIFICATIONS (Contd…)

Steel supplied by the Contractor shall be stored in accordance with the requirement of IS. Each grade and quality of steel shall be stored separately and have identification tags indicating the source, quality and grade.

10.7 **PRESERVATION AND MAINTENANCE OF STEEL:**
The steel brought by the contractor shall be preserved to ensure that no rusting takes place till it is incorporated in the works.

10.8 **SCHEDULE OF SUPPLY**
The contractor shall procure the steel sections, timely as required in accordance with CPM chart, agreed between GE and the contractor. Memorandum of understanding (MOU) has been signed by Department with SAIL (one of the main producers of steel) for supply of steel for MES works to contractor based on their demand directly to the firm. In case contractor faces difficulties in procurement of steel from primary producer, he shall contact GE who in turn will help him in procurement of steel from primary producers. The contractor will forfeit his right to demand extension of time if the supply of steel got delayed due to his failure in placing order in time to the manufacturer/supplier.

10.9 **PAYMENT:**
Receiving payment of steel shall be governed by in accordance with condition 64 of IAFW-2249. Payment shall be allowed only after production of test certificate and purchase vouchers from main manufacturer/producer.

10.10 **MEASUREMENT**
The entire quantity of steel brought to site shall be recorded in Measurement Book “NOT TO BE ABSTRACTED” indicating the reference to manufacturer, source of supply, voucher number, and test certificate before incorporation in the work and shall be signed both by the Engineer-in-Charge and the Contractor. Proper documentation/record shall be maintained as per the instructions on the subject.

10.11 **WEIGHT CONVERSION**
(a) Weight of steel supplied by the contractor shall be calculated at unit weights given in IS conversion table or manufacturer’s certificate shall be followed if the weights are not available in IS tables.

(b) Normal waste and off cuts shall be stacked neatly which shall be the property of the contractor. Contractor shall be allowed to remove such cut pieces after inspection and certification by the Engineer-in-Charge.

(c) Advance on account of payment made towards these cut pieces shall be recovered from advance on account of payment immediately falling due and before removal of such cut pieces from site.

(d) Bending and fixing of bars for concrete reinforcement including mild steel wire for binding shall be carried out all as specified in MES Schedule.

(e) Hooks shall be provided only for mild steel bars. In case of cold twisted/ deformed steel bars ends shall be bent instead of hooks as shown on drawings/specified in relevant IS.

(f) Binding wire for reinforcement shall be mild steel wire (annealed) of size not less than 0.9 mm dia.

10.12 **STEEL SUPPLY/ACCEPTANCE FORM:**
For each consignment of steel supply/acceptance form will be filled in and jointly signed by the department Rep. (AGE/ JE) and contractor and accepted/rejected by GE before incorporation in the works as per Annexure ‘A’: -

10.13 **WORKMANSHIP:**
Workmanship shall be as specified in MES schedule as applicable.

10.14 **WELDING:**
Welding shall be in accordance with Clause 10.15 of SSR Part-I.

PARTICULAR SPECIFICATIONS (Contd…)

10.15 **STEEL REINFORCEMENT:**
Provide reinforcement as shown on drawings in accordance with clauses 10.17 of SSR Part-I, (as applicable). Notes on drawing and Notes on RCC work will be followed in further reference to MES Schedule. For pricing deviations please ref Schedule 'A' notes. The length of each bar for the purpose of omission DO only, shall be considered as Ten (10.0) metres for calculating laps.

10.16 **HOLDFASTS & BOLTS:**
Provide Holdfasts as indicated on drawing. Holdfasts shall be tarred and sanded before fixing. Where holdfasts are required to be provided through concrete column etc, same shall be bolt type as shown on drawings.

10.17 **EXPANDED METAL:**
Expanded metal wherever specified for incorporation shall be of weight not exceeding 4 Kg per Sqm cut to length, bent to shape and shall be tied with and including annealed mild steel wire not less than 0.9 mm dia or shall be fixed with galvanised steel staples all as shown on drawings and directed by Engineer-in-Charge.

11.0 **ROOFING:**
11.1 **ROOFING GENERAL**:
RCC **roof/Terrace** slabs shall be laid to proper thickness and slope as indicated in drawings.

11.2 **APP WATER PROOFING TREATMENT TO ALL RCC ROOFS/TERRACE**
11.2.1 RCC roof/terrace slabs shall be laid as shown on drawings. The water proofing treatment to all **RCC roof/ terrace as referred above** shall be provided with the following specifications irrespective of whatever shown on drawings or specified elsewhere in the tender documents: -

(i) Roof/terrace surface shall be plastered with 10 mm thick cement mortar (1:3) screed bed over slab when concrete is still green, mixed with WPC @ 3% by weight of cement.

(ii) Curing of slab/terrace by ponding with water shall be done all as specified.

(iii) Cleaning of plastered roof/terrace surface and applying one coat of **oil based** cold bituminous primer @ 0.7 Kg per Sqm.

(iv) A layer of APP based polymeric membrane, 3mm thick (minimum), weighing not less than 3.6 Kg/ M^2 prefabricated five-layer water proofing membrane reinforced with polyester non-woven fabric (weighing not less than 160 gms/sqm) shall be applied over compatible primer at 0.40 Litre/Sqm of density at 25 degree Centigrade 0.87-0.89 Kg/Litre and viscosity 70-160 cps or cold sticker, application of APP modified membrane shall be by torch application. The overlaps shall be minimum 100mm on the transverse direction and 100 mm on longitudinal direction.

(v) If **roof/ terrace slab is non accessible** as mentioned/shown in drawing/Schedule of Finishes, provide two coats of Bitumastic- aluminium paint over the APP Modified Membrane and **for accessible roof/terrace** as mentioned/shown in drawing/Schedule of Finishes provide pressed cement concrete tiles 300x300x25mm thick laid over 20 mm cement mortar (1:3) screed bed over slab when concrete is still green, mixed with WPC as per manufacturer instruction and pointed in CM 1:2.

(vi) Where flat **roof/Terrace** shown on drawing WPT as described above shall be carried out by providing padding concrete to make slope given in drawing.

11.2.2 **Characteristics and specification of APP modified membrane**

(a)	Softening point	: min 150^0C
(b)	Penetration at 25^0 C, 100g, 5 seconds	: 20-35 dmm
(c)	Heat resistance	: Does not drip at 120^0C.
(d)	Tensile strength	
	Length wise	: 650N/5cm
	Cross wise	: 350N/5cm
(e)	Elongation	
	Length wise	: >20%
	Cross wise	: >20%
(f)	Dimensional stability	: maximum change of 1%

PARTICULAR SPECIFICATIONS (Contd…)

(g)	Weight of the membrane	: 3.5 Kg/Sqm
(h)	Reinforcement (non-woven polyester)	: >=160 gms/sqm
(j)	Tear strength	
	Length wise	: 340N/5cm
	Cross wise	: 250N/5cm
(k)	Water tightness/impermeability	: at 2 Kgf/cm^2
(l)	Water absorption	: 24 Hours

Notes: -

(a) Water proofing compound shall be mixed in cement mortar as per manufacture's instruction.

(b) For parapets membrane shall be taken to a height of minimum 60cm and then inserted inside the parapet in groove.

(c) Covet fillet in PCC (1:2:4) type B-0 of radius 75 mm shall be provided at the junction of roof and parapet wall/ mumty/ chimney/ other vertical surface and surfaces painted with hot paving bitumen of penetration value 34/40 conforming to IS:73 @ 1.20Kg/Sqm over a coat of bituminous primer, conforming to IS:3384 applied @ 0.4 litre per sqm.

(d) Technical specifications for APP modified membrane shall be as specified here-in-before.
(i) The weight and thickness of APP modified membrane shall be as specified here-in-before.
(ii) Both sides of the centre core will be covered with polymeric asphaltic mix.

(e) In no case damage/puncture of APP modified proofing membrane shall be permitted.

(f) The entire work of water proofing treatment of RCC roof slabs shall be carried out by engaging authorized applicator of the manufacture. For this purpose, contractor shall submit the details of authorized applicator alongwith supporting documents to GE/AGE(I) well in time and the work shall be executed only after written approval by GE/AGE(I), all materials used for water proofing treatment shall be of same manufacture. However, the main contractor shall give guarantee of water proofing treatment for a period of ten years as specified here-in-before.

(g) The contractor shall submit manufactures test certificate in support of APP modified membrane & GE/AGE(I) shall satisfy himself regarding the quality of APP modified membrane before incorporation in the work.

(h) APP modified water proofing membrane shall be of make as specified in Appendix 'C'.

11.2.3 **TESTING OF WATER PROOFING TREATMENT**

(a) After the water proofing treatment is completed, leak proof test shall be done by ponding. For this purpose, in roof, mud, mortar, fillet, ponds shall be made longitudinally one meter a part over entire treated surface of roof to form pond of suitable size as directed by the engineer-in-charge. (These ponds shall be filled with potable water so that an average 50mm (minimum 25 mm and maximum 75mm) height of water is maintained during the test period.

(b) Test shall be carried out continuously for a period of 96 hours. Any seepage notified shall be rectified by the contractor and making good the defective portion to entire satisfaction of the GE/AGE(I), who will pass this stage. All mud fillet bends shall be removed and surface made clear and tidy after completion of satisfactory testing.

(c) Satisfactory completion of test shall not absolve the contractor from his responsibility of rectification of defects, which may arise during defect liability period.

11.2.4 **WATER PROOFING TREATMENT TO SUNKEN FLOORS/SLABS OF TOILET/ BATH/WC ETC:**

9.2.4.1 Floors to toilets/ Baths/ WCs/ Kitchen or wherever shown on drawing need to be sunken to accommodate Traps of WCs, Soil & waste pipes, Nahani traps etc. Hence, sunken floor cannot be all together eliminated and damp proofing treatment shall be provided as under: -

(a) Clean the sunken portion of toilets/ Baths/ WCs/ Kitchen thoroughly to remove laitance, dirt, dust, etc.

PARTICULAR SPECIFICATIONS (Contd…)

(b) Form angle fillet of size 40 mm x 40 mm along the junction of wall and floor using polymer modified mortar ("Dr Fixit" Pidicrete URP" or equivalent).

(c) Sanitary pipes entering through walls and floor shall be sealed with "Dr Fixit Bathseal Tape" and the gaps to be grouted with non-shrink cementitious grout "Dr Fixit Bathseal Grout" or equivalent. Nahani traps etc to be fitted securely and the gaps around it to be grouted in the same manner.

(d) Apply one coat of a Bitumen-modified polymer coating "Dr Fixit Bathseal Plus" or equivalent on all angle fillets by brush and cover it with 100 mm open woven mesh when it is still wet. Apply second coat of the same coating on the angle fillets and allow it to dry completely.

(e) In the remaining area, in dry substrate condition brush apply first coat of the same coating and further apply second coat when first coat is dry. Extend the coating upto 150 mm above the FFL. Above FFL, another cementitious waterproof coating "Dr Fixit Pidifin 2 K" or equivalent can be further applied right upto 2.1 m to waterproof the shower area also, if it is a bathroom or bath cubicles of a sanitary annex and apply second coat after 6-8 hours and allow to dry completely.

(f) After 2 to 3 days, sunken portion must be overlaid with a 50 mm thick concrete screed M 15 type B0 mixed with integral WPC (Liquid) laid to slope 1:60 towards outer face of wall. Provide 40 mm OD UPVC pipe at the lowest point with 340 mm projection beyond the outer face of the wall. Then fill up the sunken portion with lean concrete 1:5:10 type E2.

(g) After completing plumbing work in the toilets/ Baths/ WCs/ Kitchen floor, tiling work (floor and dado) can be carried out using suitable Tile Adhesives and ready-to-make Tile grouts of appropriate makes such as "Dr Fixit. FOSROC SIKA, MC BUCHEMIE, ROFF etc.

11.2.5 **GUARANTEE OF WATER PROOFING TREATMENT OF RCC ROOF AND SUNKEN FLOORS/ SLABS**

(a) The contractor shall furnish guarantee in favour of GE for efficacy of water proofing treatment during the guarantee period. The guarantee shall be of 10 (Ten) years from the certified dated of completion of the work as per contract. Any leaking in the RCC roof noticed during the period shall be carried by the contractor forthwith, on demand in writing from the GE/AGE(I) specifying the roof of buildings affected, notwithstanding date the water proofing treatment to the roof might have been invariantly past, certified and paid for , the contractor shall carry out the rectification the leakage if any in roof including tiling & all other items required to make good at his own expense during the guarantee period and in even of this failure to do within a period to be specified by the GE in his demand aforesaid, the GE/AGE(I) shall undertake such rectification work at the risk and expense in all respect of the contractor.

(b) An amount equal to the 2.5% worked out on the cost of roof treatment at contract rates towards guarantee shall be retained out from the final bill amount towards security deposit for water proofing treatment of slab and sunken slab and will be refunded to the contractor after expiration of the period of 10 (Ten) years from certified date of completion by the GE provided there are no leakage/seepage in the building and the contractor shall first have been paid final bill and have rendered "No demand certificate" (IAFW-415). Condition 10, 46 and 68 of General Condition of contract (IAFW-2249) shall be deemed to be amended to the extent mentioned above.

(c) The contractor shall carryout water proofing work over roof to ensure the entire roof water tightness during the guarantee period of 10 years and he will be responsible to keep the entire surface of roof water tight for a period of 10 years from certified date of completion of work. The security Deposit towards the guarantee for water proofing treatment shall be retained from the RAR/final bill amount. The security deposit shall be released to the contractor after the satisfactory completion of TEN YEARS guarantee period. During the guarantee period if any leakage is found out same shall be got rectified by the contractor without any extra cost to the Government. In any case during the guarantee period the contractor should inspect and examine the treatment once in every year along with the agency.

11.3 **RAIN WATER PIPES:**

Provide Rain water pipes as shown on drawings. Rain water pipe shall be uPVC (medium density) of dia not less than 100 mm with uPVC grating 60 cm size and shall be procured from approved manufacture as per list enclosed as Appendix 'C'.

PARTICULAR SPECIFICATIONS (Contd…)

11.4 **TRANSPARENT SHEET:**

The transparent sheet wherever shown on drawings on open to sky portion shall be 2mm thick fibre glass reinforced translucent plain sheeting overlapping 100mm fixed with coach screw and washer in roof. The make of fibre glass translucent sheet shall be got approved from GE before fixing. The FRP sheet canopy shall be supported on tubular vertical posts. Each post shall be fixed to the roof slab by means of a base plate of minimum 3 mm thickness and size not less than 150 mm × 150 mm, welded to the bottom of the vertical post. The base plate shall be anchored to the slab using not less than four (4) fasteners of 6 mm diameter, grouted to a minimum depth of 75 mm into the roof slab at the location of the openings.

12. **FLOORING**

12.1 **GENERAL**

(a) Refer Clause 13.25 of SSR Part I.

(b) Exposed edges of floor shall be finished to match with top surfaces of floors.

(c) Junction between floor and walls shall be as directed by Engineer-in-Charge at site.

(d) Floors shall be laid to level or to slope or sunk as shown on drawings or as directed by Engineer-in-Charge. The finished surfaces shall be free from any unauthorised rise or hollows.

(e) Floors shall be carried through all the openings in walls and over dwarf wall of passage verandah etc. In case of openings in between rooms etc with different floor finishes, the dividing line of floors of each type shall be, unless otherwise indicated in drawings, the internal edge of the rebate of the door.

(f) For type of floors refer Schedule of finishes/drawings including notes thereon.

(g) PCC floors shall be laid in alternate bays adopting panel dimensions specified in Clause No. 13.32.1 of SSR Part I. Floor bays shall be so arranged that the bays shall be of equal width not exceeding 1200 mm.

(h) Sub base of ground floors shall be laid over hard core and consolidated approved earth filling unless otherwise specified here-in-after.

(j) Sub base need not be laid in bays. No price adjustment shall be made on this account.

(k) Separate formwork need not be provided for flooring when dividing strips are provided. No price adjustment shall be made on this account.

12.2 **PCC SUB BASE**

PCC sub-base as required below floor finish as specified in Schedule of finishes shall be provided over 75 mm thick (M-7.5 type D2) over 100 mm thick hard core over rammed/consolidated moorum or earth as specified in SSR Part-I.

12.2A **PCC FLOORING**

PCC flooring as required below floor finish shall be provided with 150 mm thick PCC M-15 concrete type B1 and shall be provided over 75 mm thick PCC 1:4:8 Type D2 over 150 mm thick hard core over 200mm thick moorum filling duly consolidated/compacted. Expansion/construction joints shall be provided and shall be filled with sealing compound as specified as specified in SSR Part-I.

12.3. **GLASS DIVIDING STRIPS**:

Wherever indicated in drawing / schedule of finishes provide Glass dividing strips for PCC floor & shall be of 3 mm thick sheet glass and shall be provided to the full depth of wearing course. The quality of glass dividing strip for flooring shall confirm to IS–2835.

12.4 **KOTA STONE FLOORING AND SKIRTING AND ON STEPS**

Machine cut machine polished Kota stone slab flooring/ skirting/ steps wherever shown on drawing/Schedule of finishes, shall be provided as under: -

(a) 20 to 25 mm thick polished Kota stone slab of size 550mm x 450mm (Minimum) shall be provided in flooring, set with cement slurry with neat cement mixed with pigment to match the colour of Kota stone slab. The Kota stone slab shall be laid over 20 mm thick bedding layer in CM (1:6) over 75 mm thick PCC 1:4:8 Type D2 sub base over 100mm thick hard core over consolidated approved earth filling in Ground floor. In case of upper floors, the Kota stone slab shall be laid over 20 mm thick bedding layer in CM (1:6) over RCC slab. The work shall be done all as specified in clause 13.47 of SSR Part I.

(b) The Kota stone slabs shall be of selected quality, hard, sound, dense and homogeneous in texture, free from cracks, decay, weathering and flaws. They shall be hand cut to required thickness and shall be of colour/texture approved by GE. The Slab shall have top face polished

PARTICULAR SPECIFICATIONS (Contd…)

before being brought to site. The stone slab/ tile shall be uniform thickness and colour. Tiles/slabs shall be true rectangles.

(c) Every slab shall be cut to required size and shape and fine chisel dressed on sides to full depth so that straight edge laid along side of the stone shall be in full contact with it. The sides (edges) shall be table rubbed with coarse sand or machine rubbed before laying. All angles shall be free from chippings and surface shall be true and plain.

(d) Laying, polishing and finishing shall be carried out all as specified in clause No.13.47.3 and 13.47.4 of MES Schedule Part- I.

(e) 12 to 15 mm thick polished Kota stone skirting shall be provided over backing coat of 10mm thick in CM (1:3), set and jointed in cement slurry with neat cement mixed with pigment to match the colour of Kota stone slab. If height of skirting is not mentioned on drawings, the same shall be provided 100mm high.

(f) On treads of steps, 20 to 22 mm thick polished kota stone slab single piece to the full width of tread and riser shall be provided over bedding layer of 10mm thick in CM (1:3), set and jointed in cement slurry with neat cement mixed with pigment to match the colour of Kota stone slab. Treads of kota stone slab shall be provided with bull nosing and 02 numbers of 5 mm thick anti-skid groove at one side of tile.

Notes:
(i) Where Kota stone slab flooring with borders is shown on drawing/Schedule of finishes, Kota stone flooring shall be provided with 18 to 20mm thick white ‘Makrana’ marble border laid over 20 mm thick bedding layer in CM (1:6) over sub base/RCC slab as specified here-in-above all as directed by Engineer-in-Charge.

(ii) Where Machine cut mirror polished Kota stone slab flooring is shown on drawing/Schedule of finishes, the same shall be of mirror polished Kota stone with seven cuts. Mirror polishing shall be carried out as directed by Engineer-in-Charge.

(iii) After laying, the surface shall be polished in situ using mechanical grinders and polishing machines. Polishing shall be carried out in seven cuts using successively finer grade abrasives to achieve a uniform and smooth mirror-like surface. The sequence of operations shall generally be as under, unless otherwise directed by the Engineer-in-Charge:

1) First cut with coarse stone (No. 60 grit)

2) Second cut with medium coarse stone (No. 80 grit)

3) Third cut with medium stone (No. 120 grit)

4) Fourth cut with fine stone (No. 220 grit)

5) Fifth cut with extra fine stone (No. 320 grit)

6) Sixth cut with very fine stone (No. 400–600 grit)

7) Seventh cut — final buffing using oxalic acid or tin oxide to obtain a mirror polish finish.

(iv) The finished surface shall be smooth, glossy, and free from scratches, waviness, or dull patches. All corners, edges, and junctions shall be neatly rounded or chamfered as directed.

(v) The mirror finish shall be achieved in an approved polishing unit by successive cutting and polishing operations using abrasive stones Nos. 60, 80, 120, 220, 320, 400 / 600, followed by final buffing with oxalic acid or tin oxide to produce a smooth, reflective, mirror-like surface free from scratches, pits, or dull patches. Each slab shall be properly inspected and approved by the Engineer-in-Charge prior to laying.

(vi) After laying, the surface shall be cleaned and lightly buffed by hand or single-disc polisher to restore uniform gloss without damaging the factory polish.

12.5 **NON-SKID COLOURED CERAMIC TILE/CERAMIC TILE FLOORING AND SKIRTING:**
Non-skid ceramic tile/ Colour ceramic tile flooring wherever shown on drawing/ indicated in schedule of finishes shall be provided as under: -

PARTICULAR SPECIFICATIONS (Contd…)

(a) The tiles shall be straight cut edge laid over 10 mm thick bedding layer in CM (1:4), over 20 mm thick bedding layer in CM (1:6), over 30 mm thick PCC 1:2:4 type B-0 sub base, over 75mm thick PCC 1:4:8 type D2 sub base, over 100mm thick hard core over consolidated approved earth filling. In case of **Upper floors,** it shall be laid over 10mm thick screed in cement mortar (1:4) over 23 mm thick PCC 1:2:4 type B-1 padding concrete over RCC slab. Tiles shall be set and jointed in cement slurry and pointed in white/coloured cement to match with the tiles. The work shall be done all as specified in relevant clause of SSR Part-I.

(b) Tiles shall be straight cut edge of non-skid (matt superior finish) as approved by GE.

(c) The size of non-skid tiles (matt superior finish) shall be 340mm x 340mm x 7 mm thick or 400mm x 400mm x 7 to 8 mm thick or 600mmx600mmx8 to 10mm as mentioned in the Schedule of finishes drawing. The colour/shade shall be as approved by GE.

(d) The tiles shall be tested at the sampling rate given in IS-13712 and the tile shall be conforming to IS-13712, grade B-II. Tiles shall be of premium quality.
(e) The make of tile shall be as given in **Appendix 'C'** and as approved by GE.

(f) Tile skirting shall be provided over backing coat of 10mm thick in CM (1:3). The skirting shall be provided flush with the wall. Tiles shall be set and jointed in cement slurry and pointed in white/coloured cement to match with the tiles. If height of tiles skirting is not mentioned on drawings, the same shall be provided 100mm high.

12.6 **VITRIFIED TILE FLOORING AND SKIRTING/DADO:**
Vitrified tile flooring where shown on drawings/schedule of finishes shall be full body/Double Charged Vitrified tiles and provided as under: -

(a) Vitrified tiles shall be of size 600mm x 600mmx 8 to 10mm thick (or 605mm x 605mm) as mentioned in the schedule of finishes and shall be of make as given in **Appendix 'C'**. Colour, shades, texture and design of tiles shall be as approved by GE.

(b) Vitrified tiles shall be laid over cement mortar screed bed 20mm thick in CM (1:6) over PCC sub-base as specified hereinabove. Tiles shall be set and jointed in cement slurry and pointed in white/coloured cement to match with the tiles in such manner to give joint free finish.

(c) In case of upper floors, Vitrified tiles shall be laid over 20mm thick cement mortar screed bed in CM (1:6) over RCC slab. Tiles shall be set and jointed in cement slurry and pointed in white/coloured cement to match with the tiles in such manner to give joint free finish.

(d) Vitrified tiles Skirting/dado shall be laid, set, jointed in neat cement slurry and pointed in white or coloured cement to match over 10mm thick backing coat in CM (1:3) over prepared wet surfaces of walls. If height of Vitrified tiles skirting is not mentioned on drawings, the same shall be provided 150mm high.
(e) Size of Vitrified tiles in dado shall be size 600mm x 340mm x 8 to 10mm thick. Height of dado shall be provided all as shown on drawings/ Schedule of finishes. In case the height of Dado is not mentioned on drawings, the same shall be provided 1200 mm high.

12.7 **GRANITE STONE ON TREADS AND RISERS OR STEPS:**
Where shown on drawings, provide full width of treads and risers of staircase or steps, 18 to 20 mm thick polished Granite stone slab single piece to the full width of tread and risers over bedding layer of 15mm thick in CM (1:4), set and jointed in cement slurry with neat cement mixed with pigment to match the colour of Granite stone slab. Treads of Granite stone slab shall be provided with bull nosing and 02 numbers of 5 mm thick anti-skid groove at one side of tile. The colour of the granite stone shall be as approved by GE.

12.8 **INTERLOCKING PCC PAVER BLOCK FLOORING**
Interlocking Paver blocks flooring where shown on drawings / schedule of finishes shall be with the following specifications: -
(a) Rubber moulded & coloured precast PCC paver block shall be 60 mm thick manufactured using concrete grade M-35 all as specified in SSR and shall be laid over 25 mm thick sand cushioning laid dry over 200mm thick Granular sub base (GSB) over compacted earth. The tile shall be laid in pattern as given in TD drawing. The tile shall be conforming to IS 15658. The tile shall be rubber moulded having glossy finish of size and shape as approved by GE.

PARTICULAR SPECIFICATIONS (Contd…)

(b) Precast concrete Paver blocks shall conform to IS 15658-2006, Specification for Precast concrete blocks for paving. Paver blocks shall be sound and free from cracks or other visual defects. The tolerance on length or breadth of paver blocks shall be + 2mm and tolerance on thickness of tiles shall be +3mm. Water absorption shall not be more than 6 percent by mass.

12.9 **PLASTER IN SKIRTING**

The skirting shall be provided 100 mm high 5 mm thick in setting coat of cement mortar 1:2 finished fair and even using extra cement over 10 mm all as shown on drawing.

12.10 **GLAZED CERAMIC TILES IN DADO/SKIRTING**:

Glazed ceramic tiles in dado wherever shown on drawing/indicated in Schedule of finishes shall be provided as under: -

(a) Ceramic glazed tiles shall be of colour/shade as approved by GE and conforming to IS–13712 grade B-III.

(b) The size of tiles shall be as mentioned in Schedule of finishes drawing. The colour/ shade/ texture/ design of tiles shall be as approved by GE. In case size of Ceramic glazed tiles in dado is not shown in drawing/ Schedule of finishes, the same shall be provided as 250mm x 350mm x 7 to 8 mm thick or 300mm x 450mm x 7 to 8mm thick.

(c) Where shown in drawing/ schedule of finishes, designed coloured decorative border of dark/contrast-coloured tiles 100mm height shall be provided in dado at top as directed by GE.

(d) The tiles shall be laid over 10mm thick bedding / backing layer in CM (1:3) over prepared and wet wall surfaces and shall be as specified in clause No 13.40 of SSR Part-I. Tiles shall be set and jointed in neat cement slurry and pointed in white cement with pigment to match the colour of tiles. Height of dado shall be as shown on drawings/ Schedule of finishes. In case the height is not mentioned on drawings, the same shall be 2100 mm high.

(e) The tiles shall be tested at the sampling rate given in IS–13712

(f) Tile shall be of premium quality. The make of tile shall be as given in Appendix ‘C’ and as approved by GE.

(g) Provide triangular filleting to dado in CM 1:3 finished even and smooth without using extra cement.

Note:

In case of mismatch between type of flooring and skirting/dado in a particular location, the type of flooring shall remain firm and skirting/dado to match the flooring shall be provided by the contractor and its cost is deemed to be included in the quoted rates.

12.11 **BUILDING RAMP**

Ramp for building shall be provided all as shown on drawings and as specified and shall be finished with XPM marks while concrete is green to full length and width of ramp on 100 mm thick PCC M15 concrete type B1 over 100 mm thick hard core over consolidated approved earth filling and as directed by Engineer-in-Charge.

13. **PLASTERING AND POINTING**

13.1 **GENERAL**

(a) Plastering shall be carried out all as shown in Schedule of finishes/drawings (including notes thereon) and/or specified here-in-after.

(b) The thickness of the plaster mentioned is the minimum thickness above the protruded part of masonry and is exclusive of thickness of key. Dubbing if required is deemed to be included in the plaster work and nothing extra shall be paid.

(c) Plastering shall be in one coat (including dubbing) unless otherwise specified.

(d) Mortar for plastering work/pointing may be machine mixed or hand mixed at the discretion of the contractor.

PARTICULAR SPECIFICATIONS (Contd…)

(e) Preparation of mortar for pointing indicated here-in-after shall be as per Clauses 14.13 and 14.13.3 of SSR Part I.

(f) The preparation of surface and application of plaster shall be as per Clause 14.14 of SSR Part I as applicable to new work.

(g) The junction of skirting/dado and plaster shall be as directed by Engineer-in-Charge/specified herein after.

(h) The Fine aggregate (sand) required for plastering shall be naturally occurring river sand only conforming to clause 4.4 of SSR Part-I. Manufactured sand shall not be used for plastering/pointing.

13.2 **INTERNAL PLASTER:**
Wherever shown/ indicated on drawing, provide 10 mm thick internal plaster with ready mix plaster (Makes/brand- ACC's "ACCOPLAST"/ CK Birla's "AEROCEN" / Magic Plast /Speed Dry Mix's "ECO PLASTER" as specified in drawing. The surface shall be finished fair and even without using extra cement.

13.3 **EXTERNAL PLASTER:**
Wherever shown/indicated on drawing, provide 15 (10+5) mm thick external plaster with ready mix plaster in two layers mixed with WPC in both layers at the rate of 3% of weight of cement or as per manufacturer's instructions and ready-mix plaster of Makes/brand- ACC's "ACCOPLAST"/ CK Birla's "AEROCEN" / Magic Plast /Speed Dry Mix's "ECO PLASTER" as specified in drawing. The surface shall be finished even and fair sponge finish. Where brick cladding is shown in elevation/architectural drawings, external plaster will not be provided.

13.4 **CEILING PLASTER:**
Wherever shown/ indicated on drawing, provide 5 mm thick ceiling plaster with ready mix plaster (Makes/brand- ACC's "ACCOPLAST"/ CK Birla's "AEROCEN" / Magic Plast /Speed Dry Mix's "ECO PLASTER" as specified in drawing. The surface shall be finished fair and even without using extra cement.

13.5 **PLASTER GROOVE AND CHICKEN WIRE MESH**
(a) Irrespective of whatever shown on drawings or specified elsewhere in the tender documents, no grooves are provided at the junction of RCC and masonry on the external surfaces. Instead, a strip of chicken wire mesh 10 mm aperture and 0.63 mm dia & 150 mm wide be fixed over the junction before the plastering to act as reinforcement for the plaster. However, the grooves will be provided inside the building as per SP: 25 of Bureau of Indian Standards.

(b) The position where the PCC block/brick walling is on both sides of lintel/beams/columns, the width of chicken wire mesh shall be 7.5 cm on either side and fixed with tinned tacks on walls.

14. **WHITE WASHING/COLOUR WASHING/ DISTEMPER/ WEATHER PROOF ACRYLIC EMULSION PAINT:**

14.1 **GENERAL**
White wash/colour wash shall be provided as specified in Section 15 of MES Schedule Part-I. The workmanship shall be as described in MES Schedule for new work.

14.2 **WHITE WASH:**
Three coats of white (lime) wash after preparation of surfaces shall be applied to surfaces as indicated in Schedule of finishes unless otherwise specified in the specifications.

14.3 **COLOUR WASH:**
Two coats of colour wash over one coat of white wash after preparation of surfaces shall be applied to the surface indicated in Schedule of finishes.

14.4 **CEMENT BASED PAINT:**
Two coats of cement-based paint over a coat of primer shall be applied to surfaces where shown in schedule of finishes. Cement based paint shall conform to IS 5410 and shall be applied as specified in clause 15.15 of SSR Part-I. Colour/shade of cement-based paint shall be approved by

PARTICULAR SPECIFICATIONS (Contd…)

GE. Preparation of surfaces and application of paint shall be done all as described in clause 12.4 here-in-before.

14.5 **ACRYLIC WASHABLE DISTEMPER:**

(a) Pre Painting:

Check the surface for incidence of dampness or water seepage and rectify the water seepage or dampness at source. Any loose plaster should be removed from the wall. Check for loose plaster by tapping on the walls. A hollow sound indicates loose plaster.

(b) Preparation of Surface:

Preparation of surfaces and application of paint shall be done all as described in clause 12.4 here-in-before.

(c) Application of Acrylic Distemper:

Apply two coats of acrylic distemper (first quality) over a coat of acrylic primer after a gap of 10 - 12 hours after application of primer. In case primer for Distemper is not specified, the same shall be alkali resistant primer all as specified in clause No. 15.14.3 of MES Schedule Part-I 2009 Part-I (Specifications) over white-cement based wall putty 1.5 mm thick in two layers.

14.6 **EXTERIOR ACRYLIC EMULSION WEATHER COAT PAINT (ANTI FUNGAL, ANTI ALGAE):**

Where Exterior acrylic emulsion weather coat paint is indicated in schedule of finishes, the same shall be provided in two coats Acrylic Emulsion weather proof anti-fungal, anti-algae coat over a coat of suitable primer including preparation of surface. Preparation of surfaces and application of paint shall be done all as described in clause 14.8 here-in-after. Tint of paint and make shall be as approved by GE.

14.7. **GUARANTEE FOR WEATHER COAT ANTI FUNGAL, ANTI ALGAE ACRYLIC EMULSION PAINT & GUARANTEE AMOUNT:**

The contractor shall give a written guarantee for Five years from the certified date of completion of entire work for the effectiveness of the paint carried out in favour of Garrison Engineer.

(a) An amount equal to 2.5% of weather proof anti-fungal, anti-algae acrylic emulsion paint shall be retained from the amount due in final bill as guarantee amount for 5 years towards the performance of the work executed. This amount shall be released after successful expiry of the guarantee period provided there and the contractor shall first have been paid final bill and have rendered a "No demand Certificate" [IAFW–451]. The security deposit referred here-in-above is independent of the guarantee amount referred against Performance Security here-in-before. Conditions 10, 46 and 68 of General Conditions of contracts [IAFW–2249] shall be deemed to be amended to the extent mentioned above. However, the guarantee amount will be released to the contractor if a fixed deposit in the name of "Garrison Engineer' for equal amount for 5 years is submitted by the contractor. The fixed deposit receipt amount shall be released to the contractor after expiry of guarantee period satisfactorily. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days from the date of receipt of demand in writing from the GE and if the contractor fails to do, the same shall be got done through other agency at the risk and cost of the contractor.

(b) In order to facilitate the watch of satisfactory fulfilment of guarantee, the contractor shall provide a board of adequate dimensions but not less than 600 mm X 450 mm X 20 mm, set and pointed in CM (1:4) on all the buildings at 900 mm above the plinth level as directed by the Engineer–in–Charge and indicate there on the contract No, Name of the contractor, Name of the agency who has executed the work, date of completion of the work and the date of expiry of the guarantee period.

14.8 **SMART PAINTING METHOD ON NEWLY PLASTERED SURFACES FOR CEMENT BASED PAINT / ACRYLIC WASHABLE DISTEMPER / PLASTIC EMULSION PAINT/ WEATHER PROOF ACRYLIC EMULSION PAINT:**

(a) **Preparation of Surface:**

It is an express condition that irrespective of what had been specified elsewhere, the preparation of new surface of walls, ceiling, chajjas, fins, fascias, parapets etc shall be done by using mechanical sander with internal dust extraction system for clean environment. The equipment shall be certified by approved manufacturer.

(b) **Application of paint:**

PARTICULAR SPECIFICATIONS (Contd…)

The paint shall be applied by using airless spray technology and capable of operating single spray gun with a suitable hose length.

(c) **The contractor's attention is invited that painting work for internal and external finish shall be done through paint manufacturer or their authorised applicators as described in the Notes here-in-below. The contractor's rates shall be deemed to be included this provision in his quoted rates.**

NOTES: -

(i) The equipment used for preparation of surface and application of finishes shall be certified by approved manufacturer. After preparation of surface, approval shall be obtained from Engineer-in-Charge before applying primer and further treatment. Building wise stage passing register shall be maintained.

(ii) Spray machine used for application of finishes i.e. cement based paint, oil bound distemper, acrylic water based interior grade primer, interior acrylic emulsion, acrylic water based exterior grade primer, water based premium acrylic smooth exterior emulsion etc to surface of walls, ceiling, chajjas, fins, fascias, parapets etc, should be from reputed manufacturer with pro-guard technology and capability of tracking pressure as well as paint & primer usage. The equipment shall be certified by approved manufacturer.

(iii) The accessories for applying the finishes shall be able to spray in hard-to-reach areas and penetration of finish on the surface so as to achieve uniform application and quality surface finish.

(iv) Contractor is required to enter into necessary MoU with paint manufacturer and their authorised applicator before quoting his bid.

(v) Authorised applicator of paint manufacturers shall have valid authorization letter from the manufacturer issued not earlier than 34 days from the expected start date of finishing work. The authorization letter needs to be valid for the complete period of execution.

(vi) After completion of finishing work, certificate for quality of finishing shall be given by paint manufacturer or their authorised applicators.

15. PAINTING

15.1 GENERAL

(a) Painting shall be of quality not inferior to those required by the relevant IS and as per Clause 17.2 of SSR Part I.

(b) Workmanship and preparatory works shall be as per Clause 17.6 of SSR Part I as applicable for new works. Painting shall be with priming coat, under coat and one finishing coat unless mentioned otherwise. Primer for wood work shall be pink primer and for steel shall be red oxide generally. Priming coat shall be redone if more than six months have lapsed before executing the under coat.

(c) The final finish of paint shall be glossy suitable for, internal / external use as approved by the GE. Galvanised steel articles (sheet, pipes etc. and wire cloth) and builders' hardware shall be left untreated. All coats of paint shall be synthetic enamel paint and shall be obtained from any one of the manufacturers listed in Appendix 'C' and shall be of first grade/first quality. Exposed surface of all steel and wood items shall be painted with two coats of synthetic enamel paint over a coat of primer unless otherwise specified elsewhere.

15.2 FRENCH POLISHING

French polishing to wooden surfaces wherever indicated in drawing shall be prepared and applied all as specified in clause 17.7.4 of SSR Part I.

15.3 TARRING

Two coats of hot tar shall be applied on the following surfaces: -

(a) Timber surfaces in contact with or buried in concrete/masonry.

(b) Hold fasts shall be tarred and also sanded.

15.4 PAINTING TO WOODEN SURFACE

PARTICULAR SPECIFICATIONS (Contd…)

Painting to all exposed wooden surfaces shall be carried out with two coats of synthetic enamel paint over a coat of pink primer all as specified in SSR Part-I.

15.5 **PAINTING TO STEEL SURFACE**

Painting to all exposed iron and steel surfaces shall be carried out with two coats of synthetic enamel paint over a coat of Zinc chromate primer all as specified in SSR Part-I.

16. **GLAZING**

16.1 **SHEET GLASS:**

(a) Sheet glass for glazing where ever shown on drawing shall be plain, clear, good quality free from specks, bubbles, smoke wanes, air holes and other defects and shall conform to IS-2835.

(b) The thickness of sheet glass where not indicated on drawings shall be 4 mm nominal thickness for the panes not exceeding 0.5 Sqm each and 5 mm (nominal thickness) for panes exceeding 0.5 Sqm each.

16.2 **PIN HEADED GLASS:**

(a) Pin headed specified pattern white figured glass shall be provided for the Windows / Ventilators of WC and bath / toilets.

(b) Each pane of glass shall be in whole piece. Thickness of glass for aluminium doors shall be 5.5 mm irrespective of size of glass panes.

16.3 Glazing to windows/vents shall be carried out as per clause 16.10 of SSR Part-I.

16.4 Putty for wood and metal shall conform to IS-419.

17. **SANITATION AND PLUMBING**

17.1 **SOIL/ WASTE/ VENT/ ANTI SYPHONAGE PIPES & FITTINGS**

(a) All Soil/Vent Pipes/Fittings shall be UPVC pipes type ‘B’ and shall be provided all as shown on drawing. In case size of pipes are not given on drawings, soil/vent pipes and fittings shall be 110 mm dia and all waste vent pipes and fittings shall be of 75 mm dia. 110 mm dia UPVC pipe shall be provided from gully trap to first manhole.

(b) UPVC pipes shall conform to IS-13592-1992 and shall have ISI mark on them. Also refer clauses 18.27A including sub clauses of SSR Part-I.

(c) UPVC pipes and fittings if not shown on drawing shall also be provided in following situations: -

(i) All waste pipes from Nahani Trap/floor trap to Gully trap.
(ii) Soil pipe/fittings from WC to vertical soil/vent pipe.
(iii) Waste pipe connection from Nahani trap to first manholes.
(iv) All other pipes underground/floors.

(d) Soil/ Waste/ vent/ anti syphonage pipes & fittings shall be fixed to walls 50 mm clear of wall, distance pieces & spike nails to run 65mm into tarred hard wood plug built into walls & with wooden plugs & screws 22 gauge for securing to concrete. Pipes & fittings shall be jointed & fixed as per manufacturer’s recommendation.

(e) All drain pipes from surface gully (i.e. gully trap) upto first manhole outside the building as well as vent pipe connecting cast iron soil pipe duck foot bend below ground level upto first manhole shall be 110 mm dia UPVC Pipe of approved make grade ‘A’ conforming to IS-651.

17.2 **NAHANI TRAP/FLOOR TRAP:**

Provide CPVC Nahani trap/floor trap of 75 mm out let with hinged gratings as indicated in drawing. Nahani trap shall be with long arm and shall be of approved quality weighing not less than 5.50 Kg. Floor trap shall conform to IS-3489.

17.3 **GULLY TRAP**

Provide salt glazed stone ware gully traps with grating where indicated in drawings/directed conforming to IS-651. Expanded metal reinforcement for precast RCC cover shall be of weight exceeding 2 Kg but not exceeding 4 Kg per Sqm. Size of gully trap shall be 150 mm x 150 mm.

PARTICULAR SPECIFICATIONS (Contd…)

17.4 **SANITARY AND TOILET FITTING**

All sanitary fittings shall be glazed vitreous China white first quality with ISI marking unless otherwise specified. All sanitary/toilet fittings shall be provided as shown on drawings.

17.5 **SQUAT PATTERN WATER CLOSET ORISSA TYPE**

Where shown in drawings, Indian type Water Closet vitreous China white {Make: - Cat Part No. CALINA S3010102 of CERA or equivalent model of makes as per Appendix 'C' and as approved by GE} shall be Orissa type and shall be size 580 mm x 440 mm with `P' or `S' trap tiles and shall interlia include the cost of the following: -

(a) 32 mm dia PVC flush pipe of required length including all fittings and connected to WC as per manufacturer's instructions.

(b) 10 litres capacity PVC white coloured, low level, flushing cistern (Make: Cat Part No. COVAN B1010110 of CERA or equivalent model of make as per Appendix 'C') conforming to relevant IS complete with internal fittings and necessary fixing arrangement and fixing to wall. The fixing of high-level flushing cistern shall be made with two angle iron brackets of 25x25x3 mm.

(c) WC pan and trap shall be set in cement concrete all as shown on drawings/as specified hereinbefore and as directed by Engineer-in-Charge and finished just below the level of rim of pan to receive the specified thickness of floor finishing. The joints between pan and soil pipe shall be as shown on drawings.

(d) Exposed steel surfaces shall be painted with two coats of synthetic enamel paint over one coat of red oxide zinc chrome primer

(e) Over flow pipe shall be of 15mm dia polyethylene HDPE pipe with working pressure of 2 kg/sq.cm and shall be fixed with polythene anti mosquito rose.

17.6 **EUROPEAN TYPE WATER CLOSET**

European type Water Closet {Make: - Cat Part No. CAMELIA S1053104/ S1053105 of CERA or equivalent model of makes as per Appendix 'C' and as approved by GE} shall be provided where shown on drawing and shall interalia include the cost of the following: -

(a) White glazed vitreous china water closet wash down pattern (with P or S trap) all as per IS-2556 (first quality) Part-II fixed to the floor with brass screws to hard wood plugs embedded in floor.

(b) Plastic seat and cover with flat under side, solid moulding close pattern with cover shall be white in colour with pan and shall be fixed to WC with chromium plated hinges and nut.

(c) 10 litres capacity PVC white coloured low level flushing cistern (Make: Cat Part No. COVAN B1010110 of CERA or equivalent model of make as per Appendix 'C') conforming to relevant IS complete with internal fittings.

(d) 40 mm dia PVC flush pipe shall be connected to WC all as per manufactures instructions.

(e) Exposed surfaces of steel shall be painted with two coats of synthetic enamel paint over a coat of primer.

17.7 **WASH HAND BASIN WITH MIRROR:**

Where shown on drawing, provide white coloured Wash Hand Basin of vitreous china first quality. Wash hand basin {Make: Cat Part No. CADAL S2040121 of 'CERA' or equivalent model of makes as per Appendix 'C' and as approved by GE} shall be of size 515 mm x410 mm (or nearest size) and shall include the cost of the following: -

(a) 40 mm dia GI waste pipe from CP waste fitting to NT/ bottle trap.

(b) GI pipe connection from bottle trap to Nahani trap.

(c) A pair of painted standard cast iron brackets.

(d) Rubber plug and chain chromium plated 400 mm length.

(e) Brass chromium plated bottle trap 32 mm bore.

(f) Polished sheet glass mirror shall be 5.50 mm thick. These shall be of 1st quality and make as specified in Appendix 'C'. The size of mirror shall be as shown on drawing with bevelled edges and square corners polished edged with fused PVC frame work including 6mm thick plywood backing of BWR grade with commercial face veneers backing and fixed to wall with brass screws in gutties. Size of mirror if not indicated on drawing, the same shall be 450 x 600 mm and shall be mounted above WHB at a height as directed by Engineer-in-Charge.

PARTICULAR SPECIFICATIONS (Contd…)

17.8 **COUNTER TYPE GRANITE MOUNTED WASH HAND BASIN WITH FULL SIZE MIRROR:**

(a) WHB mounted on 18-20 mm thick granite slab shall be provided at the locations shown on drawings and shall be provided all as per details shown in the relevant drawings of buildings. The Wash Hand Basin {Make: Cat Part No. OVAL S2034103 of CERA or equivalent model of makes as per Appendix 'C' and as approved by GE} shall be counter top type of vitreous china first quality as shown on drawing and shall be installed on polished 20mm thick green marble slab. The contractor shall get samples of granite marble slab approved by the GE for the colour and quality of granite before incorporating in the work. Every slab shall be machine cut to the required size and shape and shall be pre-polished with rounded polished edge.

(b) Granite stone slab shall be laid over 20mm thick cement mortar (1:4) screed bed over 80mm thick RCC slab supported on 100 mm thick AAC block masonry plastered as per internal plaster on three exposed sides all as per details shown in drawing.

(c) Wash hand basin shall be of oval shaped and shall include the cost of the following: -

(i) 40 mm dia GI waste pipe from CP waste fitting to NT/ bottle trap.

(ii) GI pipe connection from bottle trap to Nahani trap.

(iii) Brass chromium plated bottle trap 32 mm bore with CP waist coupling, rubber plug & chain C.P 400mm long.

(iv) Mirror shall be 5.50mm thick and of size as shown in drawings. These shall be of 1st quality & of make as specified in Appendix 'Ç'. Mirror shall be with bevelled edges and square corners polished edged with fused PVC frame work including 6 mm thick plywood backing of BWR grade with commercial face veneers backing and fixed to wall with brass screws in gutties. Size of mirror if not indicated on drawing, the same shall be full size of granite stone slab and 800 mm height and shall be mounted above WHB at a height as directed by Engineer-in-Charge.

17.9 **URINAL AND FLUSHING SYSTEM**

(a) Urinal shall be vitreous china flat back of size 32.5cm x 31cm x 42 cm (or nearest size) conforming to IS-2556(Part VI) of white colour including providing and fixing with and securing urinal to plugs with brass screws complete {Make: - Cat Part No. CARYS S4020104 of 'CERA' or equivalent models of makes as per Appendix 'C' as approved by GE}.

(b) Chromium plated push type Stop valve shall be provided for flushing.

(c) Screen/partition wall as shown on drawing shall be of machine cut polished (on both sides) granite stone slab 15 mm thick and shall be provided to the sizes as shown on detailed drawings.

(d) A full brass chromium plated Urinal Spreader fix to 15mm GI Pipe, 32 mm waist coupling suitable for urinal, chromium plated bottle trap weight not less than 175gms.

17.10 **URINAL PARTITION**

Where shown in drawing, Urinal Partition shall be 15 mm thick mirror polished granite with rounded edges embedded in wall plastered as per internal plaster on three exposed sides. The size and shape of partition shall be as specified in the drawing.

17.11 **RAISED PLATFORM FOR URINALS:**

PCC platform of size as specified in drawing shall be provided where shown. PCC shall be of mix (1:2:4) type B1, using 20mm graded stone aggregate. Non-skid ceramic tile as per floor finish shall be provided over 20mm thick screed in Cement Mortar (1:6) over PCC platform. The drain shall be of size 100mmx100mm and finished with ceramic tile laid over cement mortar screed as mentioned above.

17.12 **TOILET PAPER HOLDER (TPH):**

Toilet paper Holder with flap guard {Make: Cat Part No. ACN-CHR-1151N of Jaguar or equivalent model of makes as per Appendix 'C' and as approved by GE} shall be provided at locations as shown on drawings.

17.13 **SHELF FOR SOAP:**

40mm thick mirror polished Cuddapah stone shelf made to shape (circular) as shown in drawing shall be embedded in the wall at two sides all as per details and location shown in drawing.

PARTICULAR SPECIFICATIONS (Contd…)

17.14 **TOWEL RAIL:**
Towel rail 600 mm length as per Cat Part No. AQN-CHR-7711 of Jaguar or equivalent model of makes as per Appendix 'C' and as approved by GE, shall be provided at locations as shown on drawings.

18.0 **MISCELLANEOUS ITEMS:**
18.1 **GENERAL**
Miscellaneous items, fittings and fixtures shall be provided all as per locations shown on drawings. Specifications for miscellaneous items, fixtures and fittings shall be as shown on drawings and as per relevant specifications of SSR Pat-I. For the following and other miscellaneous items, relevant details shown on drawings of respective items shall be referred in preference and studied before providing them and shall be provided all as shown on drawings and as specified or shall be of any reputed makes of similar nature as shown in Appendix 'C' or as approved by GE and cost of them is deemed to be included in the lump sum cost of respective building in Schedule 'A' Part I.

(a) Health faucet with tap: At locations all as shown on drawings and shall be provided as per make specified in Appendix 'C'.

(b) Cooking platform: At locations all as shown on detailed drawing and as specified.

(c) Peg Set of 3 At locations all as shown on drawings and shall be provided as per make specified in Appendix 'C'.

(d) Platform 3 Tier (3TCS): At locations all as shown on detailed drawing and as specified.

(e) MS Railing type 'A': At locations all as shown on detailed drawing and as specified.

(f) Ward robe

(g) MS Ladder: At locations all as shown on detailed drawing and as specified.

(h) Drapery rod: At locations all as shown on drawings and shall be provided as per make specified in Appendix 'C'.

(j) RCC 3 Tier shelving: At locations all as shown on detailed drawing and as specified.

(k) Towel Ring: Towel rail 600 mm length as per Cat Part No. AQN-CHR-7711 of Jaguar or equivalent model of makes as per Appendix 'C' and as approved by GE, shall be provided at locations as shown on drawings.

(l) SS Soap tray: At locations all as shown on detailed drawing and as specified.

(m) Soap nitch: At locations all as shown on detailed drawing and as specified.

(n) Dressing cabinet with mirror full length.

(o) Platform of SS sink with draining board on both sides of sink: At locations all as shown on detailed drawing and as specified.

18.2 **HDPE WATER STORAGE TANKS:**
(a) Water tanks shall be provided as shown on drawing. Water tank shall be single piece rotational moulded polyethylene, (cylindrical vertical with top closed) triple layer, conforming to IS white coloured. HDPE water storage tank cover shall be screwed type.

(b) The lump sum shall also include for the following: -
(i) CPVC Pipes 10 cm long projected inside and outside of tank with bore as indicated in drawing for inlet and outlet including high pressure brass ball valve of bore as per bore of inlet with polythene float brass rod and fly nut conforming to IS-1703.
(ii) CPVC Pipes for inlet of size shown on drawing medium grade 10 cm long projected inside and outside for wash out pipe with mosquito proof cap.
(iii) CPVC Pipes projecting 10 cm inside and outside the tank for over flow.
(iv) CPVC Pipes projected 10 cm above top of tank for vent.
(v) 20 mm wall float valve complete.

PARTICULAR SPECIFICATIONS (Contd…)

(c) Capacity and number of water tank shall be provided as shown on drawing. The tanks shall be placed over PCC (1:2:4), type B2, 100mm thick platform all as shown on drawing.. The capacity of water tank if not indicated in drawings shall be treated as tank of capacity 2000 ltrs. The lump sum quoted shall include for the same. Water tank shall be of any of make specified in Appendix 'C'.

(d) Staging if shown on drawing for placing the tanks shall be as shown in structural drawings.

18.3 **RCC JALLI:**

Where shown in drawing, RCC Jalli with mix (1:2:4) using aggregate of size 6mm and below shall be precast with wire reinforcement and jointed in cement mortar (1:3). Thickness where not shown on drawing shall be minimum 50mm. Faces of RCC Jalli shall have fair and even surface. In the event of deviation RCC Jalli shall be priced as pre-cast using aggregate of size 12.5mm subject to contractor's percentage quoted in schedule 'A' Part-I or deviation percentage as applicable.

18.4 **CRUMPLE SECTION / EXPANSION JOINT**

(a) Crumple section joints shall be provided at the locations shown in drawing and as per details shown in drawing No. CEPZ/2009/TD/06 STR Sheet 1/1.

(b) The crumple joint shall be filled with pre moulded bituminous filler board to a depth of 234mm and top shall be sealed with sealing compound grade "A". The thickness of joint shall be as indicated on structural joint with corresponding thickness of ISI marked filler board.

(c) All exposed face of crumple joints shall be covered with Aluminium sheet fixed with cadmium plated screws / bolts on both sides at interval of 20 cms. Crumple joints in all situations shall be provided as per drawings. The thickness of Aluminium sheets shall be 1.34 mm.

(d) Crumple joints on internal face shall be covered with Stainless steel sheet fixed with stainless steel screws / bolts on both sides at interval of 20 cms. Crumple joints in all situations shall be provided as per drawings. The thickness of stainless-steel sheets shall be 1.34 mm.

(e) Internal wall and RCC structure surfaces of crumple section shall not be plastered.

19.0 **BLANK**

20. **INTERNAL WATER SUPPLY**

20.1 **SCOPE OF WORK:**

The work under this contract shall broadly comprise of the following: -

(a) Provision of CPVC SDR-11 water tubing and fittings all as described in Schedule 'A' shown on drawings and specified herein.

(b) Provision of water supply lines to overhead service tank, from overhead tanks to WC's, Wash hand basin, taps etc, including necessary controls.

(c) Provision of bib cocks, stop cocks etc.

20.2 **WORKMANSHIP**

(a) Pipes running on walls shall be all as specified in Clause 18.51 of SSR Part- I.

(b) Water storage tanks including pipes, fittings/ fixtures specials and connections are covered under lump sum price of building. However, connection to tanks shall be as under:

(i) Inlet shall be provided with valve/stop cock on the riser and controlled by ball valve in the tank.

(ii) Outlet shall be provided with valves/stop cock and shall be 5cm above bottom of tank.

(iii) Anti-airlock or air vent pipe shall be provided and branched from outlet.

(iv) Overflow pipe shall be provided slightly above level of inlet pipes and should be discharged in conspicuous spot clear off the roof and not on the roof.

(v) Washout pipe of 25 mm dia of 15 cm short length shall be provided and shall be plugged at the end.

PARTICULAR SPECIFICATIONS (Contd…)

20.3 **SPECIFIC REQUIREMENTS OF WORK PROCESS**

(a) All the pipe line/fittings are to be fixed consecutively and serial wise. Fixing of pipe line and then inserting of fittings will not be allowed.

(b) After the completion of testing all the chases, holes shall be properly filled with cement plaster in cm (1:3) and finished so as to match with the existing surfaces.

20.4 **MOUNTING HEIGHTS BATH**

(i) Water tap–the mouth of the tap shall be 60 cm from the floor level.
(ii) Shower Rose–Bottom of shower rose shall be 285 cm from the floor level.
(iii) Stop cock for shower–100 cm from the floor level.

20.5 **MATERIALS:**

(a) CPVC pipes and fittings shall be as specified in SSR Part I and grade mentioned in Schedule ‘A’. MS fittings shall be cast malleable type or wrought iron fittings.

(b) Bib taps and stop valves shall be of brass cast forged all as per clause 18.14.1 of SSR Part I.

(c) All pipes, fittings, Bib cock etc shall be of approved make with ISI certification marks.

20.6 **FITTINGS:**

All fittings are to be accurately placed in the position as directed by the Engineer-in-Charge and shall be secured, plugged to walls with hard wood or any other approved plugs, set in cement mortar as required and are to be left in clean, sound and in perfect condition. All sizes and lengths are to be verified at site. The work described in these specifications is to include all jointing materials, wall hooks etc., necessary to make the construction perfect.

(a) Ball valves shall be high pressure quality of brass or bronze horizontal plunger type with polythene float conforming to IS–1703 as specified in Clause 18.19 of SSR Part I.

(b) Washer for taps shall be of good quality fiber or specifically selected leather or plastic as may be approved by the GE.

20.7 **WATER TUBING**

(a) Water tubing shall be UPVC pipes suitable for potable water supply and fittings shall comply with relevant IS specified in para 18.7 and 18.8.1 of SSR Part I.

(b) All pipes and fittings are to be put together with adhesive as per manufacturer’s recommendation. The whole of the pipes and connections are to be fully tested and left drip dry. Test report shall be jointly prepared and signed by the contractor and Engineer– in-Charge.

(c) Water tubing in trenches laid by the contractor should be sealed properly after solvent joints of pipe and fittings in order to avoid the entry of loose soil inside the pipe line. The cost of the UPVC plug is deemed to be included with the unit rate for provision of UPVC tubing laid in trenches.

(d) The riser to the overhead tank shall be left not more than 2.0 metre away from the building in trenches to be connected from the external water supply distribution system. This end should be plugged properly to avoid the loose mud going inside.

(e) All entry points for each quarter / room shall be provided with a suitable size of tee in lieu of bend and branch end of the tee shall be connected to the pipe of quarter / room and the bottom end shall be plugged for easy removal / cleaning etc.

(f) All UPVC pipes/ fittings and fixtures such as stop cock, bib cock shall bear ISI certification mark or of specified make.

20.8 **TESTING:**

Testing shall be carried out all as per clause 18.55 of SSR Part I. The whole of the works is to be tested at the contractor’s expense at such time and in such a manner as the GE shall direct and it shall be done to his entire satisfaction. Test result shall be jointly recorded by contractor and Engineer-in-Charge for supply from each service tank.

PARTICULAR SPECIFICATIONS (Contd…)

20.9 **GATE VALVES:**

The gate valves shall be made of gun metal with iron wheel head screwed both ends, high pressure of sizes as mentioned in Schedule 'A'. The gate valves shall comply IS-778.

21. **INTERNAL ELECTRIC SUPPLY**

21.1 **GENERAL**

(a) The materials, workmanship and the installation as a whole will generally be governed by specifications, and rules and the principles laid down in SSR-2009, Part-I Section 19, Specifications given here under are in amplification and modifications, the specifications given here under will take precedence.

(b) Items of electrical work shall be deemed to include interalia minor items to make the installations in the building complete in all respects, duly tested and certified as fit for switching electric supply on the taking inside the buildings.

(c) Due regard be given for the door and windows, openings, location of water taps, locations of sinks etc. in fixing the run of cables and positions of fittings and control switches and outlet points.

(d) The installation shall strictly comply with the provisions contained in the latest edition of Indian Electricity Rules and latest edition of the Indian Standard Electrifications as applicable to the work, except where such regulations and rules are modified by the specifications. It shall be of high standard and approved construction used in modern electrical works as regards design as well as workmanship. Complete works shall be suitable in all respects for the type of voltage indicated in the relevant items Sch 'A'.

(e) All electrical works shall be executed by skilled licensed workers, only licensed supervisors and workers will be employed, and the contractor on demand by the Engineer-in-charge shall produce such evidence of qualifications for his workers/supervisors either at the commencement of the work or any time thereafter.

(f) The PVC casing capping and concealed conduits shall be marked on the walls / structure and approval of the GE obtained in writing before fixing etc as applicable.

(g) Locations of fittings and accessories indicated on drawing are tentative and may be changed by the Engineer-in-charge during execution of works. No adjustment of rates / prices shall be made on this account.

(h) All the electrical fittings, accessories, wiring and runs of cable shall be clear of doors, windows, built in cupboards, opening etc.

(j) Looping in system of wiring shall be used throughout installation. Connectors may, however be used at the discretion of Engineer–in–charge due to unavoidable practical difficulties.

(k) Hooks for hanging ceiling fans and conduit running in RCC shall be laid/ fixed while connecting the fan hooks. Exposed surfaces shall be painted with two coats of synthetic enamel paint over a coat of primer.

(l) MS hooks shall be provided at locations indicated on drawings/as directed. The cost of MS clamps/hooks is deemed to be included in the lump sum cost of the building.

(m) All metallic items e.g. fan regulator, switch boxes etc are to be properly earthed with 1.00 sqmm copper conductor green colour FRLS PVC insulated cable earth wire.

(n) All the sub main wiring upto 1 metre height from FFL is to be properly protected by metallic conduit / light grade GI pipe as directed by the Engineer-in-Charge. Percentage quoted is deemed to include the cost of the above item.

(o) Separate conduit casing capping shall be provided for light and power circuit.

(p) Earthwork and Excavation wherever necessary shall be paid for under relevant item of Schedule 'A' Part XI unless specifically mentioned in the item of the schedule.

PARTICULAR SPECIFICATIONS (Contd…)

21.2 **MATERIALS AND SAMPLES:**
All materials incorporated in the electrical Installations works shall generally be indigenous make conforming to relevant ISS/BSS as applicable. As far as practicable all materials incorporated in the work shall have ISI mark on them before starting the work, the contractor shall produce to GE samples of all materials for his approval and such approved types, make and quality materials shall only be incorporated in the work. One set of samples shall be retained by the GE duly signed by him and the contractor, till the completion and final acceptance of the work.

21.3 **SCOPE OF WORK:**
The work under this contract broadly includes as described in Schedule 'A'/BOQ: -
(a) Supplying and fixing of internal electrical installation commencing from the service connections and terminal of building to the light fittings, fan and other out let points as described in Schedule 'A'/ BOQ.

(b) Provision of earthing to main switch board of building.

(c) Providing ceiling fans with down rods and regulators / exhaust fan etc. as described in Schedule 'A'/ BOQ.
(d) Point wiring as per description given in Schedule 'A'/ BOQ.

(e) Sub main wiring from MSB to various DBs shall be provided as per Schedule 'A'.

21.4 **SCHEME OF ELECTRIFICATION:**
The schematic diagrams and plan showing the position of distribution boards, light and fan points, switch/socket outlet etc are shown in the drawings for guidance. The position of points / fittings however may be modified/changed at the discretion of the Engineer–in–Charge and contractor shall cater for such contingencies in his rates and no claim for extra expenses if any shall be entertained on this account. Necessary care shall be exercised to load all the phases approximately equally.

21.5 **TYPE OF WIRING AND MATERIALS:**
This shall be all as described in Schedule 'A' and shown on drawings read in conjunction with specification contained in the MES Schedule.

21.6 **CABLE**: Size of cables and voltage grading shall be as per Schedule 'A'/ BOQ.

21.7 **MS BOX HOUSING FOR ACCESSORIES**
(a) All electrical accessories shall be mounted on mild steel housing of 16 gauge embedded / flush with the surface of wall. The top cover of housing must be minimum 15 mm larger in all sides. The front of the housing shall be plastic laminated sheet 3 mm thick and smooth finished. Top cover must be removable type fixed to the housing with adequate number of non-rusting type polished machine screws (wood screws shall not be used for this purpose).

(b) The top surface of housing shall be provided with a groove with chamfered edge for cable entry. The housing should have suitable earth terminal which will be connected to the earth terminal on the main / sub control boards from which the circuit originates by means 1.00 sqmm copper conductor green colour FRLSH PVC insulated cable of continuity wire, the cost of which is deemed to be included in the rate per point wiring and it is deemed to include cost of supply and fixing housing and top cover also.

(c) Where fan regulators are housed, necessary ventilating holes 2.4 mm dia are to be made on top cover, No. of holes and their arrangements shall be all as directed by the Engineer-in-Charge.

(d) At locations where group of accessories are provided, one terminal box of adequate size shall be provided as directed by Engineer-in-Charge.

21.8 **CIRCUIT**
(a) Number of circuits and number of points in each circuit shall be as indicated on the drawing. The circuit arrangements are planned for better operation and maintenance and shall not be altered even though it is at variance with clause 19.2.6 of SSR Part-I.

(b) Each circuit shall have its separate neutral, originating from the neutral bus / neutral

PARTICULAR SPECIFICATIONS (Contd…)

terminal.

(c) It shall be ensured that in case of single-phase circuits the phase conductor is taken into the single pole. Switches with single pole switches in 'OFF' position, there should be no conductor at the outlet point controlled by the Switch.

(d) Lighting circuits which have three pins outlet, the earth terminal shall be connected by means of 1.00 sqmm copper conductor green colour FRLS PVC insulated cable hard drawn aluminium conductor continuity earth wire jointed with circuit earth wire.

(e) Where circuit arrangement is not shown in the drawings this shall be got approved from the Engineer-in-Charge.

(f) Where standard aluminium conductors of size less than 6 Sq.mm are connected the ends must be soldered. Necessary connectors and lugs are to be provided wherever required.

(g) Inhabiting grease should be applied where aluminium cables are connected to panel and switch terminals.

(h) No reduction in cost is contemplated even though the switches are fixed in the same board with other switches.

21.9 **CONTROL GEAR**

Control gear as far as it is related to internal electrical work in building comprises of: -

(i) Distribution Board: Distribution board MCB/TPNL/SPNL, 415/240 volts of ways as given in the drawings and described in Schedule 'A' shall be provided flush with walls. The sheet metal enclosures shall be factory fabricated preferably of the same manufacturer.

(ii) Miniature circuit breaker (MCB's) of ratings as mentioned in Schedule 'A'/ BOQ shall be provided in MSB / SMBs in all the buildings. The MCB shall have breaking capacity of 9 KA if not specified. The MCB's shall have ISI mark on them.

(iii) The control gear at MSB's shall be housed in metal box made out of 16-gauge MS sheet with hinged front cover and locking arrangement. The box shall be recessed in the wall. Each MSB shall have proper knob as approved by Engineer-in-Charge for the convenience of opening and closing.

(iv) The contractor shall submit a sketch to the Engineer-in-Charge indicating the complete dimension of the switch board for MSB's and various mountings and get it approved before installing the same.

(v) Necessary nitches / recesses shall be formed in all wall as per the actual size of the MSB's LDB nitches are deemed to be considered in the building cost.

21.10 **FITTINGS AND ACCESSORIES**

(a) Switch of rating 5 Amp shall be piano type.

(b) Switch socket outlet combination 3 pin 5/16 Amp shall be provided as indicated in Schedule 'A'/BOQ and as directed by Engineer-in-Charge.

(c) Light fittings as described under Schedule 'A' /BOQ.

21.11 **MOUNTING HEIGHTS:**

(a) BATH / TOILET / WC: Bracket light to be fixed above along the centre line of mirror at 215 cms from FFL.

(b) OTHER ROOMS

- I) BRACKET light at a height of 215 cms from FFL.
- II) Switch / fan regulator at a height of bottom of box from FFL at 100 cms
- III) Bottom of fan shall be not less than 240 cms from FFL.
- IV) Socket outlet with switch at 100 cm from FFL.
- V) On common mounting board, fan regulators shall be at the top.
- VI) Stair case light at 200 cms from FFL of landing.

PARTICULAR SPECIFICATIONS (Contd…)

VII) Where fan regulators are housed necessary ventilating holes 2.4 mm dia are to be made in top cover. Number of holes and their arrangement shall be all as directed by Engineer-in-Charge.

VIII) At locations where group of accessories are provided in terminal box. Terminal box of adequate size shall be provided as directed by Engineer-in-Charge.

21.12 **EARTHING**

(a) Earthing shall be all as per ISS, IEE Regulations. The contractor shall obtain the approval of GE for layout of earthing before the commencement of work and it shall be executed in the presence of an appropriate MES representative.

(b) Earthing shall be provided all as described in respective item of Schedule 'A' and as, shown in electrical plate No-3 and specified in clause Nos. 19.137 and 19.137.2 to 19.146.1.7 of MES Schedule A Part-I and GI watering of pipe shall be of medium grade and GI protection pipe for earth lead conductor shall be of medium grade. PCC (1:3:6) type C-1 shall be used for PCC earth pit.

(c) The charcoal dust and return filling shall be done in layers not exceeding 150 mm thick and shall be properly watered and rammed. Surplus soil shall be disposed off and site left clear and tidy on completion to a distance not exceeding 50 m.

(d) All earth electrodes shall be tested for earth resistance by means of standard earth meggar. The test shall take place in months preferably after a protracted dry spell.

(e) The resistance of earth shall not exceed one ohm. In case the resistance of earth exceeds one ohm due to soil conditions, then the earthing shall be carried out through another method as per IS-3443 and cost variation adjusted through deviation order. The decision regarding this will be given by the GE which shall be final and binding.

(f) Earth mat shall be provided to ensure absolute protection to the men working at places where isolators and switches are to be operated manually.

(g) Cost of excavation and earth work in any strata shall be deemed to be included in the unit rate for earthing.

21.13 **TESTING OF ELECTRICAL INSTALLATION**

(a) All the electrical installation shall be tested by the contractor in presence of Engineer-in-Charge as specified in MES SSR Part-I(Specifications). Test results shall be recorded duly signed by the contractor and Engineer-in-Charge of the following: -

20.13.1 Earth test
20.13.2 Continuity test
20.13.3 Insulating resistance test

(b) The installation shall be taken over only when the Engineer-in-Charge has ensured that the installation has been certified as per the laid down rules of the IE Act and IE rules.

21.14 **RECORD DRAWINGS:**

On completion of the electrical work, three copies of wiring diagram for each type of building shall be prepared and submitted to the Engineer-in-Charge. The wiring diagram shall indicate the main switch board (MSB) the runs of various mains and sub mains. The position of all points and the relative circuits of which they connect shall be indicated and numbered.

21.15 **LT PANEL BOARD**

(a) Panel offered shall be suitable for trouble free and efficient service and suitable for tropical humid climate with an ambient temperature of 45 deg C and RH of 100%.

(b) Each switch gear /MCCB/MCB shall be housed as an individual unit in a not less than 1.6 mm thick sheet steel housing having the bus bars, current transformers etc. On the top side control termination shall be accessible and from the front side, outgoing bus bars shall be accessible. Removable lift off type hinged panel doors shall be on the rear side.

(c) The bus bar entries from one panel to another panel shall be sealed off suitably by providing insulated panels so that fire does not spread from one panel to other panel Panels shall

PARTICULAR SPECIFICATIONS (Contd…)

be self-contained, including heat. Indicating instruments, collector and selector switches, indicating lamp shall be accessible on the door and be adequately protected from the safety point.

(d) All bus bars and current carrying connection shall have the same cross-sectional area throughout their length. Provision shall be made for adjustment for changing in lengths of bus bars and connections due to changes in temperature. All bus bars and connections shall be capable to withstand without damage the maximum permissible short circuit current.

(e) Where the bus bars are taken through the partitions of adjacent cubicles, sealing shall be provided to prevent spread of fire from one unit to next Bus bars and connections shall be secured in such manner that insulations are not subjected to bending forces under short circuit conditions.

(f) Each unit shall be constructed to ensure satisfactory electrical continuity between all metal parts not intended to be alive and the earth terminal of the unit.

(g) Ventilation: it shall be properly ventilated by providing suitable fans inside the panel.
(h) LT panel control: To protect from lizards, mice, vermins or any other creeping insects, panel openings shall be protected with proper screens.

21.16 **INSTRUMENTS AND METERS:**
(a) All indicating instruments and meters shall be capable of carrying continuously their full load current and full voltage across their pressure coils. They shall not be damaged by the passage of the fault currents or the over pressure on the primary side of the instrument in the transformers for the maximum permitted duration of fault conditions. All instruments and meters should be rear connected.

(b) All indicating instruments specified shall be of the best make and shall have 15 cms Sq flush cases unless otherwise specified. All such instrument shall have non-reflecting bezels clearly divided and indelibly marked scales and scales with sharply outlined pointer. They shall be provided with a zero and adjusting device for external operations.

(c) The full load reading of each ammeter shall occupy the most open part of the scale. The minimum scale reading shall be 150% full load for motor load panel the ammeter shall have suppressed scale beyond 150 % full load. Each voltmeter shall be calibrated with the coil. The scale shall be open between 60% to 125% of the normal volts and shall be suppressed below normal volts between the finger contracts.

(d) All outgoing MCCBs and mains incoming MCCBs shall be provided with meter with selector switches and of appropriate rage. All ammeters and voltmeters shall be of 15 Cms Sq flush type.

21.17 **SMALL WIRING AND FERRULES:**
(a) All small wiring shall be carried out with 660 volts grade single core cable having copper conductor preferably stranded of not less than 2.5 Sq mm cross section. The cables shall be insulated with oil- and fire-resistant materials. All holes of tubes for wiring runs shall be bushed and shall have room for reasonable additions. No joints or tees shall be made in wires between terminal. The wires shall be identified by numbered ferrules at each end and in accordance with the connection diagram. Main wiring from CT's and LT bus bar shall be identifiable by suitable colour for each phase. They shall be white except in case of warning ferrules which shall be red.

(b) The LT panel mentioned in Schedule `A' shall be composite in nature and shall be comprising of all the equipment specified in Schedule `A'. The aluminium bus bar connections and their insulated supports shall be of standard construction, mechanically strong and shall be capable to withstand all the stress which may be imposed on the panel due to vibrations, fluctuation in temperature and short circuit current and all other similar causes.

21.18 **QUALITY OF MATERIALS:**
All materials used shall be of the best quality in their respective kind and shall be of the class most suitable for the purpose for which they are intended. The tenderer shall supply necessary layout drawings, dimensional details schematic and wiring diagrams, catalogues and literatures for equipment and accessories.

PARTICULAR SPECIFICATIONS (Contd…)

21.19 **CABLE GLAND PLATES AND CABLE SOCKETS:**
Each outgoing power terminal circuit breakers shall be provided with sockets, suitable for the cores of the cables and sufficient for the number of cables, to be terminated. The number of the cables and their sizes shall be furnished later by the Engineer-in-Charge during execution. All entries for these cables shall be left blank and the gland plates shall be left underlined.

21.20 **EARTHING:**
The earthing terminals shall be provided on each switch cubicle. An earth bar of appropriate cross section shall be fixed to these terminals. The earth bar shall be continuous and shall run along the full length of each. The cost of earth work for earthing is deemed to be included in the rate of earthing.

21.21 **LOCKS:**
Locks shall be provided for safe guarding of all units and their operating and safety devices. Each lock shall be numbered and provided with two keys. One master key suitable for all the units in one substation shall be provided. A sheet steel wall mounting cabinet with hooks and racks to accommodate locks and keys shall be provided in the pump house. The hooks and racks shall be labelled with lock numbers. All protection relays requiring setting and meter case covers shall have provision for sealing.

21.22 **FINISHES:**
The cubical shall be finished to light grey conforming IS–5 shade 631.

22. **ROAD, PATH & CULVERTS**
22.1 The work of Road, Path & Culverts shall be carried out all as specified in Schedule ‘A’, BOQ and as specified herein below.

22.2 **MATERIALS**
(a) Granular Sub Base (GSB)
Gradation of Aggregate, Physical properties, procedure for spreading & compaction shall be considered & executed as mentioned in section 400, sub clauses 401.1 to 401.7 of MORT&H, IRC specifications. The material shall be best quality available in Local area as approved by GE.

(b) Wet Mix Macadam (WMM)
Stone aggregate, screenings and binding materials for wet mix macadam shall be as specified in clause 20-B.5 of MES Schedule and conform to the samples kept in GE’s office and approved by the GE before incorporation in the work. Screening shall be of Grade ‘A’ as specified in clause 20-B.5.9.4 of MES schedule. Wet mix macadam shall be of thickness given in Sch `A’ of broken stone aggregate consolidated in one layer. Spreading, rolling applying screening and watering shall be as specified in clause 20-B.5 to 20.B.5.9.4 of MES Schedule. The rolling shall be done with power roller. Gradation of Aggregate, Physical properties, procedure for spreading & compaction shall be considered & executed as mentioned in section 406, sub clauses 406.1 to 406.9 of MORT&H, IRC specifications. The material shall be best quality available in Local area as approved by GE.

(c) Bitumen
Bitumen for binder, priming coat / tack coat, seal coat, carpet, macadam and asphaltic concrete shall be paving bitumen conforming to IS-73-1961. The bitumen shall be IS grade (VG-30). The bitumen shall be brought at site either in sealed containers or in bulk in bouncers at the contractor’s desecration and no price adjustment shall be made on this account. The contractor shall procure the bitumen from manufacturers listed below and produce original paid vouchers for the total quantity of bitumen supplied under each consignment and to be incorporated in the work. The original vouchers shall be kept on record of the GE duly defaced by Engineer-in-Charge. Quantity of bitumen brought at site shall be entered in the MB with reference to vouchers as ‘Not to be abstracted’. Bitumen supplied shall be in packed containers. While calculating the quantity of bitumen used in the work weight of container shall not be taken into account.

(i) Indian Oil Corporation.
(ii) Bharat Petroleum Corporation Ltd
(iii) Hindustan Petroleum Corporation Ltd

(d) Bituminous macadam and semi dense asphaltic concrete
(i) Coarse aggregates

PARTICULAR SPECIFICATIONS (Contd…)

Coarse aggregate for bituminous macadam and SDAC shall be graded aggregate obtain from approved local quarries and conforming to IS-383. The grading of the aggregate shall be as given in relevant para as applicable. Coarse aggregate shall be crushed stone aggregate retained on 2.36 mm sieve and shall consist of angular fragments clean, tough and durable rock, free from disintegrated pieces or organizer deleterious material and adherent coating. The material shall be best quality available in Local area as approved by GE. The aggregate shall satisfy MORTH 'Specifications for road and bridge works" (Table 500-6: Physical properties of coarse aggregate) including up to and latest amendments.

(ii) Fine aggregates

Fine aggregate shall be the fraction passing 2.35 mm sieve and retained on 75-micron sieve, consisting of crushed screenings from approved stone or naturally occurring coarse sand. It shall be clean, hard, durable un coated and dry, free from injurious, soft or flaky pieces and organic deleterious substance. The material shall be best quality available in Local area as approved by GE.

(iii) Filler

Filler for bituminous macadam and SDAC shall be crushed basalt stone dust the whole of which passes through 340-micron sieve. Care shall be taken to ensure that dust thrown by plant through dust collector is not used as filler. The material shall be best quality available in Local area as approved by GE.

(e) Sand

Sand shall be clean crushed sand obtained from the sources approved by GE.

(f) Moorum

Moorum shall conform to the specification given in clause No 20.A.7.6 of SSR part I 2009. The material shall be best quality available in Local area as approved by GE.

(g) Interlocking paver blocks

Interlocking paver blocks shall be precast concrete blocks conforming to IS: 15658-2006 (Specification for Precast concrete blocks for paving). Paver blocks shall be sound and free from cracks or other visual defects. The tolerance on thickness shall be ± 3 mm. Water absorption of paver blocks shall not be more than 6% by mass. Shapes of paver blocks shall be triangular, Zigzag, Hexagonal or any other shape as approved. Colour of pave blocks shall be as indicated or as decided by GE. Thickness and grade of concrete of paver blocks shall be as specified in Schedule 'A'/BOQ. The paver blocks shall be table moulded in factory and shall be procured from any of the manufacturer as listed in Appendix 'C'.

22.3 BITUMINOUS MACADAM AND SEMI DENSE ASPHALTIC CONCRETE

(a) Design criteria for bituminous macadam and semi dense asphaltic concrete as under shall be adhered to during execution: -

Sl No	Parameter	Bituminous macadam	Semi dense asphaltic concrete
i	Number of Compaction blows each end of Marshall Specimen	75	75
ii	Marshal stability in Kgs.	545 (Min)	1050 (Minimum)
iii	Flow value (mm)	2 - 4	2 - 4
iv	% Void in Mix (to prevent bleeding)	10 -15	3 - 5
v	Binder Content % by weight of total mix	3.5 to 4.5	4.5 to 5.5

Notes:

(i) The quantity of binder has been indicated in Schedule 'A' Items However, after the mix design exact quantity shall be used as per designed binder content. In order to satisfy the above-mentioned requirements, the mix shall consist of coarse aggregate, fine aggregate and filler in suitable proportion and with sufficient binder content.

(ii) True and representative samples of the aggregate likely and proposed to be used in the work shall be tested in the laboratory and the proper blend of the aggregate shall be worked out so that the gradation of the final composition will satisfy the limits set in the following Table: -

PARTICULAR SPECIFICATIONS (Contd…)

Sl No	Percentage passing by weight			
	Sieve size	Bituminous macadam	Sieve size	Semi dense asphaltic concrete
i	26.5mm	100	22.4mm	100
ii	19mm	90-100	13.2mm	79-100
iii	13.2mm	56-88	11.2mm	68-90
iv	10 mm	-	5.6 mm	33-55
v	4.75mm	16-36	2.8mm	22-38
vi	2.36mm	4-19	2.36mm	-
vii	600 microns	-	710 microns	6-22
viii	340 microns	2-10	355 microns	4-14
ix	150 microns	-	180 microns	2-9
x	75 microns	0-8	90 microns	0-5

(iii) The grading of aggregates given in the aforesaid Table for bituminous macadam, semi dense asphaltic concrete gives a wide range of variations, for the selection of the aggregates. It is essential that with the available aggregates, a definite grading of the aggregates has to be arrived at and a job mix designed. Once the job mix is arrived at, its characteristics shall be checked with the design requirements. It is desirable that the same grading is adopted throughout the job.

(iv) The exact binder and filler content required shall be arrived at as per marshal procedure for the aggregate gradation worked out in the laboratory.

(b) Job Mix

(i) While the laboratory mix design gives different proportions of aggregate combination in terms of individual sieve size for actual execution of the work blending of two three or more sizes of aggregate (each size having within it a range of individual sieve sizes) would be necessary. This blending ratio shall be obtained on a weight basis, giving the percent weight and /or volume of one or more of the coarse, fine aggregate and filler fractions needed to give the ultimate aggregate gradation.

(ii) This aggregate combination together with the corresponding optimum binder content, as determined in the laboratory shall constitute the job mix formula for adoption during execution of the work.

(iii) The job mix formula given hereinbefore is only as a guide to help the contractor to consider them while quoting his rates. This may be varied with the change in materials or if control test given here-in- before indicates variation in design criteria beyond permissible values the revise job mix formula shall be worked out to satisfy the design criteria given here-in-before and to the approval of Engineer-in-Charge, for any variation in the binder content from the mix one given in the job mix formula.

(iv) The blending of various type and size of aggregate shall be done on the basis of the requirement as indicated vide clause No 20.B.2.3.3 here-in-before. The exact binder content shall be worked out and adjustment in the rates shall be made based on designed job formula and binder content.

(v) Design mix for bituminous macadam and semi dense asphaltic concrete shall be got done from SEMT, Wing Dapodi, Pune /Govt approved and accredited labs (along with design mix details the contractor will also submit certificate of accreditation issued to concern laboratory and GE will approve the design mix in writing before the execution of the work. In addition, the bituminous macadam and semi dense asphaltic concrete used shall be tested during execution as per Clause 20.B.4.8 of SSR Part-I, testing charges shall be borne by the contractor.

(vi) Approved design mix details including binder content shall be entered as ‘NOT TO BE ABSTRACTED’ in the MB.

(c) Mixing laying and compaction of bituminous macadam and semi dense asphaltic concrete shall be as under: -

(i) Preparation of under lying course

PARTICULAR SPECIFICATIONS (Contd…)

The underlying course shall be prepared shaped and conditioned to a uniform grade and section as specified. Any depression or pot holes shall be properly made up and thoroughly compacted. The surface shall be scraped clean and free from dust and foreign material before applying tack coat.

(ii) Application of tack coat

The binder shall be heated to its appropriate temperature and applied uniformly over the prepared surface by Mechanical sprayer. The tack coat shall be applied immediately before spreading the mix. The rate of tack coat shall be as specified.

(iii) Preparation of the mix

It is imperative that the bituminous macadam mix is made by using hot mix plants of adequate capacity to yield a mix of proper and uniform quality. The plant Maybe either a batch type or a continuous one having a coordinated set of essential units such as dryer for heating the aggregate, arrangements for grading and batching by weight or volume the required quantities of aggregate binder heating and control unit for metering out of the correct quantity of heated binder together with a paddle mixer for intimate mixing of the binder and aggregates. In case the plant has arrangement for batching by volume only and the mix design worked out and proposed to be adopted by the contractor is on weight basis, necessary conversion of the in gradients shall be done by the contractor to arrive at the corresponding volumetric mix design and approval of the GE obtained. Fine feeder for incorporation of the correct quantity of filler is also a necessary auxiliary. The hot mix plants shall be fitted with temperature measuring device for both aggregate and bitumen. The variation from the specified temperature shall not be more than 10°C on the lower side only.

(iv) Spreading of the mix

The mix shall be carried from the mixer by tipper trucks to the place (s) of deposit and spreading done by means of self-propelling mechanical paver with suitable screeds capable of spreading, taming and finishing the mix true to grade, line and cross-section without causing, segregation dragging, irregularities or other surface defects and at a speed consistent with character of the machine. The temperature at the time of laying shall be the designed temperature. The mix shall be spread so that required thickness is achieved after rolling. The max consolidated thickness after rolling shall not be more than 50mm in one layer. The work shall not be allowed to progress if the spreading is done manually due to failure of the mechanical paver. The mix shall be spreading such a manner that after consolidation, the required levels and camber etc of bituminous macadam is obtained.

(v) Compaction

The mix after spreading shall be thoroughly compacted by rolling by set of rollers, at a speed not more than 5 km/hr immediately following by paver. The initial rolling shall be with 8–12-ton, wheeled roller and surface finished by final rolling with 8-12-ton tandem roller. The wheel of roller shall be kept moist and rolling shall commence longitudinally from the edge and progress towards centre. The roller shall proceed on the fresh material with a rear or fixed wheel leading to minimize the pushing of the mix and each pass of the roller shall overlap the proceeding one by half the width of roller.

(vi) Controls

At least one sample for every 100 tons of bituminous mix discharged at the pug mill chute or one sample/day shall be collected and following test should be done: -

(a) Three marshal specimens to be compacted and tested for average stability, flow, void ratio and density and shall be as per designed values.

(b) Binder to be extracted from about 1000 gm of mix and binder content determined.

(c) The permissible variation of various ingredients shall be as per following table.

Sieve Size	Dense A/C	Semi-dense
4.75mm sieve ……	..	..
2.36 mm sieve……	+ 5%	+ 5%
Passing 2-36 mm sieve and retained on 75 microns…..	+ 3%	+ 3%
Size of mineral finer < than 75 microns..	+ 1%	+ 1%
Binder content …….	0.3%	+ 3%
Field density …..	Not less than 98% lab density	

PARTICULAR SPECIFICATIONS (Contd…)

(vii) Controls on laid thickness

After the mix is compacted, the thickness shall be checked by noting the depth of penetration of hot scale. Except cross the crown off camber or change with the finished surface of the wearing course is to such regularity that when tested with 3-meter straight edge placed anywhere in any direction there shall not be a gap greater than 3mm between the bottoms of edge and surface anywhere. Any depression or protrusion shall be rectified immediately.

(viii) Opening and traffic

Traffic may be allowed immediately after completion of the final rolling when mix has cooled down to the surrounding temperature.

(ix) Rolling

After spreading of the mix, rolling shall be done by 8 to 10-ton vibratory power roller as specified and directed to achieve dense compacted layer laid.

22.4 **SAND CUSHIONING**

Sand cushioning shall be done as specified in Clause 19.75 of SSR Part-I.

22.5 **CONCRETE WORKS**

Provide concrete works all as described in Sch 'A'/BOQ and as per concrete specifications hereinbefore under relevant clauses.

23. **AREA DRAINAGE**

Provide Area drainage all as described in Sch 'A'/BOQ and as shown on drawings. General specification for materials and workmanship shall be as specified hereinabove under relevant clauses or MES Schedule.

24. **SEWAGE DISPOSAL**

(a) Provide Sewage Disposal all as described in Sch 'A'/BOQ and as shown on drawings. General specification for materials and workmanship shall be as specified hereinabove under relevant clauses or MES Schedule.

(b) Refer clause 18.68 to 18.33 of MES Schedule Part-I for general specifications for sewage disposal work. Water testing shall be carried out as described in clause 18.93.4 of MES Schedule Part-I to ensure that the sewer line and manhole are without any leakage. Results of tests carried out shall be signed by the Engineer-in-Charge and the contractor's representative. All testing apparatus, materials labour required for water testing shall be provided by the contractor.

(c) DWC HDPE pipe shall be Double Wall Corrugated type, manufactured from virgin high density polyethylene (HDPE) material conforming to IS 16098 (Part 2):2013, having smooth internal surface and corrugated external surface. The pipe shall be of stiffness class SN 8 (minimum ring stiffness 8 kN/m²), suitable for underground installation in heavy duty conditions such as road crossings and vehicular traffic areas. Pipes shall be of co-extruded construction, with the inner and outer layers homogeneously bonded during manufacture. The outer wall shall be corrugated to provide structural strength and the inner wall shall be smooth for efficient flow. Each pipe shall be supplied with integral socket or coupler and elastomeric sealing ring (EPDM) conforming to IS 5382 for watertight jointing.

25. **Chain Link Fencing, Gate, Retaining and Boundary Wall**

Provide Chain Link Fencing, Gate, Retaining and Boundary Wall all as described in Schedule 'A'/BOQ and as shown on drawings. General specification for materials shall be as specified here-in-above under relevant clauses.

26. **-Blank-**

27. **EXTERNAL WATER SUPPLY:**

27.1 This Contract covers all works shown in drawing described in Schedule 'A'/BOQ, Special conditions and particular specification. The scope of work broadly comprises of: -

(a) Excavation and earthwork which shall be measured under relevant items of respective Schedule.

(b) Provision of CI & GI pipe lines, cast iron sluice valve, non-return valves gun metal gate valves and valve chambers etc.

PARTICULAR SPECIFICATIONS (Contd…)

27.2 **DAMAGE TO EXISTING DRAINS WATER MAINS CABLES ETC:**
During excavation, contractor shall take particular care not to damage water mains, sewage lines, pipe cables, these are to be properly slung or otherwise supported. If any damage caused, the Engineer-in-Charge shall be notified immediately and the damages shall in any case be made good at contractor's expense.

27.3 **FILLING:**
In returning, filling and ramming in trenches for the pipes, the finest soil has to be collected and carefully filled in before main filling is done. Trenches shall not be filled in before pipes are tested and passed by the Engineer–in–Charge.

27.4 **BEDDING & CUSHIONING:**
(a) Bedding and cushioning with approved soils shall be provided in rock formations and in black cotton soil. The bedding shall be 15 cm thick with approved soil and shall be well watered and rammed.

(b) Cushion with approved soil shall be provided on sides (for entire width of the trench) and upto 15 cm over the top of the pipe and well-watered and rammed to the satisfaction of the GE. The remaining filling above the cushioning shall be done with any soil available from excavation as directed by the Engineer–in–Charge.

27.5 **TYTON JOINTS:**
The DI/CI pipe with spigot and socket end shall be jointed with rubber joints (Tyton Rings). The rubber jointing as for jointing DI/CI pipes shall be either of IS or make of Statan pipes & foundry Co or Orient Rubber Products Nagpur or Sinin's Rubber Enterprises, Ahmedabad. Insertion of gasket in the socket ends will be done as per manufacturer's instructions and directions. While jointing of pipes (insertion of) the socket end of one pipe into spigot end of another pipe will be done through a rock and lever arrangement as directed by the Engineer-in-Charge.

27.6 **FLANGED JOINTS:**
Flanged joints of DI/CI/GI/MS pipes as applicable shall be carried out as per relevant clause of MES SSR Part-I with 6mm thick fibre board gasket, nuts, bolts and washers etc.

27.7 **LAYING OF DUCTILE/CAST IRON PIPE LINES:**
(a) The routes for laying pipe lines have been marked on the drawings as a guide to the tenderer. However, the actual layout shall be as directed by the GE and no claim whatsoever on this account shall be admissible. The pipe shall have a minimum soil cover of 75 cms when laid under foot paths and side walls, 90 cms when laid under roads with light traffic or under cultivated soil and 1.25 meters when laid under road with heavy traffic and rail tracks.

(b) CI/DI pipes (ISI Marked) shall be centrifugally cast of Class mentioned in Schedule with spigot and socket ends iron pressure pipes. CI/DI pipes shall be laid and jointed with lead/rubber tyton joints and all DI fittings shall be as described in Schedule `A'.

(c) The laying of CI/DI pipes shall be in accordance with relevant IS and as per clause 18.95 of MES Schedule Part-I.

27.8 **DUCTILE/CAST IRON PIPE AND FITTINGS:**
(a) All Ductile/ cast iron fittings/specials for socket and spigot pipes required for the work shall be procured and supplied by the contractor from his sources and shall be of grade conforming to relevant IS.

(b) The pipes are to be laid in such a way that the socket ends of the pipe should be in the opposite direction to the flow of water so as to avoid direct impact of water pressure at the joints of pipe line.

27.9 **DUCTILE /CAST IRON PIPE LINE WORK**
(a) The work shall be executed as specified in MES Schedule Part-I and as per IS-3114.

(b) When the DI/CI unloading pipes shall not be thrown down from the trucks on hard surface. Unloading them on timber skids without steady slope and thus making pipes to lump hard against one another should not be allowed. In order to avoid damage to the pipes and especially to the spigot end, pipes should not be dragged along the concrete and similar pavement with hard

PARTICULAR SPECIFICATIONS (Contd…)

surfaces.

(c) The pipes shall be inspected for defects and to detect suspected cracks it shall be rung with light hammer, if doubt persists further confirmation may be obtained by pouring little paraffin on the inside of the pipe at the suspected spot. It a crack is present the paraffin will sweep through and show on the outer surface.

(d) All lumps, blisters and excess coating materials shall be removed from the spigot end of each pipe. Outside of the spigot and the inside of the socket shall be wire brushed to clean, dry and make free from oil greases before the pipe is laid.

(e) Every precaution shall be taken to prevent foreign materials from entering the pipe when it is being placed in the location. If the pipe cannot be laid without earth entering into it a heavy tightly woven canvas bag of suitable size should be placed over each end and left, there until the connection is made with the adjacent pipe. During laying operation, no debris, tool clothing or other materials shall be placed in pipe.

(f) After placing a length of pipe in trench, spigot end shall be connected to the socket end of the adjacent pipe and the pipe aligned to the gradient. The pipe shall be secured in its place with approved backfill material, tamped, except under the socket. Pipe and fittings which do not allow sufficient and uniform space for joints shall be removed and replaced with pipe and fittings of proper dimensions. To ensure uniform space, precautions shall be taken to prevent dirt from entering the joint space. At times when pipe laying is not in progress the open end of pipes shall be closed by water tight plug or other means as approved by Engineer-in-Charge.

(g) The cutting of pipe for inserting valves, fittings or collar pieces shall be done in a neat and in a workman like manner without incurring damage to the pipe and leaving a smooth end at right angles to the axis of pipe cutting machine. The cutting of pipes by means of any oxyacetylene torch shall not be allowed.

(h) In the DI/CI pipe line, if short pieces are required for adjustment of length, pipes may be cut with prior permission from Engineer–in–Charge. Minimum number of cuts shall be used in the pipe and the schedule rates shall be deemed to be inclusive of cost of cutting of the pipes as well the concept of minimum usage.

(j) Use of lead wool is strictly prohibited.

(k) The jointing shall be done in dry conditions. The spun yarn shall be placed around the spigot of the pipe and shall be of proper dimensions to insert the spigot in the socket. Making up of required length by knotting of strands of yarn not be allowed. When single strand of spun yarn is used, it shall have an overlap at the top not more than 5 cm. When more than a singular strand is required for different lengths so that end will not meet without it causing an overlap, ends of strand shall meet on opposite side of the pipes and not on top or bottom. The yarning materials shall be pressed tightly against the inside base of hub on the socket with suitable tools. The socket ends should face the upstream whenever it is necessary to deflect pipe from straight either in the vertical or horizontal planes to avoid obstructions or where long radius curves are permitted. The deflection allowed at joints shall not exceed an angle of 2-½ (two and half degree). Lead jointing and quantity of lead and spun yarn shall be as specified in SSR Part-I and IS-762. Use of less / more quantity of lead and spun yarn per joints upto the extent of 5 % may be allowed. Lead joints shall be caulked to make them thoroughly water tight. The joints shall be preferably finished 3 mm behind the socket face.
NOTE: Test certificate for DI/CI Pipes & Fittings shall be procured by the contractor as per relevant IS & shall be kept on record by the Engineer-in-Charge.

27.10 **RUN LEAD JOINTS:**
The run lead joints shall be carried out as per, relevant clauses of SSR Part I.

27.11 **GATE VALVES:**
The gate valves shall be made of gun metal with iron wheel head screwed both ends, high pressure of sizes as mentioned in Schedule ‘A’. The gate valves shall comply IS-778

27.12 **SLUICE VALVES:**

PARTICULAR SPECIFICATIONS (Contd…)

Sluice valves shall conform to IS–780 and IS-2906. The valves shall be of cast iron with flanged and drilled ends. The body shall be CI with high tensile brass spindle, iron wheel head and suitable for operation in clockwise direction to open.

27.13 **NON-RETURN VALVE AND AIR RELEASE VALVE:**
Non-Return valve and Air release valve shall conform to relevant IS & shall bear ISI mark. The valves shall be all as specified in BOQ.

27.14 **VALVE CHAMBERS:**
Valve chambers of internal dimensions as indicated in Schedule 'A'/BOQ shall be provided. Specifications of chamber, irrespective of what is shown on drawing, shall be as under and other details shall be as per drawing: -
(a) Excavation and Earthwork in any type of soil, returning filling in with approved soil and removal of spoil to a distance n. exc. 50 m.

(b) 150 mm thick broken stone hard core over 150 mm thick PCC (1:4:8) type D-2 in foundation.

(c) 234 mm thick fly ash brick masonry wall in CM (1:6) using old size brick.

(d) 40 x40 x 3 mm MS angle frame, 4 Nos 25x6 mm MS flat hold fast welded to frame and embedded in 150 mm thick PCC (1:2:4) type B-1 coping finished even and smooth without using extra cement at top.

(e) 15 mm thick plaster in CM (1:4) finished even and smooth without using extra cement on internal surfaces of walls and external exposed surfaces (except top) of walls upto 150 mm below ground level.

(f) 10 SWG MS sheet cover with 40x40x3 mm MS angle frame 40x3 mm MS flat stiffeners and MS handle, all welded to sheet cover.

(g) 3 Nos. 100 mm long MS cold rolled medium weight hinges and locking arrangement consisting of 40x40x3 mm MS angle 40 mm long cleat hole drilled and 40x3 mm MS flat 80 mm long all welded to frames of cover.

(h) Two coats of bituminous paint to MS angle frame in contact with a coping after preparation of surfaces and 2 coats of synthetic enamel paint over a coat of red oxide zinc chrome primer after preparation of surfaces of all surfaces of MS sheet cover including locking arrangements.

27.15 **GI TUBES AND FITTING:**
GI tubes and fittings such as bends, tees, short pieces, diminishing pieces caps, plugs, unions etc. shall be arranged by the contractor under his own sources and shall be provided all as directed by the Engineer–in–Charge. The route of laying GI pipe lines when marked on the drawings shall be as guide to the tenderers. However, the actual layout shall be got approved from GE before commencing the work.

27.16 **TESTING OF MAINS UNDER HYDRAULIC PRESSURE**
(a) As the work of laying of the pipe lines progresses the testing of the sections of the main already laid and completed shall be carried out as early as possible. All the equipment and accessories to carry out the test successfully shall be arranged by the Contractor under his own management.

(b) The length of the section to be tested shall be as decided by Engineer-in-Charge.

(c) The trenches shall be temporarily filled on central portion of the pipes keeping joints exposed to detect leakages therein, during testing operation. The closing arrangements at the free ends of the section to be tested will have to resist the end thrust calculated on test pressure.

(d) Filling of the pipe, if done by pump it shall be placed at a lower level of the section. However, if filling is done manually it shall be done from a higher point in the section near the air value.

PARTICULAR SPECIFICATIONS (Contd…)

(e) DI/CI pipes will be tested to full pressure as per provisions in IS–3114 and IS 5822. The tests shall be carried as per clause 18.48.7 of MES schedule Part-I. The test pressure shall be reached gradually raising about 1 kg per square cm.

(f) The pressure will be maintained in the line till such time careful check is carried out for the pipe and joints. Any leakage found in joints shall be rectified and tests shall be repeated to the full satisfaction of Engineer–in–Charge. In case of leakage in pipes, the pipes shall be replaced.

(g) The installation and other connected work shall be taken over, only if the aforesaid tests are satisfactorily carried out and a certificate issued by the GE or his nominated representative.

27.17 **FOR MAKES OF FITTINGS & ACCESSORIES:**
Please refer list given in Appendix `C'.

28. **EXTERNAL ELECTRIC SUPPLY/ EXTERNAL ELECTRIFICATION**

28.1 **GENERAL:**
The rates quoted by the Contractor shall be deemed to include for any minor details of construction which are obviously intended and which may not have been specifically included in these documents, but which are essential for the execution and entire completion of the work.

(a) The routes for underground pipes and cables etc. is shown in the site plan as a guideline for quoting tender. The tenderer shall mark the route on the ground and shall get it approved by the GE before the actual commencement of the work.

(b) The rates quoted for supplying and fixing of pipes and cables and other equipment shall be deemed to include for the necessary breaking of walls / floor / road surfaces etc. and making them good to match with the existing finishes.

(c) The unit rate quoted by the tenderer for supply and installation of the dynamic equipment shall be deemed to include the cost of foundation wherever necessary.

(d) Wherever reference to samples is made in these tender documents the same shall be read as samples kept in sample room of the office of GE.

28.2 **STANDARD AND QUALITY OF WORK:**

(a) The entire electrical work under this contract shall be carried out in strict compliance with these specifications and in conformity with the provisions contained in the latest edition (including amendments) of Indian Electricity Act 1940, Indian Electricity Supply Act 1948 as amplified and enforced by the Maharashtra State Govt.

(b) All water supply electrical work shall be carried out by properly skilled plumber and electrician respectively under the supervision of suitably qualified electrical supervisors and the contractor on demand by Engineer-in-Charge shall produce such evidence either at the commencement of the work or at any time thereafter when called for.

(c) All equipment and materials to be used in the work shall have ISI mark on them as are available in the market. However, if equipment and materials with ISI mark are not available, the equipment and materials supplied by the contractor shall comply with relevant ISS and if relevant IS has not been issued, these shall comply with current relevant BSS unless otherwise specified in these tender documents.

(d) In case tenderer's offer conforms to standard specification other than ISS / BSS, copies of such standard specification with English translation and salient points of comparison between the two standards shall be submitted along with the tender.

(e) Approval of the GE as referred to in Clause 19.2.1 of MES Schedule Part I shall be in writing. Approved samples shall be labelled as such and signed by both the contractor and the GE. The sample shall be kept in the custody of the GE till the final completion of the work, except for high value items for which the required quantity is not more than five.

(f) The materials shall be brought to the site by the contractor in the manufacturer's original packing with seal intact or with maker's wrapper on and shall not be installed unless approved by Engineer-in-Charge/GE.

PARTICULAR SPECIFICATIONS (Contd…)

(g) Tenderer is free to choose any of the makes mentioned in the Appendix 'C', however he shall give in writing along with the submitted tender, the make selected by him in his offer. In absence of such letter, the decision of Accepting Officer shall be final and binding.
(h) All the materials and equipment shall be of the best class and quality and shall have to be capable of satisfactory operation in the tropics under hot and humid atmospheric conditions. The installation shall strictly comply with the provisions contained in the latest edition of IER.
(j) The workmanship shall be of the highest grade and the entire construction shall be in accordance with the best modern engineering practice.

(k) All similar materials and removable parts of similar equipment shall be interchangeable with each other. The equipment's should be designed to facilitate inspection and repairs and ensure satisfactory operation under the atmospheric conditions prevailing at site, under sudden variations of load and voltage as may be met with under different working conditions in the system.

28.3 EXCAVATION AND EARTHWORK

(a) Excavation and earthwork for laying cables, pipes etc. shall be carried out as laid down in MES Schedule Clause 3.2 to 3.4 and 19.74 and 19.75 to a depth as ordered by the GE.

(b) The excavation for laying cables shall be measured under respective Schedule.

(c) Removal and disposal of surplus spoil after utilising approved earth within a distance specified in Schedule 'A' and depositing at places as directed by the Engineer-in-Charge.

(d) The hard rock measurements / excavation records shall be simultaneously recorded in the MB as the work progress and all the MB entries of hard rock excavation shall be approved by GE.

28.4 CABLE TRENCH AND LAYING OF CABLES

(a) The depth of trench for the purpose of excavation in trenches shall comply to clause 19.74.1 of SSR Part-I. The depth of the trench as specified there in may however be altered to suit site condition. The width of the trench shall be authorised width as specified in clause 3.2.3 of SSR Part- I.

(b) The method of laying cable shall be as specified in clause 19.75 of SSR Part I. The bricks shall be laid on the sand cushion.

28.5 SAND FILLING:

Sand for filling in trenches where specified or indicated shall be free from foreign materials and shall be naturally occurring river sand.

28.6 AGGREGATE:

(a) Coarse aggregate shall be of graded broken trap stone and shall conform to the sample kept in the office of the GE.

(b) Fine aggregate (sand) shall be from natural sources and shall conform to the sample and grading kept in the sample room of GE.

28.7 CEMENT CONCRETE:

Type of mixes of cement concrete required for works in various situations shall be as stated in Schedule 'A'/BOQ.

28.8 MIXING:

Mixing of all cement concrete shall be done in mixer machines, where small quantities of cement concrete is involved, hand mixing may be adopted, if approved by the Engineer-in-Charge.

28.9 FORM WORK

(a) Form work shall be of steel or plywood or timber of adequate strength and for finished surfaces suitable for the description of the item of work.

(b) Screws need not be used in the form work except at the discretion of the Contractor for his own convenience.
(c) The Contractor's attention is invited to the stipulation in clause 4.11.6.3 of MES Schedule

PARTICULAR SPECIFICATIONS (Contd…)

Part I regarding stripping off formwork. The periods stipulated there in are for concrete using ordinary Portland cement.

28.10 **WELDING**

(a) Welding shall be generally done by metal arc process unless oxyacetylene welding is specifically permitted by the GE in writing. All welds shall be made in flat position where possible.

(b) The areas of welding shall be well cleaned to remove any paints, scales or rust to obtain clean metal surface, immediately before welding. The members shall be securely held in position by means of tack welds, service bolts, clamps or jigs before commencing welding. The welding of a joint shall be so arranged that resulting tensile and compressive stresses produced by all portions of the weld tend to balance each other. The step back method shall be adopted for continuous weld.

28.11 **BOLTS, NUTS, WASHERS:**

All bolts and nuts shall be MS, HRH, and of the dimensions specified/shown in the drawings. They shall conform to IS-1363. The washers shall be of sufficient thickness. All bolts and nuts shall be of grade black (B) and in general shall comply with IS-1367 and shall be dipped in oil while hot. Steel required for items of works under this Schedule shall be procured by the contractor, under his own arrangements and will not be issued under Schedule 'B'.

28.12 **PAINTING**

(a) All MS works including poles etc., shall be painted after preparation of surfaces with two coats of aluminium paint, one coat before erection / fixing and other coat after erection / fixing over a priming / shop coat of red oxide primer done at the end of fabrication.

(b) The portions which are required to be embedded in earth / concrete will be painted with two coats of approved paint over one coat of red oxide primer.

28.13 **GI PIPES**

GI pipes for cable guard shall be all as specified in Schedule 'A' & conforming to IS-1239 (Part-I). The pipes shall be fixed to poles etc. with suitable MS clamps, bolts, nuts and washers.

28.14 **RCC PIPES:**

RCC pipes shall be all as specified in Schedule 'A' & conforming to IS–458.

28.15 **POWER CABLES**

(a) The LT underground cables shall be 1100-volt grade, 3 ½ core/ 4 core / 2 core PVC armoured, heavy duty with aluminium conductor of sizes as specified in Schedule 'A' suitable for earthed system and conforming to IS–1554(Part I).

All HT cables shall be of three core aluminium conductors, XLPE insulated, armoured and conforming to IS-7098(Part 2)/1985. These cables shall be suitable for earthed system.

(b) The cables shall be laid in trenches at a depth as specified in Clause No 19.74.1 of SSR Part-I(Specifications).

(c) The cable trench shall be carefully levelled and rendered free of stones. Before laying cable, a layer of 8 cm of sand shall be provided and after the cable has been laid, it shall be covered with sand to a depth of 15 cm before bricks are laid. This is then gently punned down to a depth of 10 cm above the top of upper most cable, thus providing good bedding for providing pre cast PCC slab cable protection, which are placed over the cables. Contractor shall produce test certificate for PCC pre cast slab cover.

(d) For spacing between cable, Cables laid in tier formation at road / railway crossing and laying of cables inside buildings refer SSR Part I Para 19.76, 19.78, 19.33 & 19.82 of SSR Part I.

(e) The rates quoted by the tenderer for supplying and fixing of cables of walls, poles / bastions and other similar positions shall be deemed to include clamps fabricated out of flat iron 34 x 6mm including nuts, bolts, and washers fixed at an interval of 1.5 m apart. Excavation and earth work shall be measured and paid separately.

(f) The rates quoted by the tenderer for supplying, laying, jointing and testing of cable shall include the cost of straight through joints on long run of cable. No straight through joints shall be

PARTICULAR SPECIFICATIONS (Contd…)

acceptable on a length less than standard cable drum length or otherwise as directed by the Engineer–in–Charge.

(g) Cable route indicators shall be provided all as specified in Schedule 'A'/BOQ.

(h) After completion of work the contractor shall submit a cable route chart. This shall depict the complete layout of the cables on the ground with their sizes, turning points accurately marked with reference to certain permanent points and building etc.

(j) While transporting cable, cable drum shall be mounted on cable wheels sufficient to take the weight of drum with cable which are to be pulled by means of ropes or alternately the drum maybe mounted on trailer or a vehicle with a low loading platform to the destination.

(k) Underground cable shall be laid out by mounting the cable drum on jacks or cable wheels with a spindle of sufficient strength placed on the jacks horizontally so that the drum is free to rotate axially. Cable shall be pulled by means of ropes gently from the drum. In no case the drum shall be rolled for taking out cable.

(l) While laying the cable the same shall be fitted over rollers beginning from one end by helpers 10 yards apart and drawing straight and taken off the rollers by the helpers lifting the cable and then laid straight into the route provided. By the help of string line drawn into the trench. Kinks shall be avoided.

(m) Cable glands shall be of brass with double compression type nuts and shall be as approved by GE.

28.16 **TESTING CABLES:**

(a) The new cables shall be megger tested before jointing as well as after completion of jointing of cables. Cables shall be tested for: -

a) Continuity.
b) Insulation resistance between conductors to earth.
c) High voltage test.
d) Earth test.

(b) The results shall be tabulated and submitted to the Engineer–in–Charge duly signed by the Contractor and authorized MES representative.

(c) Cable should be manufactured in Jan 2022 onwards. Cable should be marked with name of manufacturer, ISI marked, meter marked etc, at an interval of one meter throughout the length of cable

(d) HT Testing in accordance with existing IE rules shall be carried out to entire satisfaction of MES & MSEDCL representatives by the contractor. Any cost towards this testing & commissioning shall be deemed to be included in the rates quoted by the contractor.

28.17 **EARTHING:**

(a) Earthing shall be all as per ISS, regulations and Electrical plate No.3 in MES Schedule Part I. The contractor shall obtain the approval of GE for layout of earthing before the commencement of work and it shall be executed in the presence of an appropriate MES representative.

(b) The charcoal dust/salt return filling shall be done in layers not exceeding 150 mm thick and shall be property watered and rammed. Surplus soil shall be disposed off and site left clean and tidy on completion, to a distance not exceeding 50m. Cost of all excavation and earthwork in any strata shall be deemed to be included in the unit rate of earthing.

(c) All earth electrodes shall be tested for earth resistance by means of standard earth megger. The tests shall take place in dry months preferably after a protracted dry spell.

(d) The resistance of earth electrode shall not exceed 1 Ohm. In case the resistance of electrodes exceeds 1 Ohms due to soil conditions the earthing shall be carried out through another method as per IS–3443 and cost variations shall be adjusted through a deviation order. The decision regarding adopting additional method shall be given by the GE which shall be final and binding.

(e) LT Panels and other equipment shall be connected to earth through GI strip.

PARTICULAR SPECIFICATIONS (Contd…)

28.17 **LT PANEL BOARD**

(a) **GENERAL**

(i) Panel offered shall be suitable for trouble free and efficient service and suitable for tropical humid climate with an ambient temperature of 45 deg C and RH of 100%.

(ii) Each switch gear /MCCB/MCB shall be housed as an individual unit in a not less than 1.6 mm thick sheet steel housing having the bus bars, current transformers etc. On the top side control termination shall be accessible and from the front side, outgoing bus bars shall be accessible. Removable lift off type hinged panel doors shall be on the rear side.

(iii) The bus bar entries from one panel to another panel shall be sealed off suitably by providing insulated panels so that fire does not spread from one panel to other panel Panels shall be self-contained, including heat. Indicating instruments, collector and selector switches, indicating lamp shall be accessible on the door and be adequately protected from the safety point.

(iv) All bus bars and current carrying connection shall have the same cross-sectional area throughout their length. Provision shall be made for adjustment for changing in lengths of bus bars and connections due to changes in temperature.

(v) Where the bus bars are taken through the partitions of adjacent cubicles, sealing shall be provided to prevent spread of fire from one unit to next Bus bars and connections shall be secured in such manner that insulations are not subjected to bending forces under short circuit conditions.

(vi) All bus bars and connections shall be capable to withstand without damage the maximum permissible short circuit current.

(vii) Panel shall be approved by CPRI.

(viii) Each unit shall be constructed to ensure satisfactory electrical continuity between all metal parts not intended to be alive and the earth terminal of the unit.

(ix) Ventilation: It shall be properly ventilated by providing suitable fans inside the panel.

(x) LT panel control: To protect from lizards, mice, vermin or any other creeping insects, panel openings shall be protected with proper screens.

(b) **INSTRUMENTS AND METERS:**

(i) All indicating instruments and meters shall be capable of carrying continuously their full load current and full voltage across their pressure coils. They shall not be damaged by the passage of the fault currents or the over pressure on the primary side of the instrument in the transformers for the maximum permitted duration of fault conditions. All instruments and meters should be rear connected.

(ii) All indicating instruments specified shall be of the best make and shall have 15 cms Sq flush cases unless otherwise specified. All such instruments shall have non-reflecting bezels clearly divided and indelibly marked scales and scales with sharply outlined pointer. They shall be provided with a zero and adjusting device for external operations.

(iii) The full load reading of each ammeter shall occupy the most open part of the scale. The minimum scale reading shall be 150% full load for motor load panel the ammeter shall have suppressed scale beyond 150 % full load.

(iv) Each voltmeter shall be calibrated with the coil. The scale shall be open between 60% to 125% of the normal volts and shall be suppressed below normal volts between the finger contacts.

(v) All outgoing MCCBs and mains incoming MCCBs shall be provided with meter with selector switches and of appropriate rage. All ammeters and voltmeters shall be of 15 Cms Sq flush type.

(c) **SMALL WIRING AND FERRULES:**

PARTICULAR SPECIFICATIONS (Contd…)

(i) All small wiring shall be carried out with 660 volts grade single core cable having copper conductor preferably stranded of not less than 2.5 Sq.mm cross section. The cables shall be insulated with oil- and fire-resistant materials. All holes of tubes for wiring runs shall be bushed and shall have room for reasonable additions. No joints or tees shall be made in wires between terminals. The wires shall be identified by numbered ferrules at each end and in accordance with the connection diagram. Main wiring from CT's and LT bus bar shall be identifiable by suitable colour for each phase. They shall be white except in case of warning ferrules which shall be red.

(ii) The LT panel mentioned in Schedule `A' shall be composite in nature and shall comprise of all the equipment specified in Schedule `A'. The aluminium bus bar connections and their insulated supports shall be of standard construction, mechanically strong and shall be capable to withstand all the stress which may be imposed on the panel due to vibrations, fluctuation in temperature and short circuit current and all other similar causes.

(d) **QUALITY OF MATERIALS:**

(i) All materials used shall be of the best quality in their respective kind and shall be of the class most suitable for the purpose for which they are intended. The tenderer shall supply necessary layout drawings, dimensional details schematic & wiring diagrams, catalogues and literatures for equipment and accessories.

(ii) Each outgoing power terminal circuit breakers shall be provided with sockets, suitable for the cores of the cables and sufficient for the number of cables, to be terminated. The number of the cables and their sizes shall be furnished later by the Engineer-in-Charge during execution. All entries for these cables shall be left blank and the gland plates shall be left underlined.

28.18 **EARTHING:**

The earthing terminals shall be provided on each switch cubicle. An earth bar of appropriate cross section shall be fixed to these terminals. The earth bar shall be continuous and shall run along the full length of each. The cost of earth work for earthing is deemed to be included in the rate of earthing.

28.19 **LOCKS:**

Locks shall be provided for safe guarding of all units and their operating and safety devices. Each lock shall be numbered and provided with two keys. One master key suitable for all the units in one substation shall be provided. A sheet steel wall mounting cabinet with hooks and racks to accommodate locks and keys shall be provided in the pump house. The hooks and racks shall be labelled with lock numbers. All protection relays requiring setting and meter case covers shall have provision for sealing.

28.20 **FINISHES:**

The cubical shall be finished to light grey conforming IS-5 shade 631.

28.21 **FEEDER PILLAR BOX:**

These shall be of rigid construction out of sheet steel of not less than 3.15 mm thick to enclosed bus bar cubicle and switches. These shall have hinged doors, with locking arrangements and protection against seepage of rain water. Necessary earth connection points at two places shall be provided. The bus bar and switch assembly shall be housed and fixed in such a way, that there is enough working space. All around bus bar covers on front and rear shall have smooth facility for easy removal with butterfly winged nuts. Danger board written boldly shall be displayed prominently with markings of voltage, skull and bone.

28.22 **EARTHING FOR POLES & EQUIPMENTS:**

(a) FOR POLES: Earthing to poles shall be carried out with GI wire 4 mm dia (No.8 SWG). The GI wire shall be protected with GI pipe of 15 mm dia medium grade. Every fifth pole carrying overhead line shall be earthed. Earthing maintained through earth in case of overhead poles and through steel armoured tape in case of underground cable. The steel armoured tape shall be bound effectively with the pole.

(b) FOR EQUIPMENT: LT panels and transformer shall be connected to earth through GI strip 32 x 6 mm. The unit rate for earthing included provision of funnel with watering pipe, wire mesh, lugs and GI medium grade pipe for protection earthing lead.

28.23 **PRECAST CONCRETE CABLE COVER:**

Provide precast concrete cable covers all as specified in para 19.20 of MES Sch Part I.

PARTICULAR SPECIFICATIONS (Contd…)

28.24 **STEEL TUBULAR SWAGED POLES**

Steel tubular swaged poles shall be as mentioned in clause 19.3 of SSR Part-I. Make of the pole shall be as mentioned in Appendix- 'C' and approved by the GE. External surfaces of poles shall be painted with black bituminous paint upto planting height. Exposed surfaces shall be painted in two coats of aluminium paint over a coat of red oxide primer.

28.25 **STEEL CROSS ARMS**

Cross Arms shall be MS channel of suitable section. They shall be in one piece free from defects. Steel cross arms shall be given one primer coat of red oxide primer and two coats aluminium paint. Length of cross arms shall be suitable to accommodate the number of insulators on them leaving sufficient spacing between insulators. The Cross arms shall be complete with clamps of the flat iron, bolts, nuts and washers etc. Pin hole, on cross arms shall be on required basses, and cross arms in all other respects shall conform the clause 19.9 of SSR Part-I 2009. Workmanship shall conform to clause 19.53.3 of SSR Part-I 2009.

28.26 **PORCELAIN INSULATORS:** Porcelain insulations shall comply with IS 1445 and IS 731 and shall be sound, free from defects, thoroughly vitrified and smoothly glazed.

28.27 **TRANSFORMER**

(a) The transformer shall be all as specified in Schedule 'A'/BOQ.

(b) The transformer shall conform to IS-1180. The transformer shall be outdoor type as mentioned in schedule 'A'/BOQ and shall be installed as directed by the Engineer-in-Charge.

(c) The temperature rise of the windings when measured by resistance method shall not exceed 55 deg C and the temperature when measured by keeping the thermometer on the top shall not exceed 45 deg C.

(d) Suitable plain rollers shall be fitted to the base of the transformers to facilitate transporting. The rollers shall be of cast steel and shall be detachable.

(e) The transformer shall be provided with the following accessories: -

- (i) Oil conservator with filling hole and oil level indicator.
- (ii) Silica gel breather complete with first fill of dehydrating agent.
- (iii) Tap filter valve.
- (iv) Drain valve.
- (v) Thermometer pocket with 100 mm dia dial type thermometer scaled 0 to 100º centigrade
- (vi) Explosion vent.
- (vii) 02 Nos earthing terminals.
- (viii) Plain roller 4 Nos.
- (ix) Lifting Hooks.
- (x) Rating and terminal marking plates.
- (xi) Air relief plug.

(f) The transformer should have HT cable end box for indoor type & HT bushings for outdoor type suitable for XLPE cable 95 to 185 sq mm 3/4 core and LT cable and box suitable for upto 400 sq. mm PVC cable.

(g) Off load tap changing switch with handle and locking arrangement. The tenderer shall submit the information as called for in Appendix 'B' of IS–2025 (Part I) to GE. The transformer shall be supplied with first fill of oil which shall conform to IS-335 (Revised).

28.27 **TEST CERTIFICATE:**

Manufacturer's test certificates shall be furnished by the contractor to the GE in respect of the following items before installation: -

- (a) Switch gear LT
- (b) Cable LT & HT
- (c) Relays and instruments
- (d) Insulated rubber matting
- (e) Switch fuses
- (f) All HT Equipment & Transformer

PARTICULAR SPECIFICATIONS (Contd…)

27.28 **TECHNICAL LITERATURE:**
The tenderer shall submit along with the offer three complete sets of detailed specifications, instruction manuals and descriptive literature for all equipment offered by him. The contractor shall within 4 weeks of acceptance of tender submit detailed dimensional drawings, wiring diagrams etc. for approval of the GE.

28.29 **TESTS ON COMPLETION:**
The following tests shall be carried out by the representative of accepting officer after completion of the work in presence of the contractor. The results of such tests shall be recorded and signed by the contractor and the Engineer-in-Charge. All testing apparatus required to carry out the under mentioned tests shall be arranged by the contractor without any extra cost to the Govt. The work which does not withstand satisfactory test shall be re-executed by the contractor at his own expense: -

(a) POLARITY TEST:
This shall be made to ensure all switches are connected to the correct phase or live conductor of supply.

(b) RESISTANCE OF EARTH CONTINUITY PLATE:
Maximum continuity resistance test shall be carried out with continuity tester of a low reading Ohm meter. From any point in the installation, including the earth continuity conductor and earth lead to earth plate the resistance shall not exceed 1 Ohm.

(i) EARTH TEST: Effectiveness of earth shall be tested by earth tester.

(ii) INSULATION TEST: The test shall be carried out by 500-volt megger testing set for LT system, 1000 Volts Meggar testing set for 11 KV lines and 5000 Volts Meggar testing set for 22 KV lines.

(iii) The insulation resistance shall be measured by the meggar between all conductors connected to natural phases of supply and the results shall not be less than those specified in the relevant IS / IE rules.

28.34 **TAKING OVER:**
Installation will be taken over after completion of testing to the entire satisfaction of Engineer-in-Charge. On completion of work the contractor shall submit 3 copies of line plan showing the complete layout indicating distribution system of underground cables, position of poles, layout of panels in the sub stations buildings and all other details as executed by him together with any other information which the Engineer-in-Charge may require, duly signed by both the parties.

29 **TESTING ON COMMISSIONING OF ELECTRICAL EQUIPMENT AND INSTALLTION (APPLICABLE FOR MAJOR ELECTRICAL EQUIPMENT LIKE HT VCB, RMU, TRANSFORMER)**
The testing and commissioning of electrical equipment at site shall be according to the procedure laid down below: -

(a) All electrical equipment shall be tested, installed and commissioned in accordance with latest relevant IS and code of practice published by ISI wherever available and stipulations made in the relevant general specifications.

(b) In case IS are not available the tests shall be carried out in accordance with the latest standards and code of practice published by any other recognized standard institution or latest publication IEC.

(c) The testing of all electrical equipment as well as the system as a whole shall be carried out to ensure that the equipment and its components are in satisfactory condition and will successfully perform its functional operation. The inspection of the equipment (HT VCB/ RMU /Transformer/ HT cable) shall be jointly carried out at the factory premises by the officer nominated by the accepting officer & contractor to ensure that all materials, workmanship and installation conform to the accepted design, engineering and construction standards as well as accepted codes of practice and stipulations made in the specifications. The Contractor shall make necessary arrangement for inspection at factory premises in liaison with manufacturer without any extra cost to the Govt.

PARTICULAR SPECIFICATIONS (Contd…)

(d) All tests shall be carried out by the contractor using his own arrangements, testing equipment as well as qualified testing personnel.

(e) The results of the test shall conform to the specification requirements as well as any specific performance data guaranteed during finalisation of the contract.

(f) At site all equipment shall be energised only after certification by the personnel performing the test that the equipment is ready for energising and with the concurrence of the GE.

29.1 **PREPARATION OF THE PLANT FOR COMMISSIONING:**

After completion of the installation at the site and before preparation of plant for commissioning, the contractor shall carry out checking and testing of all equipment and installation in accordance with the agreed standards codes of practice of ISI and specific instruction furnished by the equipment supplier as well as the GE. Checking required to be made on all equipment and installation at site shall comprise (but not be limited to) of the following: -

(i) Physical inspecting for removal of any foreign bodies, external defects such as damaged / loose connected bolts etc.
(ii) Check for grease, insulation / lubricating oil leakage and its proper quality.
(iii) Check for tightness of all cable, bus bars as well as earth connections in the main earthing network.
(iv) Check for clearance of live bus bars and conductors from the metal enclosures.
(v) Continuity check in case of power and control cables.
(vi) Checking of all mechanical and electrical interlocks including tripping of breakers using manual operation of relays.
(vii) Checking of alarm and actuation circuit, manual actuation of relevant relays like Bocholt relay in case of transformer.
(viii) Check and calibrate devices requiring field adjustment / calibration like adjustment of settings.
(ix) Check proper connections to earth network of noncurrent carrying parts of the equipment / installation.
(x) Check for liquid level in batteries. Testing of cables and earthing system shall be all as described in the relevant clauses.

29.2 On completion of the work contractor shall submit 5 copies of layout of equipment & panels, LT cables and wiring diagram for all equipment as required by the GE for records.

29.3 **TESTING AND COMMISSIONING OF ALL HT ELECTRICAL EQUIPMENT:**

All HT electrical equipment shall be tested in accordance with the latest relevant IS and IE code of practice published by IS/IE rules wherever available and stipulations made in the relevant general specifications. Pre-commissioning test shall be carried out by EI (Electrical Inspector detailed by the SEI, HQ CESC, Pune.

29.4 **G.I. EARTH WIRE:**

Plain G.I. Steel wire shall conform to IS-280. The wires shall be round free from splits, kinks, surface flukes, rough, jagged and imperfect edges and all other harmful defects. The zinc coating shall be smooth even and bright.

30. **SITE CLEARANCE, EXCAVATION AND EARTHWORK**:

The work of excavation, earthwork and site clearance shall be carried out all as specified in Schedule ‘A’/BOQ. General specification for materials shall be as specified hereinabove under relevant clauses.

PARTICULAR SPECIFICATIONS (Contd…)

35.0 **LIST OF DRAWINGS**

The drawings forming part of this tender/Contract documents are listed below. All these drawings and in addition any other drawings if referred in any of the documents forming part of this contract the same shall be deemed to form part of this contract, though the same may not have been enclosed/uploaded. The tenderers are deemed to have inspected such drawing in the office of the GE/CWE/CE and no claim whatsoever for misrepresentation/ interpretation/ applicability/deviation etc. of any sort shall be entertained on this account by the Government at later stage: -

Sl. No	Description	Drawing No	Sheet No	Date	Revised/ Corrected date
1	2	3	4	5	6
1	List of Drawings	CEPZ/2026/ANR/LIST/04	01/01	13/04/2026	
2	**SITE PLAN**				
2.	Site plan showing external B/R services.	CEPZ/2026/ANR/SP/04	01/02	13/04/2026	
3.	Site plan showing external E/M services.	CEPZ/2026/ANR/SP/04	02/02	13/04/2026	
3	**CONTOUR MAP**				
4.	Contour Map with Proposed MGL	CEPZ/2026/ANR/CM/04	01/01	13/04/2026	
4	**ARCHITECTURAL DRAWINGS**				
5.	Ground floor plan	CEPZ/2026/ANR/04	01/08	13/04/2026	
6.	First floor plan,	CEPZ/2026/ANR/04	02/08	13/04/2026	
7.	Second floor plan and Roof Plan	CEPZ/2026/ANR/04	03/08	13/04/2026	
8.	Section A-A, Section B-B and section E-E	CEPZ/2026/ANR/04	04/08	13/04/2026	
9.	Elevations and Part Section at R-R & P-P	CEPZ/2026/ANR/04	05/08	13/04/2026	
10.	Cook House, Toilet details and section at D-D	CEPZ/2026/ANR/04	06/08	13/04/2026	
11.	Section at C-C, Details of Ventilators and Structural Glazing	CEPZ/2026/ANR/04	07/08	13/04/2026	
12.	Misc details	CEPZ/2026/ANR/04	08/08	13/04/2026	
05	**SCOOTER SHEDS**				
13.	Plan, Roof Plan, Section and Elevations	CEPZ/2026/ANR/04(A)	01/01	13/04/2026	
06	**SCHEDULE OF FINISHES**				
14.	Schedule of finishes	CEPZ/2026/ANR/SF/04	01/01	13/04/2026	
07	**E/M DRAWING**				
15.	Internal electrification – Ground floor	CEPZ/2026/ANR/EM/04	01/03	13/04/2026	

PARTICULAR SPECIFICATIONS (Contd…)

16.	Internal electrification – First floor	CEPZ/2026/ANR/EM/04	02/03	13/04/2026	
17.	Internal electrification – Second floor	CEPZ/2026/ANR/EM/04	03/03	13/04/2026	
08	**STRUCTURE DRAWINGS**				
18.	Structural General notes	CEPZ/2026/ANR/STR/04(A)	01/05	10/04/2026	
19.	Structural Typical details	CEPZ/2026/ANR/STR/04(A)	02/05	10/04/2026	
20.	Structural Typical details	CEPZ/2026/ANR/STR/04(A)	03/05	10/04/2026	
21.	Structural Typical details	CEPZ/2026/ANR/STR/04(A)	04/05	10/04/2026	
22.	Structural Typical details	CEPZ/2026/ANR/STR/04(A)	05/05	10/04/2026	
09	**SINGLE MEN BARRACKS (FOR 250 AGNIVEERS)**				
23.	Layout of Column-1	CEPZ/2026/ANR/STR/04(B)	1/16	10/04/2026	
24.	Layout of Column-2	CEPZ/2026/ANR/STR/04(B)	2/16	10/04/2026	
25.	Schedule of column	CEPZ/2026/ANR/STR/04(B)	3/16	10/04/2026	
26.	Layout of foundation-1	CEPZ/2026/ANR/STR/04(B)	4/16	10/04/2026	
27.	Layout of foundation-2	CEPZ/2026/ANR/STR/04(B)	5/16	10/04/2026	
28.	Details of combined footing MKD as CF1, CF12 & Footing Schedule	CEPZ/2026/ANR/STR/04(B)	6/16	10/04/2026	
29.	Plan Details of Footing	CEPZ/2026/ANR/STR/04(B)	7/16	10/04/2026	
30.	Layout of plinth beam – 1	CEPZ/2026/ANR/STR/04(B)	8/16	10/04/2026	
31.	Layout of plinth beam - 2	CEPZ/2026/ANR/STR/04(B)	9/16	10/04/2026	
32.	Layout of first floor slab & beam – 1	CEPZ/2026/ANR/STR/04(B)	10/16	10/04/2026	
33.	Layout of first floor slab & beam - 2	CEPZ/2026/ANR/STR/04(B)	11/16	10/04/2026	
34.	Layout of second floor beam & slab	CEPZ/2026/ANR/STR/04(B)	12/16	10/04/2026	
35.	Layout of roof beam & slab- 2	CEPZ/2026/ANR/STR/04(B)	13/16	10/04/2026	
36.	Schedule of beam and slab	CEPZ/2026/ANR/STR/04(B)	14/16	10/04/2026	
37.	Layout and RCC details of stair-case – 2 & 4	CEPZ/2026/ANR/STR/04(B)	15/16	10/04/2026	
38.	Layout and RCC details of stair-case – 1 & 3	CEPZ/2026/ANR/STR/04(B)	16/16	10/04/2026	
10.	**SCOOTER SHEDS**				
39.	Layout & RCC detail of column	CEPZ/2026/ANR/STR/04(C)	01/03	10/04/2026	
40.	Layout & RCC detail of	CEPZ/2026/ANR/STR/04(C)	02/03	10/04/2026	

PARTICULAR SPECIFICATIONS (Contd…)

	Foundation, Plinth beam & Beam Schedule				
41.	Layout & RCC detail of ground floor lintel & roof slab & beam Schedule.	CEPZ/2026/ANR/STR/04(C)	03/03	10/04/2026	

	TYPICAL DRAWINGS				
1	Misc details	CEPZ/88/TD/4M	1/4 to 4/4	31-9-88	
2	Details of Indian type WC single stack system	CEPZ/88/TD/9M	1/2	1-10-88	
3	Details of Nahani trap & pipe connection	CEPZ/88/TD/9M	2/2	1-10-88	
4	Details of fan hook	CEPZ/88/TD/11M	1/1	1-10-88	
5	Switch boxes for domestic light & power (Main switches & dist board including meter)	CEPZ/88/TD/14M	1/1 to 3/3	1-10-88	
6	Typical details of foot path & PCC clean way	CEPZ/88/TD/15M	1/1	1-10-88	
7	Details of Glass Cupboard and details of Class Room Cupboard	CEPZ/89/TD/01	1/1		
8	Typical details of manhole and gully trap	CEPZ/89/TD/15M	1/1	30-6-89	16-3-92
9	Typical detail of fixing of HDPE water storage tank over RCC roof slab	CEPZ/91/TD/7M	1/1	7-2-91	6-6-03
10	Detail of fixing of exhaust fan	CEPZ/91/TD/19M	1/1	6-5-91	
11	Architecture norms	CEPZ/91/TD/24M	1/1	20-5-91	
12	Typical details of Roads and Drain	CEPZ/92/TD/11M	1/2 to 2/2	3-2-92	7-6-03
				3-2-92	
13	Details of Cupboard with steel frame Steel shutter (CB1)	CEPZ/93/TD/16M	1/1	19-6-93	
14	Details of water meter niche and sluice valve chamber	CEPZ/93/TD/20	1/1	6-8-93	
15	Misc Details	CEPZ/94/TD/31	1/1		
16	Details of Notice Board	CEPZ/94/TD/37	1/1	21-10-94	4-6-03
17	Details of internal plaster grooves and external plaster details of junctions of wall, beam & s/o	CEPZ/97/TD/06/STR	1/1	7-3-97	
18	Details of LT, HT pole and street light pole	CEPZ/98/TD/06	1/2 to 2/2	21-4-98	7-6-03
19	Typical details of Hume pipe culverts	CEPZ/88/TD/16M	1/1	01.10.88	
20	Interlocking concrete tiles, plan and part typical pattern	CEPZ/2001/TD/06	1/2 to 2/2	8-10-01	
21	Details of RCC Box Culvert	CEPZ/2016/TD/02 STR	1/1	4-10-16	

PARTICULAR SPECIFICATIONS (Contd…)

22	Schedule of finishes part-I	CEPZ/2021/SF(TD)/04	1/1	20-11-21	
23	Elevation of Aluminium Windows & Section H-H	CEPZ/2023/TD/2	1/1	10-3-23	
24	Factory made pre supporting system	CEPZ/2023/TD/3	1/4 to 4/4	23-10-23	
25	Factory made pipe supporting system	CEPZ/2024/TD/1	1/1	1-3-24	
26	General notes for architectural drawings	CEPZ/2024/TD/3	1/1	1-3-24	
27	Typical details of stainless steel (SS) railing	CEPZ/2024/TD/5	1/1	28-11-24	
28	Typical detail of one unit of 04 OR's room	CEPZ/2025/TD/2	1/1	28-2-25	

NOTE:

(i) Typical details drawings referred in list of drawings, including latest revision shall be form part of this tender documents. These drawings may not be attached/ uploaded with tender; however, the contractor shall verify these drawings in this office, concerned CWE/GE's office during any working hours before submission of the tender. No claim what so ever in this respect shall be entertained.

(ii) Wherever drawing Nos are mentioned in Particular specification/tender/BOQ and the same drawing is revised/ amended then drawing No. shall be deemed to be amended as per revised/amended drawing.

Signature of Contractor **Asst Dir (Contracts)**
Date: **For Accepting Officer**

PARTICULAR SPECIFICATIONS (Contd…)

APPENDIX 'A'

1.0 **CEMENT**

1.1 **GENERAL**:

Cement required for the work under the contract shall be procured, supplied and incorporated in the works by the Contractor under his own arrangement. Cement shall be of tested quality and shall comply with the requirements mentioned in the drawings, SSR, IS specifications as amended and particular specifications given hereinafter.

1.2 **TYPES OF CEMENT**

(i) Ordinary Portland cement Grade 43 - BIS 269-2015
(ii) Ordinary Portland cement Grade 53 - BIS 269-2015)
(iii) Rapid Hardening Portland cement - (IS: 8041-1990)
(iv) Portland Pozzolana Cement - (IS: 1489-1991 Pt-I)
(v) High Alumina Cement - (IS: 6452-1989)
(vi) Sulphate Resisting Portland cement - (IS: 12234-1988)

1.2.1 Type of cement for the subject work shall be Ordinary Portland Cement grade 43 (Forty-Three)/ 53 (Fifty-Three) in accordance with IS 269-2015 unless otherwise mentioned in drawings.

1.2.2 Mixing of OPC and PPC is not allowed.

1.2.3 The type of cement to be selected for use shall invariably depend upon the specific usage in the work(s). 33 grade OPC shall not be used in the works. Use of PPC of required strength with fly ash content as per IS: 1489-1991 Pt-I is also permitted.

1.3 **PROCUREMENT / SUPPLY OF CEMENT BY CONTRACTOR**

(a) **PROCUREMENT:** Cement shall be procured by the contractor from any of the following manufacturers only. However, cement can be procured from any of the manufacturers as approved by E in-C's branch during currency of the contract. The particulars of the manufactures of cement alongwith the date of manufacture shall be obtained from the Contractor for every lot of cement separately. The documents in support of the purchase of cement shall be verified by the Engineer-in-charge / GE and site staff. The cement shall be procured by the Contractor from the manufacturers as given below.

(b) **MANUFACTURERS**: The following are the approved manufactures for MES works on Pan India: -

(a)	The Associated Cement Companies Ltd **(Brand: "ACC")** (For ALL)	(l)	Nuvoco Vistas Corporation Ltd (Formally Lafarge Cement) **(Brand: "NUVOCO")** (For All)
(b)	M/s Ultra Tech Cement Ltd **(Brand: "ULTRATECH")** (For ALL)	(m)	Shree Cement Ltd. **(Brand: "SHREE")** (For ALL)
(c)	The India Cement (For ALL)	(n)	JK Cement **(Brand: "J K")** (For ALL)
(d)	M/s Dalmia Cement (Bharat) Ltd **(Brand: "DALMIA INFRA PRO")** (For ALL)	(o)	J K Lakshmi Cement Ltd **(Brand: "J K LAKSHMI")** (For ALL)
(e)	Century Cements **(Brand: "CENTURY")** (For ALL)	(p)	Jaypee Rewa Cement **(Brand: "JAYPEE")** (For ALL)
(f)	Saurashtra cement **(Brand: "SAURASHTRA")** (For ALL)	(q)	Ambuja Cement **(Brand: "AMBUJA")** (For ALL)
(g)	The Ramco Cements ltd. (Formally Madras Cement) **(Brand: "RAMCO")** (For ALL)	(r)	M/s Chettinad Cement Corporation Pvt. Ltd. Chennai **(Brand: "CHETTINAD CEMENT")** (For OPC_43 & PSC)

PARTICULAR SPECIFICATIONS (Contd…)

(h)	Mangalam Cement Ltd **(Brand: "MANGALAM")** (For ALL)	(s)	M/s My Home Industries Pvt Ltd **(Brand: "MAHA CEMENT")** (For PSC)
(j)	Birla Corporation Ltd **(Brand: "BIRLA")** (For ALL)	(t)	M/s Wonder Cement Ltd. **(Brand: "WONDER CEMENT")** (For OPC_43 & PSC)
(k)	Orient Cement (**Brand: "BIRLA-A1**") (For ALL)	(u)	M/s Sagar Cements Ltd, Hyderabad **(Brand: " SAGAR")** (For OPC 43, OPC 53, PPC & PSC)

B. The Contractor shall furnish, the particulars of the manufacturer of cement alongwith the date of manufacture to the Garrison Engineer 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 manufacture. The document in support of the purchase of cement shall be verified by the Garrison Engineer. 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. Cement shall conform to the requirement of Indian Standard specification and each bag of cement shall bear relevant ISI certification mark. The weight of each consignment shall be verified by the GE and recorded. The content of cement shall be checked at random to verify the actual weight of cement per bag. However, the content of cement per bag shall be 50 Kg only subject to tolerance given in clause 9.2.2.1 and Annexure 'B' of IS -8112 of 1989.

1.4 **TESTING OF CEMENT**

(A) The contractor shall submit the manufacturer's test certificate in original alongwith test sheet giving the result of each physical test as applicable and the chemical composition of the cement or authenticated copy thereof, duly signed by the manufacturer with each consignment, as per the following IS provision: -

(a) Method of sampling hydraulic cement as per IS-3535-1986.
(b) Method of physical test for hydraulic cement as per IS-4031.
(c) Method of chemical analysis of hydraulic cement as per IS-4032-1985.

The test certificate and test sheet shall be furnished with each batch of cement. The Engineer-in-Charge shall record these details in cement acceptance register to be maintained by him, which will be signed by JE (Civil), EIC, GE and the Contractor as given in the format hereinafter for verification.

(B) The contractor shall however, organize setting time and a compressive strength test of cement through designated laboratory on samples collected from the 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 20 days stock before any new lot 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-day strength test will be relied upon to accept the lot of cement to commence the work. However, 28 days compressive strength test will be the final criteria to accept/reject the lot.

(C) The GE shall carryout independent testing as per the tests mentioned in the `CEMENT SUPPLY/ACCEPTANCE FORM` (**Annexure 'A'**) of random samples of cement drawn from various lots, if sample fails in 7 days compressive strength, the testing shall be carried out through National Test House/ SEMT/ CME/ Regional Research Laboratories/ Govt. approved Laboratories/ Zonal laboratories/Govt. Engg College & National Institute of Technology as per IS - 3535-1986 (Method of sampling hydraulic cement) and IS-4031 (method of physical test for hydraulic cement) and IS-4032-1985 (method of chemical analysis of hydraulic cement) referred to above . 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.

(D) 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

PARTICULAR SPECIFICATIONS (Contd…)

maintained in the `cement Testing Register' giving cross reference to relevant consignment of cement and quantity received etc.

1.5 **TESTING CHARGES:**

(a) 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.

(b) The contractor shall be required to set up adequate testing facilities at site to entire satisfaction of Garrison Engineer for conducting setting time test and compressive strength test as per IS codes referred to herein before for the samples collected from the lot brought at site. The tests shall be carried out jointly within 7 days of receipt of cement at site. These tests can alternatively be carried out at the Zonal Laboratory or any other recognised Laboratory so designated by GE. The entire cost of testing shall be borne by the contractor irrespective of the fact that the results are satisfactory or not. Recovery for tests carried out in Zonal Laboratory of MES shall be made by MES at the rates included in Appendix 'D' to these Particular Specifications.

1.6 **PURCHASE VOUCHER**

(a) The Contractor shall submit original purchase vouchers 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 along with the relevant documents to ensure the requirements as mentioned hereinbefore, before acceptance.

(b) The original purchase vouchers and the test certificates shall be verified for subject contract and defaced by the Engineer-in-Charge and kept on record in the office of the Garrison Engineer duly authenticated and with cross reference to the consignment / control number recorded in the Cement Acceptance Register. The cement Acceptance Register shall be signed by the Junior Engineer (Civil), Engineer -in- Charge, GE and the Contractor. The Contractor shall maintain schedule of supply of cement for each consignment. Cement when tested as per IS 4031, initial setting time shall not be less than 34 minutes and final setting time shall not be more than 600 minutes.

(c) The Accepting Officer may order a board of officers for random check of cement and verification of connected documents during the currency of contract.

1.7 **STORAGE / ACCOUNTING AND PRESERVATION OF CEMENT**

(A) Cement shall be stored in covered godown over dry platform at least 20 cm high in such a manner as to prevent deterioration due to moisture or intrusion of foreign matter. In case of store room, the stack should be at least 20 cm away from floors and walls. The stacking of cement shall be done as specified in relevant IS. The storage accounting and preservation of cement supplied by the Contractor shall be done as per standard engineer practice till the same is incorporated in the work and the cost of the same shall be deemed to be included in the unit rates/ amount quoted by the tenderer.

The Engineer - in - Charge shall inspect once a day to verify that cement lying at site is stored, accounted preserved and maintained as per norms. The cement shall be stored so as to differentiate each tested and untested consignment separately with distinct identifications. If the GE is not satisfied with the storage /preservation of cement, he may order for any test(s) of cement as applicable for that consignment to ensure its conformity to the quality mentioned in the manufacturer's test certificate. The Contractor shall bear the cost of necessary testing (s) in this regard also and no claim whatsoever shall be entertained.

(B) Stacking of cement shall done as per relevant IS and as under: -

(a) Each cement consignment shall be stacked separately and removal shall be made on the basis of `First in First out'.

(b) Adequate top cover will be provided.

(c) Stacks in no case shall be higher than 10 bags. The maximum width of each stack shall be 3.0m. If the stack is to be more than 7 or 8 bags high, the bags shall be arranged in header and stretcher fashion, i.e. alternately lengthwise and cross wise so as to tie the piles together and lesser the danger of topping over.

(d) Adequate space shall be kept between two stacks.

PARTICULAR SPECIFICATIONS (Contd…)

(C) Cement godown shall be provided with two locks on each door. The key of one lock of each door shall remain with the EIC or his representative and that of the other lock with the Contractor's authorized agent at site of works so that cement is removed from the godown only according to 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 any reason whatsoever, the same shall be removed from the cement godown on written orders of the GE and suitable replacement for the cement bag(s) so removed shall be made and no claim whatsoever shall be admissible on this account.

(D) The Contractor shall procure the cement timely as required in accordance with CPM agreed between GE and the Contractor. 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.

(E) Cement shall be removed from the store only according to daily requirement with the knowledge of both the parties and daily consumption of cement shall be recorded in cement consumption register which shall be signed by the Engineer-in-Charge and the contractor. Cement constants given in Appx 'A' to E-in-C's Branch letter No. 19280/E8 dated 03 May 1976 shall form the basis of consumption of cement for various items of works unless specifically indicated otherwise.

(F) In case the consumption of cement as per cement consumption register is found to be more than the estimated quantity of cement due to whatsoever reason, the contractor shall not have any claim whatsoever for such excess consumption of cement.

1.8 MEASUREMENTS AND PAYMENT OF CEMENT

(A) The entire quantity of cement brought at site shall also 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.

(B) The payment shall only be allowed after production of original purchase vouchers, certified copies of test certificates from the 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 hereinbefore. Cement shall be paid as materiel lying at site as per Condition 64 of IAFW-2249.Rate of cement given in SSR shall be applicable for cement irrespective of grade of cement specified for use in the work.

Signature of Contractor
Dated:

Asst Dir (Contracts)
For Accepting Officer

PARTICULAR SPECIFICATIONS (Contd…)

Annexure 'A'

CEMENT SUPPLY AND ACCEPTANCE FORM

Contract No. :

Name of Work :

Control No. : Date:

Details of purchase:

(i) Particulars of manufacturer :

Details of test certificate:

(i) No. and date :

(ii) Particulars of Issuing Authority :

Sl. No.	Nomenclature	IS ref	Sampling as per IS-3535-1980	Physical test as per IS-4031	Chemical analysis as per IS-4032	Remarks
1	2	3	4	5	6	7

*As ordered

Remarks with Signature

JE

Engineer-in-Charge

Contractor

Accepted/Rejected

Remarks of GE/Inspecting Officer/CE

PARTICULAR SPECIFICATIONS (Contd…)

APPENDIX 'B'

STEEL SUPPLY/ ACCEPTANCE FORM

1. CA No and Name of work :
2. Consignment No. :
3. Name of Manufacturer :
4. Manufacturer's TC No :
5. Random test details

   (a) Physical test report from ……..vide letter No……

   (Name of NABL approved Lab/Govt Engg College)

   (b) Chemical test report from……..vide letter No…….
6. Type of steel, dia & Qty :

   (a) Type : TMT

   (b) Dia : mm

   (c) Actual Wt : MT

   (d) Conversion Wt : MT

	Chemical test							Mechanical test						
	Carbon %	Sulphur %	Phosphorous %	Sulphur + Phosphorus %	Manganese %	Silicon %	Corrosion resistant element	Weight per meter	Yield Stress (N/mm2)	Tensile Strength (N/mm2)	Percent elongation (Min 18%)	Bend test	Rebend Test	Remarks
As per IS-1786 2008														
As per manufacturer's test certificates														
As per independent test														

Remarks of Inspecting Officer/CWE:

Signature of Contractor
Dated:

Asst Dir (Contracts)
For Accepting Officer

APPENDIX 'C'

APPROVED LIST OF PRODUCTS AND MAKES/ BRANDS/ MANUFACTURERS

Ser No	Items		Make/Brand/Manufacturers
1	2		3
	B/R ITEMS		
	Concrete		
1	**Ready Mix Concrete (RMC)**	1	Lafarge
		2	Ultra Tech
		3	ACC
		4	RMC Ready Mix/Prism RMC
		5	Ramco
		6	M/s Shaneshwar Ready Mix, Ahmednagar
		7	M/s Shiv Shree Venkateshwara RMC, Ahmednagar
1A	**AAC Block**	1	Siporex
		2	HIL Limited (Birla AEROCON)
		3	ACCOFIX
		4	Greenway Building Materials
		5	DLITE blocks
		6	ISI marked Grade I as approved by GE
	Joinery		
2	**Factory made Panelled /Glazed/ Gauzed Wooden Shutter / Flush Doors**	1	M/S Goel Brothers, Raipur
		2	M/S Pioneer Timber, Chandigarh
		3	M/S Goyal Industries, New Delhi
		4	M/S Jain Doors Pvt Ltd, Haryana
		5	M/S India Wood & Wood P Ltd Mangalore
		6	M/S MP Wood Products, Indore
		7	M/S A1 Teak Products, Indore
3	**Factory made PVC, WPC, FRP Shutters and Frames**	1	M/S Rajshri Plastiwood, Indore (Rajshri)
		2	M/S Sintex Industries Ltd (Sintex)
		3	M/S AccuraPolytech (Accucel)
		4	M/S Dura Plast Extrusion (Duraplast)
		5	M/S Madhu Industries (Madhu Industries)
		6	M/S Navratna Co Speciality Chemicals(GIZA)
3A	**UPVC Doors, Windows & Ventilators**	1	M/s Poly Windows, Pune
		2	M/s Aparna Profiles Pvt Ltd
		3	M/S Rajshri Plastiwood
		4	M/S Madhu Industries
4	**Steel windows/ ventilators/Pressed steel door frames**	1	M/s Madhu Industries
		2	Jangid Engineering Jaipur
		3	Decan Structural Pvt Ltd Bangaluru
		4	Chandni Industries
		5	Ashwani& Sons
		6	Anoop Industries
		7	Trisul Industries
		8	Ashish Industries
4A	**WPC Boards**	1	Rajshri
		2	Giza
		3	Echon
4B	**Rolled Formed GI Section Pre-Painted/Pre- Coated Windows**	1	M/s NCL ALLTEK & SECCOLOR
		2	Elexir Met
		3	Ashwani& Sons
5	**Aluminium section of shutters/ frames for door/window/ ventilator**	1	Hindalco
		2	Indal (Indian Al Company)
		3	Jindal

Appendix 'C' (Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
6	**Venetian Blinds**	1	Vista Levolor
		2	MAC
		3	Aerolux
	Builder's Hardware		
7	**Hydraulic Door Closer**	1	Everlite
		2	Universal
		3	Hardwin
		4	Dyana
7A	**Stainless Steel Plate Rack**	1	Prayag
		2	Nirali
		3	Bluestar (Silver Shine)
7C	**Towel Rails**	1	Jaquar
		2	KICH
		3	Swastik
		4	Crown
		5	Prayag
		6	ESS ESS
		7	CERA
7D	**Mortice Locks**	1	Harrison
		2	Godrej & Boyce Co ltd
		3	RP Lock Co. Delhi
		4	KICK
7E	**Drapery Rod**	1	Vista Levolor
		2	MAC-DECOR
		3	Sophia
	Roof Covering		
8	**Mangalore Tiles**	1	Charminar
		2	Raja
		3	RECHO
		4	Prajapat
		5	Kerela Tile Wks
8A	**Non Asbestos Fibre Reinforced (Polypropylene), 6mm Cement Corrugated Sheets**	1	Everest Industries Ltd (EVEREST)
		2	Charminar Fortune
		3	RAMCO Indus Ltd (RAMCO)
8B	**Pre-Painted Galvalume/ Galvanized Corrugated Steel Sheets**	1	TATA
		2	JSW
		3	ESSAR
8C	**Galvanised Plain/ Corrugated Steel Sheets**	1	TATA
		2	JSW
		3	ESSAR
8D	**Pre-moulded bituminous joint filler board**	1	STP Ltd
		2	Tikitar Industries Ltd (TIKIDAN)
		3	Sikka

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
8E	**AC Sheets & Ridges**	1	Charminar
		2	Everest
		3	UP Asbestos
		4	Ramco
8F	**Water Proofing Compound**	1	Pidilite Industries Ltd
		2	FOSROC
		3	Dr Fixit
		4	Asian Paints Ltd.
8G	**APP Membrane**	1	STP Ltd
		2	Texsa India Ltd
		3	IWL Ltd
		4	TIKIDAN
		5	Asian Paints Ltd.
	Ceiling and Linings		
9	**Perforated particle board/tiles for insulation and acoustic**	1	Anchor Ceiling Tiles
		2	Armstrong
		3	Anutone
		4	Bison Panel
		5	Lagyp
		6	Gypboard
9A	**PVC False Ceiling, Wall Lining & Solid PVC Partitions**	1	Rajshri
		2	GIZA
		3	Echon
		4	Accucel
10	**Plywood**	1	Kitply
		2	Century Plywood
		3	Archidply
		4	Green Ply
		5	Anchor
11	**Particle Board Gypsum**	1	Mangalam Timber Product
		2	Gypsum Board
		3	Jolly BD, Mumbai
		4	Indian Gypsum product
		5	Armstrong World Industries
12	**Laminated Sheets**	1	Formica
		2	Sun Gloss
		3	Sunmica
		4	BackliteHylum
		5	ECO Board
12A	**Adhesives**	1	Pidilite
		2	Fevicol
		3	Vamicol
13	**Pre-laminated Particle board/ MDF board**	1	Novapan
		2	Eco Board Industries, Pune
		3	Kitply
		4	Anchorlam
		5	Century Plywood
		6	Green Ply

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
14	**Block boards / Plain Particle boards/ Veneered particle board**	1	Bajaj Boards
		2	NU Wood
		3	A-1 Boards
		4	Bhutan Board
		5	Charminar
		6	Kitply
		7	Green Ply
	Floor finishes and Pavings		
15	**Glazed Ceramic wall tiles**	1	Johnson Tiles
		2	Kajaria
		3	Somany
		4	AGL Tiles
		5	RAK Ceramic
		6	Orient Bell Ltd
16	**Non-skid Ceramic tiles/Ceramic tiles**	1	Johnson Tiles
		2	Kajaria
		3	Somany
		4	AGL Tiles (Asian Granite Ltd)
		5	RAK Ceramic
		6	Orient Bell Ltd
17	**Vitrified Tiles /Heavy duty exterior Vitrified tiles/Anti slip Vitrified tiles**	1	Johnson marbonite
		2	Kajaria
		3	Somany
		4	AGL Tiles
		5	RAK Ceramic Ltd
		6	Orient Bell Ltd
18	**Mosaic/Cement Flooring Tiles**	1	M/S Mehatab Tiles, Indore
		2	National Tiles
		3	Bharat Tiles and Engg Coy, Bangalore
		4	Modern Tiles and Marbles Bangalore
		5	M/s NITCO, Mumbai
		6	Ultra
		7	Duracrete
19	**Acid Resistant Tiles**	1	M/S Johnson, Mumbai
		2	Somany
		3	Kajaria
		4	M/S Burn Standard Co, Jabalpur
		5	M/S Purshuram Pottery Wks, Marvi
20	**Cement Concrete Interlocking Paver Blocks / Tiles**	1	MehtabTiles , Indore
		2	Ultra Tiles
		3	Navya Tiles, Jodhpur
		4	NITCO
		5	Patel Furniture Mart
		6	Topaz Tiles
		7	SAP Paver Jodhpur
		8	Sagar Tiles Saharanpur
		9	CEME
		10	Swami Tiles
		11	Sukhi Enterprises
		12	Supreme Tiles
		13	Luck Cement Block Works
		14	Vaishnavi Developers
21	**PVC Sheet and tile flooring**	1	Krishna Vinyl Tiles
		2	Armstrong
		3	M/S Marblex Tiles
		4	Polyfin Tiles
		5	Square Foot

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
	White washing, Colour washing & Distempering		
22	**Distemper Oil Emulsion/Acrylic Washable Distemper/Acrylic Emulsion Distemper/ Plastic Emulsion Paint**	1	Nerolac
		2	Berger Paints
		3	Dulux (Akzonobel)
		4	Asian Paints
		5	Nippon Paint India Pvt Ltd
		6	JSW
23	**Weather proof exterior acrylic emulsion paint**	1	"APEX ULTIMA" of Asian Paints
		2	"WEATHER COAT ALL GUARD" of Berger Paints
		3	"EXCEL TOP GUARD" of Nerolac
		4	"DULUX WEATHERSHIELD MAX" of ICI India
		5	"Maxx Durafresh" of Nippon Paint India Pvt Ltd
24	**Cement Base Paint**	1	Super Snowcem
		2	Duracem
		3	Aquacem
		4	Shalimar
		5	Berger
		6	Nippon Paint India Pvt Ltd
25	**Cement Putty (Wall Care Putty)**	1	Birla White
		2	JK White
		3	Asian Paint
		4	Jenson & Nicolson
		5	Shalimar Paint
		6	Golden Mohar
	Glazing	7	Nippon Paint India Pvt Ltd
26	**Sheet glass plain/Sheet glass frosted**	1	Saint Gobin
		2	Asahi
		3	Atul Glass Industries
		4	Golden Fish
		5	Modi Guard
		6	Hindustan Pilkington Glass
		7	Trupti
		8	Modi Float
27	**Heat absorbing glass & reflective solar control film**	1	Hindustan Pilkington Glass works
		2	Saint Gobin
		3	Modi Float
		4	Modiguard
28	**Rough cast wired glass**	1	Hindustan Pilkington Glass works
		2	Saint Gobin
		3	Modi Float
		4	Modiguard
29	**Oil Putty**	1	Jenson & Nicolson
		2	Asian
		3	Burger
30	**Mirror**	1	Modi
		2	Atul
		3	Saint Gobain
	Painting		
31	**Synthetic Enamel Paint**	1	Asian Paints
		2	Nerolac Paints
		3	Dulux (Akzonobel)
		4	Nippon Paint India Pvt Ltd
		5	JSW
32	**PVC Water Tanks/Polythylene**	1	Sintex
		2	Polycon
		3	Rotex

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
33	CP Bib Cock, Stop cock, pillar cock, TPH & accessories	1	Jaquar
		2	Marc
		3	CERA
		4	Kohler
		5	Player
		6	Hindware
34	Copper/Brass Alloy Bib Tap, Pillar Tap, Angle Valve and Stop valves & accessories	1	Soma
		2	Leader
		3	Zoloto
		4	Jaquar& Co Pvt Ltd (JAQUAR)
35	PVC Stop Cock and Bib Cock/ Float Valves & Accessories	1	Jaypee
		2	GMP
		3	Neta
		4	Zolota
		5	Prayag Polymer
		6	Symet
36	Gun-Metal Globe or Gate Valves/ Angle Valves	1	Leader
		2	Bir
		3	Zoloto
		4	Kirloskar
37	Shower Rose	1	Jaquar
		2	CERA
		3	Crabtree
		4	Kohler
38	CI/ Brass Ball Cocks (Float Valves)	1	Leader
		2	NETA
		3	Zoloto
39	Water Closet -Vitreous China (European/ Indian)/ squatting pan Orissa pattern	1	CERA
		2	RAK Ceramics
		3	Parryware
		4	Jaquar
		5	Hindware
		6	Johnson
		7	Kajaria (KEROVIT)
40	Flushing Cistern - PVC Low Level including Flush Valves & Fittings for WC and Urinals	1	M/S Johnson Peddar
		2	Parryware
		3	RAK Ceramics
		4	CERA
41	Plastic Seat Covers for EWC	1	CERA
		2	Parryware
		3	Neycer
42	Urinals - Vitreous China	1	CERA
		2	Parryware
		3	Neyveli Ceramics (Neycer)
		4	Hindware
		5	Johnson
		6	Jaquar
		7	Kajaria (KEROVIT)
43	Wash Basin - Vitreous China	1	CERA
		2	RAK Ceramics
		3	Parryware
		4	Hindware
		5	Neyveli Ceramics (Neycer)
		6	Jaquar
		7	Kajaria (KEROVIT)

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
44	**Stainless steel Sink / Stainless Steel Sink with draining board**	1	Jayna
		2	Nirali
		3	Neelkant
		4	Parryware
45	**Steel Rolling Shutters/ Grills & Collapsible Gates**	1	Shree Lakshmi EnggWks, Bangalore
		2	M/S Prakash& Co, New Delhi
		3	M/S Senthil Rolling Shutters &Engg Co, Chennai
		4	M/S Swastik Rolling Shutters, Mumbai
		5	M/S Jayaraj Industries, Chennai
		6	M/S Darshan Rolling Shutters, Nasik
		7	M/S Shalimar Rolling Shutters & Co.
		8	M/S Ganesh Rolling Shutters Hyderabad
		9	M/S Shaparia Dock & Steel
	E/M ITEMS		
	Water Supply & Plumbing		
1	**CI Pipe and fittings**	1	Electro-Steel
		2	Kejriwal
		3	NECO
		4	Kesoram
2	**GI Pipes & Fittings**	1	Tata
		2	Jindal
		3	BST
		4	Surya
		5	KS Engineering
		6	Zenith
		7	Swastik
		8	Prakash
3	**DI Pipes & Fittings**	1	Jindal Ltd, Gujrat
		2	Electrosteel Castings Ltd, W.B.
		3	Tata Metalinks, Kolkata
		4	SAW pipes
		5	Srikalahasthi Pipes Ltd
3A	**Hubless Centrifugal**	1	NECO
		2	SKF
		3	RPMF
4	**MS Pipes & Fittings**	1	Tata
		2	Jindal
		3	Swastik
		4	Prakash
		5	Surya
		6	BST
		7	Zenith
5	**HDPE Pipes & Fittings**	1	Finolex
		2	PRINCE (Corefit)
		3	Supreme
		4	JAIN IRRIGATION SYSTEM
		5	KSR
		6	Astral
6	**CPVC pipes and fittings (Chlorinated polyvinyl chloride)**	1	FINOLEX
		2	Dutron
		3	SFMC
		4	Birla Aerocon
		5	Prince (Smartfit)
		6	Astral

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
7	PVC - Soil, waste, rainwater (SWR) & Drainage pipes	1	Supreme
		2	PRINCE (Ultrafit)
		3	KSR
		4	Finolex
		5	Astral
7A	PPR Pipes & Fittings	1	PRINCE (Greenfit)
		2	Finolex
		3	Supreme
		4	SFMC
7B	PVC Pipes & Fittings	1	PRINCE (Aquafit)
		2	Finolex
		3	Supreme
		4	HIL Limited (Birla Aircon)
		5	KSR
7C	UPVC Pipes & Fittings	1	PRINCE (Aquafit)
		2	Finolex
		3	Supreme
		4	HIL Limited (Birla Aircon)
		5	KSR
		6	Astral
7D	UPVC Pipes & Fittings for SWR	1	PRINCE
		2	Finolex
		3	Supreme
		4	HIL Limited (Birla Aircon)
		5	KSR
		6	Astral
7E	Polyethylene/Aluminium/Polyethylene Composite Pressure Pipe	1	PRINCE
		2	Finolex
		3	Supreme
7F	Plastic Pipe (for non pressure Drainage &Sewerage)	1	PRINCE (Foamfit)
		2	Finolex
		3	Supreme
8	CI - Soil, waste, rainwater (SWR) & Drainage pipes	1	NECO, Nagpur
		2	SKF (Singhal Iron Foundry, Mathura)
		3	Bengal Iron Company
		4	DhatuUdyog
		5	Kapilansh
		6	AnandFouder&Engg
		7	Raj Pattern Makers Founders (RPMF)
9	AC - Soil, waste, rainwater (SWR) & Drainage pipes	1	M/S Everest Asbestos Hyderabad
		2	VisakaInd Ltd
		3	M/S Hyderabad Asbestos (Charminar)
		4	M/S Ramco
10	RCC pipes, drain pipes	1	Thuluvananikal Pipes
		2	Everest Asbestos
		3	Himalaya
		4	Indian Hume Pipes
11	Air Release Valves	1	Leader
		2	BIR
		3	Kirloskar
		4	Sant
		5	Upadhyay
		6	Lauritz Knudsen (Formerly L&T)

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
12	**Foot Valves**	1	Upadhyay
		2	Leader
		3	Kirloskar
		4	Sant
13	**Reflex Valves**	1	Kirloskar
		2	Leader
		3	Sant
		4	Lauritz Knudsen (Formerly L&T)
14	**Sluice valves**	1	Leader
		2	Kirloskar
		3	Upadhyay
		4	Lauritz Knudsen (Formerly L&T)
		5	Zoloto
		6	Bir
15	**Butterfly Valves/ Disc Valves**	1	Leader
		2	Upadhyay
		3	Sant
		4	Lauritz Knudsen (Formerly L&T)
		5	Kirloskar
		6	Zoloto
16	**Gate valves**	1	Leader
		2	Zoloto
		3	Sant
17	**Water Meter**	1	Capstan
		2	Dashmesh
		3	Kaycee
		4	Capital
		5	Anand Asahi
		6	Kirloskar
18	**Centrifugal Pump/ Monoblock Pump**	1	Kirloskar
		2	Beacon
		3	Crompton Greaves
		4	KSB
		5	Wilo Mather & Platt
		6	Jyoti
		7	V-Guard
		8	CRI
19	**Submersible Pump/ Open Well Pumps**	1	Kirloskar
		2	KSB
		3	Jyoti
		4	Wilo Mather & Platt
		5	V-Guard
		6	CRI
20	**Vertical Turbine Pumps**	1	Kirloskar
		2	KSB
		3	Wilo Mather & Platt
		4	Jyoti
21	**Non Clog Sewage Submersible Pumps**	1	KSB
		2	Kirloskar
		3	Wilo Mather & Platt

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
22	**Pumps for Fire Fighting**	1	Kirloskar
		2	Wilo Mather & Platt
		3	Crompton
		4	Bharat Bijlle
23	**Pole - Pre-stressed concrete**	1	M/S Cement Fabric India, Jodhpur
		2	M/S Hindustan Prestressed Concrete, Faridabad
		3	M/S Indian PCC Poles
		4	M/S Concrete Udyog Jhansi
		5	M/S SanklaUdyog, Jhansi
24	**Pole - Steel tubular**	1	India Tube and Co
		2	India Electric Poles Mfg Co, Maharashtra
		3	Bombay Tubes
		4	The National Tubing Company, Kanpur
		5	Kalinga Tubes
		6	Singh Profile, Pune
25	**Insulators HT / LT Disc/ Pin / Shackel / loop / String Type**	1	BHEL
		2	Jayshree
		3	WS Insulators
		4	Southern Insulators
		5	MEI
		6	Mordern Insulators
26	**Air Circuit Breaker (ACB) LT 1100 Volts**	1	Lauritz Knudsen (Formerly L&T)
		2	Siemens
		3	ABB
		4	Schneider
		5	Crompton Greaves
		6	GEC
		7	English Electric
		8	BCH
		9	HPL
27	**Vacuum Circuit Breaker (VCB) suitable for 36 KV, 22 KV and 12 KV system including accessories**	1	SIEMENS
		2	Crompton
		3	ABB
		4	Alsthom
		5	BHEL
		6	Schneider
		7	Lauritz Knudsen (Formerly L&T)
28	**Automatic Power Factor Correction (APFC) Panel**	1	Lauritz Knudsen (Formerly L&T)
		2	GEC
		3	Siemens
		4	ABB
		5	Epcos
		6	BCH
29	**Power Factor Improvement Capacitor Banks**	1	Lauritz Knudsen (Formerly L&T)
		2	Siemens
		3	EPCOS
		4	GE
		5	ABB
30	**HT Switch Gear 66/33/11KV 3 Phase, Gas Circuit Breaker circuit breaker SF-6 Type**	1	Crompton Greaves
		2	ABB
		3	Siemens
		4	Schneider

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
31	HT 11 KV, 3 Ph Automatic Switch Fuse Unit	1	ABB
		2	Crompton Greeves
		3	Schneider
		4	AREVA T&D India Ltd
		5	C & S Electric
32	Air Break Switch Gang Operated (33KV/11 KV)	1	Pactil
		2	Jaipuria Brothers
		3	HEI
33	Air-break Switch Gang (Isolators)	1	MEI
		2	Southern Switchgear
		3	Andrew Yule
		4	Crompton Greeves
34	Arresters Lightening LT / HT	1	Oblum
		2	BHEL
		3	GEC-ELPRO
		4	Crompton & Greaves
		5	AREVA T&D
		6	HPL
35	Change Over Switch /Starter/ Contactor /DOL/ Star-Delta/ Synchronising Panel/ Single Phase Preventor	1	Havells
		2	Siemens
		3	Lauritz Knudsen (Formerly L&T)
		4	ABB
		5	Crompton Greaves
		6	GE
		7	BCH
		8	C&S
		9	HPL
36	Main Switch Iron Clad / Switch Fuse unit	1	Havells
		2	Crompton Greaves
		3	Lauritz Knudsen (Formerly L&T)
		4	Siemens
37	Transformers 66/11 KV, 33/11 KV, 33/0.433 KV, 22KV/11KV, 22/0.433 KV Copper Wound all rating	1	Alstom (GEC)
		2	Siemens
		3	Bharat Bijlee Ltd, Mumbai
		4	Crompton Greeves, Mumbai
		5	ABB
		6	Schneider
		7	Kirloskar
		8	EMCO
		9	BHEL
		10	Andrew Yule
38	Transformers 11 KV/433 V Step Up/ Step Down, Indoor/ Outdoor Type 11KV upto 1000 KVA Capacity Dry Type, Cast Resin	1	Schneider
		2	Crompton
		3	Kirloskar
		4	ABB
39	Transformers 33 KV & 11 KV Current & Potential	1	Lauritz Knudsen (Formerly L&T)
		2	Siemens
		3	Schneider
		4	Crompton Greeves, Mumbai
40	Isolation Transformer	1	Vinitek Electronics(Volina)
		2	Power One
		3	Spectron
41	Transformers 6.6 KV/ 433V, 3 Phase upto and including 100 KVA	1	Indian Transformer Electrical, (ITE) Gurgaon
		2	Voltech

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
42	Transformers 11 KV or 6.6 KV/0.433 KV Copper Wound (500 KVA and Above)	1	KIRLOSKAR
		2	Crompton Greaves, Mumbai
		3	ABB
		4	Andrew Yule
		5	Schneider
		6	Bharat Bijlee Ltd, Mumbai
		7	ECE
		8	Voltamp
43	Transformers 11 KV/0.433 KV Copper Wound (100 KVA to less than 500 KVA)	1	M/S Indo Tech Transformers
		2	Alstom (GEC)
		3	ABB
		4	Schneider
		5	Bharat Bijlee
		6	Indian Transformer & Electrical Pvt Ltd (ITE Gurgaon)
		7	Kirloskar
		8	Voltamp Transformer Pvt Ltd., Vadodara
		9	Voltamp Electrical Pvt Ltd., Kolkata
		10	Silver Line Electricals Pvt Ltd.
44	Transformers 11 KV/0.433 KV Copper Wound (Below 100 KVA)	1	PME
		2	Rajasthan Transformer
		3	Everest
		4	RK Industries
		5	Pactil
		6	Kotson
		7	Hi-Tech Industries, Jaybetti
		8	Blank
		9	Voltamp
		10	Kirloskar
45	Cable Jointing Kit for 11 KV/22 KV	1	Raychems
		2	Densons
		3	M-Seal
		4	Birla -3M
46	UG HT XLPE, PVC Insulated Aluminum Conductor for 3.3/33/22/11 KV System	1	Cable Corporation of India (CCI)
		2	Havells
		3	Universal Cables Ltd
		4	Asian Cables
		5	Gloster
		6	RPG Cables Ltd , Thane
		7	Finolex
		8	RR Kabel
		9	KEI
		10	Polycab Pvt Ltd
		11	APAR Industries
47	UG LT XLPE, PVC Insulated Aluminium Conductor for 1100 Volts	1	Cable Corporation of India (CCI)
		2	Asian Cable Co, Chattisgarh
		3	Finolex
		4	Polycab
		5	Gloster
		6	Universal
		7	RPG Cables Ltd , Thane
		8	Havells India Ltd
		9	RR Kabel
		10	KEI Industries Ltd(KEI)
		11	Vishal
48	Aluminium Conductor Steel Reinforced (ACSR)	1	All-Ind
		2	ICC
		3	Bharat Conductors
		4	NICCO
		5	Indian Aluminum Co

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
49	Street Light fittings	1	Bajaj
		2	Phillips
		3	Wipro
		4	Crompton
		5	GE
		6	Havells
		7	Luker
		8	Jaquar
		9	BENLO
		10	EVEREADY
		11	ORIENT Electric
		12	POLYCAB
		13	SURYA Roshni
		14	Pyrotech
		15	Halonix
		16	FIEM
		17	SYSKA
		18	HPL
50	Solar Street light Fitting	1	Phillips
		2	BHEL
		3	Tata
		4	Bajaj
		5	Havells
		6	Benlo
51	High Mast light	1	Bajaj
		2	Phillips
		3	Crompton
52	Fluorescent tube light fittings/LED/Lamp Holder	1	Wipro
		2	Bajaj
		3	Crompton
		4	Phillips
		5	Havells
53	Flame Proof Light Fittings (LED/ FAN/ WELLGLASS/ BULKHEAD including accessories)	1	M/S Sudhir
		2	M/S Baliga
		3	Flexpro Electricals, Nasik
		4	M/S Shyam Switchgears, Mumbai
		5	Bajaj
		6	Crompton
54	Florescent lamp Lt lamp	1	Phillips
		2	Wipro
		3	Bajaj
		4	Crompton
		5	Osram
		6	Havells
		7	GE- Lighting (GEC)
54A	Water Coolers	1	Blue Star
		2	Usha
		3	Voltas
54B	Desert Cooler	1	Kenstar
		2	Symphony
		3	Voltas
		4	V-Guard
54C	Refrigerator	1	Godrej
		2	Samsung
		3.	CG
		4.	WhirlPool

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
55	Light fittings LED	1	Phillips
		2	GE
		3	Osram
		4	Wipro
		5	Bajaj
		6	Havells
		7	Luker
		8	Jaquar
		9	BENLO
		10	EVEREADY
		11	ORIENT Electric
		12	POLYCAB
		13	SURYA Roshni
		14	Pyrotech
		15	Halonix
		16	Crompton
		17	FIEM
		18	SYSKA
		19	HPL
56	LED Tube Lights/Bulbs	1	Phillips
		2	Havells
		3	Osram
		4	Wipro
		5	Bajaj
		6	GE
		7	Luker
		8	Jaquar
		9	BENLO
		10	EVEREADY
		11	ORIENT Electric
		12	POLYCAB
		13	SURYA Roshni
		14	Pyrotech
		15	Halonix
		16	FIEM
		17	SYSKA
57	Electronic / Photoelectric Switch for Auto Op of Street Lights	1	Lauritz Knudsen (Formerly L&T)
		2	GE
		3	Siemens
		4	Bajaj
		5	Legrand
58	DBs/MCB (Miniature Circuit Breakers) & MCCB (Moulded Case Circuit Breakers)/ RCCB/ RCBO/ ELCB	1	Lauritz Knudsen (Formerly L&T)
		2	ABB
		3	Siemens
		4	Schneider
		5	Havells
		6	Legrand
		7	Indo ASIAN
		8	C & S Electric
		9	BhartiaCuttler Hammer (BCH)
		10	HPL
		11	Benlo

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
59	BLANK		
60	Fire Fighting Eqpt like hose reel, nozzles, couplings, valves, etc	1	Ceasefire
		2	Safex
		3	Flame Guard
		4	Nitin
		5	Vimal Fire Control Pvt Ltd
61	Electric Accessories, Piano Switches, Ceiling rose, call bells, Buzzers, Lamp Holders/ Socket Outlet etc , Plug & Socket Board	1	Panasonic Anchor
		2	Crabtree
		3	Leader
		4	Legrand
		5	Havells
		6	C & S Electric
		7	Benlo
62	Ammeter / Voltmeter / Power Factor / frequency Meters	1	IMP
		2	Automatic Electrical(AE)
		3	L&T
		4	Havells
		5	MECO
		6	HPL
63	Digital Meters with built in selector switches for Voltmeter, Ammeter, Frequency Meter, Energy/KWH Meter, Power Analyser	1	Lauritz Knudsen (Formerly L&T)
		2	Automatic Electrical (AE)
		3	Havells
		4	Enercon
		5	Secure Meter
64	Modular Switches/ Sockets	1	Anchor Roma
		2	Legrand
		3	Crabtree
		4	Havells
		5	Indo Asian
		6	Polycab
		7	Lauritz Knudsen (Formerly L&T)
		8	Panasonic Anchor
		9	HPL
		10	Benlo
65	Electronic Energy Meters, Tamper Proof	1	Lauritz Knudsen (Formerly L&T)
		2	Japuria Meters
		3	Havells
		4	Secure Meters
		5	Elmeasure
		6	BENLO
		7	HPL
66	SCADA System	1	Schneider
		2	Elmeasure
		3	Forbes Marshall
67	Ceiling Fan/ BLDC Ceiling Fan (5 Star rating)	1	Bajaj
		2	Crompton
		3	Polar
		4	Khaitan
		5	Orient
		6	Havells
		7	V-Guard
		8	Polycab
		9	Panasonic
68	Exhaust fan/ Air Circulators	1	Crompton
		2	Khaitan
		3	Usha
		4	Bajaj
		5	Almonard
		6	Havells
		7	Polycab

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
69	**Fan Regulator**	1	Anchor
		2	Havells
		3	Bajaj
		4	Usha
		5	Khaitan
		6	GEC
		7	Legrand
70	**Electronic Type Fan Regulator**	1	Legrand
		2	Crompton
		3	Havells
		4	Bajaj
		5	Orient
		6	V-Guard
		7	Polycab
71	**Geyser**	1	Bajaj
		2	Racold
		3	Usha
		4	Venus
		5	Jaquar
		6	V-Guard
		7	Havells
72	**PVC insulated Copper/ Aluminium wires/ cables**	1	Havells
		2	Finolex
		3	Nicco
		4	Plaza
		5	Anchor
		6	Polycab
		7	RPG
		8	GLOSTER
		9	RR Kabel
		10	KEI
		11	HPL (for Copper wire/ cable only)
		12	Vishal
73	**PVC conduits (Rigid or Flexible)/ FRLS Rigid PVC Conduits/ Fittings**	1	Anchor
		2	Modi
		3	Presfit
		4	Precision
		5	Astral
		6	Panasonic Anchor
		7	Polycab
74	**MS conduit**	1	BEC Industries
		2	Kalinga
		3	Jindal
		4	Bharat
		5	AKG
75	**Casing capping & Accessories**	1	Precision
		2	Modi
		3	Presto Plast
		4	Supreme
		5	Polycab
		6	Plaza
		8	Pressfit
76	**Indicating Lamps Neon / LED Type**	1	Lauritz Knudsen (Formerly L&T)
		2	Siemens
		3	ABB
		4	Schneider
		5	Japuria
		6	EPCOS

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
77	**LT Relay Numerical, Static**	1	Simens
		2	ABB
		3	Lauritz Knudsen (Formerly L&T)
		4	Schneider
		5	Japuria
		6	EPCOS
78	**UPS**	1	Tata-Liebert
		2	APLAB
		3	Luminous
		4	Sukam
		5	Protect services
		6	Microtech
		7	Labotech
		8	Power Conservation Tech
		9	Sintrac
		10	Liveline
		11	Power One
79	**Automatic Voltage Stabilizer (servo controlled)**	1	Automatic Electrical (AE)
		2	Vinitec
		3	APLAB
		4	V Guard
		5	Vintek Electronics (Volina)
80	**DG Set (Engine)**	1	Kirloskar
		2	Cummins
		3	Greaves -Cotton
		4	Ashok Layland
		5	CaterPillar
		6	Sterling
		6	Mahendra
81	**DG Set (Alternator)**	1	Kirloskar
		2	Stamford
		3	Jyoti
		4	Crompton Greaves
		5	Alstom
		6	Areva
		7	Bharat Bijlee
82	**DG Set Assembled with Sound Proof Canopy**	1	Kirloskar
		2	Jackson
		3	Sudhir
		4	Greaves- Cotton
		5	Cummins India
		6	Mahendra
83	**Induction Motors**	1	Crompton Greaves
		2	Kirloskar Electric
		3	Bharat Bijlee
		4	Simens
		5	NGEF
		6	ABB
84	**Gang operated devices (GOD)**	1	Pactil (Metro)
		2	Jaipuria
		3	Atlas
		4	ECE
		5	AREVA
85	**Precast Concrete Cable Cover**	1	Mehtab
		2	Patel Furniture Mart
		3	Lucky Cement Block Works (Lc)
		4	Sukhi Enterprises

Appendix 'C'(Contd…)

Ser No	Items		Make/Brand/Manufacturers
1	2		3
86	**Electric Panel (LT)**		Factory made CPRI approved
87	**Air Handling unit**	1	Voltas
		2	Bluestar
		3	National
		4	Zeco
88	**Air Curtains**	1	Almonard
		2	Air Con
		3	Crompton Greaves
89	**Cooling towers**	1	Paharpur
		2	Mihir
		3	Delta
		4	Advance
90	**Centrifugal Chillers& Screw Chillers**	1	Carrier
		2	Voltas
		3	DAIKIN
		4	Hitachi
		5	Blue Star
91	**Window type Air Conditioner**	1	Carrier
		2	Voltas
		3	Daikin
		4	Hitachi
		5	Blue Star
92	**Split type Air Conditioner**	1	Carrier
		2	Voltas
		3	Daikin
		4	Hitachi
93	**Solar Water heating system**	1	M/s Noval Energy
		2	M/s Solar Equipment Mfg Noida
		3	M/s Solautomatic Electrical Equipment
		4	M/s Digific Controls India Pvt Ltd.
		5	M/s Solchrome System (I) Ltd.
		6	M/s Surya Jyoti Devices
		7	M/s Jain Solar
94	**Chemical Earthing**	1	U-ProtecEarthing
		2	Shivangi Engineering Works
		3	JEF
		4	Aishlok
		5	Truepower
		6	Planet Power Solution

NOTES:

(i) Materials to be incorporated in the work shall be superior/1st quality of the makes given above.

(ii) Items shall be considered whichever is applicable only.

(iii) Sources indicated are only for guidance and approval of the Garrison Engineer shall be taken prior to procurement of materials and its incorporation.

(iv) The tender 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.

(v) Sources of materials shall be as above or in the vicinity thereof. 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 of its distance from site of works.

Signature Of Contractor **Asst Dir (Contracts)**
Dated: **For Accepting Officer**

Appendix 'D'

MATERIALS AND THEIR TESTS
RECOVERY RATES OFTESTING CHARGES

Sl. No	Materials	Test	Method of testing	Frequency of Tests			Level of test	Rate per test Rs.Ps	Remarks
1.	Bricks	(i) Compressive strength	IS-3495 (Part-II)	As per (IS-5454) as given under :			'A'	330/-	Checks for visual and dimensional characteristics shall also be carried out as per IS:5454
				Lot Size	**Sample Size**	**Permissible No of Defective Bricks**			
		(ii) Water Absorption	IS-3495 (Part-II)	1001 to 10000	5	0	'A'	330/-	
		(iii) Efflorescence	IS-3495 (Part-I)	10001 to 35000	10	0	'A'	330/-	
				35001 to 50000	15	1			
2.	Coarse aggregate	(i) Sieve analysis	IS:2386 (Part-I)	One test for every 15 cu. m of aggregates or part thereof brought to site			'A'	660/-	
		(ii) Flakiness Index	--do--	-do-			'A'	250/-	
		(iii) Estimation of deleterious materials	--do--	One test for every 100 cu. m of or part thereof			'A'	600/-	
		(iv) Organic impurities	--do--	One test per source of supply			'C'	275/-	
		(v) Moisture content	--do-- (Part-II)	Regularly as required			'A'	330/-	
		(vi) Specific gravity	--do-- (Part-II)	One test for each source of supply.			'B'	330/-	
3.	Fine Aggregate	(i) Sieve analysis	IS:2386 (Part-I)	One test for every 15cu.m of FA or part when brought to site.			'A'	660/-	
		(ii) Test for clay, silt and impurities	IS:2386 (Part-II)	--do--			'A'	500/-	
		(iii) Specific gravity.		One for each source of supply			'B'	330/-	
		(iv) Moisture content		Regularly as required subject to 2 tests/day when being used.			'A'	330/-	
		(v)Test for organic impurities		One test for each source of supply.			'C'	275/-	
4.	Cement	(i) Setting time	IS:4031-63 affirmed 1980	Once for each consignment or as and when required.			'B'	500/-	
		(ii) Soundness		--do--			'B'	550/-	
		(iii) Compressive strength		--do--			'B'	550/-	
		(iv) Fineness		-do-			'B'	275/-	

Appendix 'D' (Contd…)

Sl. No	Materials	Test	Method of testing	Frequency of Tests		Level of test	Rate per test Rs.Ps	Remarks
5.	Structural concrete (M-15 grade and above)	(i) Slump test (OR) Compacting factor Test (OR) Vee-Bee Time.	IS:1199	The minimum frequency of sampling of concrete of each grade shall be as under:		'A'	300/-	(i) Random sampling shall be carried out to cover all mix units.
				Qty of concrete in the work	**No of samples**			
				1 to 5	1			
				6 to 15	2			
		(ii) Compressive strength	IS : 516	16 to 30	3	'A'	900/-	(ii) Refer IS 456-2000 clause 14 for frequency of sampling.
				31 to 50	4			
				50 and above	4+1for each addl50cum or part thereof			
6.	(a) PCC Blocks for walling (Hollow Block)	(i) Compressive strength	IS:2156-1984 (Appx 'B')	8 Blocks out of 14		'A'	900/-	Samples : 14 blocks from consignment of every 5000 blocks or part thereof.
		(ii) Water absorption	--do-- (Appx 'E')	3 Blocks out of 14		'B'	330/-	
		(ii) Density	--do-- (Appx 'A')	3 Blocks out of 14		'B'	330/-	
	(b) PCC Solid blocks for walling	(i) Compressive strength	IS:2185	12 Blocks out of 18		'A'	900/-	Samples : 18 blocks from consignment of every 5000 blocks or part thereof. These blocks to be checked for dimension & weight.
		(ii) Water absorption	--do--	3 Blocks out of 18		'B'	330/-	
		(ii) Density	--do--	3 Blocks out of 18		'B'	330/-	
7.	Cement flooring tiles/ Terrazzo tiles	(i) Water absorption	IS-1237. (Appx 'D')	6 tiles out of 18		'B'	330/-	Samples: 18 tiles from each source of supply selected at random.
		(ii) Wet transverse strength	--do-- (Appx 'E')	6 tiles out of 18		'B'	600/-	
		(iii) Resistance to wear	--do-- (Appx 'F')	6 tiles out of 18		'C'	1000/-	

Appendix 'D' (Contd…)

Sl. No	Materials	Test	Method of testing	Frequency of Tests	Level of test	Rate per test Rs.Ps	Remarks
8.	Burnt clay roofing tiles (hand made) As per IS : 2690 (Part-II) Length 150 mm to 250 mm, width 100mm to 200mm, thickness 35mm to 50mm	(i) Water absorption	IS : 3495 (Part-II)	6 tiles out of 12	'B'	216/-	Sample: 12 tiles from each source of supply selected at random.
		(ii) Compressive strength	--do— (Part-I)	6 tiles out of 12	'A'	180/-	
9.	Mangalore pattern roofing tiles	(i) Water absorption	IS:654 (Appx 'A')	6 tiles out of 32	'B'	180/-	Sample: 32 tiles from each consignment of 3000 tiles or part thereof. These tiles shall be checked for dimension ..
		(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 constructi-on purposes	(i) Test for acidity	IS : 456 & 3015	Once at the stage of approval of source of water	'B'	500/-	Also refer clause 4.3 of IS: 456 and its subsequent sub clauses regarding suitability of water.
		(ii) Test for alkalinity	--do--	--do--	'B'	500/-	
		(iii) Test for solid content	--do--	--do--	'C'	500/-	
12	Welding of steel work	Visual Inspection test	IS : 822 Clause 7.1	100% by visual inspection	Work site	360/-	Specialised tests, their method and frequency to be

Appendix 'D' (Contd…)

Sl. No	Materials	Test	Method of testing	Frequency of Tests	Level of test	Rate per test Rs. Ps	Remarks
12 (Contd…)							decided on consideration of their importance by the Accepting Officer
13	Timber panelled and glazed Door/ Window shutters (including factory made shutters)	(a) Dimensions, sizes, Workmanship and finish	IS:1003 (Part-I)	Frequency of sampling from each lot shall be as under: **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 &above / 80	'A'	180/-	
		(b) Strength test (i) Slamming (ii) Impact Indentation (iii) Shock Resistance (iv) Edge Loading	IS:1003 --do— --do— --do--	From each lot 5% of the factory made shutters shall be manufacturer tested for strength tests.			
14	Plywood (IS:303)	Moisture content	IS:1734 (Part-I)	Six test pieces cut from each of the boards selected as per table shall be subjected to tests.	'C'	240/-	Sampling shall be as per IS: 7835 tables.
15	Wood particle board (Medium density IS:3097)	(a) Density	IS:2360 (Part-III)	Three test specimen from each sample (Size 150mm x75mm)	'A'	60/-	Sampling shall be as per IS:3487- with moisture metre.
		(b) Moisture content	--do--	--do--	'A' & 'B'	60/-	
		(c) Water absorption	--do— (Part-16)	--do-- (Size 300mm x300mm)	'A'	60/-	
		(d) Swelling due to surface absorption	--do— (Part-17)	--do— (Size 125mm x100mm)	'A'	60/-	
		(e) Swelling in water	--do--	--do— (Size 200 mm x 100mm)	'A'	60/-	
		(f) Modulus of rupture	--do— (Part-4)	Three test specimens as per IS:2380	'B'	90/-	
		(g) Screw withdrawal strength	--do— (Part-4)	--do -- As per IS:2385	'C'	120/-	
16	Reinforcement steel	(i) Physical test upto 16mm dia (Normal mass, tensile elongation, bend and rebend)			'B'	2500/-	
		(ii) Ditto- More than 16mm dia			'B'	2750/-	

Legend

A :Site Lab.
B :MES Lab/Zonal Lab/Command Test Lab.
C :NABL Accredited Lab/IIT/Engineering College.

Signature of Contractor **Asst Dir(Contracts)**
Date: **For Accepting Officer**