

MILITARY ENGINEER SERVICES
(EASTERN COMMAND)
SHILLONG ZONE

PROVN OF 1 MW SOLAR POWER PLANT ALONGWITH ALLIED INFRA AT
JORHAT UNDER GE JORHAT

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Encls : Drawings _____Sheets

SIGNATURE OF CONTRACTOR

Jt DIRECTOR (CONTRACTS)
FOR ACCEPTING OFFICER

Dated : _____

e-Tender System

Tele :72-6733(Mil)/0364-2534846
 Fax :0364-2537640
 E-Mail: ceshiz-ec-army@nic.in

मुख्यालय मुख्य अभियन्ता
 HQ Chief Engineer
 शिलॉंग आंचल
 Shillong Zone
 एस. ई. फाल्स
 Spread Eagle Falls
 शिलॉंग-७६३०११
 Shillong-793011

89649/JOR/ 11 /E8

19 Jun 2020

M/S_____

**NAME OF WORK : PROVN OF 1 MW SOLAR POWER PLANT ALONGWITH ALLIED
 INFRA AT JORHAT UNDER GE JORHAT**

Dear Sir(s),

1. Tender documents in respect of above work are uploaded on the site <https://defproc.gov.in>. The tender is on single stage two cover e-tendering system. The contents of Cover I & Cover II are specified in **NOTICE OF TENDER**.
2. Bids will be received online by **ACCEPTING OFFICER** upto the date and time mentioned in the **NOTICE INVITING TENDER (NIT)**. No tender/bid will be received in physical form and any tender/bid received in such manner will be treated as non bonafide tender/bid.
3. Bid will be opened on due date and time fixed for opening in the presence of tenderers/bidders or their authorised representatives, who have uploaded their quotation bid and who wish to be present at the time of opening the bids.
4. Your attention is also drawn to instruction on filling and submission of tender attached herewith. You may forward your points on tender documents and/or depute your technical representative for discussion on tender/ drawings and to clarify doubts, if any, on or before as mention web site . You are requested not to write piece meal points and forward your points duly consolidated before due date as mentioned in web site.
5. Unenlisted contractors are required to submit the scanned copies (in pdf file) of documents required as per eligibility criteria mentioned in instructions for filling the tender documents and Appendix 'A' to NIT alongwith **EARNEST MONEY DEPOSIT (EMD)** and tender fee on e-procurement portal and submit the physical documents in the office of **HQ Chief Engineer Shillong Zone, SE Falls, Shillong-793011** within time limit specified in NIT. Inadequacy/deficiency of documents shall make the bid liable for rejection resulting in disqualification for opening of finance bid.
6. Contractor having not executed standing security bond and standing security deposit in any MES formation shall upload scanned copy of **EARNEST MONEY DEPOSIT (EMD)** mentioned in Notice of Tender and shall ensure receipt of hard copy of EMD in the office of tender issuing authority before date & time fixed for this purpose. In case of failure to abide by any of these two requirements the finance bid will not be opened.
7. Enlisted contractors of MES shall submit the scanned copies (pdf file) of enlistment letter, tender fee and such other documents as mentioned in Appx 'A' to NIT on e-procurement portal and submit physical documents in the office of **HQ Chief Engineer Shillong Zone, SE Falls, Shillong-793011** before date & time fixed for this purpose .
8. The contractor must ensure that the tender/bid on the proper form is uploaded in time as the Accepting Officer will take no cognizance of any quotations/offer received in any other electronic or physical form like email/fax/by hand/ through post from tenderer/bidder even if they are received in time.
9. In view of delays due to system failure or other communication related failures, it is suggested that the tender/bid be uploaded, if necessary, sufficiently in advance of the last due date and time fixed.

10. General Conditions of Contracts (IAFW-2249) (1989 Print) and errata and amendments thereto, Schedule of minimum fair wages and MES SSR (Part -1 and Part -II) are not enclosed with these documents. These are available for perusal in the Office of GE concerned and this office.
11. **ANY TENDER / BID, WHICH PROPOSES ALTERATIONS TO ANY OF THE CONDITIONS, SPECIFICATIONS LAID DOWN IN THE TENDER DOCUMENTS OR WHICH PROPOSES ANY OTHER CONDITION OR PRESCRIPTION, WHATSOEVER, IS LIABLE TO BE REJECTED.**

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

Yours faithfully,

Encls: As above

SIGNATURE OF CONTRACTOR

SD/-

JT DIR (CONTRACTS)

FOR ACCEPTING OFFICER

INSTRUCTIONS FOR COMPLETION OF TENDER DOCUMENTS TO BE COMPLIED WITH BY THE TENDERER(S)

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, alongwith their tender/bid :-

(a) Deposit at Call Receipt from a Scheduled Bank in favour of respective **GE** as mentioned in the NIT.

(b) Receipted Treasury Challan, the amount being credited to the Revenue Deposit of respective **GE** as mentioned in the NIT.

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

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

2 **PERFORMANCE SECURITY DEPOSIT (APPLICABLE FOR BOTH UNENLISTED AS WELL AS ENLISTED CONTRACTORS):-** In case, the tender submitted by contractor is accepted, the contractor will be required to lodge “**Performance Security Deposit**” for an amount equivalent to 5% of the Contract Sum/Lump Sum in favour of the Accepting Officer within 28 (Twenty Eight) days of the receipt by the contractor of notification of acceptance of his tender/bid in the form of “Bank Guarantee” or FDR. Failure of the contractor to comply with the requirements of Performance Security shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Earnest Money. In case of MES enlisted contractor, amount equal to the Earnest Money stipulated in the Notice Inviting Tender, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury {See Condition 19 of General Conditions of Contract (IAFW-2249) (As amended under amendment No. 47 to IAFW- 2249)}.

3 **GENERAL INSTRUCTIONS FOR COMPLIANCE**

3.1 The bids received only in the electronic form will be considered. All bids shall be submitted on ‘<https://defproc.gov.in>’ portal. Documents should be scanned and forwarded in ‘pdf’ form and ‘xls’ form as indicated.

3.2 Bids shall be uploaded on '<https://defproc.gov.in>' 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 post will be considered.

3.3 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.

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

3.5 The tender shall be signed, dated and witnessed at all places provided for in the documents after acceptance. All corrections shall be initialled. The Contractor shall initial every page of tender and shall sign all drawings forming part of the tender. Any tender/bid, which proposes alterations to any of the conditions whatsoever, is liable to be rejected.

3.6 In the technical bid, a scanned copy of **Power of Attorney** in favour of the person uploading the bid using his/her DSC shall be uploaded. In case the digital signatory himself is the sole

INSTRUCTIONS FOR COMPLETION OF TENDER DOCUMENTS TO BE COMPLIED WITH BY THE TENDERER(S) (Contd.....)

proprietor, scanned copy of an affidavit on stamp paper of appropriate value to this effect stating that he has authority to bind the firm in all matters pertaining to contract including the Arbitration Clause, shall be attached in 'pdf' form. In case of partnership concern or a limited company, digital signatory of the bid/tender shall ensure that he is competent to bind the contractor (through partnership deed, general power of attorney or Memorandum and Articles of Association of the Company) in all the matters pertaining to the contracts with Union of India including arbitration clause. A scanned copy of the documents confirming of such authority shall be attached with the tender/bid in 'pdf form, if not submitted earlier. The person uploading the bid on behalf of another partner(s) or on behalf of a firm or company using his **DSC** shall upload with the tender/bid a scanned copy (in 'pdf form) of Power of Attorney duly executed in his favour by such other or all of the Partner(s) or in accordance with constitution of the company in case of company, stating that he has authority to bind such other person of the firm or the Company, as the case may be, in all matters pertaining to the contract including the Arbitration Clause.

- 3.7 Even in case of Firms or Companies which have already given Power of Attorney to an individual authorizing him to sign tender in pursuance of which bids are being uploaded by such person as a routine, fresh Power of Attorney duly executed in his favour stating specifically that the said person has authority to bind such partners of the Firm, or the Company as the case may be, including the condition relating to Arbitration Clause, should be uploaded in 'pdf' form with the tender/bid; unless such authority has already been given to him by the Firm or the Company. It shall be ensured that power of attorney shall be executed in accordance with the constitution of the company as laid down in its Memorandum & Article of Association.
- 3.8 Hard copies of all above documents should be sent by the contractor to the Tender issuing authority well in advance to be received before the date & time fixed for the same.
- 3.9 Bid (Cover 1 & 2) shall be uploaded online well in time.
- 3.10 The contractor shall employ Indian Nationals after verifying their antecedents and loyalty. Attention is also drawn to special condition 3 referred hereinafter and also conditions 24 & 25 of IAFW 2249 (General conditions of contract).
- 3.11 Tenderers/bidders who uploaded their priced tenders/bids and are desirous of being present at the time of opening of the tenders/bids, may do so at the appointed time.

4 BOQ :-

- 4.1 The tenderer shall quote his rates on the BOQ EXCEL FILE only as per guide line of e-procure web portal. No alteration to the format will be accepted and such bid will be disqualified.
- 4.2 In case any tenderer wishes to revise/modify the rates quoted in the BOQ file, he can do so only in the BOQ files before uploading the tender through **<https://defproc.gov.in>** site only before closing date & time.
- 4.3 After the uploading of tender, Department may upload the errata/ amendment through corrigendum. The tenderer / bidder should submit their offer considering the errata/amendment carried out through corrigendum issued from time to time.
- 4.4 While uploading the bid, the tenderers / bidders should specifically check whether any **revised BOQ** has been uploaded by department through corrigendum prior to **Bid submission start date**. Tenderers / bidders attention is specifically drawn to the fact that they should submit their offer on revised BOQ only. In case any tenderer submits offer on pre-revised BOQ in lieu of Revised BOQ, **it will be considered as a willful negligence by the tenderer/bidder and quotation shall be considered non-bonafide.**

INSTRUCTIONS FOR COMPLETION OF TENDER DOCUMENTS TO BE COMPLIED WITH BY THE TENDERER(S) (Contd.....)

5 REVOCATION / UPWARD REVISION OF OFFER / OFFERING VOLUNTARY REDUCTION, AFTER CLOSING OF BID SUBMISSION DATE & TIME:-

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

6 CPM (Critical Path Method):-

- 6.1** The project planning for work covered in the scope of tender is based on CPM.
- 6.2** The tenderer/bidder is expected to be fully conversant with the CPM technique and employ technical staff who can use the technique in sufficient details. Sufficient books and other literature on the subject are widely available in the market which the tenderer,/bidder may make use of.
- 6.3** The tenderer's/bidder's attention is drawn to special condition of the tender regarding preparation of the detailed network analysis and time schedule for the work and his liability for employing sufficient resources to adhere to this schedule. Any inability on the part of the tenderer/bidder in using the technique will be taken as his technical inefficiency and will affect his class of enlistment and future prospect/invitation to tenders for future works.
- 6.4** The tenderer shall make / update the CPM Chart using software's like MS Project or PRIME VERA or any other suitable software after taking prior approval from GE.
- 7 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 all the errata/ amendments/corrigendum, if any, issued by the department.
- 8 These instructions shall form part of the contract documents.

**SIGNATURE OF CONTRACTOR
DATED:**

**JT DIR (CONTRACTS)
FOR ACCEPTING OFFICER**

MILITARY ENGINEER SERVICES
NOTICE OF TENDER IAFW-2162
APPLICABLE FOR LUMP SUM/MEASUREMENT CONTRACTS (Contd.....)

- 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. The tender shall be based on as mentioned in aforesaid Appendix 'A'.
- 3 The work is to be completed within the period as indicated in aforesaid Appendix 'A' in accordance with the phasing, if any, indicated in the tender from the date of handing over site, which will be mentioned in Work Order.
- 4.1 Normally contractors whose names are on the MES approved list for the area in which the work lies, and within whose financial category the estimated amount would fall, may tender/bid but in case of term contracts, contractors of class SS to E may tender/bid.
- 4.2 In case, the tender submitted by enlisted as well as un-enlisted contractor is accepted, the contractor will be required to lodge “**Performance Security Deposit**” for an amount equivalent to 5% of the Contract Sum/Lump Sum in favour of the Accepting Officer within 28 (Twenty Eight) days of the receipt by the contractor of notification of acceptance of his tender/bid in the form of “Bank Guarantee” or FDR. Failure of the contractor to comply with the requirements of Performance Security 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 Appendix ‘A’, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury {See Condition 19 of General Conditions of Contract (IAFW-2249) (As amended under amendment No. 47 to IAFW- 2249)}.
- 4.3 Not more than one tender/bid shall be submitted/uploaded by one contractor or one firm of contractors. Under no circumstances will a father and his son(s) or other close relations who have business dealing with one another be allowed to tender/bid for the same contract as separate competitors. A breach of this condition will render the tenders/bids of both the parties liable for rejection.
- 5 The **CHIEF ENGINEER, SHILLONG ZONE, SPREAD EAGLE FALLS, SHILLONG – 793011** will be the Accepting Officer here in after referred to as such for purpose of the contract.
- 6 The Technical Bid and Financial Bid (Cover-1 and Cover-2) shall be uploaded by the tenderer/bidder on or before the date & time mentioned in NIT. A scanned copy of DD with enlistment details/documents shall be uploaded as packet 1/cover-1 ('T' bid) of the tender/bid on e-tendering portal. DD is refundable in case ‘T’ bid is not accepted resulting in non-opening of ‘Q’ bid. The applicant contractor shall bear the cost of bank charges for procuring and encashing the DD and shall not have any claim from Government whatsoever on this account.
- 6.1 **INTEGRITY PACT (IP)** duly signed by Accepting Officer / Officer designated by Accepting Officer is uploaded as part of NIT as Annexure – I of Appendix ‘A’ to NIT and the same shall form part of tender documents. The scanned copy of **INTEGRITY PACT (IP)** duly signed on each page by the bidder(s) shall be uploaded as part of technical bid (Cover – I) and original **INTEGRITY PACT (IP)** duly signed on each page shall be forwarded to this office by post alongwith demand draft and all other documents as required and mentioned in Appendix ‘A’ to NIT. Bidders who do not upload scanned copy of **INTEGRITY PACT (IP)** duly signed, shall be intimated of the same alongwith intimation of other such deficient documents, through option of ‘Short Fall Documents’ in e-tendering portal before ‘T’ Bid evaluation. Any bidder who fails to forward the copy of **INTEGRITY PACT (IP)** duly signed even after this communication, shall be disqualified in the Technical Bid (Cover – I).

MILITARY ENGINEER SERVICES
NOTICE OF TENDER IAFW-2162
APPLICABLE FOR LUMP SUM/MEASUREMENT CONTRACTS (Contd.....)

- 6.2 **The provisions of Joint Venture (JV) including format for JV agreement is uploaded as part of NIT as Annexure – II of Appendix ‘A’ to NIT and the same shall form part of tender documents in case the tender is awarded to the Joint Venture firm.**
- 6.3 Tender form and conditions of contract and other necessary documents shall be available on <https://defproc.gov.in> web site for download and shall form part of contract agreement in case the tender/bid is accepted.
- 6.4 In Case of contractor who has not executed the Standing Security Bond, the Cover-1 shall be accompanied with Earnest Money of such amount as mentioned in Appendix 'A' in the form of deposit at call receipt in favour of concerned GE/ GE(I)/ AGE(I) (see Appendix 'A') by a scheduled Bank or in receipted treasury Challan the amount being credited to the revenue deposit of the concerned GE/ GE(I)/ AGE(I) (see Appendix 'A').
- 6.5 The 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 production by the tenderer, bidder a certificate of the Accepting Officer that a bonafide tender/bid was received and all documents were returned.
- 6.6 The GE/ GE(I)/ AGE(I) will either return the Earnest Money to the successful tenderer/bidder by endorsing an authority on the deposit-at-call Receipt for its refund on receipt of an appropriate amount of Security Deposit or will retain the same in part or full on account of security deposit if such a transaction is feasible.
- 6.7 Copies of the drawings and other document pertaining to the work signed for the purpose of identification by the Accepting Officer or his accredited representative, sample of materials and stores to be supplied by the contractor will also be available for inspection by the tenderer/bidder at the office of Accepting Officer and concerned GE/ GE(I)/ AGE(I) during working hours.
- 7 The tenderers/bidders are advised to visit the site of work by making prior appointment with GE/ GE (I)/ AGE(I) who is also the Executing Agency of the work (see appendix 'A'). The tenderers/bidders are deemed to have full knowledge of all relevant documents, samples, site etc., whether they have inspected them or not.
- 8 Any tender/bid which proposes any alteration to any of the conditions laid down or which proposes any other condition or prescription whatsoever, is liable to be rejected.
- 9 The uploading of bid 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, tools and plants etc will be issued to him and local conditions and other factors having bearing on the execution of the work.
- 10 Tenderers/bidders must be in possession of a copy of the MES Standard Schedule of Rates (see appendix 'A') including amendments and errata thereto.
- 11 Invitation for e-tender does not constitute any guarantee for validation of 'T' bid and subsequent opening of finance bid of any applicant/bidder, even of enlisted contractors of appropriate class, merely by virtue of enclosing DD. Accepting Officer reserves the right to reject the 'T' bid and not open the finance bid of any applican/bidder. 'T' bid validation shall be decided by the Accepting Officer based on, inter alia, capability of the firm as per criteria given in Appx 'A' to this NIT. The applicant contractor/bidder will be informed regarding non- validation of his 'T' bid assigning reasons thereof through the <https://defproc.gov.in> website. The applicant contractor/bidder if he so desires may appeal to the next higher Engineer authority viz CE Eastern Command on email id jtdgcontcengrkl-mes@nic.in with copy to the Accepting Officer on email before the scheduled date of opening of Finance Bid. The decision of the Next Higher Engineer Authority (NHEA) shall be final and binding. The contractor/bidder shall not be entitled for any compensation whatsoever for

MILITARY ENGINEER SERVICES
NOTICE OF TENDER IAFW-2162
APPLICABLE FOR LUMP SUM/MEASUREMENT CONTRACTS (Contd.....)

rejection of his bid.

- 12 The Accepting Officer reserves the right to accept a tender submitted by a Public Undertaking, giving a price 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 from such tenderer/bidder whose tender/bid is rejected.
- 13 Accepting Officer does not bind himself to accept the lowest or any tender/bid or to give any reason for not doing so.
- 14 This **Notice Inviting Tender (NIT)** including Appendix 'A' shall form part of the contract.

SIGNATURE OF CONTRACTOR
DATED : _____

JT DIR (CONTRACTS)
FOR ACCEPTING OFFICER

SINGLE STAGE TWO COVER SYSTEM FOR ISSUE OF TENDER ONLINE (ई-निविदा)**APPENDIX 'A' TO निविदा आमंत्रण सूचना (NIT)**

1.	कार्य का नाम/Name of Work	PROVN OF 1 MW SOLAR POWER PLANT ALONGWITH ALLIED INFRA AT JORHAT UNDER GE JORHAT
2.	अनुमानित लागत/ Estimated Cost	₹ 606.00 Lakhs /लाख (At par Market)
3.	पूरा होने की अवधि/Period of Completion	Phase – I : 12 Months } (Total Period of Completion 67 Calendar Months) Phase – II : 55 Months }
4.	निविदा मूल्य/ Tender Cost	₹ 3000/- in the shape of DD/Bankers Cheque from any Scheduled Bank in favour of GE JORHAT and payable at JORHAT
5.	वेबसाइट (Website / portal address)	https://defproc.gov.in and www.mes.gov.in
6.	संविदा की प्रकार / Type of Contract	The tender shall be based on drawings and specifications (IAFW-2159) and General Conditions of Contract (IAFW-2249) with Schedule 'A' (List of items of work) to be pre-priced by MES. The tenderer is required to work out detailed quantity for each building/structure listed in Schedule 'A' Part-I, apply his own rate and quote the lumpsum amount that he will charge for the complete Schedule 'A' Part-I. The tenderers are required to quote their lumpsum amounts for pre-priced parts (except Part-I i.e. Buildings/Structures) of Schedule 'A' and quote rates against each item of other parts (except pre-priced parts) of Schedule 'A'.
7.	जानकारी और विवरण / Information & details :	
	(a) Bid submission start date	: 17 Jul 2020, 1800 Hrs
	(b) Bid submission end date	: 22 Jul 2020, 1800 Hrs
	(c) Date of bid opening	: 24 Jul 2020, 1200 Hrs
8.	पात्रता मपदंड /Eligibility Criteria	
	(A) एम.ई.एस में सूचीबद्ध संवेदकों के लिये / For MES Enlisted Contractors	(i) Contractors enlisted with MES in class 'A' and above shall be considered eligible. (ii) They should not have adverse remarks in Work Load Return of competent engineer authority. (iii) Contractor should have MoU with solar power firms of rating 1A / 1B / 1C / 2A / 2B / 2C given by CRISIL / CARE / FITCH / ICRA / SMERA / BRICKWORK RATING INDIA PRIVATE LIMITED and having experience as given in 8C(i) here-in-after. (iv) Enlisted contractors who are either having above mentioned solar rating themselves fulfilling the criteria laid down here-in-after or meeting the criteria laid down for un-enlisted contractors shall also be considered eligible.
	(B) अन्य संवेदकों के लिये / For Contractors not enlisted with MES {Un-enlisted / Joint Venture (JV) Firms}	(i) Firms meeting the criteria of Annual turnover, Financial criteria, Solvency, Working capital, Police verification/ Passport etc. with enlistment criteria of Class 'A' contractor in MES given in Para 1.4 and 1.5 of Section 1 of Part I of MES Manual on Contracts – 2007 (Reprint 2012) as available in all MES formations including latest amendments.

(APPENDIX 'A' TO NOTICE INVITING TENDER CONTD...)

	<p>(ii) Firm should have MoU with solar power firms of rating 1A / 1B / 1C / 2A / 2B / 2C given by CRISIL / CARE / FITCH / ICRA / SMERA / BRICKWORK RATING INDIA PRIVATE LIMITED and having experience as given in 8C(i) here-in-after". However requirement of MoU is exempted for contractors who themselves are having requisite rating by rating agency mentioned here-in-before.</p> <p>Note:-Incase eligible solar power firms are bidding directly, their pre-qualification criteria (PQC) shall consider both performance capability and financial capacity and are limited to rating 1A/1B/2A/2B.</p> <p>(iii) They should not have adverse remarks in Work Load Report return of competent Engineer authority.</p> <p>(iv) No recovery outstanding in Government Department.</p>
(C) सभी संवेदकों के लिये / For all contractors	<p>(i) Experience of having successfully completed Solar Power Plants in Government Department / PSU during last seven years ending last day of the month previous to the one in which applications are invited should be any of the following :-</p> <p>(a) One work of capacity \geq 80% of capacity of plant specified in NIT.</p> <p style="text-align: center;">or</p> <p>(b) Two works of capacity \geq 50% of capacity of plant specified in NIT.</p> <p style="text-align: center;">or</p> <p>(c) Three works of capacity \geq 40% of capacity of plant specified in NIT.</p> <p>(ii) Contractor will not be allowed to execute the work by subletting or through power of attorney holder on his behalf to a third party / another firm except Sons / Daughters / Spouse of proprietor / partner / Director, Project Manager. This shall be subject to certain conditions which will be prescribed in the NOT forming part of the tender documents.</p> <p>(iii) In a tender, the eligible solar power firms can either bid as direct participant / bidder or under MoU with MES enlisted / un-enlisted contractor, but cannot bid simultaneously for the same tender as direct participant / bidder as also under MoU with MES enlisted / un-enlisted contractor</p> <p>(iv) MoU will be permitted between only one eligible solar power firm and one MES enlisted / un-enlisted contractor, bidding for the same tender</p> <p>(v) In case any violation of condition at 8C(iii) & (iv) above is noticed, all such bids shall be treated as invalid</p> <p>(vi) Scanned copy of GST registration letter along with registration number as applicable to be uploaded in cover -1 of e-bid system. In absence of this Cover-1 shall be liable for rejection.</p> <p>(vii) Scanned copy of Integrity Pact (IP) duly signed on each pages shall be uploaded in cover -1 of e-bid system. In absence of this, Cover-1 shall be liable for rejection.</p>

(APPENDIX 'A' TO NOTICE INVITING TENDER CONTD...)

9	निविदा जारी व स्वीकार करने वाला अधिकारी / Tender issuing and Accepting Officer	Chief Engineer Shillong Zone, Military Engineer Services, SE Falls, Shillong, Meghalaya-793011 Tele :72-6733(Mil)/0364-2534846 Fax :0364-2537640 E-Mail: ceshiz-ec-army@nic.in
10.	निष्पादन एजेंसी / Executing Agency	GE JORHAT
11.	अग्रिम राशि / Earnest Money	₹ 6,28,000.00 in favour of GE JORHAT payable at JORHAT

नोट /Notes:-

- Contractor enlisted **upto two class below** the **eligible class** may also bid for this tender. Their application shall be considered subject to fulfillment of other eligibility criteria given in NIT when number of applicants of **eligible class** qualifying for the tender are less than 7 (seven).
- In case number of **eligible class** contractors satisfying the eligibility criteria given in NIT are 7 or more than 7, application of **one class below** the **eligible class** shall not be considered except those who have previously completed similar works satisfactorily and are meeting the criteria of up-gradation in respect of past experience and / or average annual turnover as applicable and financial soundness (solvency / financial soundness and working capital) provided the value of work is less than twice the tendering limit of such contractors. Contractors **one class below** the eligible class may upload necessary documents w.r.t. works experience and financial soundness in **Cover 1 of tender (T bid)**.
- Applications / bids not accompanied by scanned copies of requisite DD / Bankers Cheque towards cost of tender and earnest money (as applicable) shall not be considered for validation of 'T' bid and their finance bids will not be opened.
- Contractors should ensure that their original DD's and earnest money (as applicable) are received **within 05 (five) days** of bid submission end date.
- In case of applications / bids from enlisted contractors of MES, where scanned copies of requisite DD/Bankers Cheque towards cost of tender has been uploaded but physical copies are not received by the stipulated date, their finance bids will be opened. However non-submission of physical copies of cost of tender shall be considered as willful negligence of the bidder with ulterior motives and such bidder shall be **banned from bidding** for a period of six months, commencing from the date of opening of finance bid (Cover 2).
- In case of applications / bids from un-enlisted contractors, where scanned copies of requisite DD/Bankers cheque towards cost of tender has been uploaded but physical copies are not received by the stipulated date, finance bids 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 finance bid (Cover 2).
- In case of applications / bids (enlisted contractor as well as un-enlisted contractor) where scanned copies of requisite Earnest money (as applicable) were uploaded but the same are not received in physical form within stipulated time, such bids shall **not qualify for opening of finance bid (Cover 2)**.
- Un-enlisted contractors** may note that they shall not be loaded 2 times the upper tendering limit of class for which contractor meets the criteria for enlistment.
- In case any deficiency is noticed, in the documents required to be uploaded by the tenderers as per NIT, after opening of cover 1 (T bid) and during technical evaluation, a communication in the form of e-mail / whatsapp / sms / speed post etc. shall be to the contractor to rectify the deficiency within a period of 7 days from date of communication failing which financial bid (cover 2) shall not be opened and contractor shall not have any claim on the same.
- In the technical bid, a scanned copy of Power of Attorney in favour of the person uploading the bid using his/her DSC shall be uploaded. In case the digital signatory himself is the sole proprietor, scanned copy of affidavit on stamp paper of appropriate value to this effect stating that he has authority to bind the firm in all matters pertaining to contract including the Arbitration Clause, shall be attached in 'pdf' form. In case of partnership concern or a limited company, digital signatory of the bid/tender shall ensure that he is competent to bind the contractor (through partnership deed, general power of attorney or Memorandum and Articles of Association of the Company) in all the matters pertaining to the contracts with Union of India including arbitration clause. A scanned copy of the documents confirming of such authority shall be attached with the tender/bid in 'pdf' form, if not submitted earlier. The person uploading the bid on behalf of another partner(s) or on behalf of a firm or company using his DSC shall upload with the tender/bid a scanned copy (in 'pdf' form) of Power of Attorney duly executed in his

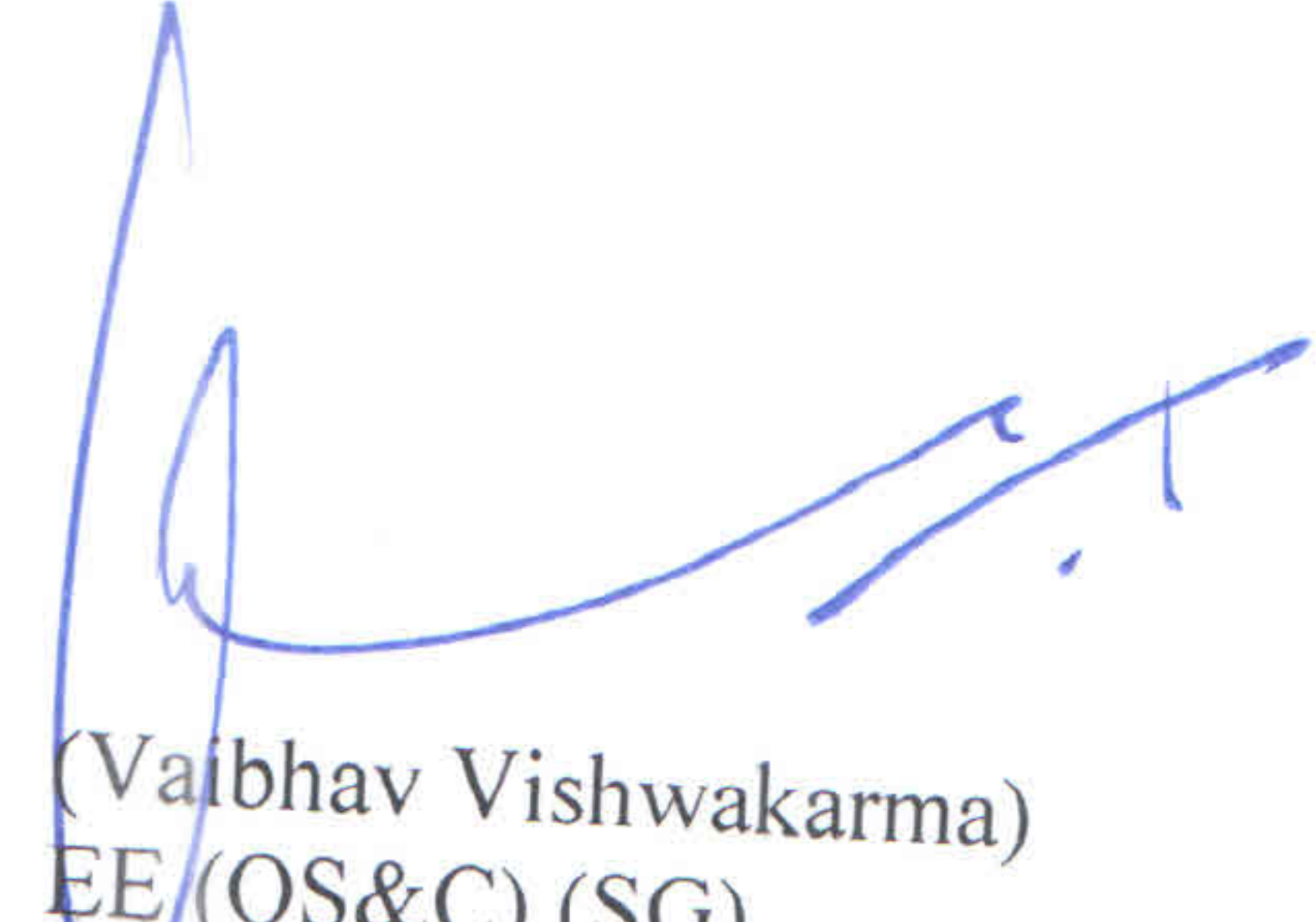
(APPENDIX 'A' TO NOTICE INVITING TENDER CONTD...)

- favour by such other or all of the Partner(s) or in accordance with constitution of the company in case of company, stating that he has authority to bind such other person of the firm or the company, as the case may be, in all matters pertaining to the contract including Arbitration Clause.
11. Even in case of Firms or Companies which have already given Power of Attorney to an individual authorizing him to sign tender in pursuance of which bids are being uploaded by such person as a routine, fresh Power of Attorney duly executed in his favour stating specifically that the said person has authority to bind such partners of the Firm, or the Company as the case may be, including the condition relating to Arbitration Clause, should be uploaded in 'pdf' form along 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 & Articles of Association.
 12. The bidder/ tenderer shall also ensure compliance the **EPF & MP Act 1952** by the sub-contractor, if any engaged by the contractor for the subject work.
 13. **Contractors enlisted with MES** will upload following documents for checking eligibility:-
 - (a) Application for bid in Firm's letter head
 - (b) Enlistment letter
 - (c) Scanned copy of DD of cost of tender
 - (d) Memorandum of Understanding (MoU)
 - (e) Details of **similar nature of works executed during last seven years as detailed in 8C(i) here-in-before.**
 - (f) Works experience and financial soundness and other necessary documents as applicable as per Para 2 of Notes above for contractors **one class below the eligible class.**
 - (g) Scanned copy of **GST registration letter** along with registration number as applicable to be uploaded in cover -1 of e-bid system. **In absence of this Cover-1 shall be liable for rejection.**
 - (h) Scanned copy of **Integrity Pact (IP)** duly signed on each pages shall be uploaded in cover -1 of e-bid system. **In absence of this, Cover-1 shall be liable for rejection.**
 14. **Contractors not enlisted with MES {Un-enlisted / Joint Venture (JV)}** will be required to upload necessary documents to prove their eligibility for enlistment in eligible class & category of work, including Affidavit for no recovery outstanding. List of documents required for enlistment in MES has been given in para 1.5 of section 1 of part I of MES manual on contracts 2007 (reprint 2012). Following documents shall also be uploaded amongst others.
 - (a) Application for tender on tenderer's letter head.
 - (b) Details of **similar nature of works executed during last seven years as detailed in 8C(i) here-in-before or any works in MES or DG MAP or any Govt./State Services or Public sector (Govt undertaking)**, financial year-wise in tabular form giving name of work, Accepting Officer's details, viz, Address, Telephone, Fax No, E-mail ID etc, date of acceptance of tender and actual date of completion. This shall be duly signed by proprietor/all partners/authorized Director of Pvt/ Public Ltd, as applicable. It should indicate whether extension was granted or compensation was levied. Attested copy of acceptance letter and completion certificate shall be enclosed of each work. In case performance report has been given by the client same shall also be submitted duly attested.
 - (c) Memorandum of Understanding (MoU) as per Para 8(B)(ii) here-in-before
 - (d) Solvency certificate and working Capital Certificate issued by scheduled bank.
 - (e) Annual turnover certificate for last 2 Years issued by Chartered Accountant along with relevant pages of audited balance sheets in support thereof.
 - (f) In addition, the un-enlisted contractors shall also furnish affidavit on non judicial stamp paper in the form of hard copy declaring their turnover for last 2(Two) years.
 - (g) Scanned copy of **GST registration letter** along with registration number as applicable to be uploaded in cover -1 of e-bid system. **In absence of this Cover-1 shall be liable for rejection.**
 - (h) Scanned copy of **Integrity Pact (IP)** duly signed on each pages shall be uploaded in cover -1 of e-bid system. **In absence of this, Cover-1 shall be liable for rejection.**
 - (i) Scanned copy of DD of cost of tender and earnest money.
 - (j) **Joint Venture (JV) firm** shall upload Joint Venture Agreement duly affidavit on non judicial stamp of appropriate value in cover -1 of e-bid system. **In absence of this Cover-1**

(APPENDIX 'A' TO NOTICE INVITING TENDER CONTD...)

shall be liable for rejection. The provisions of Joint Venture (JV) including format for JV agreement has been specified in Annexure – II of Appendix 'A' to NIT

15. **Performance Security** : Please refer condition 19 of IAFW-2249 (As amended under amendment No 47 to IAFW- 2249).
16. All disputes arising out of or in respect of this tender before acceptance shall be decided by Court of appropriate jurisdiction at **Shillong** only. After acceptance of tender, Condition 72 (Jurisdiction of Courts) of IAFW – 2249 shall be applicable.
17. In case of rejection of technical/prequalification bid, contractor may appeal to Next Higher Engineer authority i.e. HQ CE Eastern Command on email cengrkl-mes@nic.in or itdgcontcengrkl-mes@nic.in against rejection, whose decision shall be final and binding. However contractor/bidder shall not be entitled to any compensation whatsoever for rejection of technical/prequalification bid.



(Vaibhav Vishwakarma)
EE/(QS&C) (SG)
Offg Dir (Contracts)
For Accepting Officer

89649/JOR/ 10 /E-8 दिनांक/Dated 19 Jun 2020

मुख्यालय मुख्य अभियन्ता
HQ Chief Engineer
शिलांग आंचल
Shillong Zone
एस. ई. फाल्स
Spread Eagle Falls
शिलांग-७६३०११
Shillong-793011

CA NO: CESZ/JOR/13 OF 2020-2021

SERIAL PAGE NO. 15
Annexure – I to
Appendix 'A' to NIT

INTEGRITY PACT

Tele :72-6733(Mil)/0364-2534846
Fax :0364-2537640
E-Mail: ceshiz-ec-army@nic.in

मुख्यालय मुख्य अभियन्ता
HQ Chief Engineer
शिलाँग आंचल
Shillong Zone
एस. ई. फाल्स
Spread Eagle Falls
शिलाँग-७६३०११
Shillong-793011

89649/JOR/ 49 /E8

19 Jun 2020

To

**SUB : TENDER ID NO. 2020_MES_1 FOR THE WORK PROVN OF 1 MW
SOLAR POWER PLANT ALONGWITH ALLIED INFRA AT JORHAT
UNDER GE JORHAT (CA NO : CESZ/JOR/13 OF 2020-2021)**

Dear Sir(s),

1. It is hereby declared that MES is committed to follow the principle of transparency, equity and competitiveness in public procurement.
2. 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 tenderer / bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.
3. 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,


Chief Engineer / Designated Officer
(Nominated by Chief Engineer)

INTEGRITY PACT

To,

मुख्यालय मुख्य अभियन्ता
HQ Chief Engineer
शिलॉंग आंचल
Shillong Zone
एस. ई. फाल्स
Spread Eagle Falls
शिलॉंग-७६३०११

**SUB : TENDER ID NO. 2020_MES_ _1 FOR THE WORK PROVN OF 1 MW
SOLAR POWER PLANT ALONGWITH ALLIED INFRA AT JORHAT
UNDER GE JORHAT (CA NO : CESZ/JOR/13 OF 2020-2021)**

Dear Sir,

1. I/We acknowledge that MES is committed to follow the Principles thereof as enumerated in the Integrity Pact enclosed with the tender/bid document.
2. I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the Integrity Pact, which is an integral part of tender 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 the conditions of the NIT.
3. I/We confirm acceptance and compliance with the Integrity Pact in letter and sprit and further agree that execution of the said Integrity Pact shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by MES. I/We acknowledge and accept the validity of the Integrity Pact, which shall be in line with Para 15 of the enclosed Integrity Pact.
4. I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Pact, while submitting the tender/bid, MES shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid in accordance with terms and conditions of the tender/bid.

Yours faithfully

(Duly authorized signatory of the Bidder)

PROVISIONS OF JOINT VENTURE

1. Two firms are permitted to bid for the tender based on Joint Venture agreement between them. Joint Venture (JV) shall not comprise more than two firms (called parties of JV). The format of agreement is at Annexure 'III'. The JV shall be considered as un-enlisted contractor. The JV shall submit Earnest Money Deposit for all tenders and Performance Security as per instructions, if contract is awarded.
2. Foreign Companies shall not be permitted to participate in JV.
3. Indian Companies having Director(s) of foreign origin and Indian Companies having Director(s) of Indian origin but residing abroad / having foreign citizenship shall be permitted to participate in JV. However, security clearance in such cases shall be obtained by following procedure laid down by Ministry of Home Affairs. However, if the JV requiring security clearance of Director (s) becomes L1, the tender shall be accepted only on receipt of security clearance.
4. A valid agreement shall exist between the parties of JV defining clearly the role, responsibility and scope of work of each party, percentage share of each party alongwith nomination of leader (Lead Party) for the purpose of this work and a confirmation that the parties of the JV are jointly and severally responsible.
5. JV as a single unit or each party of the JV shall have Permanent Account Number (PAN) and GSTIN. However, if the contract is awarded to the JV, then PAN & GSTIN shall be obtained by the JV as a single unit.
6. The lead party of the JV shall meet minimum 60% or the percentage of share in the JV (whichever is higher) of the qualifying criteria pertaining to (a) past experience of completed works, (b) Average Annual Turnover, (c) Bank Solvency/ Financially Sound for engagement and (d) Working Capital. Both the parties combined shall meet minimum 120% of the above qualifying criteria. The party other than the lead party shall meet minimum 30% of the above qualifying criteria.
7. Both the Parties of JV shall jointly possess the required T&P, machinery and engineering/supervisory staff. T&P can be either on ownership basis or leasehold as stipulated in NIT/tender documents and documentary proof of the same shall be submitted. Other qualification criteria shall be met fully/jointly by both the parties of JV or as a single unit of JV.
8. JV concluded up to the date of bid submission are permitted to apply. Copy of JV should be uploaded. The Department reserves the right to verify the particulars furnished by the applicant independently. If any information furnished by the applicant JV is found incorrect and/or misleading and / or false representation and/or deliberately suppressed information, at a later stage, the JV and both the parties shall be liable to be debarred from tendering/taking up of any work in MES.
9. Party/ parties will not be allowed to bid for the same tender in their independent capacity as well as under JV. Also no party will be allowed to bid for the same tender under multiple JVs. In case of violation (party/parties bidding independently as well as under JV for the same tender, party/parties bidding for the same tender under multiple JVs), the bid of the party/parties concerned as well as the bid(s) of the related JV(s) shall not be opened (i.e. shall not be qualified in 'T' bid Cover '1').
10. The lead party shall attend all progress review meetings and shall be answerable to all issues relating to the project.

PROVISIONS OF JOINT VENTURE (CONTD...)

11. For any of the defaults as under of the JV, administrative action shall be taken against both the parties of JV :-
- a) In case of non-submission of physical original documents of cost of tender, EMD - Barring from bidding for six months.
 - b) Due to default in performance of contract etc - Administrative actions as per existing instructions.
12. Any unrealised recovery from JV shall be recovered proportionately from the parties in proportion to their percentage share in the JV. If it is not possible to recover proportionate share (partly/ fully) from one party, it shall be recovered from other party.
13. No JV shall be allowed to participate if either or both the parties are found banned / adversely remarked in WLR of MES or debarred from tendering by any authority.

SIGNATURE OF CONTRACTOR

DATED : _____

JT DIR (CONTRACTS)

FOR ACCEPTING OFFICER

FORMAT FOR JOINT BIDDING AGREEMENT FOR JOINT VENTURE

(to be executed on stamp paper of appropriate value)

THIS JOINT BIDDING AGREEMENT is entered into on this theday of

AMONGST

1.having its registered office at (here-in-after referred to as the 'First Part' which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

2.having its registered office at (here-in-after referred to as the 'Second Part' which expression shall, unless repugnant to the context include its successors and permitted assigns)

The above mentioned parties of the FIRST and SECOND PART are collectively referred to as the "**Parties**" and each is individually referred to as a "**Party**"

WHEREAS,

A. The Military Engineer Services, represented by HQ CHIEF ENGINEER SHILLONG ZONE and having its office at SPREAD EAGLE FALLS, SHILLONG – 793 011 (here-in-after referred to as the "**Authority**") which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited bid by its Tender ID No. 2020_MES_ _1 for "PROVN OF 1 MW SOLAR POWER PLANT ALONGWITH ALLIED INFRA AT JORHAT UNDER GE JORHAT".

B. The Parties are interested in jointly bidding for the tender as member of a Joint Venture and in accordance with the terms and conditions of the tender document in respect of the work, and

C. It is necessary condition under the Pre-qualification Criteria (PQC) that the parties of the Joint Venture shall enter into a Joint Bidding Agreement and furnish a copy thereof with the Application.

NOW IT IS HEREBY AGREED as follows :-

1. Definitions and Interpretations

In this Agreement, the capitalised terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the PQC in the Notice Inviting Tender.

2. Joint Venture

a) The parties do hereby irrevocably constitute a Joint Venture for the purposes of jointly participating in the Bidding Process for the project.

b) The Parties hereby undertake to participate in the Bidding Process only through this Joint Venture and not individually and/or through any other Joint Venture constituted for this Project, either directly or indirectly.

3. Covenants

The parties hereby undertake that in the event the Joint Venture is declared the selected Bidder and awarded the contract, it shall perform all its obligations as the Contractor in terms of the Contract.

4. Role of the Parties

The parties hereby undertake to perform the roles and responsibilities as described below :-

a) Party of the First Part shall be the Lead member of the Joint Venture and shall have the power of attorney from the other Party for conducting all business for and on behalf of the Joint Venture during the Bidding Process and execution process as well as post execution process.

b) Party of the Second Part shall be the Member of the Joint Venture.

5. Joint and Several Liability

The parties do hereby undertake to be jointly and severally responsible for all obligations and liabilities relating to the Project and in accordance with the terms and conditions given in the NIT and Tender Documents.

6. Field of Expertise

The parties do hereby declare that the field of expertise of the parties are as under:-

First Party :

Second Party :

7. Share of Work in the Project

The parties agree that the proportion of the Contract to be allocated among the parties shall be as follows :-

First Party :

Second Party :

8. Representation of the Parties

Each Party represents to the other Party as of the date of this Agreement that :-

a) Such Party is duly organised, validly existing all in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Agreement;

b) The execution, delivery and performance by such Party of this Agreement has been authorised by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution /power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Joint Venture party is annexed to this Agreement, and will not, to the best of its knowledge :-

(i) Require any consent or approval not already obtained;

(ii) Violate any applicable law presently in effect and having applicability to it;

(iii) Violate the memorandum and articles of association, by-laws or other applicable organisational documents thereof;

(iv) Violate any clearance, permit, concession, grant, license or other governmental authorisation, approval, judgment, order or decree or any mortgage agreement, indenture or any other instrument to which such Party

is a Party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or

(v) Create or impose any liens, mortgages, pledges, claims, security interest, charges or encumbrances or obligations to create a lien, charge, pledge, security, interest, encumbrances or, mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement.

c) This Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and

d) There is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Affiliates is a Party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfilment of its obligations under this Agreement.

9. Termination

This Agreement shall be effective from the date hereof and shall continue in full force and effect until completion of Defect Liability Period under and in accordance with the Contract, in case the Project is awarded to the Joint Venture. However, in case the Joint Venture does not pre-qualify for the Project or does not get selected for award of the Project, the Agreement will stand terminated in case the Applicant does not pre-qualify or upon return of the Bid Security/Earnest Money Deposit by the Authority to the Bidder, as the case, may be.

10. Miscellaneous

- a) This Joint Bidding Agreement shall be governed by Laws of India.
- b) The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the Authority.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN

SINGED, SEALED AND DELIVERED

SINGED, SEALED AND DELIVERED

For and on behalf of

LEAD member by :

SECOND PART

(Signature)
(Name)
(Designation)
(Address)

(Signature)
(Name)
(Designation)
(Address)

WITNESS

In the presence of :

1.

2.

SCHEDULE 'A'(BOQ) : NOTES
(LIST OF ITEMS OF WORKS)

1. GENERAL:-

1.1. This SCHEDULE is divided into **13 PARTS** as mentioned here-in-below :-

(i)	SCHEDULE 'A' PART-I	BUILDING & STRUCTURES WORKS
(ii)	SCHEDULE 'A' PART-II	SITE CLEARANCE, SITE DEVELOPMENTS & EARTH WORKS
(iii)	SCHEDULE 'A' PART-III	INTERNAL WATER SUPPLY
(iv)	SCHEDULE 'A' PART-IV	INTERNAL ELECTRIFICATION
(v)	SCHEDULE 'A' PART-V	ROAD, PATH & HARD STANDING
(vi)	SCHEDULE 'A' PART-VI	SEWAGE DISPOSAL
(vii)	SCHEDULE 'A' PART-VII	AREA DRAINAGE
(viii)	SCHEDULE 'A' PART-VIII	EXTERNAL WATER SUPPLY
(ix)	SCHEDULE 'A' PART-IX	EXTERNAL ELECTRIFICATION
(x)	SCHEDULE 'A' PART-X	DEMOLITION & DISMANTLING
(xi)	SCHEDULE 'A' PART-XI	SOLAR POWER PLANT (TO BE QUOTED BY CONTRACTOR)
(xii)	SCHEDULE 'A' PART-XII	MISC B/R, E/M SERVICES (TO BE QUOTED BY CONTRACTOR)
(xiii)	SCHEDULE 'A' PART-XIII	MANNING & OPERATIONS OF SOLAR POWER PLANT (TO BE QUOTED BY CONTRACTOR)

1.2. Description of Building/Structures and Services/Works given in various Parts of SCHEDULE 'A' are in brief. These are deemed to be amplified and read in conjunction with Special Conditions, Particular Specifications, Specification for Materials and Workmanship and Conditions in relevant Trade Section of the MES STANDARD SCHEDULE OF RATES PART-I (2009), PART-II (2010) and Contract Drawings.

1.3. ALL PRE-PRICED SCHEDULE :-

1.3.1. Pre-priced Rates inserted under Column 4 of SCHEDULE 'A' PART-II to SCHEDULE 'A' PART-X are deemed to be at par with the Rates contained in the MES STANDARD SCHEDULE OF RATES PART-II (2010) or ANALOGOUS RATES thereto. Contractor's attention is invited to Condition 6A(B) of IAFW-2249, where under the LUMP SUM PRICE shall be worked out by him independently of the Prices or Rates inserted by MES in the Tender and irrespective of any Errors or inaccuracies therein.

1.3.2. The tenderer to work out detailed quantity for each building / structure listed in Schedule "A" Part-I apply his own rate including all tax as specified and quote the lumpsum amount that he will charge for the complete Schedule "A" Part-I. The tenderers to quote their lump sum amounts including all tax for all pre-priced parts of Schedule 'A'. It is an express Condition of the Contract that the tendered amount shall be deemed to include for the full and entire completion of the items or building/ structure of work and the contractor shall have **no claims on account of any error in the unit rates/prices inserted by MES.**

1.3.3. The Lump Sum Amount shall be Quoted / entered in Figures at **green Space on the BOQ (GENERAL SUMMARY).**

1.4. In SCHEDULE 'A' PART-XI to SCHEDULE 'A' PART-XIII the UNIT RATES for various Items shall be entered by the Tenderer/Bidder in FIGURES under Green Column of BOQ and quoted amount of each items shall be deemed to include for the full and entire completion of the items of work.

1.5. The under mentioned remarks shall be deemed to have been against each item of BOQ:-

- (a) Refer list of drawing
- (b) Refer note No : All applicable Schedule 'A' Notes

1.6. The under mentioned remarks shall be deemed to have been inserted in respective columns against each item of Schedule 'A' parts prepriced in tender by MES:-

- (a) Under Column 3 (Drg No.) : Refer List of Drawings

SCHEDULE 'A'(BOQ) : NOTES
(LIST OF ITEMS OF WORKS)

- (b) Under Column 7 : Refer Note No. 1.23 of SCHEDULE
 (Period of Completion of Individual Item 'A' NOTES here-in-after
 from the Date of handing over Site)
- (c) Under Column 8 (REMARKS) : Refer SCHEDULE 'A' NOTES for all
 Items

- 1.7.** Probable distributions of various Items of Internal / External Services are indicated on Drawings. These are tentative and may be varied as per Site Requirement, where necessary, at the discretion of the Engineer-in-Charge. The effect of such Changes/Variations in quantities due to realignment or re-siting shall be deemed to be included in the QUOTED RATES and no Price Adjustment on this account shall be allowed.
- 1.8.** In case, details in respect of Items shown on Main Drawings are not given in the Drawings referred to in the Main Drawings then the same shall be followed from any Other Drawings included in the LIST OF DRAWINGS. Any Drawings mentioned in any of the Contract Drawings if inadvertently not included in the LIST OF DRAWINGS shall also be deemed to form Part of the Contract. The Tenderer shall see such Drawings in the office of ACCEPTING OFFICER/CWE/GE.
- 1.9.** The LUMP SUM AMOUNT quoted against SCHEDULE 'A' PART-I to SCHEDULE 'A' PART-X and Unit Rate(s) Quoted against Items catered for under SCHEDULE 'A' PART-XI to SCHEDULE 'A' PART-XIII shall include all TAXES/DUTIES/CESS including GST, etc.
- 1.10.** Unless otherwise specifically mentioned, unit rate of Each Item of Work is inclusive of all 'Material & Labour' or 'Supply & Fixing' or 'Supply & Laying' including Tools and Plants, Installing, Commissioning and Testing complete as required for entire Completion of Works.
- 1.11.** The Lump Sum Amount quoted for Works under SCHEDULE 'A' PART-I to SCHEDULE 'A' PART-X & Unit Rate(s) quoted against Items catered for under SCHEDULE 'A' PART-XI to SCHEDULE 'A' PART - XIII shall be deemed to include for all minor extra constructional details which have not been specifically shown on drawings or given in particular specification but are essential for the execution of works and services in the workmen like manner, sound construction and established engineering practice. In all the above and similar cases the details indicated elsewhere in the drawings that are similar or near similar to the missed out items of works shall be followed. In the absence of any other similar or near similar details, minimum essential requirement for completion of the work from the structural and utility point of view shall be deemed to be included in the quoted lump sum. The details of such items not specifically shown on drawings/specified shall be furnished during execution of works.
- 1.12.** All Reinforcement shall be of TMT Bars (Fe 500D) (except Mild Steel Round Bars where specifically shown in Drawings/mentioned in Schedule 'A' Items) irrespective of whatever shown on Drawings or Specified elsewhere in these Tender documents. However, wherever 6mm dia Mild Steel Round Bars is indicated in the Drawing as reinforcement, the same shall be amended to read as 8mm dia TMT Bar (Fe 500D).
- 1.13.** The description of the Items/Works mentioned are in brief and be read as "Complete all as specified and shown on Drawings" whether specifically written at the end of respective Item in particular or not.
- 1.14.** Special Conditions and Preambles to Items given in MES Schedule Part-I and MES Schedule Part-II under respective Trades shall be applicable. If any Provision in the description of Items of Schedule 'A' and/or in Particular Specifications is at variance with the Provisions in Special Conditions and Pream-bles to MES Schedule Items, the Provisions in description of Items of Schedule 'A' and Provisions in Particular Specifications shall take precedence thereover.
- 1.15.** Government shall not Pay anything Extra if the Contractor has to Pay Royalty to the State Government for the Earth brought to Site by him from Outside of the MD Land.
- 1.16.** In case any Royalty is required to be Paid by the Contractor for bringing Approved Earth from Outside of the MD Land, the Rate quoted shall be deemed to include for the same and nothing Extra shall be Paid to the Contractor by the Department.
- 1.17.** The Rate quoted for Rough Excavation is independent of the Actual Method of Excavation permitted by the Private Land Owners and nothing Extra shall be Paid by the Department.
- 1.18.** Blasting in the Work site is not permitted.
- 1.19.** Excavation and earthwork required for the execution of items covered under Schedule 'A' Part-V to Part- IX shall be measured and paid under Schedule 'A' Part-II except where excavation and earthwork specifically included in the description of particular items of respective Schedule 'A'.

SCHEDULE 'A'(BOQ) : NOTES
(LIST OF ITEMS OF WORKS)

1.20. Cost of Testing including Transportation of Materials or Equipments or Items, provision of all facilities for Testing in accordance with Specifications and/or IS shall be borne by the Contractor unless otherwise mentioned.

1.21. VISIT TO SITE

1.21.1. The Tenderer are advised to visit the Work Site by taking prior appointment with GE before uploading of BOQ. The Tenderer shall have no Claim what-so-ever on this account at a Later Stage whether he has actually inspected the Work Site or not.

1.22. LAYOUT

1.22.1. Layout of Building/Structures and Works Services indicated in the SITE PLAN are Tentative and no Adjustment in Price shall be done on account of Final Approved Layout.

1.23. PERIOD OF COMPLETION :- The entire Work under this Contract including its Connected Services shall be completed in two phases as under :-

1.23.1. **PHASE-I** :-Total work i.e. Schedule 'A' Part-I to Schedule 'A' Part-XII Schedule of Works (BOQ) under Phase-I shall be completed within **12 (Twelve) Calendar Month** from the date of commencement of work as mentioned in Work Order No 1 to be issued by the GE after acceptance of tender. Site for all Works and other Services shall be handed over simultaneously and their Completion Period shall run concurrently. The completion certificate for Phase-I shall be issued by GE after completion of all works cover under this phase.

1.23.2. **PHASE -II** :- Manning & Operations of 1 MW Solar Power Plant against Schedule 'A' Part-XIII of Schedule of Works (BOQ) shall commence after successful completion of Phase-I. The period of completion for Phase-II shall be total **55 (Fifty Five Calendar Months)**.

Notes:-

- (i) Completion for each phase shall be issued separately by GE in terms of condition 49 of IAFW – 2249.
- (ii) Final bill for the work covered under Phase-I shall be paid to the contractor after satisfactory completion of Phase-I. Final Bill for Phase-II shall be prepared and paid separately after satisfactory completion of Phase-II.
- (iii) **Irrespective of the variation in prices of material and labour during period of Phase-II i.e Manning & Operation and supplying consumable materials, no escalation shall not given to the contractor.** The bidder/ firms should quote their rates accordingly and no claim whatsoever on this account shall be admissible at a later stage.
- (iv) The contractor shall plan the work in such a phased manner so as to hand over the complete work.
- (v) The defects liability period for Phase I shall commence after completion of Phase I as certified by GE.

1.24. QUOTED RATES/PERCENTAGES/AMOUNT

1.24.1. The LUMP SUM quoted by the Tenderer shall be deemed to include for All Minor Details of construction which are not specifically shown on Drawings or specified in Particular Specification but which are essential for execution of WORKS/ SERVICES in Workman like manner and sound Construction. In case of differences in opinion of the Contractor and the GE as to whether or not a certain Item of Work constitutes Minor Details of Construction, the Decision of ACCEPTING OFFICER shall be final, conclusive and binding.

1.25. TAXES, DUTIES & LEVIES, ETC.:-

1.25.1. The rate quoted by the tenderer shall be inclusive of all types of taxes, levies including GST, labour welfare tax etc. as prevailing on the date of submission of tender.

1.25.2. Certain taxes such as central excise duty, service tax, additional custom duty, state level value added tax, octroi and other levies which were applicable on interstate transportation of goods are subsumed by GST, thus special condition for **“Reimbursement/refund on variation in prices in taxes directly related to contract value”** as specified here-in-after in tender shall be deemed to be amended incorporating GST in lieu of taxes mentioned in the condition but subsumed by GST.

1.25.3. Cost of Testing including Transportation of Materials or Equipments or Items, provision of all facilities for Testing in accordance with Specifications and/or IS shall be borne by the Contractor unless otherwise mentioned.

1.26. SAFETY MEASURES, PRECAUTION'S, RISKS ETC.,

1.26.1. The Work shall be carried out with utmost care to ensure that no damage to Existing/Adjoining Work is done failing which the damage, if any done shall be rectified by the Contractor to match

SCHEDULE 'A'(BOQ) : NOTES
(LIST OF ITEMS OF WORKS)

with the Existing/ Adjoining Work to the entire satisfaction of Engineer-in-Charge under Contractor's own arrangement and at his own expenses.

- 1.26.2. Suitable Tools, Plants, Equipments, Mechanism, etc., as considered necessary shall be adopted during execution of the Work. The Contractor shall take all Precautions, Safety Measures, etc., to avoid any Damage, Miss-happening, Accident, etc., to the Workmen engaged by him to carryout the Work. The UNIT RATES quoted by Contractor shall be deemed to have included the Element of adopting Safety Measures, Precautions and also the Risks, etc. involved in Work and nothing EXTRA shall be admissible on this account.
- 1.26.3. **The Contractor has to follow all the directives issued by MES / Station Authority / Concerned State Authority / GOI to avoid the spread of Corona Virus (COVID-19). For this account nothing extra shall be admissible.**

1.27. METHOD OF MEASUREMENTS

- 1.27.1. The method of Measurements to be adopted in the Contract shall be as laid down in MES STANDARD SCHEDULE OF RATES PART-I & II, **IS-1200 (latest)** and relevant BIS standard. The General Rules, Special Conditions, Preambles and Other Provisions in MES STANDARD SCHEDULE OF RATES PART-I & II, **IS-1200** and relevant BIS standard shall be deemed to apply to the Work under this Contract unless otherwise mentioned in the Tender documents. However, where the UNITS of Work given in Column 4 against Items of SCHEDULE 'A' are at variance with that mentioned against respective Items in MES STANDARD SCHEDULE OF RATES, the Measurements of Work against such Items of SCHEDULE 'A' shall be done as per the UNITS given in SCHEDULE 'A'.

1.28. SUBMISSION OF DESIGN DETAILS OF MOUDLE MOUNTING STRUCTURE (MMS) AND SOLAR PV MODULE

- 1.28.1. The contractor shall submit following documents off line to this HQ through GE within **15 days of issue of Work Order No. 01.**

(A) Design folder shall include following :-

- (i) Design Calculations :- The tenderer should work out the design of Solar Power Plant based on the conditions prevalent at site plan, structural specifications as existing. The complete design calculations using PVSYS and PVSOL software or any other software shall be submitted alongwith design of Module Mounting Structure (MMS). The documents shall be prepared as Detailed Project Report (DPR).
- (ii) The design of solar power plant and module mounting structure (MMS) shall be got vetted from any one of the following agencies :- (i) National Institute of Solar Energy/ (ii) Sardar Swaran Singh National Institute of Renewable Energy/ (iii) Solar Energy Corporation of India/ (iv) The Indian Renewable Energy development Agency/ (v) Any of the IIT/NIT. The vetting agency shall also approve the make proposed by the contractor in his design.
- (iii) The design layout of all equipments and sub systems of the PV plant shall be self contained and self explanatory representation of layout of the equipments and sub system. The detail dimensional drawing of the site of work clearly marked with all subsystem components etc shall be submitted.
- (iv) Schematic diagram of electrical system :- This shall contain specifications, sizes, current, voltage and fault levels rating of all cables, switch gears and instrumentation & control systems and all metering and interlocking etc.

(B) The following documents shall be submitted after duly complied the above aspects :-

- (i) Design folder in two sets of hard copies & one set of soft copy
 - (ii) Drawings must be complete and detailed enough for convenient interpretation by Engineer/Quantity Surveyor.
 - (iii) Detailed drawing duly vetted by any of the institute mentioned above in two set in tracing ink signed and design as per standard procedure incorporating relevant codal provisions of loading and detailing.
- 1.28.2. The rate quoted against Schedule of works for **Schedule 'A' Part-XII, Serial Item No. 11.00 & its sub-para** shall include the cost towards submission of details as mentioned above.
- 1.28.3. The contractor shall execute this item at site after finally approval of the design details as mentioned above from this HQ, for this account nothing extra shall be admissible.

SCHEDULE 'A'(BOQ) : NOTES
(LIST OF ITEMS OF WORKS)

2. FOR SCHEDULE 'A' PART-I**2.1. GENERAL**

- 2.1.1. Buildings and/or Item of Works as indicated in SCHEDULE 'A' PART-I includes Verandah, Steps, Built-in-Furniture (as applicable and/or as shown on Drawing) etc. likewise (even if not specifically mentioned in description of Items under SCHEDULE 'A' PART-I) all as shown in Key Plans and other Drawings and as specified in Particular Specifications are included in the scope of Work of this Tender unless otherwise specifically stated to be excluded in SCHEDULE 'A' or in Particular Specifications & Contractor's quoted LUMP SUM against SCHEDULE 'A' PART-I shall be deemed to include for the above Provisions.
- 2.1.2. The LUMP SUM quoted against SCHEDULE 'A' PART-I Item, shall deemed to include for all Items of Works complete as specified in Particular Specifications and shown on DRAWINGS, NOTES thereon for completion of Work and all minor details though not specifically shown on DRAWINGS or specified in Particular Specifications except Works covered under SCHEDULE 'A' PART-I or unless specifically stated elsewhere in the Tender documents.
- 2.1.3. Cutting and Forming Chases in Masonry, Concrete Work, etc. including Cutting and or Leaving Holes/ Recesses, Sinking, etc. where required and as directed by the Engineer-in-Charge shall be done as far as possible while the Work is in Progress. The Cost of Materials and Labour for Cutting and/or Forming Chases, Cutting or Leaving Holes/Recesses, Sinking and Making Good in Cement Mortar 1:3 for filling up to 20mm and in PCC 1:2:4 (12.5mm Graded Stone Aggregate) for filling more than 20mm shall deemed to be included in the LUMP SUM quoted by the Contractor. In addition cutting for Forming Chases, Cutting or Leaving Holes/Recesses, Sinking and Making Good in Cement Mortar 1:3/PCC 1:2:4 (12.5mm Graded Stone Aggregate) in connection with the Work required in Plumbing, Internal Water Supply, Internal Electrification, etc. shall deemed to be included in the UNIT RATES of respective Building Works in SCHEDULE 'A' PART-I. However no Price Adjustment shall be made for any variation in the Items/ Quantities of Chases/Holes /Recesses, etc. consequent upon Changes in Quantities of Internal Water Supply, Internal Electrification Works, etc.
- 2.1.4. In all the above and other similar cases, the details indicated elsewhere in the drawings that are similar or near similar to the missed out items of work shall be followed. In the absence of any other similar or near similar details, minimum essential requirement for completion of the work from structural and utility point of view shall be deemed to be included in the lump sum /rates quoted by contractor.
- 2.1.5. In case of varying provisions between Schedule of Finishes drawings and other drawings with regard to finishes except cooking platform, bar counter, service counter, reception counter, step of stair case, other steps, Lab bench, shelve, wall cladding & sloping roof finishing the Schedule of Finishes drawing(s) shall take precedence over other drawings and cooking platform, bar counter, service counter, reception counter, step of stair case, other steps, Lab bench, shelve finishes, wall cladding & sloping roof finishing shall be provided as per architectural drawing. However, in case there are varying provisions with regard to height of skirting/dado in Schedule of Finishes drawings and other drawings, provisions in other drawings shall be followed.
- 2.2. LUMP SUM QUOTED** by the Contractor for the Building/Works under SCHEDULE 'A' PART-I shall be deemed to include for the following :-
- 2.2.1. EXCAVATION AND EARTHWORK**
- 2.2.1.1.** Surface Dressing and Leveling of the Premises around 3.0 METRE Perimeter of the Building from External Wall.
- 2.2.1.2.** The existing Areas/ground where the Buildings / Structures covered in SCHEDULE 'A' PART-I are to be provided, are assumed not having much undulations. In case large undulations are existing at site and site clearance/development works are required to achieve the modified ground level, the payment for such site clearance/development works shall be paid separately. At the initial stage(without disturb existing ground levels) , the levels of the existing ground shall be recorded as per methods as specified in relevant clause in particular specification and final proposed modified ground levels shall be approved by CWE **under intimation to AO.**
- 2.2.2. ANTI-TERMITE TREATMENT**
- 2.2.2.1.** Pre-construction anti-termite treatment shall be provided to the buildings listed at **Serial Item No. 01** of Schedule 'A' Part-I.
- 2.2.2.2.** Pre-construction Anti-Termite Treatment shall be carried out as per IS, to the Building of SCHEDULE 'A' PART-I as mentioned as above.

SCHEDULE 'A'(BOQ) : NOTES
(LIST OF ITEMS OF WORKS)

- 2.2.2.3. Irrespective of whatever Shown/Specified in Tender document the Contractor has to give the Guarantee for for Anti-Termite Treatment for TEN YEARS.
- 2.2.3. Damp Proof Course (DPC) as specified.
- 2.2.4. Seismic Strengthening Measures as specified.
- 2.2.5. Heavy water proofing roof treatment shall be provided to the buildings listed at **Serial Item No. 01** of Schedule 'A' Part-I. Irrespective of whatever Shown/Specified in Tender document the Contractor has to give the Guarantee for Water Proofing Treatment over RCC Roof Slabs for TEN YEARS.
- 2.2.6. PCC Plinth Protection, PCC Plinth Protection with PCC Surface Drain as indicated/shown in Drawings or specified in tender document.
- 2.2.7. RCC lintels band shall be provided as per mentioned structural drawing.
- 2.2.8. RCC lintels beam/continuous lintel beam shall be provided over all doors, windows or any openings if required as per site condition and as well as structural purpose.
- 2.2.9. Masonry work under external plinth beam shall provided complete all as mentioned in TD drawing No. CESZ / STD/26.
- 2.2.10. Builders hardware for doors/windows etc. shall be provided though not indicated on drawings but essential for functional.
- 2.2.11. Steps, Ramp, Platforms, etc. shall be provided as indicated / shown in Drawings.
- 2.2.12. All structural details & structural note shall be provided as shown / mention in main drawing & TD drawing No CESZ/STD/26.
- 2.2.13. Fittings and Fixtures, Fitments, Built-in-Cupboards, Built-in- lockers, Wardrobes, Cabinets below Platforms, Other Furniture Articles shall be provided as indicated/shown in Drawings.
- 2.2.14. PVC (HDPE) water tank over 75mm thick cement concrete 1:2:4 (using 20mm graded stone aggregate) platform over roof slab including PVC valve with PVC float of size to suit inlet pipe for each service tank. Over flow pipe and wash out pipe (galvanised iron 'medium grade' of dia same as inlet pipe) shall be projected suitably beyond the external face of tank wall. Both the pipes than shall be connected with each other and one common pipe shall be brought down along the wall upto and beyond plinth protection to drain out the water in drain. Location of PVC tank if not shown on drawings shall be provided as directed by GE and capacity of tank shall be as given in schematic diagram for water supply (incase the capacity of tank is not mentioned in drawing or also in tender documents then the same shall be considered as 500 liters capacity).
- 2.2.15. Flushing Cistern, EWC / WC shall be as per standard pattern as specified and shown on drawings, Urinal, Readymade PVC Connecting Pipes to Wash Hand Basin, etc., Wash Hand Basin with bottle trap including Mirror. Readymade PVC Connecting Pipes shall be of 15mm Outer Diameter of Low Density Coloured Polythene Pipe, 450 mm long conforming to IS-3076 with and including Brass Unions with Nuts on Both Sides complete as shown on drawings.
- 2.2.16. Nahani trap with stainless steel grating, gully trap with grating, soil, waste and vent pipe, HDPE drain pipe upto and including first manhole and gully trap where bath/WC/toilet are occurring. The average distance of Gully Trap if not shown on Drawings shall be considered 1.50 METRE from the outer face of External Wall of the Buildings. The average distance of First Manhole if not shown on Drawings shall be considered as 3000 mm from the Outer Face of External Wall of the Buildings.
- 2.2.17. Provision for hanging arrangement for ceiling fan and fixing arrangement for exhaust fan, AC, etc. (if shown on Drawings) shall be deemed to be included against SCHEDULE 'A' PART-I.
- 2.2.18. The foundation depth wherever marked on drawings shall be taken as depth from natural ground level and in no case any foundation shall be laid on filled earth.
- 2.2.19. Wherever door/window/ventilator is marked but type of door/window/ventilator is not shown in drawings, the same shall be provided with similar type of door/window/ventilator as provided for other rooms in the same building with complete all as specified in particular specifications and shown on TD drawings, except toilets where PVC doors and frames shall be provided if nothing is marked on drawings.
- 2.2.20. Provision of required type of RCC shelves / RCC loft / working platform shall be all as specified in particular specifications and as shown on drawings.

SCHEDULE 'A'(BOQ) : NOTES
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- 2.2.21. Provision of required type of “Cable Duct” shall be “Type-2” with complete all as specified in particular specifications and shown on TD drawing, wherever cable duct is marked but type of cable duct is not shown in main drawing.
- 2.2.22. The water proofing compound to be used in this work shall be liquid water proofing compound of approved make and shall be used @ 200 ml per 50 kg bag of cement or as per manufacturer instructions whichever is more. The water proofing compound shall be mixed in water used for concrete/mortar.
- 2.2.23. Provision of 3 coat of white wash after preparation of surfaces on walls as specified and 3 coat of white wash on soffits of RCC slab, wherever Schedule of Finishes are missing for walls and ceilings respectively.
- 2.2.24. Provision of 40mm thick PCC M-15(Nominal Mix)(using 20 mm graded stone aggregate) finished even and smooth using extra cement in flooring all as specified in particular specifications wherever floor finishes are missing in schedule of finishes.
- 2.2.25. Provision of 20 mm thick kota stone on RCC counters/platforms/cooking platforms/shelve/stair case step in one piece (Max 1.00 m length) all as specified in particular specifications wherever finishes over counters / platforms / cooking platforms / shelve / recitation counter / Lab bench / stair case step are missing in drawings.
- 2.2.26. In addition to list of drawings attached with tender documents, if any other drawing(s) are referred to in drawings or in the tender documents, but not listed in the list of drawings, these drawing shall also form part of the tender documents. The contractor shall be deemed to have taken the details etc, shown in these missing drawing into consideration before quoting the lump sum amount, nothing extra shall be paid on this account.
- 2.2.27. In case where type, size and reinforcement details of footing, pile, pile cap, beam, continuous lintel beam / chajja, slab, columns, fins, truss & purlin, etc are not indicate on structural drawing these shall be provided as directed by accepting officer as per details of similar footing, pile, pile cap, beam, continuous lintel beam / chajja, slab, columns, truss & purlin etc and cost of same and shall be deemed to be included in the lump sum. The decision of the accepting officer as to the similar of footing, pile, pile cap, beam, continuous lintel beam/chajja, slab, columns, truss & purlin etc shall be final binding.
- 2.3. SBC (SAFE BEARING CAPACITY) :-** The SBC of building based on which foundation has been designed has been indicated in the structural drawings. While quoting the offer, the tenderer should consider the SBC given in the main structural drawings. However, in case GE observes soil of unusual nature at site during the execution, which may result in lower SBC. GE shall get tested the SBC of soil and if actual SBC found at site is at variance with reference to SBC mentioned in main drawings, the case shall be referred to Accepting Officers for approval and the change shall be regularized through deviation order (DO) and the cost for such testing of SBC of soil shall be borne by the department.
- 2.4. SBC (SAFE BEARING CAPACITY) FOR MMS STRUCTURE :-** The foundation for Module Mounting Structure (MMS) shall be designed and quoted considering **SBC as 9.9 Ton/Sqm**, however the actual foundations shall be as per site SBC and technical requirement and if any change in SBC during execution at site, the change shall be regularized through deviation order (DO) and the same shall be priced at **60% (Plus)** on SSR Part-II (2010). The foundation shall be appropriate to with stand the uplift pressure due to wind effect and as directed by GE.
- 3. FOR SCHEDULE 'A' PART-II TO SCHEDULE 'A' PART X**
- 3.1.** All Quantities shown under Col. 5 are PROVISIONAL. Any variation in Quantities if considered necessary due to Site Requirement and/or any Other Technical Reasons as decided by the GE may be executed to the extent as specified in Condition 7 of General Conditions of Contract (IAFW-2249).
- 3.2.** Unless otherwise specified, the UNIT RATES of SCHEDULE 'A' PART-II to SCHEDULE 'A' PART-X under Col. 4/5 of Each Item of Work inserted by MES and/or Rate quoted by the Tenderer shall be deemed to includes 'Materials and Labours' i.e. 'M&L' or 'Supplying and Fixing' i.e. 'S&F' or 'Supplying and Laying' complete unless otherwise specifically mentioned.
- 3.3.** Special Conditions, Conditions in MES STANDARD SCHEDULE PART-I and the PREAMBLES to the Items given in MES STANDARD SCHEDULE OF RATES PART-II under respective Trades shall be applicable, if any provision in the description of Items of SCHEDULE 'A' and PARTICULAR SPECIFICATIONS are at variance with the provision laid in the Conditions of MES SCHEDULE and PREAMBLES to MES SCHEDULE Item, the provision in description of Items of SCHEDULE 'A' and provision in PARTICULAR SPECIFICATIONS shall take precedence.

SCHEDULE 'A'(BOQ) : NOTES
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4. APPLICABLE FOR SCHEDULE 'A' PART- XI TO SCHEDULE 'A' PART-XIII

- 4.1. All Quantities shown under Col. 6 are PROVISIONAL. Any variation in Quantities if considered necessary due to Site Requirement and/or any Other Technical Reasons as decided by the GE may be executed to the extent as specified in Condition 7 of General Conditions of Contract (IAFW-2249).
- 4.2. Special Conditions, Conditions in MES STANDARD SCHEDULE PART-I and the PREAMBLES to the Items given in MES STANDARD SCHEDULE OF RATES PART-II under respective Trades shall be applicable, if any provision in the description of Items of SCHEDULE 'A' and PARTICULAR SPECIFICATIONS are at variance with the provision laid in the Conditions of MES SCHEDULE and PREAMBLES to MES SCHEDULE Item, the provision in description of Items of SCHEDULE 'A' and provision in PARTICULAR SPECIFICATIONS shall take precedence.

5. FOR ALL SCHEDULE 'A' PARTS (EXCEPT SCHEDULE 'A' PART-XI TO PART-XIII)

- 5.1. VALUATION OF DEVIATIONS APPLICABLE FOR LUMP SUM CONTRACTS BASED ON DRAWINGS & SPECIFICATIONS.
- 5.2. Refer Condition 62 (B) & (C) of the General Conditions of Contracts (IAFW-2249).
- 5.3. In case of any DEVIATION involved in respect of SCHEDULE 'A' PART-I, the Pricing of the Deviation shall be done at applicable RATES of MES SCHEDULE PART-II (2010) enhanced by Contractor's derived percentages i.e Represent (%) Percentage of BOQ.
- 5.4. Items of Work involved in Deviation Order for which there are no Rates in MES Schedule be priced in accordance with the Conditions 62(G) of IAFW-2249 and shall be approved as specified below :-
- 5.4.1. In case of any deviation, mode of pricing shall be decided by Accepting Officer in terms of Condition 62 of IAFW-2249.
- 5.4.2. 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.
- 5.4.3. 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 engg books and record available in respect of Star Rates approved in the past for similar item of work etc. Contractor may also assist GEs office in preparation of draft Star Rate.
- 5.4.4. 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.
- 5.4.5. 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 and approved by competent authority within a period of one month from submission of the relevant documents by contractor as mentioned above.
- 5.4.6. 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.

6. EXECUTION OF ELECTRICAL WORKS / ELECTRICAL COMPONENT OF WORKS

- 6.1. For execution of electrical works / electrical component of works requiring Electrical License in accordance with Rule 29 under Chapter III of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulation, 2010, the contractor shall have valid Electrical License issued by the concerned State / Union Territory in the name of Firm or get the work executed through an agency having valid Electrical License issued by the concerned State / Union Territory where the work is being executed.

SCHEDULE 'A'(BOQ) : NOTES
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- 6.2. Prior to commencement of electrical works / electrical component of works, copy of valid Electrical License in the name of the contractor or copy of agreement with an agency having valid Electrical License alongwith agency's Electrical License shall be submitted by the contractor to the Accepting Officer through GE with copy to CWE. Incase contractor does not possess valid Electrical License and he intends to get such work executed through agency having valid Electrical License and with whom he has agreement, prior approval of such agency in all contracts shall be got done from competent authority (i.e. concern CWE) (concerned CE Zone incase there is no CWE). Copy of License shall be kept on record by GE as well as CE Zone.
- 6.3. GE and concerned AGE / Engineer-in-Charge shall ensure that electrical work / electrical component of works required to be executed in accordance with Rule 29 mentioned above are executed by contractor / agency having valid Electrical License, as applicable. In addition, Supervisor for execution of electrical works / electrical component of works employed by the contractor shall possess Supervisor Certificate of Competency issued by concerned State Government / Union Territory and the worker / tradesmen for execution of electrical works / electrical component of works shall hold necessary permit issued by concerned State Government / Union Territory.
- 6.4. Reference of Electrical License and details of Supervisor's Certificate of Competency and Permit of tradesmen employed for execution of electrical works / electrical component of works shall be duly incorporated in the Works Diary and relevant site documents respectively for the whole period during which such work is executed.
7. **INTEGRITY PACT (IP) :- Integrity Pact (IP)** is an integral part of contract and both parties are bound by its provisions.
8. **INSPECTION OF THE WORKS (DEFECTS LIABILITY PERIOD FOR PHASE-I) :** {Refer Condition 46 of IAFW – 2249 (General Conditions of Contracts) (As amended under amendment No. 48 to IAFW- 2249)}:-
 "The Defects liability period for the scope of work(s) covered under the contract is **TWENTY FOUR CALENDAR MONTHS**. Any defects in the work noticed during this period shall be rectified by the contractor forthwith, on demand in writing from the GE specifying the area affected notwithstanding that the work executed might have been inadvertently passed, certified and paid. The contractor shall carry out the rectification of the defects notified at his own expense during the defects liability period and in event of his failure to do within a period to be specified by the GE in his demand, the GE shall undertake such rectification work at the risk and expense of the contractor".
9. **APPLICABLE TO SCHEDULE OF CREDIT**
- 9.1. All the Quantities under this Schedule are PROVISIONAL. In the event of any Variation of the Quantity of Items under this Schedule, the same shall be Priced at Rate inserted by the Department.
- 9.2. In case any proposed building has to be constructed at location of any existing buildings then the same shall be executed by dismantling / demolition of the existing building earmarked for dismantling / demolition catered in the respective schedule of the tender document and **location as shown on Site plan**. The building will be handover by GE for dismantling/demolition in piecemeal according to site conditions so that **functioning of user unit shall continue without any hindrance**. No claim whatsoever on this account shall be admissible.
- 9.3. The Unit Rates for the Items covered under this Schedule as inserted by the Department shall be final and binding. No effect will be made on the Priced Rate and Amount for any overall Less/Rebate offered by the Tenderer.
- 9.4. The Unserviceable Materials retrieved from Dismantling/Demolition as included under this Schedule shall not be permitted to be incorporated under this Contract under any circumstances. The Contractor shall be permitted to take away these Materials only after requisite Credit for the Materials is recovered from the RARs/FINAL BILL and necessary Written Permission in this regard is obtained from the Engineer-in-Charge.
- 9.5. Old materials other than that mentioned in the SCHEDULE OF CREDIT if any retrieved from demolition, dismantling, taking down, taking up, taking out, etc., shall become Government Property and shall be stacked at Site(s) of Work by the contractor for checking at his own expense and under his own arrangement. Nothing extra shall be admissible to the Contractor on this account and quoted UNIT RATE shall be deemed to be based on this aspect by inspecting Site of Work before submitting his Tender.

SCHEDULE 'A'(BOQ) : NOTES
(LIST OF ITEMS OF WORKS)

- 9.6. Before commencement of the dismantling, taking down, taking up, taking out etc., an Inventory of all old Materials, Fittings, Fixtures etc., shall be made and signed by the Engineer-in-Charge, the Contractor & counter signed by GE and kept on MES record.
10. **SCHEDULE OF CREDIT** :- Tenderer has to visit the Schedule 'A' pages of tender document for quoting the rates of each items / parts of the Schedule 'A'. Total amount of S chedule of Credit has been catered towards Schedule of Credit for which details have been made in a separate schedule in the PDF document and bidder shall study the same before quoting. The amount of Schedule of Credit shall be deducted from the total amount of BOQ and contract sum shall be arrived accordingly. Contractors are requested to take note of this while quoting for items contained in BOQ (Cover No 2).

(SIGNATURE OF CONTRACTOR)
DATED:

Jt / Dy DIR(CONTRACTS)
FOR ACCEPTING OFFICER

**SCHEDULE 'A' PART I
BUILDING & STRUCTURES WORKS**

PROVN OF 1 MW SOLAR POWER PLANT ALONGWITH ALLIED INFRA AT JORHAT UNDER GE JORHAT

Ser No	Description of items/works	Drg Nos (See list of drgs)	Rate per unit (Rs)	No of unit required	Amount	Period of completion of individual items from the date of handing over the site	Remarks
1	2	3	4	5	6	7	8

1	Construction of a Block of SUB STATION BLDG, Single Storey including ramp with all fittings, fixtures and built in furniture items etc. complete all as specified and shown on drawings.	₹	<u>869,000.00</u>	1	₹	869,000.00
			Each Block			

Total Carried Over to BOQ (General Summary)	₹	<u><u>869,000.00</u></u>
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Signature of Contractor

Date :

Jt/Dy Dir (Contracts)

For Accepting Officer

SCHEDULE 'A' PART - II
(LIST OF ITEMS OF WORKS & PRICES)
(SITE CLEARANCE, SITE DEVELOPMENTS & EARTH WORKS)

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	Surface excavation not exceeding 30 cm deep and averaging 15 cm deep and getting out in soft/loose soil.		<u>15.90</u> Sqm	19,480.00	309,732.00		
2	Excavation in trenches not exceeding 1.50 m wide and not exceeding 1.50 m in depth for foundations or for shafts, wells, cesspits, manholes, pier holes etc. not exceeding 10 Sqm on plan and not exceeding 1.50 m in depth and getting out in soft/loose soil.		<u>115.20</u> Cum	624.00	71,884.80		
3	Returning, filling in, including spreading, levelling, watering and well ramming in layers not exceeding 25 cm as in soft/loose soil complete all as specified and directed.		<u>41.70</u> Cum	383.00	15,971.10		
4	Removing excavated material (soil) not exceeding 50 m and depositing where directed at a level n. exc. 1.50 m above the starting point complete all as specified and as directed.		<u>96.10</u> Cum	344.00	33,058.40		
5	Removing excavated material (soil) exceeding 50 m but not exceeding 100 m and depositing where directed at a level n. exc. 1.50 m above the starting point complete all as specified and as directed.		<u>109.20</u> Cum	2,712.00	296,150.40		
6	Removing excavated material (soil) exceeding 250 m but not exceeding 500 m and depositing where directed at a level n. exc. 1.50 m above the starting point complete all as specified and as directed.		<u>149.40</u> Cum	107.00	15,985.80		
Total of Schedule 'A' Sch A Part-II					742,782.50		
carried over to General Summary on Srl Page No							

Signature of Contractor

Dated _____

Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer

SCHEDULE 'A' PART - III
(LIST OF ITEMS OF WORKS & PRICES)
(INTERNAL WATER SUPPLY)

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	Chlorinated Polyethylene Chloride (CPVC) concealed pipes 32 mm outside dia, SDR 11 (IS 15778) & Plain CPVC SDR 11 including all special fittings (brass threaded elbow, tee, unions, etc.) polypropylene random fittings on walls / ceiling or laying in floors complete all as specified.		<u>200.30</u> RM	8.50	1,702.55		
2	Chlorinated Polyethylene Chloride (CPVC) concealed pipes 25 mm outside dia, SDR 11 (IS 15778) & Plain CPVC SDR 11 including all special fittings (brass threaded elbow, tee, unions, etc.) polypropylene random fittings on walls / ceiling or laying in floors complete all as specified.		<u>144.10</u> RM	6.00	864.60		
3	Chlorinated Polyethylene Chloride (CPVC) concealed pipes 20 mm outside dia, SDR 11 (IS 15778) & Plain CPVC SDR 11 including all special fittings (brass threaded elbow, tee, unions, etc.) polypropylene random fittings on walls / ceiling or laying in floors complete all as specified.		<u>111.40</u> RM	5.00	557.00		
4	Suppling and fixing CPVC Ball valve for 32 mm dia outer cpvc pipe complete all as specified and as directed.		<u>763.00</u> Each	1.00	763.00		
5	Stop valves fancy type, chromium plated, cast copper alloy, screwed down high pressure with crutch or butterfly handle, screwed both ends for iron pipe or for unions and of size 15 mm bore		<u>169.00</u> Each	2.00	338.00		
6	Bib taps cast copper alloy screwed down fancy type chromium plated, with crutch or butterfly handle, screwed for iron pipe or for brass ferrule and fixed for 15 mm bore pipe		<u>180.30</u> Each	2.00	360.60		
7	Pillar tap cast copper alloy, fancy type, with capstan heads, chromium plated, screwed down, high pressure with or without letter 'HOT' or 'COLD' with long screwed shanks and fly nuts, screwed for fixing to 15 mm bore GI pipe		<u>279.90</u> Each	1.00	279.90		

**SCHEDULE 'A' PART - III
(LIST OF ITEMS OF WORKS & PRICES)
(INTERNAL WATER SUPPLY)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
8	Gun metal gate valve with iron wheel head, screwed both ends for iron pipe of 32mm bore		<u>471.40</u> Each	1.00	471.40		
9	Gun metal gate valve with iron wheel head, screwed both ends for iron pipe of 25mm bore		<u>413.80</u> Each	1.00	413.80		
Total of Schedule 'A'SchAPart-III					<u><u>5,750.85</u></u>		

carried over to General Summary on Srl Page No

Signature of Contractor

Dated _____

**Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer**

**SCHEDULE 'A' PART - IV
(LIST OF ITEMS OF WORKS & PRICES)
(INTERNAL ELECTRIFICATION)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	Point wiring with 1.5 Sq. mm (nominal area) PVC insulated and un-sheathed single core FRLSH copper cable 1100 volts grade with multi-stranded copper conductor in and including PVC rigid concealed conduit (heavy grade) and conduit accessories alongwith continuous earth wire 1.5 Sq mm PVC insulated and un-sheathed single core FRLSH cable 1100 volts grade with multi-stranded copper conductor and connected to common earth dolly complete for one Light / Fan point controlled by one, one way modular switch.		<u>440.40</u> Point	18.00	7,927.20		
2	Point wiring with 1.5 Sq. mm (nominal area) PVC insulated and un-sheathed single core FRLSH copper cable 1100 volts grade with multi-stranded copper conductor in and including PVC rigid concealed conduit (heavy grade) and conduit accessories alongwith continuous earth wire 1.5 Sq mm PVC insulated and un-sheathed single core FRLSH cable 1100 volts grade with multi-stranded copper conductor and connected to common earth dolly complete for one 5/6 Amps socket outlet point controlled by one, 5/6 A modular switch on independent board.		<u>440.40</u> Point	3.00	1,321.20		
3	Point wiring with 4 Sq. mm (nominal area) PVC insulated and un-sheathed single core FRLSH copper cable 1100 volts grade with multi-stranded copper conductor in and including PVC rigid concealed conduit (heavy grade) and conduit accessories alongwith continuous earth wire 4 Sq mm PVC insulated and un-sheathed single core FRLSH cable 1100 volts grade with multi-stranded copper conductor and connected to common earth dolly complete for one 15/16 Amps socket outlet point controlled by one, 15/16 A modular switch on independent board.		<u>921.30</u> Point	6.00	5,527.80		
Note for Sl Item No. 1.00 to 3.00 :-							
(i) Modular metal flush box and white cover plate with frame shall be measured and paid separately.							
4	S & F Ceiling rose surface bakelite, PVC/Polycarbonite, 63.5 mm x 23.5 mm, 3 terminals, isolated body, complete all as specified and as directed.		<u>22.80</u> Each	20.00	456.00		

**SCHEDULE 'A' PART - IV
(LIST OF ITEMS OF WORKS & PRICES)
(INTERNAL ELECTRIFICATION)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
5	Modular switch 6 Amp single pole one way ISI marked complete all as specified and as directed.		<u>130.10</u> Each	21.00	2,732.10		
6	Modular switch 16 Amp single pole one way ISI marked complete all as specified and as directed.		<u>194.90</u> Each	6.00	1,169.40		
7	Modular socket 6 Amp, 2/3 pin combined, 2 modulae, 240 volts, ISI marked complete all as specified and as directed.		<u>203.60</u> Each	3.00	610.80		
8	Modular socket 6Amp /16 Amp, 2/3 pin combined, 2 module, 240 Volts, ISI marked complete all as specified and as directed.		<u>279.10</u> Each	6.00	1,674.60		
9	Modular electronic type fan regulator step type 120 watt, two module, 240 volts, ISI marked complete all as specified and as directed		<u>637.10</u> Each	3.00	1,911.30		
10	Metal flush box modular with white cover plate with frame (both inner plate & outer plate cover) modular for 12 module.		<u>558.30</u> Each	1.00	558.30		
11	Metal flush box modular with white cover plate with frame (both inner plate & outer plate cover) modular for 8 module.		<u>413.50</u> Each	1.00	413.50		
12	Metal flush box modular with white cover plate with frame (both inner plate & outer plate cover) modular for 6 module.		<u>363.80</u> Each	1.00	363.80		
13	Metal flush box modular with white cover plate with frame (both inner plate & outer plate cover) modular for 4 module.		<u>217.00</u> Each	1.00	217.00		

**SCHEDULE 'A' PART - IV
(LIST OF ITEMS OF WORKS & PRICES)
(INTERNAL ELECTRIFICATION)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
14	Metal flush box modular with white cover plate with frame (both inner plate & outer plate cover) modular for 3 module.		<u>189.40</u> Each	7.00	1,325.80		
15	Metal flush box modular with white cover plate with frame (both inner plate & outer plate cover) modular for 2 module.		<u>182.90</u> Each	1.00	182.90		
16	Metal flush box modular with white cover plate with frame (both inner plate & outer plate cover) modular for 1 module.		<u>176.40</u> Each	2.00	352.80		
17	Sub main wiring with two single core 1.50 sqmm (nominal area) PVC insulated copper conductor FRLSH, multi stranded, unsheathed 1100 volts grade IS-694 marked in PVC conduit including one single core 1.50 sqmm copper conductor cable FRLSH as earth wire complete all as specified and as directed (for security light). NOTE:- (a) All runs of copper conductor and one run of conduit shall be measured as one run length.		<u>90.00</u> RM	40.00	3,600.00		
18	Sheet metal enclosure DB SPN 240 Volts 8 Way double door type with 200 Amps rated bus bar for fixing MCB.		<u>1,232.90</u> Each	1.00	1,232.90		
19	MCB Double Pole 415 volts, 6 Amps to 32 Amps, 10KA rupturing capacity, 'C' series complete all as specified.		<u>307.40</u> Each	1.00	307.40		
20	MCB Single Pole 240 volts, 6Amps to 32 Amps, 10KA rupturing capacity, 'C' series complete all as specified.		<u>120.00</u> Each	6.00	720.00		

**SCHEDULE 'A' PART - IV
(LIST OF ITEMS OF WORKS & PRICES)
(INTERNAL ELECTRIFICATION)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
21	Material & Labour for earthing with galvanised steel earth plate electrode of size 60cmx60cmx6mm thick buried directly in ground (earth pit not less than 2.25m deep below the ground level) with top edge of the plate not less than 1.5m below normal ground level, connected to the galvanised earth lead by means of bolts, nuts check nuts and washers of galvanised iron or steel using GI or steel wire 4 mm dia as earthing lead as shown in electrical plate No. 3 of SSR Part-I connected to earthing test point all as specified or indicated including testing on completion including necessary excavation and earth work in soft/loose soil, returning filling, disposal of surplus soil, earth pit in PCC 1:3:6 type C-1 using 20mm graded stone aggregate pit, funnel, 20mm dia GI medium grade watering pipe, 15mm dia GI light grade earth lead protection pipe, CI frame and cover, wire, copper lugs etc mesh, chorcoal and common salt in alternate layer complete all as specified and directed by Engr-in-Charge.		<u>3,036.80</u> Each Set	1.00	3,036.80		
	Note :- Length of earthwire and protection pipe in above mentioned item is considered upto 7.50 m length, additional length required shall be measured and paid separately.						
22	Earth continuity conductor or main earthing lead fixed to wall or 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 4 mm dia GI or steel wire		<u>18.30</u> RM	5.00	91.50		
23	Galvanised steel water tubing 15 mm bore, light grade with all fittings (such as bends, elbows, tees, short plugs and union etc.) for cable protection, fixed to walls, ceiling or laid in floors or laid in trenches complete all as specified and as directed.		<u>103.90</u> RM	5.00	519.50		

**SCHEDULE 'A' PART - IV
(LIST OF ITEMS OF WORKS & PRICES)
(INTERNAL ELECTRIFICATION)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
Total of Schedule 'A' SchAPart-IV					36,252.60		
carried over to General Summary on Srl Page No							

Signature of Contractor
Dated _____

Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer

SCHEDULE 'A' PART - V
(LIST OF ITEMS OF WORKS & PRICES)
(ROAD, PATH & HARD STANDING)

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	Hard core of gauge not exceeding 63 mm of broken stone or boulders , spread and levelled in layers not exceeding 15 cm thick, watered and rammed to a true surface		<u>895.10</u> Cum	105.00	93,985.50		
2	75 mm thick plain cement concrete M-7.5 (Nominal Mix), type D-2 using 40 mm graded stone aggregate as in floor / sub base complete all as specified and as directed.		<u>176.40</u> Sqm	1,400.00	246,960.00		
3	100 mm thick plain cement concrete M-15 (Nominal Mix), type B-2 using 40 mm graded stone aggregate as in path / paving laid in panels complete all as specified and as directed.		<u>305.80</u> Sqm	1,400.00	428,120.00		
4	Forming 12 mm thick expansion joints filled with pre-formed bituminous filler and top 30 mm primed and sealed with sealing compound, Grade 'A', in concrete slab of thickness 100 mm.		<u>663.70</u> 10 RM	46.60	30,928.42		
5	Continuous brick edging with burnt clay bricks of sub class B, old size bricks, with width equal to the width of the bricks laid dry on end vertically including embedding the brick in ground and tamping the ground around the brick and including necessary earth work, removing surplus soils if any, complete all as specified and as directed.		<u>47.80</u> RM	2,800.00	133,840.00		
Total of Schedule 'A' SchAPart-V					933,833.92		

carried over to General Summary on Srl Page No

Signature of Contractor
Dated _____

Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer

**SCHEDULE 'A' PART - VI
(LIST OF ITEMS OF WORKS & PRICES)
(SEWAGE DISPOSAL)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	Plain Cement Concrete M-7.5 (Nominal Mix), type D-2 using 40 mm graded stone aggregate as in foundation filling and mass concrete		<u>2,303.30</u> Cum	2.52	5,804.32		
2	Brick work with bricks class designation 75, old size, straight or curved on plan exceeding 6 m mean radius built in Cement Mortar 1:4		<u>2,351.90</u> Cum	3.45	8,114.06		
3	Rendering 15 mm thick in Cement Mortar 1:4 on fair faces of brick work or concrete surfaces finished even and smooth without using extra cement complete all as specified and as directed.		<u>127.40</u> Sqm	13.00	1,656.20		
4	Plain Cement Concrete M-15 (Nominal Mix) type B-1 using 20 mm graded stone aggregate as in coping, benching, etc. complete all as specified and as directed.		<u>4,144.40</u> Cum	0.39	1,616.32		
5	Plain Cement Concrete M-10 (Nominal Mix), type C-2 using 40 mm graded stone aggregate as in surface channel and drain complete all as specified and as directed.		<u>2,648.80</u> Cum	0.15	397.32		
6	High strength steel deformed TMT bars (Fe 500D) 10 mm dia and over, cut to length, bent to shape required including cranking, bending spirally and binding with and including mild steel wire (annealed) not less than 0.90 mm dia		<u>48.60</u> Kg	10.50	510.30		
7	Precast Reinforced Cement Concete type M-15 (Nominal Mix), type B-1 using 20 mm graded stone aggregate as in cover slab of man holes, septic tank, etc. set in Cement Mortar (1:4) including necessary form, mould work, etc. complete all as specified and as directed.		<u>4,817.60</u> Cum	0.20	963.52		
8	Construction of Brick Masonary SOAK WELL of size 1.90 m Dia x 3.00 m Depth with all fittings and fixtures complete all as specified and as shown on Drawings No. TD/SZ/502, Sheet No. 1/1.		<u>39,000.00</u> Each Job	1.00	39,000.00		

**SCHEDULE 'A' PART - VI
(LIST OF ITEMS OF WORKS & PRICES)
(SEWAGE DISPOSAL)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8

**Total of Schedule 'A'SchAPart-VI
carried over to General Summary on Srl Page No**

58,062.04

**Signature of Contractor
Dated _____**

**Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer**

**SCHEDULE 'A' PART - VII
(LIST OF ITEMS OF WORKS & PRICES)
(AREA DRAINAGE)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	Plain Cement Concrete M-7.5 (Nominal Mix), type D-2 using 40 mm graded stone aggregate as in foundation filling and mass concrete		<u>2,303.30</u> Cum	15.00	34,549.50		
2	Plain Cement Concrete M-10 (Nominal Mix), type C-2 using 40 mm graded stone aggregate as in surface channel and drain		<u>2,648.80</u> Cum	6.75	17,879.40		
3	Plain Cement Concrete M-15 (Nominal Mix), type B-0 using 12.5 mm graded stone aggregate as in coping, benching, etc. complete all as specified and as directed.		<u>4,169.10</u> Cum	4.60	19,177.86		
4	Brick work with bricks class designation 75, old size, straight or curved on plan exceeding 6 m mean radius built in Cement Mortar 1:4		<u>2,351.90</u> Cum	85.10	200,146.69		
5	Rendering 15 mm in Cement Mortar 1:4 on fair faces of brick work or concrete surfaces fair finished.		<u>114.90</u> Sqm	340.00	39,066.00		
6	Extra for forming fair finished drain or channel 30 cm inner girth in cement concrete, using extra cement, including forms, moulds, mitred/stopped ends etc.		<u>14.90</u> RM	200.00	2,980.00		
Total of Schedule 'A' SchA Part-VII					<u>313,799.45</u>		

carried over to General Summary on Srl Page No

Signature of Contractor

Dated _____

**Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer**

**SCHEDULE 'A' PART - VIII
(LIST OF ITEMS OF WORKS & PRICES)
(EXTERNAL WATER SUPPLY)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	Supply and fixing of 3- layer PP-R (Polypropylenerandon copolymer) pipes 50 mm outer dia ,SDR 7.4 (PN-16) pipes UV stabilized and antimicrobial fusion welded having thermal stability for hot & cold water supply all PP-R plain & brass threaded polypropylene random fittings fixed complete including laid in trenches complete all as specified and directed.		<u>480.80</u> RM	200.00	96,160.00		
2	Supply and fixing of 3- layer PP-R (Polypropylenerandon copolymer) pipes 25mm outer dia ,SDR 7.4 (PN-16) pipes UV stabilized and antimicrobial fusion welded having thermal stability for hot & cold water supply all PP-R plain & brass threaded polypropylene random fittings fixed complete including laid in trenches complete all as specified and directed.		<u>133.50</u> RM	150.00	20,025.00		
3	Supply and fixing of 3- layer PP-R (Polypropylenerandon copolymer) pipes 20 mm outer dia ,SDR 7.4 (PN-16) pipes UV stabilized and antimicrobial fusion welded having thermal stability for hot & cold water supply all PP-R plain & brass threaded polypropylene random fittings fixed complete including laid in trenches complete all as specified and directed.		<u>101.50</u> RM	100.00	10,150.00		
4	3 layered fusion welded PP-R (polypropylene Randocm Co -Polymer) gate valve (brass insert as pre requirement of the site with handle, screwed both ends for PP-R pipes or for unions fixed of grade SDR - 7.4 (PN-16) and size 50 mm complete all as specified and directed.		<u>862.00</u> Each	10.00	8,620.00		
5	3 layered fusion welded PP-R (polypropylene Randocm Co -Polymer) gate valve (brass insert as pre requirement of the site with handle, screwed both ends for PP-R pipes or for unions fixed of grade SDR - 7.4 (PN-16) and size 25 mm complete all as specified and directed.		<u>420.00</u> Each	15.00	6,300.00		
6	3 layered fusion welded PP-R (polypropylene Randocm Co -Polymer) gate valve (brass insert as pre requirement of the site with handle, screwed both ends for PP-R pipes or for unions fixed of grade SDR - 7.4 (PN-16) and size 20 mm complete all as specified and directed.		<u>390.00</u> Each	50.00	19,500.00		
7	Supply, installing, testing and commissioning of hose reel drum with 20 mm bore high pressure braided rubber hose 30 m long with 6 mm bore shut off nozzle and 25 mm dia inlet valve, mounting on glove gate valve 20 mm bore complete all as specified and as directed.		<u>7,935.50</u> Each	10.00	79,355.00		

**SCHEDULE 'A' PART - VIII
(LIST OF ITEMS OF WORKS & PRICES)
(EXTERNAL WATER SUPPLY)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
8	Drilling and tapping cast iron water mains (in position) for branch connection of internal dia 20 mm		<u>162.00</u> Each	2.00	324.00		
9	Construction of brick masonry valve pit of size 60 cm x 60 cm x 60 cm (inner dimension) with subclass 'B' brick in CM (1:4) with PCC M-7.5 (Nominal Mix) (using 40 mm graded stone aggregate) for foundation including 15mm thick plastering in CM (1:4) inside the valve pit and on the external portion upto 150 mm below the ground level, including 3 mm thick MS cover welded around with MS flat iron of size 40x6mm with provision of hinges, handle and locking arrangement including MS angle iron frame of size 40x40x6mm fixed on top of valve pit by means of hold fast 150 mm long, embedded in PCC block 1:2:4, Type B-1 (using 20 mm graded stone aggregate) of size 230 mm x 200 mm x 100 mm including painting with two coats of anti-corrosive paint over a coat of red oxide zinc chrome primer including necessary earthwork in soft/loose soil well ramming of soil around the constructed valve pit complete all as per Drawing No. TD/EM/06, Sheet No. 1/2 & 2/2.		<u>4,900.00</u> Each Job	5.00	24,500.00		
10	Supplying, hoisted and fixed in position of rotational moulded polyethylene water storage tanks in double layers and cylindrical vertical type with manhole lids(closed top) of 2000 litres capacity with ISI marked and all as specified in IS 12701 complete all as specified and directed. Note :- Relevant Items for platform for water storage tank shall be measured and paid under Schedule 'A' Part-VI		<u>8,454.30</u> Each	2.00	16,908.60		

**SCHEDULE 'A' PART - VIII
(LIST OF ITEMS OF WORKS & PRICES)
(EXTERNAL WATER SUPPLY)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8

11	Material & Labour for earthing with galvanised steel earth plate electrode of size 60cmx60cmx6mm thick buried directly in ground (earth pit not less than 2.25m deep below the ground level) with top edge of the plate not less than 1.5m below normal ground level, connected to the galvanised earth lead by means of bolts, nuts check nuts and washers of galvanised iron or steel using GI strip 32x6mm as earthing lead as shown in electrical plate No. 3 of SSR Part-I connected to earthing test point all as specified or indicated including testing on completion including necessary excavation and earth work in soft/loose soil, returning filling, disposal of surplus soil, earth pit in PCC 1:3:6 type C-1 using 20mm graded stone aggregate pit, funnel, 20mm dia GI medium grade watering pipe, 40mm dia GI medium grade earth lead protection pipe, CI frame and cover, wire, copper lugs etc mesh, chorcoal and common salt in alternatee layer complete all as specified and directed by Engr-in-Charge.		<u>3,777.50</u> Each Set	1.00	3,777.50		
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Note :- Length of earthwire and protection pipe in above mentioned item is considered upto 7.50 m length, additional length required shall be measured and paid separately.

Total of Schedule 'A' SchA Part-VIII

carried over to General Summary on Srl Page No

285,620.10

Signature of Contractor

Dated _____

Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer

**SCHEDULE 'A' PART - IX
(LIST OF ITEMS OF WORKS & PRICES)
(EXTERNAL ELECTRIFICATION)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	LT XLPE insulated armoured heavy duty cable 1100 volt grade ISI marked with aluminium conductor multi strand cross sectional area 16 Sqmm x 4 Core		<u>160.00</u> RM	500.00	80,000.00		
2	XLPE insulated, screened, PVC bedded, galvanized steel strip or wire armoured, electric power cables (heavy duty) with aluminium conductor, 11000 volts grade, cross sectional area 95 Sq mm, 3 core.		<u>917.00</u> RM	800.00	733,600.00		
3	Sand cushioning to the full width of trenches for protection of cables including punning down complete all as specified. Note :- Thickness of sand cushioning shall be the thickness after punning down.		<u>666.20</u> Cum	93.15	62,056.53		
4	Supply and laying for sub class 'B' bricks, old size, flat, common clay laid in trenches across the trench as cable protection complete all as specified and directed.		<u>2.63</u> Each	3,600.00	9,468.00		
5	Supply and laying un-reinforced precast concrete cable cover, class HV, type I flat size of 300 x 180 mm x 40 mm with minimum average breaking load 70 kgf/sqcm as per IS 5820 : 1970 complete all as specified and as directed.		<u>38.00</u> Each	3,800.00	144,400.00		
6	Steel Tubular Swaged Poles Type 410-SP-31 (9 Metre long) including cast iron base plate, finial taper plug, cap, mild steel bolts, screws, etc. including applying two coats of black bituminous paint internally and externally upto planting depth and applying two coats of aluminium paint over a coat of aluminium primer (externally from top of PCC copping) including writing MES Pole No. with synthetic enamel paint (first grade quality) complete all as specified. Note:- (a) Earthwork will be measured and paid under appropriate items in Schedule 'A' Part-II and PCC will be measured and paid under relevant items in this Schedule. (b) Volume occupied by Steel Pole shall be deducted to derive the quantity of PCC.		<u>7,891.70</u> Each	10.00	78,917.00		

SCHEDULE 'A' PART - IX
(LIST OF ITEMS OF WORKS & PRICES)
(EXTERNAL ELECTRIFICATION)

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
7	Plain Cement Concrete M-7.5(Nominal Mix), type D-2 using 40 mm graded stone aggregate as in foundation filling and mass concrete for poles, stays, etc. including necessary formwork complete all as specified and as directed.		<u>2,303.30</u> Cum	1.50	3,454.95		
8	Plain Cement Concrete M-10 (Nominal Mix), type C-2 using 20 mm graded stone aggregate as in coping of pole and other similar work etc. including weathering, slightly rounded or chamfered angles and throating and necessary form work complete.		<u>3,656.70</u> Cum	5.40	19,746.18		
9	Cable jointing kit for 11KV (Earthed) grade cable for outdoor termination cold shrink type joint complete with jointing materials and accessories suitable for 3 core XLPE armoured aluminium conductor cable of size 50 Sqmm to 95 Sqmm.		<u>16,731.00</u> Each	1.00	16,731.00		
10	Cable Jointing kit for 11 KV (Earthed) grade cable for indoor termination cold shrink type joint complete with jointing material and accessories suitable for 3 core XLPE armoured aluminium conductor cable of size 50 sqmm to 95 sqmm.		<u>10,469.00</u> Each	5.00	52,345.00		
11	Cable Jointing kit for 11 KV (Earthed) grade cable for straight through cold shrink type joint complete with jointing material and accessories suitable for 3 core XLPE armoured aluminium conductor cable of size 50 sqmm to 95 sqmm.		<u>21,387.00</u> Each	1.00	21,387.00		

**SCHEDULE 'A' PART - IX
(LIST OF ITEMS OF WORKS & PRICES)
(EXTERNAL ELECTRIFICATION)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8

12	Material & Labour for earthing with galvanised steel earth plate electrode of size 60cmx60cmx6mm thick buried directly in ground (earth pit not less than 2.25m deep below the ground level) with top edge of the plate not less than 1.5m below normal ground level, connected to the galvanised earth lead by means of bolts, nuts check nuts and washers of galvanised iron or steel using GI or steel wire 4 mm dia as earthing lead as shown in electrical plate No. 3 of SSR Part-I connected to earthing test point all as specified or indicated including testing on completion including necessary excavation and earth work in soft/loose soil, returning filling, disposal of surplus soil, earth pit in PCC 1:3:6 type C-1 using 20mm graded stone aggregate pit, funnel, 20mm dia GI medium grade watering pipe, 15mm dia GI light grade earth lead protection pipe, CI frame and cover, wire, copper lugs etc mesh, chorcoal and common salt in alternate layer complete all as specified and directed by Engr-in-Charge.		<u>3,036.80</u> Each Set	2.00	6,073.60		
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Note :- Length of earthwire and protection pipe in above mentioned item is considered upto 7.50 m length, additional length required shall be measured and paid separately.

Total of Schedule 'A' SchA Part-IX

carried over to General Summary on Srl Page No

1,228,179.26

Signature of Contractor

Dated _____

**Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer**

SCHEDULE 'A' PART - X
(LIST OF ITEMS OF WORKS & PRICES)
(DEMOLITION & DISMANTLING)

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
1	Demolition of brickwork or stone/ boulder masonry, built in cement mortar including all quoins, arches, pillars, etc, but excluding ashlar facings, dressed stonework and precast concrete articles		<u>417.80</u> Cum	210.00	87,738.00		
2	Demolition of cement concrete (un-reinforced) in ground floors and paving not exceeding 15 cm thickness (below or above ground level)		<u>417.80</u> Cum	5.00	2,089.00		
3	Dismantling timber scantling 40 Sqcm and over in section, in any position (Framed work).		<u>360.90</u> Cum	0.80	288.72		
4	Dismantling fillets, rails, posts, rafters, purlins etc under 40 Sqcm in section (Framed work)		<u>6.40</u> RM	400.00	2,560.00		
5	Dismantling plain or corrugated steel sheeting, any gauge, thickness including Nanital or similar pattern roof covering.		<u>8.30</u> Sqm	150.00	1,245.00		
6	Taking down chowkats/frames with shutters (without taking off shutters from the frame) etc. exceeding 1.50 Sqm but not exceeding 4.00 Sqm each and stacking at site.		<u>117.60</u> Each	8.00	940.80		
7	Taking down chowkats/frames with shutters (without taking off shutters from the frame) etc. not exceeding 1.50 Sqm each and stacking at site.		<u>93.10</u> Each	9.00	837.90		
8	Dismantling Boarding including cover fillets, any description, fixed in any Position with Nails, complete all as specified and as directed.		<u>15.90</u> Sqm	111.00	1,764.90		
9	Demolition of lime concrete (reinforced) of any description and in any position not otherwise specifically provided for (reinforcement cut as required to facilitate demolition).		<u>337.70</u> Cum	3.00	1,013.10		

**SCHEDULE 'A' PART - X
(LIST OF ITEMS OF WORKS & PRICES)
(DEMOLITION & DISMANTLING)**

Srl No	Description of item	Drg Nos	Rate per Unit (Rs.)	Nos of units required	Amount (Rs.)	Period of completion of individual items from the date of handing over of	Remarks
1	2	3	4	5	6	7	8
10	Dismantling wrought iron or mild steel work of any description not other wise provided for		<u>155.40</u> Quintal	2.50	388.50		
11	Dismantling posts or struts (wood, steel or RCC) any section, including taking out embedded portion and making good disturbed ground, embedded in concrete, brickwork, masonry etc.		<u>10.90</u> RM	15.00	163.50		
Total of Schedule 'A'SchAPart-X					99,029.42		

carried over to General Summary on Srl Page No

Signature of Contractor

Dated _____

Jt/Dy/Asstt/Addl. Asstt. Dir (Contracts)
for Accepting Officer

SCHEDULE OF CREDIT

Sl.	Description of Items	UNIT	Approx	Rate of Recovery	AMOUNT	REMARKS
1	2	3	4	5	6	7
1	Old unserviceable CGI Sheet	Sqm	150.00	₹ 30.00	₹ 4,500.00	
2	Old unserviceable brick bat	Cum	210.00	₹ 500.00	₹ 105,000.00	
3	Old unserviceable wooden boarding of any thickness	Sqm	111.00	₹ 250.00	₹ 27,750.00	
4	Old unserviceable scrap iron	Kg	250.00	₹ 25.00	₹ 6,250.00	
5	Old unserviceable chowkat or frame with shutter exc. 1.5 & n exc 4 Sqm, any type with iron mongeries.	Each	8.00	₹ 300.00	₹ 2,400.00	
6	Old unserviceable chowkat or frame with shutter n exc 1.5 Sqm, any type with iron mongeries.	Each	9.00	₹ 200.00	₹ 1,800.00	
7	Old unserviceable wooden fillets	RM	400.00	₹ 2.00	₹ 800.00	
8	Old unserviceable timber scantling	Cum	0.80	₹ 5,000.00	₹ 4,000.00	

Total Schedule of Credit Amount Deduct from Total Amount of BOQ as per Schedule 'A' Note

₹ **152,500.00**

Notes :-

1. The rates under Col. 5 are fixed by the department, irrespective of quality of old materials obtained from demolition/ dismantling/ taking down. No further claim in this respect shall be entertained from the contractor.
2. The quantities under Col. 4 are approximate and shall be measured as per actual quantities obtained from site of work.
3. The materials under this schedule are contractor's property. Other materials if any obtained from demolition/ dismantling/ taking down shall be deposited in MES store yard or disposed off as directed by Engineer-in-Charge. The materials under this schedule shall be removed from site being contractor's property through proper gate pass after approval of the Engineer-in-Charge.

Signature of the Contractor
Date

Jt/Dy Dir (Contracts)
For Accepting Officer

SCHEDULE 'B'
LIST OF MATERIALS TO BE ISSUED TO THE CONTRACTOR
(REFER CONDITION 10 OF GENERAL CONDITIONS OF CONTRACTS - 1AFW-2249)

Sl No.	Particulars	Rate at which Stores, etc. will be issued to the Contractor		Place of issue (by name)	Remarks
		UNIT	RATE		
1	2	3	4	5	6

----- NIL -----

(SIGNATURE OF CONTRACTOR)
DATED:

Jt/Dy DIR (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'C'

ISSUE OF TOOLS AND PLANTS (OTHER THAN TRANSPORT) WHICH WILL BE

HIRED BY THE CONTRACTOR

(REFER CONDITION 15, 34 AND 35 OF IAFW-2249)

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

----- NIL -----

SIGNATURE OF THE CONTRACTOR

Jt/Dy DIR (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE 'D'
TRANSPORT TO BE HIRED BY THE CONTRACTOR
(REFER CONDITION 16, AND 35 OF IAFW-2249)

Sr. No.	Quantity	Particulars	Rate per unit per working day	Stand by charges per unit per day	Place of Issue	Remarks
1	2	3	4	5	6	7

----- NIL -----

SIGNATURE OF THE CONTRACTOR

Jt/Dy DIR (CONTRACTS)
FOR ACCEPTING OFFICER

TENDER

To

The President of India

Having examined and perused the following documents : -

1. Specifications signed by Joint Director (Contracts)/ Dy Director (Contracts /Asst Director (Contracts)/ Addl Asst Director (Contracts)
2. Drawings details in the specifications.
3. Schedule 'A', 'B', 'C', 'D' attached hereto.
4. MES Standard Schedule of Rates Part-I (2009) Specifications and Part-II (2010) Rates (here-in-after and in IAFW-2249 referred to as the MES schedule) together with Errata/amendment nos 1(a) to 3 for Part-I and 1 to 59 for Part-II as applicable.
5. General Conditions of Contracts, IAFW-2249 (1989 print) together with **errata No 1 to 20 and amendments 1 to 48.**
6. **WATER** : Water will be supplied by MES.

Should this tender be accepted, I/We agree

- (a) *That the sum of ₹ **6,28,000.00** forwarded as Earnest money, shall either be retained as part of Performance Security Deposit or be refunded by the Government on receipt of the appropriate amount of Performance Security Deposit, all as per Condition 19 of IAFW-2249.
- b) To execute all the works referred to in the said documents upon the terms and condition contained or referred to therein and as detailed in General Summary here-in-after and to carry out such deviations as may be ordered vide condition 7 of IAFW-2249 upto a maximum of **10 % (ten percent)** and further agree to refer all disputes (in case disagreement with the decision of such **DRB or conciliator** as applicable as per condition 71 of IAFW 2249), as required by Condition 70 of IAFW-2249 to the sole arbitrator of a serving Officer having degree in Engineering or equivalent or having passed final/direct final Examination of Sub-division II of Institution of Surveyors (India) recognised by the Government of India to be appointed by the **ENGINEER-IN-CHIEF** or in his absence the Officer Officiating as **ENGINEER-IN-CHIEF** or **DIRECTOR GENERAL OF WORKS** if specifically delegated in writing by the **ENGINEER-IN-CHIEF ARMY HEADQUARTERS NEW DELHI** whose decision shall be final, conclusive and binding.

*Delete if not applicable.

Brought forwarded ₹.....(Rupees.....

.....)

Signature_____ (Name of Signatory_____) in the

Capacity of _____ duly authorised to sign the

TENDER and on behalf of M/S_____ DATED _____

(IN BLOCK CAPITALS)

Postal Address

.....

.....

.....

Witness.....

Telephone No.

Address.....

Mobile No 1.

.....

(Alternate) 2.

.....

E-Mail ID 1.@.....

2.@.....

Fax No

ACCEPTANCE

.....alterations have been made in these documents as evidence that these alterations were made before the execution of the contract Agreement, they have been initialed by the contractor and Shri

The said officer(s) is/are hereby authorized to sign and initial on my behalf of the documents forming part of this contract.

The above tender is/was accepted by me on behalf of the President of India for the lump sum of ₹..... (Rupees.....)

Signature _____

Appointment : Chief Engineer Shillong Zone
(For and on behalf of the President of India)

Dated this _____ day of _____ 2020.

GENERAL CONDITIONS OF CONTRACTS (IAFW-2249 : PRINT – 1989)**FOR****ITEM RATE CONTRACT (IAFW-1779A (REVISED 1955))/ LUMP SUM CONTRACT IAFW-2159**

A copy of the GENERAL CONDITIONS OF CONTRACTS (IAFW-2249-1989 print) has been supplied to me/us and is in my/our possession. I/We have read and understood the provisions contained in the aforesaid GENERAL CONDITIONS OF CONTRACTS before submission of this tender and I/We agree that I/We shall abide by the terms and conditions therefore, as modified, if any, else where in this tender documents.

It is hereby further agreed and declared by me/us, that the GENERAL CONDITIONS OF CONTRACTS (IAFW-2249-1989 Print) including condition 70 thereof pertaining to settlement of dispute by Arbitration , containing 33 pages (Ser Page No. 100 to 132) with **errata 1 to 20** and **amendment Nos 1 to 48** form part of this tender documents.

It is also agreed by 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
DATED :

Jt/Dy/ASST DIRECTOR (CONTRACTS)
FOR ACCEPTING OFFICER

Note :- In case the tenderer is not in possession of any of the documents referred above he should obtain a copy from the office of the HQ Chief Engineer Shillong Zone, Spread Eagle Falls, Shillong - 793011 before submission of his tender.

MILITARY ENGINEER SERVICES
ERRATA TO GENERAL CONDITIONS OF
CONTRACT IAFW - 2249 (1989 PRINT)

ERRATA

Errata No	Page No	Particulars
1	2	3

1. 4 Condition 3, Para 3, Line 1: For "An' Read " and"
2. 7 Condition 7, last Para, line 9 ; For "Objection" Read "objection"
3. 7 Condition 7, last Para, line 11 : For "thetein" Read "therein"
4. 8 Condition 8, line 7 "Delete" after the word "necessary"
5. 10 Condition 15, Para 2, line 3, For "actory" Read " Factory"
6. 11 Condition 15, Para 2, line 6 For "escept" Read "except"
7. 11 Condition 15, Para 2, line 6 For "authorise Read " authorised"
8. 11 Condition 15, Para 5, line 1, For "Maintence" Read " Maintenance"
9. 16 Condition 32, Para 1, line 4 For "sitning" Read "siting"
10. 16 Condition 32, Para 2, line 6 For "reinstead" Read "reinstated"
11. 16 Condition 34, line 6 For "revese " Read "revest"
12. 16.17 Condition 36, para 2, line 2 For "conbusitible" Read "combustible"
13. 17 Condition 37, line 3 For "whese " Read "whose"
14. 17 Condition 43, line 1 For "shal" Read " Shall"
15. 17 Condition 44, para 2, line 4 For "visit this " Read "visit his"
16. 18 Condition 48, para (a), line 5 For "airising" Read "arising"
17. 20 Condition 54, line 1 and 2 illigible word is "Contractor"
18. 20 Condition 54, para below (a), Insert `b' in the exsiting bracket "()"
19. 30 ANNEXURE `B', Clause 6, line 2 Delete the word "after"
20. 30 ANNEXURE `B', Clause 6 but line 3 Insert fullstop"(".")" after the word "thereof" and For "laddor" Read "Ladder"

SIGNATURE OF CONTRACTOR
DATED :

Jt/Dy/ASST DIRECTOR (CONTRACTS)
FOR ACCEPTING OFFICER

MILITARY ENGINEER SERVICES
AMENDMENT TO GENERAL CONDITIONS OF
CONTRACT IAFW - 2249 (1989 PRINT)

Amendment No	Page No	Particulars
1	2	3

- | | | | | | | | | |
|--|---|--|--|---|---|--|---|--|
| 1. | 28 & 29 | <p>Annexure `A' Military Engineer Services Contractor's labour Regulations</p> <p>(a) Para 2 (a) line 3</p> <p>For : Not exceeding Rs.400 per month</p> <p>Read: Not exceeding Rs.500 per month"</p> <p>(b) Para 11, line 5 Add the following after the words labourers concerned. "The Garrison Engineer shall payments to the labour concerned within 45 days from the receipt of the report from the labour welfare officer or other person authorised as aforesaid, as the case may be."</p> | | | | | | |
| 2 | 9 | <p>Condition 10(R), Line 2 to 6.</p> <p><u>For</u> : Materials which _____ as aforesaid.</p> <p><u>Read</u>: "Materials which Govt shall supply are shown in Schedule `B' which also stipulates place of issue and rate(s) to be charged in respect thereof".</p> | | | | | | |
| 3. | 19 | <p>Condition 50, Sub para 4(b) (iii) Delete the existing description against sub para 4(b) (iii) and insert as under:-</p> <table border="0" style="margin-left: 40px;"> <tr> <td style="padding-right: 20px;">(iii) Where the contract sum exceeds Rs.20lakhs but does not exceed Rs. 150 lakhs.</td> <td>Seven and half percent of the Contract value of the item or group of items of work for which a separate period of completion is given or Rupees seven and a half lakhs whichever is less.</td> </tr> <tr> <td style="padding-right: 20px;">(iv) Where contract exceeds Rs.150 lakhs but does not exceed Rs. 300 Lakhs.</td> <td>Five percent of the contract value of the item or group of the items of work for which a separate period of completion is given or Rupees twelve and a half lakhs whichever is less.</td> </tr> <tr> <td style="padding-right: 20px;">(v) Where the contract sum exceeds Rs. 300 lakhs.</td> <td>Four percent of the contract value of the item or group of items of work for which a separate period of completion is given subject to a maximum of Rupees twenty five lakhs."</td> </tr> </table> | (iii) Where the contract sum exceeds Rs.20lakhs but does not exceed Rs. 150 lakhs. | Seven and half percent of the Contract value of the item or group of items of work for which a separate period of completion is given or Rupees seven and a half lakhs whichever is less. | (iv) Where contract exceeds Rs.150 lakhs but does not exceed Rs. 300 Lakhs. | Five percent of the contract value of the item or group of the items of work for which a separate period of completion is given or Rupees twelve and a half lakhs whichever is less. | (v) Where the contract sum exceeds Rs. 300 lakhs. | Four percent of the contract value of the item or group of items of work for which a separate period of completion is given subject to a maximum of Rupees twenty five lakhs." |
| (iii) Where the contract sum exceeds Rs.20lakhs but does not exceed Rs. 150 lakhs. | Seven and half percent of the Contract value of the item or group of items of work for which a separate period of completion is given or Rupees seven and a half lakhs whichever is less. | | | | | | | |
| (iv) Where contract exceeds Rs.150 lakhs but does not exceed Rs. 300 Lakhs. | Five percent of the contract value of the item or group of the items of work for which a separate period of completion is given or Rupees twelve and a half lakhs whichever is less. | | | | | | | |
| (v) Where the contract sum exceeds Rs. 300 lakhs. | Four percent of the contract value of the item or group of items of work for which a separate period of completion is given subject to a maximum of Rupees twenty five lakhs." | | | | | | | |

MILITARY ENGINEER SERVICES
AMENDMENT TO GENERAL CONDITIONS OF
CONTRACT IAFW - 2249 (1989 PRINT)

Amendment No	Page No	Particulars
1	2	3

4. 27 CONDITION 70 TO SUB PARA-9
 Add the following at the end of the sub para : "If the value of the claims or counter claims in an arbitration reference exceeds Rs. 1 Lakh the arbitrator shall give reasons for the award."
5. 14 &15 CONDITION 25
 Delete para 2 and 3 of the above condition and substitute the following :-
 "Where the contractor is not a qualified Engineer or even if he is so qualified, he cannot, in the opinion of the GE give his full personal attention to the works, he shall at his own expense employ a person/person(s) possessing the following qualifications, and/or experience as his accredited agent(s)to supervise the works and to receive instructions from the Engineer-in-Charge:-
- (a) For works costing over Rs. 300 lakhs other than those covered in(g) below. Two Degree holders in Engineering from Government recognised Institution or equivalent with atleast 5 years practical experience of works.
 and
 Adequate numbers of Diploma holders in Engineering from a government recognized Institution with at least 8 years practical experience of works.
- (Note :- The above provision shall be applicable irrespective of the fact whether contractor himself is a qualified Engineer or not).
- (b) For works costing between Rs.100 lakhs and Rs.300 lakhs. other than those covered in (g) below A degree holder in Engineering from a Government recognised Institution or equivalent with at least 4 years practical experience of works
 OR
 Two diploma holders in Engineering from a Government recognised Institution with at least 6 years practical experience of works
- (c) For works costing between Rs.60 lakhs and Rs.100 lakhs other than those covered in (g) below A degree holder in Engineering from a Government recognised Institution or equivalent with at least 3 years practical experience of works.
 OR
 A diploma holder in Engineering from a Government recognised Institution with at least 5 years practical experience of works.

MILITARY ENGINEER SERVICES
AMENDMENT TO GENERAL CONDITIONS OF
CONTRACT IAFW - 2249 (1989 PRINT)

Amendment No	Page No	Particulars
1	2	3

(d)	For works costing between Rs.7.5 lakhs and Rs.60 lakhs other than those covered in (g) below	A degree holder in Engineering from a Government recognised Institution or equivalent with at least 2 years practical experience of works. OR A diploma holder in Engineering from a Government recognised Institution with at least 4 years practical experience of works.
(e)	For works costing between Rs.2 lakhs and Rs.7.5 lakhs other than those covered in (g) below	A degree or diploma holder in Engineering from a Government recognised Institution with adequate practical experience of works.
(g)	For works of any value for repairs to buildings and roads, periodical Services to building, term contract, grass cutting and fencing	A competent person with adequate practical experience of works. The employment of Agent(s) as aforesaid shall be to the approval of GE who may verify his / their qualifications and experience by referring to original degree/diploma/testimonials which shall be made available to him by the contractor or by the individual employed or proposed to be employed.
6	27	<u>Delete</u> the description added at the end of sub para 9 vide amendment No.4 (1989 Print) and insert as under :- "The arbitrator shall give reasons for the award in each and every case irrespective of the value of claims or counter-claims".
7	24	<u>CONDITION 64</u> <u>Delete</u> para 4 viz `Provided the amount_____ shall not exceed Rs. 1.5 lakhs in toto.
8.	26	<u>CONDITION 70 ARBITRATION PARA 1, LINE 4</u> Amend the words "Engineer Officer" to Read" Serving Officer having degree in Engineering or equivalent or having passed final/direct final Examination of of Sub-Division II of Institution of Surveyor (India) recognised by the Govt. Of India."
9.	2	<u>Add</u> the following new condition under chapter IV:- "71. Jurisdiction of Courts".

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- 27 Add the following new condition:-
 "71. Jurisdiction of Courts-Irrespective of the place of issue of tenders, the place of acceptance of tenders, the place of execution of contract or the place of payment under the contract, the contract shall be deemed to have been made at the place from where the acceptance of tenders has been issued and the work is executed/executable, The courts of the place from where the acceptance of the tender has been issued or the place where the work is executed/under execution shall alone have jurisdiction to decide any dispute arising out of or in respect of the contract."
10. 14 & 15 CONDITION 25 AS AMENDED VIDE AMENDMENT No.5
FOR " Degree holders in Engineering from a Government recognised Institution or equivalent" wherever occurring.
READ "Degree holders in Engineering from a Government recognised Institution or equivalent/final or direct final pass of sub division II of the Institution of Surveyors (India)."
11. 27 CONDITION 70 : ARBITRATION PARA 8
FOR : "The Arbitrator may, from time..... Publishing the award."
READ: "The arbitrator may, from time to time with the consent of the parties, enlarge the time for making and publishing the award."
12. 24 Add the following Para 4 after Para 3 (c) :-
 "The amount so retained from the contractor shall be called retention money and shall be released to the contractor alongwith the final bill. However, in case the amount of this retention money is more than 1.50 lakhs, then after retaining an amount of Rs. 1.50 lakhs or 1% of the contract amount as executed whichever is more, the balance amount of retention money will be refunded to the contractor at satisfactory completion of works as certified by the GE."
13. 23 Condition 62 (G) valuation of deviation para 1 line 3
For : "Plus 10 %" Read : "Plus 15 %"
14. 5 (a) Condition 4A(a), Line 4
FOR: "Rs. 2,500/-"
READ : "Rs.5,000/-"
 (b) Condition 4A(d), Line 2 & 3
FOR : "Rs. 5,000/-"
READ: 10,000/-
15. 13 Condition 22, Security Deposit, sub para 3,
Line 3 and 4 For : "Controller of Defence Accounts concerned"
Read : "Accepting Officer"

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16.	24	<p><u>Condition 64</u> Sub para 7, lines 4 & 5 For: "Controller of Defence Accounts" Read: "Accepting Officer"</p>
17.	19	<p>(a) <u>Condition 50, Sub Para 2, Line 2a</u> For : "Deviation orders on the contractor" Read : "Deviation order, escalation amount" (b) <u>Condition 50, Sub Para 4 (b) (i) to 4 (b) (v)</u> Delete existing sub para 4 (b) (i) to 4 (b) (v) in toto and insert as under ; "Ten percent of the contract value of the item or group of items of work for which a separate period of Completion is given."</p> <p>(c) <u>Condition 50, Sub Para para 5</u> <u>Add Sub para 5 as under</u> "Amount of retention money plus compensation during currency of contract shall not exceed ten percent of contract value. Contractor shall furnish BGB or Fixed Deposit Receipt in lieu of retention money and if compensation amount is not fully met from retention money, the difference if any shall be recovered from the payments due to the contractor."</p>
18.	3 and 4	<p>(a) <u>Condition 1(a), line 4</u> For : "the M.E.S. Schedule, the Specifications" Read : "the M.E.S. Schedule, the Special Conditions, the Specifications"</p> <p>(b) <u>Condition 1(b), line 2</u> For : "these conditions, and the Specifications" Read : "these conditions, the Special Conditions and the Specifications"</p> <p>(c) <u>Condition 1(b), line 3</u> For : "loaned" Read : "sold"</p> <p>(d) <u>Condition 1(g), line 3</u> For : "Garrison Engineer" who administers" Read : "Garrison Engineer" (or Assistant Garrison Engineer (Independent) if applicable) who administers"</p> <p>(e) <u>Condition 1(g), line 3</u> In the end, add the following:- "Where the office of the CWE does not exist and the GE is directly under the Chief Engineer, the authority of the CWE stipulated in these conditions shall vest in the concerned Chief Engineer."</p> <p>(f) <u>Condition 1(h), line 3</u> For : "the Superintendent Grade I" Read: "the Junior Engineer (JE)"</p>

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(g) Condition 1(i), line 1
 For : “Indian Standards Instiution.”
 Read: “ Bureau of Indian Standards.”

(h) Condition 1(p), line 4
 For : “air craft and acts of God”
 Read: “air craft and natural calamities”

(j) Condition 1(p), line 5
 For : “floods and tornado.”
 Read: “floods, tornado and Tsunami.”

19.

5

(a) Condition 4A, line 7
 For : “Rs. 60,000/-”
 Read: “Rs. 1,50,000/-”

(b) Condition 4A(a), line 4
 For : “Rs. 2,500/-”
 Read: “Rs. 10,000/-”

(c) Condition 4A(c), line 4
 For : “Rs. 2,500/-”
 Read: “Rs. 10,000/-”

(d) Condition 4A(d), lines 2 and 3
 For : “Rs. 5,000/-”
 Read: “Rs. 20,000/-”

(e) Condition 4A(f), line 1
 For : “Rs. 60,000/-”
 Read: “Rs. 1,50,000/-”

20.

5

(a) Condition 6, subpara 1

The existing contents shall be substituted as under:-

“**6. Provisional Items-** The amount pertaining to provisional items need not be deducted from the Contract Sum. The Engineer-in-Charge and Contractor shall set out the works covered under provisional items and provisional lump sum based on the description of items, drawings forming part of contract agreement and considering the ground conditions as encountered at site of works. The statement of variation in quantities, new items or deletion of items from the contract agreement as required will be worked out for approval of Engineer-in-Charge who will convey approval of such changes through site order book. For the purpose of payment the variation in value of work executed under these items shall be ascertained by measurement or valuation as for deviation. The variations shall be regularized as per condition 7.”

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21. 6 and
 7
- (a) Condition 6A, line 6
Add following after the words 'preference to scale.':-
"However the provisions of any drawing of a later date shall take precedence over that of a drawing of previous date further subject to the condition that working drawing will take precedence over a Typical Detail Drawing."
- (b) Condition 6 A(a), line 1
For: "Quantities."
Read: "Quantities, Schedule 'B', 'C', 'D',"
- (c) Condition 6 A(a), subpara 3, line 1
For: "one document forming"
Read: "one document as defined hereinabove forming"
- (d) Condition 6 A(A)
(i) Existing subpara (b) to (f) shall be enumerated as subpara (c) to (g)
(ii) Add new subpara (b) after existing subpara (a) as under:-
" (b). Items and their quantities for which no rates or prices have been quoted shall be deemed to have been covered by the rates and prices quoted for the other items of Schedule 'A' or bill of quantities."
- (e) Condition 6 A(C) (iii)
The existing contents shall be substituted as under:-
- | | | |
|-------|---|---|
| (iii) | Contract sum exceeding Rs. 10 lakh but not exceeding Rs. 100 lakh | : Rs. 20,000 plus 2% of Contract Sum exceeding Rs. 10 lakh subject to a maximum of Rs. 1,00,000/- |
| (iv) | Contract sum exceeding Rs. 100 lakh | : 1% of Contract Sum subject to a maximum of Rs. 5 lakh |
22. 8
- (a) Condition 9 (c), line 19
For: "labour at Site"
Read: "labour and tools and plants at Site"
- (b) Condition 9(c), line 19
Add following at the end of para (c) viz line 21:-
"The contractor shall give the details of idle labour, workmen, employees, tools and plants and such other details as asked by the GE, within seven days of issue of order of suspension and the GE shall verify the necessity and correctness thereof. Proper record of these details shall be maintained duly signed by the GE and the contractor."
23. 8, 9
 and 10
- (a) Condition 10 A, subpara 2
Add in the end after the word "comply" following:-
"However if the cost of particular item of material in a contract exceed Rs. 1 lakh, these materials shall be procured only from the manufactures or from their authorised dealers/ stockist (except in case of material of local origin) and the contractor shall furnish proof thereof to the satisfaction of the GE that the material so comply."

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23.(Contd)	8, 9 and 10 (Contd)	<p>(b) <u>Condition 10 A, subpara 2</u> Add in the end after the word “in the Contract.” following:-</p> <p>“The approved samples of materials which loose their identity after incorporation in the work shall be preserved with the GE till completion of work. Thereafter the same shall be removed in ‘as is where is’ condition by the contractor with prior permission of the GE without any extra cost to the Government. However, the approved samples of material which do not loose their identity after incorporation and which can be incorporated in the work as decided by the Engineer-in-Charge shall be allowed to be used in the sample quarter/ block/ work.”</p> <p>(c) <u>Condition 10 B, line 1 of last subpara of page 9</u> For: “cost of loading,” Read: “cost of carriage, loading,”</p> <p>(d) <u>Condition 10 B, line 3 of subpara 3 of page 10</u> For: “the Engineer-in-Charge may,” Read: “the GE may,”</p> <p>(e) <u>Condition 10 B, line 5 of subpara 3 of page 10</u> For: “as decided by the GE.” Read: “on the date of notifying to the contractor by GE (after technical check of final bill in CWE’s Office) as decided by the GE or the stock book rate as fixed by the department, whichever is higher.”</p> <p>(f) <u>Condition 10 B, line 6 of subpara 3 of page 10</u> For: “the market rate,” Read: “the recovery rate,”</p>
24.	10 and 11	<p>(a) <u>Condition 11(A), subpara (i) to (vii)</u> Existing contents of subpara (i) to (vii) shall be replaced as under with sub para (i) to (iv):-</p> <p>“(i) by reason of civil commotion, local combination of workmen, strike or lockout, affecting any of the trades employed on the work, or</p> <p>(ii) by reason of delay on part of nominated sub contractors, or nominated suppliers which the Contractor has , in the opinion of G.E., taken all practicable steps to avoid, or reduce, or</p> <p>(iii) by reason of delay on the part of Contractors or tradesmen engaged by Government in executing works not forming part of the contract, or</p> <p>(iv) by reason of any other cause (except force majeure) which in the absolute discretion of the Accepting Officer is beyond the Contractor’s control;”</p> <p>(b) <u>Condition 11(A), last subpara, line 2</u> For: “G.E.” Read: “Accepting Officer”</p> <p>(c) <u>Condition 11(B), last but 3rd line from end</u> For: “G.E.” Read: “Accepting Officer”</p>

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24 (Contd.)		<p>(d) <u>Condition 11(C)</u> The existing contents shall be substituted as under:-</p> <p>“(C) Extension of time if due shall be granted within 45 days of receipt of request from the contractor along with supporting documents, but before expiry of original/ extended period of completion.</p> <p>(D) No claim in respect of compensation or otherwise, for idle labour and/ or idle machinery etc. and/ or business loss or any such loss, howsoever arising, as a result of extensions granted under Conditions (A) and (B) above shall be admissible. The decision on reason and quantum of extension shall be final binding.</p> <p>(E) <u>DELAY ON ACCOUNT OF FORCE MAJEURE –</u> Should any force majeure circumstances arise, each of the contracting party will be excused for the non fulfilment or for the delayed fulfilment of any of its contractual obligations, if the affected party within 15 days of its occurrence informs the other party in writing.</p> <p>Force majeure shall mean fires, floods, natural calamities such as earth quakes, lightening or other acts such as war, turmoils, strikes (otherwise than contractor’s employees), invasion, act of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection, military or usurped power, damage from aircraft, sabotage, explosions, quarantine restrictions, beyond the control of either party.</p> <p>It is understood and agreed between the parties here to that the rights and obligations of the parties shall be deemed to be in suspension during the continuance of the force majeure even as aforesaid and the said rights and obligation shall automatically revive upon cessation of the intervening force majeure event. The period within which the rights and obligations of the parties shall be in suspension due to force majeure event, shall not be considered as a delay with respect of the period of completion and/ or taking over work under the contract or otherwise to the detriment of either party.</p> <p>Notwithstanding the provision of the immediately foregoing clauses, it is further understood and agreed between the parties hereto that in the event of any force majeure persisting for an uninterrupted period exceeding 6 (Six) months, either party hereto reserves the right to terminate this contract upon giving prior written notice of 30 (thirty) days to the other party of the intension to terminate without any liability other than agreement for the completed work and/ or contractor’s materials lying at site.”</p>
25.	12	<p>(a) <u>Condition 17, line 1</u> For: “The Contractor shall not” Read: “The Contractor including Public Sector undertaking/ Government agency shall not”</p>
26	13	<p>(a) <u>Condition 18, line 1</u> For: “The Contractor shall not” Read: “The Contractor including Public Sector undertaking/ Government agency shall not”</p>

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27. 14 and 15 (a) Condition 25, the contents of subpara 2 after line 5 shall be substituted as under:-

(a)	For works costing between Rs. 50 lakh to 1000 lakh	A Degree holder in Engineering from a Govt recognized Institution or equivalent, with final or direct final passed of Sub Division II of the Institution of Surveyors (India) with at least 4 years practical experience of works.
(b)	For works costing between Rs. 7.5 lakh to 50 lakh	A Degree holder in Engineering from a Govt recognized Institution or equivalent, with final or direct final passed of Sub Division II of the Institution of Surveyors (India) with at least 2 years practical experience of works.
(c)	For works costing below Rs. 7.5 lakh	A Diploma holder in Engineering from a Govt recognized Institution with adequate practical experience of works.

Notes:-

- (1) Engineers (Degree/ Diploma holders) employed should be of the relevant discipline to which nature of work pertains.
- (2) The provision at Serial (b) & (c) above shall be applicable irrespective of the fact whether contractor himself is a Qualified Engineer or not.
- (3) Contractor shall employ additional Engineers as directed by GE where there are scattered sites.
- (4) For works costing more than Rs. 10 crore, the requirement of Engineering staff shall be as given in the tender documents.
- (5) For specialist works/ services Accepting Officer may vary requirement of supervisory staff in tender documents.

(b) Condition 25, last subpara on page 15:

The contents of last subpara on page 15 shall be substituted as under:-

“ The G.E. shall have full powers, to put the contractor on notice on account of default either for non-employment of Engineer(s) or absence of Engineer(s) from site and levy penalty @ Rs. 500/- per day per vacancy upto 30 days period. Thereafter GE shall have the option to either suspend the work or employ Engineer(s) at contractor’s cost and recover the amount from contractor’s dues.”

28. 15 (a) Condition 26, last subpara, last line

For: “Rs. 50/-”

Read: “Rs. 5,000/- (Rupees five thousand only)”

29. 16 (a) Condition 31, third subpara, line 2

For: “at the *All India Flat Rate per 1,000 gallons which”

Read: “at the *All in cost Rate per 1,000 gallons subject to a minimum of Rs. 3.75 per every Rs. 1000/- worth of work done priced at contract rates which”

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30	17	<p>(a) <u>Condition 36, last subpara</u> Add the following at the end:- “ Fencing be provided wherever necessary as decided by GE to isolate the working area to make the area unrestricted from restricted”</p>
31.	17	<p>(a) <u>Condition 44, subpara 3, line 1</u> For: “rupees one lakh” Read: “rupees two lakh”</p> <p>(b) <u>Condition 44, subpara 3, line 2</u> For: “rupees five lakh” Read: “rupees ten lakh”</p>
32.	18	<p>(a) <u>Condition 46, subpara 2, line 11 to 14</u> For: “Provided always that the liability of the Contractor under this Condition shall not extend beyond the defects liability period except as regards workmanship which the G.E. shall have previously given notice to the contractor to rectify.” Read: “Alternatively, such work, if technically/ structurally acceptable, without detriment to the safety and utility of the item and the structure may be permitted to be accepted as devalued and recovery shall decided by competent authority (CWE in respect of contract concluded by himself and GE’s and AGE(I) and CE in respect of contract concluded by him) or he may reject the work outright without any payment and/ or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Whether any particular defect is due to unsound, imperfect or unskillful workmanship or due to normal wear & tear or user’s negligence, decision of GE shall be final and binding. Provided always that the liability of the contractor under this Condition shall not extend beyond the defects liability period except as regards workmanship which the G.E. shall have previously given notice to the contractor to rectify. Govt. further reserves the right to get the work technically inspected during currency of the contract and also during defects liability period by the Additional Director General of Technical Examination and/ or his Officers or any other agency. The defects observed as a result of such technical examination shall be rectified by the contractor as notified by the GE. However, if the defects are not rectified, the devaluation of the work shall be carried out and recovery thereon shall be affected. ”</p>
33.	19	<p>(a) <u>Condition 49, subpara 2, line 2,3 and 4</u> For: “within such period as may be notified by the Engineer-in-Charge, to the place of issue against written receipt from the Engineer-in-Charge.” Read: “to the place of issue as stipulated in Condition 10(B) here-in-before against written receipts from the Engineer-in-Charge.”</p> <p>(b) <u>Condition 49, subpara 5, line 3,4 and 5</u> For: “before the completion of entire group, but for all purposes of the contract except for compensation for delay, the completion of the entire group shall be taken into account.” Read: “before the completion of the entire group. In such event, the grouping (phasing) of items as catered for in the contract shall be deemed to have been amended accordingly.”</p>

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33. (Contd.) (c) Condition 49, subpara 7
Existing contents shall be substituted as under:-
- “On receipt of notice from the Contractor that the work has been completed, the G.E. shall within seven days certify to the Contractor the Date(s) on which the items or group of items of works are completed and taken over and the state thereof or shall notify the details of incomplete items of work to the contractor. In case of dispute between G.E. and the Contractor over completion of work, the decision of Accepting Officer or CWE in case of G.E.’s contract shall be final and binding.”
34. 21 (a) Condition 55
Existing contents shall be substituted as under:-
- “55. Termination of Contract for Death**—Without prejudice to any of the rights or remedies under this contract, if the Contractor dies, the Accepting Officer shall have the option of terminating the Contract without compensation to the Contractor. If proprietor has nominated a person during his lifetime, the nominee will be allowed by the GE to complete the balance work. However if the nominee is not willing or in the opinion of Accepting Officer is not capable of completing the work as contracted for, he shall terminate the contract without any compensation to the nominee. The decision of the Accepting Officer whether the nominee is capable or not shall be final and binding.”
35. 21 and 22 (a) On page 2 against Sl 59, Blank, add following in description
“Determination of contract in the event of Force Majeure_”
- (b) On page 22, against SL 59, Blank
Insert new condition 59 in lieu of **Blank** as under:-
- “59. Determination of Contract in the event of Force Majeure**— The contract may be determined at the option of either party by giving 30 days notice in writing to the other party should any event of ‘Force Majeure’ continue to prevail for an uninterrupted period of six months and no progress of work is achieved owing to such circumstances during these six months. On receipt of notice from one party to other explaining circumstances of ‘Force majeure’ the Garrison Engineer and contractor will carry out joint inspection of works and an inventory of completed, incomplete works and the materials collected for incorporation in the work shall be prepared for processing of final bill. The contractor shall have no claim to payment of any compensation on account of any profit or advantage which he may have derived from the execution of work in full but which he could not derive due to determination of contract on account of ‘Force Majeure.’”
36. 22 (a) Condition 61, Last but one para, line 6
- For: “Rs. 500/-”
Read: “Rs. 5,000/-”

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37.	24	<p>(a) <u>Condition 64, subpara 1 and 2</u> Substitute existing contents with following:-</p> <p style="padding-left: 40px;">“64. Advances on Account-- The contractor may at intervals of not less than 30 days for contracts of value less than Rs. 50 lakhs and 15 days in case of contracts more than 50 lakhs submit claims on I.A.F.W. – 2263 provided the payment due is not less than Rs. 50,000/- and for Term Contracts, contractor may prefer not more than two claims for payment of advances on account of work done and of materials delivered in connection with Measurement and Lump Sum Contracts. However such claim for work done, which are required to be measured, shall be submitted only after recording joint measurements in the MES Measurement Book IAFW-2261.”</p> <p>(b) <u>Condition 64, subpara 3, line 3</u></p> <p>For: “Engineer-in-Charge:-” Read: “Garrison Engineer:-”</p> <p>(c) <u>Condition 64, subpara 8 and 9</u> Insert a new subpara between subpara 8 and 9 as follows:-</p> <p style="padding-left: 40px;">“ Provided further, the contractor may be paid advance on account to the full value of materials such as fittings and fixtures and other manufactured items as decided by the GE which do not lose their identity, brought on the site, on his furnishing Guarantee Bond(s) or Fixed Deposit Receipt(s) from Schedule Bank for the amount of retention money which should otherwise be recoverable from him under the contract. The Guarantee Bond and Fixed Deposit Receipt shall be executed and kept valid in a manner as described here-in-before.”</p>
38.	25	<p>(a) <u>Condition 66, line 2</u></p> <p>For: “the period being” Read: “the period to be”</p> <p>(b) <u>Condition 66, line 3</u></p> <p>For: “by the G.E.” Read: “by the Engineer-in-Charge”</p> <p>(c) <u>Condition 66(a)</u></p> <p>For: “Four months” Read: “Six months”</p> <p>(d) <u>Condition 66(b)</u></p> <p>For: “Six months” Read: “Nine months”</p>
39.	27	Existing Condition 71 Jurisdiction of Courts shall be renumbered as Condition 72

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40.	27	<p>Add a new Condition 71 Conciliator as under:-</p> <p style="margin-left: 40px;">“71. Conciliator—If a dispute (other than those for which the decision of the CWE or any person is by the contract expressed to be final and binding) of any kind whatsoever arises between the parties to the contract during the execution of the works, or after completion or after determination cancellation/ termination of the contract, including any disagreement by either party with any action, inaction, opinion, instruction, certificate or valuation by the Accepting Officer or his nominee, the matter in dispute shall, in the first place be referred to the Disputes Resolution Board (DRB) in case of contracts valuing Rs. 10 crore or more and to conciliation, by a sole conciliator, in case of contracts valuing less than Rs. 10 crore. In case of disagreement with the decision of such DRB or conciliator, any party may invoke arbitration clause.</p> <p style="margin-left: 40px;">Procedure for the constitution/ appointment of DRB/ Conciliator shall be as laid down in the Contract Agreement.”</p>
41.	13	<p><u>Condition 22, Security Deposit including all its sub para</u></p> <p style="margin-left: 40px;">“Security deposit including all its sub para as existing be deleted in toto and read as BLANK.”</p>
42.	20	<p><u>Condition 53, Three Paragraphs after Para 53(c)</u> Substitute existing contents with following:-</p> <p style="margin-left: 40px;">“Whenever the Accepting Officer exercises his authority to cancel the Contract under this condition, he may complete the Works by any means independently without risk and cost of the original contractor.</p> <p style="margin-left: 40px;">On cancelation of contract, the performance security and retention money upto last paid RAR shall be forfeited. All T&P and material of contractor lying at site shall be confiscated by Government and shall be absolutely at the disposal of the president of India and No compensation whatsoever shall be allowed by the department.</p> <p style="margin-left: 40px;">If the failed contractor is a Company, or a Firm then every member / partner / Director of Company, or Firm shall be barred from participating in the tender for the balance work either in his/her individual capacity or as a partner of any other Company/Firm.”</p>
43.	20 and 21	<p><u>Condition 54, Paras after Para 54(d)</u> Substitute existing contents with following:-</p> <p style="margin-left: 40px;">“The Accepting Officer may without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter to the Government, cancel Contract as a whole or only such Work Order(s) or items of Work in default from the Contract. Whenever the Accepting Officer exercises his authority to cancel the Contract under this condition, he may complete the Works by any means independently without risk and cost of the original contractor.</p> <p style="margin-left: 40px;">On cancelation of contract, the performance security and retention money upto last paid RAR shall be forfeited. All T&P and material of contractor lying at site shall be confiscated by Government and shall be absolutely at the disposal of the president of India and No compensation whatsoever shall be allowed by the department.</p> <p style="margin-left: 40px;">If the failed contractor is a Company, or a Firm then every member / partner / Director of Company, or Firm shall be barred from participating in the tender for the balance work either in his/her individual capacity or as a partner of any other Company / Firm.”</p>

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44.	25 & 26	<p><u>Condition 67, Recovery from contractor</u> (i) Para 67(a), line – 10</p> <p>For words : “Security Deposit or Security Bond amount”</p> <p>Read: “Performance Security amount (or from the Contractor’s Standing Security Deposit amount or Security Bond if Performance Security amount is not adequate)”</p> <p>(ii) Para 67(g), line – 5</p> <p>For words : “Security Deposit or Security Bond amount”</p> <p>Read: “Performance Security amount (or from the Contractor’s Standing Security Deposit amount or Security Bond if Performance Security amount is not adequate)”</p>
45.	26	<p><u>Condition 68, Refund of Security Deposit including all sub paras</u> Existing contents shall be substituted as under:-</p> <p>“68. Refund of Performance Security:- The Performance Security Deposit mentioned in Condition 19 above may be refunded to the Contractor after the expiration of the defects liability period (vide Condition 46) by the G.E. provided always that the Contractor shall first have been paid the Final Bill and have rendered a No-Demand Certificate (I.A.F.W.-451).”</p>
46.	26	<p><u>Condition 70, Para 3</u> Deleted the existing contents and shall be substitute as “BLANK”</p>
47.	13	<p><u>Condition 19</u> For: “BLANK”</p> <p>Read: “19. Performance Security:-</p> <p>19.1. Within 28 days of receipt of the Letter of Acceptance, the successful contractor shall deliver to the Accepting Officer a Performance Security in any of the forms given below for an amount equivalent to 5% of the contract sum.</p> <p style="padding-left: 40px;">(a) A Bank Guarantee in the prescribed form.</p> <p style="padding-left: 40px;">(b) Government Securities, FDR or any other Government Instruments stipulated by the Accepting Officer.</p> <p>19.2. If the performance security is provided by the successful Contractor in the form of a Bank Guarantee, it shall be issued by Nationalized/Scheduled Indian Bank but its confirmation shall be done only from the Head Office of the Bank.</p> <p>19.3. Failure of the successful contractor to comply with the requirements of subclause 19.1 shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Earnest Money. In case of MES enlisted contractor, amount equal to the Earnest Money stipulated in the Notice Inviting Tender, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury.</p> <p>19.4. All compensation or other sums of money payable by the contractor to the Government under the terms of this contract or under any other contract with Government may be deducted from, or paid by the sale of a sufficient part of the Performance Security or from the interest arising there from or from any sums which may be due or become due to the contractor by the Government on any account whatsoever and in the event of his Performance Security being reduced by reason of any such deduction, or sale as aforesaid, the contractor shall within ten days thereafter make good in cash or securities, endorsed as aforesaid, any sum or sums which may have been deducted from or realized by the sale of his Performance Security or any part thereof.</p> <p style="padding-left: 40px;">Government shall not be responsible for any loss of securities or any depreciation in the value of securities while in their charge nor for loss of interest thereon.</p>

MILITARY ENGINEER SERVICES
AMENDMENT TO GENERAL CONDITIONS OF
CONTRACT IAFW - 2249 (1989 PRINT)

Amend ment No	Page No	Particulars
1	2	3
47. (Contd)		19.5. In the event of contract being cancelled, under Condition 52, 53 & 54 of General Conditions of Contract, the Performance security shall be forfeited in full and shall be credited into Consolidated Fund of India.”
48.	17 and 18	<p><u>Condition 46, Inspection of the Works, Second Para, lines 1 to 5</u></p> <p>For: “Should the G.E. consider, at any time during the construction or reconstruction or prior to the expiration of period of a twelve calendar months after the works have been handed over to Government (hereinafter referred to as the “defects liability period”) that any work has been executed with unsound, imperfect or unskilful workmanship or of a quality inferior to that contracted for or not otherwise in accordance with the Contract.....”</p> <p>Read: “Should the G.E. consider, at any time during the construction or reconstruction or prior to the expiration of period of:-</p> <p>(a) Thirty six calendar months after the works have been handed over to Government (hereinafter referred to as the “defects liability period”) for Runway works, Marine & Harbour works, High Altitude works & Specialist works of Hospitals & Medical Equipment/Medical Gas.</p> <p>(b) Twenty four calendar months after the works have been handed over to Government (hereinafter referred to as the “defects liability period”) for works other than mentioned in sub para (a) above.</p> <p><i>(The period of defects liability period shall be specified in the tender documents.)</i></p> <p>that any work has been executed with unsound, imperfect or unskilful workmanship or of a quality inferior to that contracted for or not otherwise in accordance with the Contract.....”</p>

SIGNATURE OF CONTRACTOR
DATED :

Jt/Dy DIRECTOR (CONTRACTS)
FOR ACCEPTING OFFICER

SCHEDULE OF MINIMUM WAGES

1. It is hereby agreed that the "**Schedule of Minimum 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.

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

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

**SIGNATURE OF CONTRACTOR
DATED :**

**Jt/Dy DIRECTOR (CONTRACTS)
FOR ACCEPTING OFFICER**

SPECIAL CONDITIONS (CONT....)**1. GENERAL**

1.1 The following Special Conditions shall be read in conjunction with the General Conditions of Contracts, IAFW-2249 and IAFW-2159 (Revised-1947) including errata/amendments thereto. Any provision in these special conditions if at variance with that of the aforesaid documents shall take precedence there over. The term General specification used in any of the documents forming part of the contract refer to the specification contained in the MES Schedule.

2. ADMISSION TO SITE BY CONTRACTOR AND RESPONSIBILITY TO ASCERTAIN HIS OWN INFORMATIONS

2.1 Refer paras 11 and 15 of Notice of Tender (IAFW-2162) and Condition 4 of IAFW-2249. The tenderer shall be deemed to have satisfied himself before submitting his tender as to the nature of the ground and sub-soil (so far as it is practicable), the climatic conditions, the form and nature of the site, nature of work and the manner of access to the site and the accommodation he may require. In general, the tenderer shall be deemed to have himself obtained all necessary information's on inspection of site, as to risks, contingencies and other circumstances which may influence or effect his tender. No extra payment consequent on any mistake or misunderstanding or otherwise on this account shall be allowed.

2.2 The tenderer shall be deemed to have visited the site(s) before quoting rate and made themselves familiar with the working conditions, whether he actually inspect the site(s) or not.

3. AVAILABILITY OF LAND FOR STORAGE OF MATERIALS, ACCOMMODATION FOR LABOUR ETC

3.1 Delete the following from lines 5 to 9 of sub para 1 of Condition 24 of IAFW-2249 General Conditions of Contracts and insert as under in lieu thereof :-

"The contractor shall be permitted to store his materials including erecting temporary sheds thereof, temporary Workshops and the like at the area of land, marked for this purpose, on the site plan/shown by the GE free of rent, if it is on class A-1 land. For other types of land he shall be charged licence fee Re 1/- per year or part of a year for each and every separate area of land allotted to him. No land shall be allotted to the contractor for construction of huts for accommodation of labour.

4. CONDITIONS OF WORKING

4.1 The work lies in UNRESTRICTED AREA. However, the contractor, his agents, employees, work people and vehicles may pass through the unit lines in which case the Engineer-in-Charge shall, at his discretion have the right to issue passes, control their admission to the site of work or any part thereof. The contractor shall on demand by the Engineer-in-Charge submit a list of personnel, etc. concerned and shall satisfy the Engineer-in-Charge as to the bonafides of such people. Passes shall be returned at any time on demand by the Engineer-in-Charge and in any case on completion of work.

4.2 The contractor and his agents, employees and work people shall observe all the rules promulgated by the authority controlling the area in which the work is to be carried out e.g. prohibition of smoking, lighting and fire precaution, search of persons at entry and exit, keeping to specified routes, restricted hours of working etc. Any person found violating the security rules laid down by the authority, shall be immediately expelled from the area without assigning any reasons what so ever and the contractor shall have no claim on this account. Nothing shall be admissible for any man-hours lost on this account.

4.3 **WORK ON HOLIDAYS:-**The contractor shall not carry out any work on gazetted holidays, weekly holidays and other non-working days except when he is specially authorized in writing to do so by the GE. The GE may at his sole discretion declare any day as holiday or non-working day without assigning any reason for such declaration. Nothing extra shall be admissible on this accounted for any man hours lost.

5. CONTRACTOR'S REPRESENTATIVES AND WORKMEN

5.1 Refer Condition 25 of IAFW -2249. The contractor shall employ only Indian Nationals as his representatives, servants and workmen 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 works. If for reasons of technical collaboration, or other consideration employment of any foreign national is unavoidable, the contractor shall furnish full particulars to this effect to the Accepting Officer at the time of submission of his tender.

6. SECURITY OF CLASSIFIED DOCUMENTS.

6.1 Contractor's special attention is drawn to Conditions 2-A and3 of IAFW-2249 (General Conditions of Contracts). The contractor shall not communicate any classified information regarding the work either to subcontractors or others without the prior approval of the Engineer-in-Charge. The contractor shall also not make copies of the design/drawings and other documents furnished to him in respect of the work, and shall return all document son completion of the works or earlier on determination /Termination /cancellation of the contract. The contractor shall alongwith the final bill, attach a receipt of his having returned the classified documents as per condition 3 of IAFW-2249 (General Conditions of Contracts).

SPECIAL CONDITIONS (CONT....)**7. MINIMUM WAGES PAYABLE.**

- 7.1 Refer Condition 58 of IAFW-2249. The contractor shall not pay wages lower than minimum wages for labour as fixed by the Govt of India/State Govt/Union Territory under Minimum Wages Act or Contract Labour (Abolition and Regulation Act) whichever is higher.
- 7.2 The fair wage referred to in condition 58 of IAFW-2249 shall be deemed to be the same as the minimum wages payable as referred to above.
- 7.3. 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.

8. CO-OPERATION WITH OTHER AGENCIES

- 8.1 The contractor shall permit free access and generally afford reasonable facilities to other agencies or departmental workmen engaged by the Govt to carry out their part of the work, if any, under separate arrangements. The contractor shall not be allowed any extra payment on this account.

9. QUARRIES

- 9.1 Quarries are not available on land which is in the charge of the MES authorities. Condition 14 of IAFW-2249 shall thus be treated as deleted.

10. WATER

- 10.1 Refer Condition 31 of General Conditions of Contracts (IAFW-2249).
- 10.2 Water will be supplied by MES to the Contractor at Points shown on Site Plan/ as shown by the GE from Piped System and shall be Paid by the Contractor at the Rate of ₹ 21.19 PER 1000 LITERS of Water Consumed/Supplied. The Contractor shall arrange at his own expense for Storage of Water and Lifting Pumping, carrying of conveying Water to the Site of Work as required. In case Water Points are not marked on the Site Plan, the Water shall be supplied at ONE POINT at decided by GE.
- 10.3 The supply of Water may not be continuous. The Contractor shall be deemed to have ascertained the Hours of availability of Water before submitting his Tender. The MES do not guarantee the continuity of Water Supply and no Compensation shall be allowed for intermittent or inadequate Water Supply and Break Down in the System. If the Supply is not sufficient the Contractor shall make his own arrangement to supplement the Water supply at his own Cost. For this purpose the Contractor shall be allowed to install Hand Pumps at the Site of Work at places as directed by the Engineer-in-Charge without any charges from the contractor on this account. The contractor shall remove the Hand Pumps as and when asked to do so by Engineer-in-Charge or GE and in any case on Completion of Work. No Compensation what-so-ever shall be admissible to the Contractor if the GE requires him to remove the Pumps before Completion of Work.

11. SUPPLY OF ELECTRICITY.

- 11.1 Electricity will be supplied by MES upto 5KVA only. The contractor will be charged for the Electric energy consumed at ₹ 15.53 per unit for lighting and power.
- 11.2 Electric supply required for works shall be made available by the MES at the incoming terminal of the main switch marked on the layout plan or nearest available tapping point wherever required during construction. The main switch and KWH meter to register the electricity supplied shall be provided and installed by MES. The contractor shall provide all necessary connection cables, fittings etc to the main switch in order to ensure proper and suitable supply of electricity.
- 11.3 MES do not guarantee continuity of supply and no compensation whatsoever shall be allowed for supply becoming intermittent or for break down in the system or any reason whatsoever.
- 11.4 GE or his representative shall be free to inspect all the power consuming devices or any electric lines provided by the contractor. Any devices or electric lines provided by the contractor, which are not to the satisfaction of the GE, shall be disconnected from the supply, if so directed by him and no claim for compensation whatsoever may be, shall be allowed on this account.

12. SAMPLE OF MATERIALS

- 12.1 Refer condition 10 of I.A.F.W. 2249 and Clause No.1.6 & 1.7 of MES Sch Part I.
- 12.2 The tenderers are advised to inspect sample of the materials which are displayed in the office of the Garrison Engineer before submitting his tender. The tenderers shall be deemed to have inspected the samples and satisfied himself as to the nature and quality of materials, he is required to incorporate in the work, irrespective of whether he has actually inspected or not. The materials to be incorporated in the work by the contractor shall conform to or shall be superior in quality to the sample displayed and shall comply with the specifications given hereinafter.
- 12.3 The contractor shall not procure materials unless the samples are first approved by the Garrison Engineer.

SPECIAL CONDITIONS (CONT....)

- 12.4 The materials other than materials of local origins shall comply with the requirement of the latest IS.
- 12.5 The cost of testing of material shall be borne by the contractor while quoting their lumpsum. This aspect shall be kept in mind and nothing extra shall be admissible on this account.
13. **RECORD OF MATERIALS.**
- 13.1 The quantity of materials such as cement, steel, paints, water proofing compound, chemicals for antitermite treatment and the like, as directed by the Engineer-in-Charge (the quantity of which cannot be checked after incorporation in the works), shall be recorded in measurement books and signed by the contractor and the Engineer-in-Charge as a check to ensure that the required quantity has been brought to site for incorporation in the work.
- 13.2 Materials brought to site shall be stored as directed by the Engineer-in-Charge and those already recorded in Measurement Book shall be suitably marked for identification.
- 13.3 Contractor shall produce vouchers/invoices from the manufacturers and/or their authorized agents for the full quantity of the following materials as a pre-requisite before submitting claims for payment for advances on account-of the work done and/or materials collected in accordance with Condition 64 of General Conditions of Contracts-IAFW-2249 :
- | | |
|--|--|
| (i) All items for which payment is claimed in RAR as “ material lying at site” | (ii) Cement |
| (iii) Reinforcement/ Structural Steel | (iv) All types of Doors / Windows / Shutters including Frames & Glass / Wire Cloth |
| (v) All Types of Paints / Primer / Putty | (vi) All type of Tiles / Paver Blocks |
| (vii) APP membrane & primer | (viii) ATT Chemicals |
| (ix) All Types of Board / Plywood & False Ceiling Items | (x) All type Sanitary Appliance & Water Storage Tank |
| (xi) LLDPE Septic Tank | (xii) All types of Pipes & Valves / Taps |
| (xiii) All Types of LT / HT XLPE & Wiring Cable | (xiv) All types of light fitting & fixtures / Fans |
| (xv) Steel Tubular Pole | (xvi) All Switch Gears |
| (xvii) PVC conduit/casing capping | (xviii) LT/HT panel/feeder pillar box |
| (xix) Pump Set | (xx) All items / fitting connected with Solar Power Plant |
- 13.4 The contractor shall ensure that the materials are brought to site, in original sealed containers/packing, bearing manufacturer's marking except in the case of the requirement of materials(s) being less than smallest packing.
- 13.5 The vouchers/invoices will clearly indicate the contract number and the IS No., specific alternative to which the material conforms in case of various alternative in IS.
14. **PHOTOGRAPHS**
- 14.1 The contractor shall provide minimum 200 photographs (coloured) in duplicate with soft copy CD of the important stages of the work in progress as directed by GE/ Engg-in-charge. The contractor shall arrange the equipment or any other attachment for taking the photograph.
- 14.2 The photograph shall be postcard size and shall be sharp, neat and clean and of standard as approved by GE. Cost of photographs shall be borne by the contractor.
- 14.3 In case photography is prohibited in this area, the photographs shall not be taken and no price adjustment shall be made on this account. The contractor shall not allowed to carry the camera or the equipment connected with the photographs in the area/buildings without permission of the Engineer-in-Charge.
15. **VALIDITY OF TENDER**
- 15.1 The tender shall remain open for acceptance for a period of **90 (ninety days)** from bid submission end date as mention in web site. For the purpose of calculating this period, the day on which the tenders are due to be submitted shall be excluded.

SPECIAL CONDITIONS (CONT....)**16. CPM NET WOPK DIAGRAM**

- 16.1 The time and progress chart to be prepared as per condition 11 of General Conditions of Contracts (IAFW-2249) shall consist of detailed net work analysis and a time schedule. The critical path net work shall be drawn jointly by the GE and the contractor soon after acceptance of tender. The time scheduling of the activities shall 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 shall be prepared and submitted by the contractor to the GE who shall approve it after due scrutiny. The schedule shall be submitted in four copies within two weeks from the date of handing over the site. In case the contractor fails, to submit the CPM net work diagram, the network prepared by the GE shall be binding on him.
- 16.2 During the currency of the work, the contractor is expected to adhere to the time schedule and this adherence shall be a part of his/their performance under the contract. During the execution of the work, the contractor is expected to participate in the reviews and updating of the net work undertaken by the GE. These reviews may be undertaken at the discretion of the GE, either as a periodic appraisal measure or when the quantum of work ordered on the contractor is substantially changed through deviation orders or otherwise. Any revision of the time schedule as a result of the review, shall be submitted within a week by the contractor to the GE for his approval after due scrutiny.
- 16.3 The contractor shall adhere to the revised time schedule there after. In case of contractor disagreeing with revised schedule, the same shall 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.
- 16.4 Contractor is expected to mobilize and employ sufficient resources to achieve the detailed schedule within the broad frame work of the accepted methods of working and safety.
- 16.5 No additional payment will be made to contractor for any multiple shift work or other incentive methods contemplated by him in his work schedule, even though the time schedule is approved by the department.

17. RELEASE OF PERFORMANCE SECURITY DEPOSIT

- 17.1 Refer Conditions 19 and 68 of IAFW-2249 (As amended vide amendment No 47 and 45 to IAFW-2249).

18. SITE FOR EXECUTION WORK

- 18.1 Site for execution of work shall be available as soon as the work is commenced on the date as mentioned in the work order No 1. However, in case due to unavoidable circumstances it is not possible to make the entire sites available on the date of the commencement, the contractor shall have to arrange his programme accordingly. No claim whatsoever for not getting the entire site on the date of commencement of work & for giving the site gradually shall be tenable.

19. RECOVERY CHARGES FOR TESTING OF MATERIALS

- 19.1 Where testing of contractor's materials is carried out in zonal/National test house/SEMT wing/Engineering college by the department, the contractor shall be liable to pay the testing charges as stated in Appendix 'F' to particular specifications and shall be recovered from the contractor's running payment/final bill as the case may be.

20. SAFETY PRECAUTION

- 20.1 The contractor shall take every/precaution to control trifurcation road keeping danger boards, necessary lighting arrangements, fencing and watchman to avoid any damage. In case due to excavation or others the road is to be blocked the contractor shall, without any extra cost to the Govt. provide separate bypass so that normal traffic is not disturb.
- 20.2 Any damages to the existing road/building etc, shall be made good by the contractor with the same specifications as per existing work, without any extra cost to the Govt. In the event of contractor not fully complying with the above provisions to the satisfaction of the GE, the GE may provide the same for which the expenses incurred shall be recovered from the contractor.

SPECIAL CONDITIONS (CONT....)**21. RECORD OF CONSUMPTION OF CEMENT**

- 21.1 The contractor shall maintain a pucca bound register with serially numbered pages with all pages initialed by Engineer-in-Charge against numbering showing quantities of cement records and used in the work daily and balance at the end of each day. The form of record shall be as approved by Engineer-in-Charge. The register shall be signed daily by the representative of MES and the contractor in token of verification of its correctness and shall be checked by Engineer-in-Charge, at least once a week and on the days cement is issued to the contractor.
- 21.2 The register shall be kept at site safe custody of the contractor representative during the progress of the work and shall on demand, be produced for verification to the inspecting officers.
- 21.3 On completion of the work the contractor shall deposit the cement register with the Engineer-in-Charge for record.

22. REIMBURSEMENT/REFUND ON VARIATION IN PRICES :- Refer Condition 63 of IAFW-2249

Increase or decrease in prices of materials and fuel shall be adjusted on the basis stipulated here-in-after irrespective of the actual variation in prices (to the contractor).

22.1 MATERIALS

- 22.1.1 The materials cost component including the cost of materials issued under Schedule `B' in accordance with Condition 10 (B) of IAFW-2249 for the contract as a whole, shall be taken as KM% for the value of works executed under the contract, value of K_M is given herein below.

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

$$E_M = (VM_2 - VM_1) \times \frac{W_1 - W_0}{W_0}$$

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

$$V_M = \left\{ \frac{KM}{100} \right\} \times V_g + (V_s - V_B)$$

Where,

E_M = Variation in price of materials to be adjusted

K_M = Constant representing the percentage cost of materials, including Schedule `B' materials as compared to the total value of work under the contract as a whole. The value of K_M for this work shall be **60 (Sixty only)**

V_g = Gross value of work done at contract rates upto the last date of the period of reckoning.

V_s = Value of all materials lying at site for incorporation in the work including materials issued under Schedule `B' and including materials brought and paid or payable to contractor under Prime Cost sum and/or Star Rate (s).

V_B = Value of all materials (out of V_g and V_s) issued under Schedule `B' plus value of all materials brought and paid or payable to contractor under prime cost sum and/or Star rate(s).

W_1 = Monthly whole sale price index for all commodities (base year 2011-12 = 100) published by Economic Adviser to the Government of India of the month preceding to the month in which the date of commencement of the period of reckoning lies. In case the original contract period is extended under condition 11 of IAFW-2249, the price index as applicable on the date of commencement of the last reckoning period before the original completion date (s) (phase wise except where phasing has been done only for sample quarter/block) shall only be applicable during the extended period. If phasing has been done for only sample quarter/sample block, the price index as applicable on the date of commencement of the last reckoning period before the original completion date of the project as a whole shall only be applicable during the extended period.

W_0 = Monthly whole sale price index for all commodities (base year 2011-12 = 100) published by Economic Adviser to the Government of India of the month preceding to

SPECIAL CONDITIONS (CONT....)

the month in which the date of receipt of the tender lies i.e bid submission end date as mention in web site.

V_{m2} = Value of materials upto the last date of the period of reckoning, for which price variation is adjustable as worked out as per formula for V_M

V_{m1} = -do- but as on date of immediate preceding period of reckoning.

22.2 **FUEL.**

22.2.1 Fuel cost component for the contract as a whole shall be taken as K_p % of the value of the work executed under the contract. Value of K_p is given herein below :-

$$E_p = \frac{K_p}{100} \times V_{g1} \times \frac{(F_1 - F_0)}{F_0}$$

Where

E_p = Variation in prices of fuel to be adjusted.

K_p = Constant representing the percentage cost of fuel as compared to the total value of work under the contract as a whole. The value of K_p for this work shall be **1.5 (ONE DECIMAL FIVE ONLY)**

V_{g1} = Gross value of work done during the period of reckoning, using value of V_g for calculating V_{M1} and V_{M2} under clause 22.1 hereinbefore.

F_1 = Monthly whole sale price index for sub group for fuel, power, light and lubricants (base year 2011-12 = 100) published by Economic Adviser to Government of India of the month preceding to the month in which the date of commencement of the period of reckoning lies.

F_0 = Monthly whole sale price index for sub group for fuel, power, light and lubricants (base year 2011-12= 100) published by Economic Adviser to Government of India of the month preceding to the month in which the date of receipt of tenders lies i.e bid submission end date as mention in web site.

NOTES :

1. No adjustment, whatsoever, due to variation in prices of materials and fuel on account of coming into force of any fresh law or statutory rule or order as provided in Condition 63 of IAFW-2249 or otherwise than provided in this condition, shall be made.
2. Material: No adjustment in prices shall be made for any work done with materials brought at site after the stipulated date of completion of the work under contract except as contemplated under definition of W_1 .
3. Fuel: No adjustment in prices shall be made for any work done with material brought at site after due date of completion or extension of time granted under condition 11 of IAFW (whichever is later) for the work under the contract.
4. Periodicity of working out the variations will be three months. The last calculation shall however be done for the value of work at contract rates and materials lying at site for incorporation in the work as on date of completion or extension thereof as mentioned in Note 2 & 3 above. Valuation of RARs is to be timed in such manner that relevant data required for quarterly calculation under this condition is available from RARs. Amount payable relevant to work done and materials collected in any quarter will be worked out after firm whole sale price indices for the relevant quarter are available. Once the amount adjustable for any quarter is worked out, the same shall be adjusted as and along with advance on account payment under Condition 64 of IAFW-2249 in the subsequent RARs.
5. For purposes of calculation of retention money, liquidated damages, sales tax/service tax on works contracts, deduction of income tax at source and recovery of water charges (in case of unmetered supply), the value of contract as revised by the above price variation will be taken into account.
6. Any dispute arising out of interpretation or application of this Special Condition shall be referred to the Accepting Officer whose decision shall be final and binding.
7. In cases "where value of $V_{M2}-V_{M1}$ works out to minus on account of higher utilization of Schedule 'B' stores (i.e value of Sch 'B' store under contract as a whole is higher than KM

SPECIAL CONDITIONS (CONT....)

value) and the reimbursement on account of variation in prices of materials works out to be negative inspite of the whole sale price index for all commodities published by Economic Adviser to Government of India going up from “Wo”, reimbursement on account of variation in prices of materials shall be treated as “NIL”.

22.3. **REIMBURSEMENT/REFUND ON VARIATION IN PRICES-WAGES OF LABOUR** :- Refer Condition 63 of IAFW-2249).

The condition 63 of the General Condition of contract shall be deemed to be modified to the extent mentioned here-in-after. Increase or decrease in prices consequent on variation in wages of labour, shall be adjusted on the basis stipulated hereinafter, irrespective of the actual variation in price wages of labour to the contractor.

22.3.1 **LABOUR.**

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

$$E_L = \frac{K_L \times V_{g1}}{100} \times \frac{L_1 - L_0}{L_0}$$

Where

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

K_L = Constant representing the percentage cost of labour element as compared to the total value of the work under the contract as a whole. The value of K_L for the work shall be **20 (TWENTY)** only.

V_{g1} = Gross value of work done at contract rates during the period of reckoning less value of work paid or payable to the contractor based on actual cost (eg. star rate (s), work executed under prime cost sum etc) during the period of reckoning.

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

L_0 = Minimum wage in rupees of an unskilled adult male Mazdoor as fixed under any law, statutory rule or order as on the last due date for receipt of tender i.e bid submission end date as mention in web site. If labour wage on the date of receipt of tender are increased afterwards with retrospective effect, the value of L_0 shall be fixed keeping in view the following aspects :-

(a) If the increase/decrease in wages of labour are made known to the public by any means of media before receipt date of tender but the same is officially notified thereafter giving retrospective effect, the value of “ L_0 ” shall be as per notification though made subsequently.

(b) If a net wage comprises a fixed basic wage and the living allowance revised from time to time based on consumer price index (CPI) and increase in CPI is made known to the public by any means before the date of receipt of tender, the “ L_0 ” will be revised wages corresponding to revised CPI, though the formal notification for the net wage (considering the revised living allowance corresponding to revised CPI) is made subsequent to date of receipt of tender.

(c) In case the labour enforcement officer makes the announcement before date of receipt of tender but Gazette notification is made subsequently making wages applicable with retrospective effect, the value of “ L_0 ” shall be as per Gazette Notification subsequently made.

(d) If the increase/decrease in wages of labour is notified/announced subsequent to receipt of tender with retrospective effect without making the same publicly known by means of publicity/media prior to the date of receipt of tender, then, the value of “ L_0 ” shall be as per wage known at the time of receipt of tender.

NOTES

1. The contractor shall within reasonable time of his becoming aware of any alteration to the payment of wages of labour consequent on fixation of minimum wages under any law, statutory

SPECIAL CONDITIONS (CONT....)

rule or order, give written notice thereof to the GE stating that the same is given pursuant to this special conditions together with all information relating thereto which he may be in a position to supply.

2. Irrespective of the variation in minimum wages for any category of labour, for the purpose of adjustment under this special condition, the variation in minimum wages fixed under any law, statutory rule or order for an unskilled adult male Mazdoor, if any, shall only form the basis.
3. Periodicity of working out the variation in wages of labour will be three months commencing from the last due date for receipt of tender. The last adjustment for variation in wages of labour shall however, be done for the period up to the date of completion or extended date of completion. Valuation of price adjustment due to increase/decrease in minimum wages under any law, statutory rule or order for the purpose of making reimbursement/refund in RARs, will be timed in such manner that relevant data required for quarterly calculation under this special condition is available from the RARs. The first price adjustment in respect of variation in wages of labour will be worked out for the relevant quarter during which alteration to the wages of labour took place. For implementing this provision, the period of reckoning in such quarter will have to be divided into two periods i.e., the first period upto the RAR payable immediately after the date of variation and the other upto the end of the quarter. Value of L_1 at the beginning of the other period shall be the altered wage. If there are more than one change in wages in a quarter, there will be more than two periods of the reckoning on similar basis. Amount payable relevant to work done for any quarter will be worked out after the minimum wage of an unskilled adult male Mazdoor as fixed under any law, statutory rule or order for the relevant quarter is available. Once the amount adjustable for any quarter is worked out, the same shall be adjusted in subsequent RAR as 'advance on account' adjustments along with adjustment for "Material" and "Fuel".
4. No adjustment in prices shall be made for any work done after the due date of completion or extension of time granted under Condition 11 of IAFW-2249 (whichever is later) for the work under the contract.
5. No adjustment, whatsoever, due to variation in wages of labour on account of coming into force of any fresh law or statutory rule or order as provided in Condition 63 of IAFW-2249 or otherwise, than provided in this special condition shall be made.
6. Any dispute arising out of interpretation or application of this special condition shall be referred to the Accepting Officer whose decision shall be final and binding.
7. For the purposes of calculation of retention money, liquidated damages, sales tax/service tax on works contract, deduction of income tax at source and recovery of water charges (in case of unmetered supply), the value of contract as revised by the above price variation will be taken into account.

23. RETENTION MONEY/COMPENSATION FOR DELAY

- 23.1 Refer condition 64 of IAFW-2249 (Advances on account) and Condition 50 of IAFW-2249 (Compensation for Delay).
- 23.2 For the purpose of calculating retention money and liquidated damages under condition 64 of IAFW-2249 and compensation for delay in completion of work under condition 50 of IAFW-2249, the value of contract as revised by above mentioned price variation under modified condition 63 of IAFW-2249 shall be taken into account.

24. OFFICIAL SECRET ACT

- 24.1 Refer Condition 24 of General Condition of Contract IAFW-2249. The contractors attention is invited to Indian Official Secret Act 1923 (xxx of 1923) particularly Sec 5 thereof. The contractors shall be bound by the provision of this Act.

25. BLANK**26. ROCK MET IN EXCAVATIONS**

- 26.1 If during excavation, rock is met with GE shall be informed of this in writing by the contractor. The nature/type of rock met with shall be decided by the GE, whose decision is final and binding. If the nature of rock met with is 'Hard Rock' the same shall be priced and paid as excavation in hard rock at the rates as applicable to this contract. Hard rock obtained from excavation shall be properly stacked, measured and recorded in measurement book and will be the property of the Contractor. Credit at the

SPECIAL CONDITIONS (CONT....)

rate of ₹ 500.00 per cubic metre of hard rock obtained shall be recovered from the contractor. The measurement shall be signed by Engineer-in-charge and contractor. Hard rock obtained thus can be reused in the execution under this contract subject to fulfillment of requisite specification specified here-in-after and after written approval of Garrison Engineer.

27. ADVANCE ON ACCOUNT OF MATERIALS

27.1 Refer condition 64 of the General Condition of Contract (IAFW- 2249) including amendment thereof shall be followed for payment of advance in account during currency of the contracts.

27.2 BLANK

27.3 The Bank Guarantee Bonds shall be executed for a period of 24 months and on a form as directed by the Accepting Officer. The contractor shall further arrange to extend the period of Guarantee Bond if and when necessary, as directed by the Accepting Officer or shall furnish fresh guarantee bond(s) of similar value in lieu.

28. FEMALE LABOUR

28.1 If the contractor desires to employ female labour on works to be carried out inside the area of a 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 the tender, he shall be deemed to have allowed in his tender for pay and allowances etc. for a Female Searcher (Class (IV) servant/GP 'D' servant) calculated for the period, female labour is employed by him inside that area. If more than one contractor has/have to employ female searcher in addition to the authorised strength of the Factory, depot, park etc the salary and allowances paid to additional female searcher(s) shall be distributed on an equitable basis between the contractors employing female labour taking into consideration the value and period of completion of their contracts. The GE's decision in regard to the amount recoverable on this account from any contractor shall be final and binding.

29. GUARANTEE FOR ANTITERMITE TREATMENT

29.1 Should the GE any time during construction or reconstruction or prior to the expiration of period of ten years after the anti-termite treatment has been completed as per contract, finds that the buildings have been infected with termites, the Contractor shall, on demand in writing by the GE specifying the building(s) complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith undertake to carry out such treatment as may be necessary to render the said building(s) free from termite infestation at his own expenses for a period of ten years from the certified date of completion, and in the event of his failing to do so within a period to be specified by the GE in his demand aforesaid, the GE may undertake such treatment at the risk and expense in all respects of the Contractor. The liability of the Contractor under this condition shall not extend beyond the period of ten years from the certified date of completion unless the GE had previously given notice to the Contractor.

29.2 The Security Deposit referred to be held from the contractor against the guarantee period for anti-termite treatment shall be calculated as per scales laid down for calculating "Individual security deposit" on the amount of anti-termite treatment at contract rates for the buildings for which treatment is to be done and may be refunded to the Contractor after the expiration of the period of ten years from the certified date of completion by the GE, provided always that the Contractor shall first have been paid the final bill and have rendered a No-Demand Certificate (IAFA-451). The facility of furnishing fixed deposit receipt in lieu of the sum to be retained as security may be accepted.

29.3 Conditions 10, 46 and 68 of General Conditions of Contracts (IAFW 2249) shall be deemed to be amended to the extent mentioned above.

29.4 The Chemical shall be procured only from manufacturer or from their authorized agents/dealers.

29.5 Chemical brought to site in sealed containers bearing ISI certification marks shall only be permitted to be used.

29.6 Chemicals shall be stored carefully at site, seals of the containers shall be broken only in the presence of the Engineer-in-Charge. Empty containers should be got removed off the site promptly. If on any particular day the contents of full containers could not be used in the work, the containers should be got sealed at the end of the day in the presence of the Engineer-in-Charge and opened when required, also in the presence of the Engineer-in-Charge.

29.7 The Engineer-in-Charge should ensure that paid vouchers are produced by the agency executing the work for the full quantity of chemicals required and brought to site and record of such vouchers should be kept by the Engineer-in-Charge.

SPECIAL CONDITIONS (CONT....)

29.8 Tests may be carried out, in a recognized laboratory or test house at the discretion of the GE, of the chemicals brought by the agency executing the work, to satisfy that spurious materials are not being used, and testing charges borne by the contractor. A copy of IS 6313 (Part-II) should be made available at site by the contractor.

30. **GUARANTEE FOR WATER PROOFING TREATMENT**

30.1 The period of Guarantee for the water proofing treatment shall be **10 (ten) years** from the certified date of completion. The contractor shall be responsible for effectiveness of the water proofing treatment during this period and any leakage noticed therein during this period shall be made good by him at his own cost.

30.2 The contractor shall furnish guarantee in favour of the Garrison Engineer for the efficacy of the water proofing treatment during the guarantee period.

30.3 An amount of security deposit equal to the individual security deposit calculated based on the amount of water proofing treatment at contract rates for the building for which treatment to be carried out shall be retained from the contractor's final bill as security deposit for the water proofing treatment which shall be released to the contractor only after expiry of guarantee period. The contractor may alternatively furnish a fixed deposit receipt in favour of GE in lieu of sum to be retained as security deposit for water proofing treatment from any approved Schedule Bank.

30.4 Condition 46 of the General Conditions of Contracts (IAFW 2249) shall be deemed to be amended to the extent mentioned above.

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

(a) The rates quoted by the contractor shall be deemed to be inclusive of all taxes/cesses viz GST, duties, Royalties, Octroi & other levies payable under the respective statutes. No other levies, and/or imposition/abolition of any new/existing taxes, duties, Royalties, Octroi & other levies shall be made except as provided in para (b) here-in-below.

(b) (i) The taxes/cesses which are levied by Govt at certain percentages rates of contract sum/Amount shall be termed as "taxes directly related to contract value" such as GST, Labour welfare cess/tax and like as applicable 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 i.e. **bid submission end date as mentioned in web site**. 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 i.e. **bid submission end date** shall be reimbursed to the contractor and any decrease in percentage rate of "taxes directly related to contract value" with reference to prevailing rates on last due date for receipt of tenders i.e. **bid submission end date** shall be refunded by the contractor to the Govt/deducted by Govt from any refunded due to the contractor. Similarly imposition of any new "taxes directly related to contract value" after the last due date for receipt of tenders i.e. **bid submission end date** 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 i.e. **bid submission end date** shall be refunded by the contractor to the Govt/deducted by the Govt from the payments due to the contractor.

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

(iii) The contractor shall, for the purpose of this condition keep such books of account and other documents as are necessary and shall allow inspection of the same by a duly 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's as the GE may require.

(iv) Reimbursement for increase in percentage rates/imposition of "taxes directly related to contractor value" shall be made only if the contractor necessarily & properly pay 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.

SPECIAL CONDITIONS (CONT....)**32. OUTPUT OF ROAD ROLLER**

32.1 Refer CONDITION 15 OF IAFW - 2249.

32.2 Where road roller(s) is/are hired by the Department to contractors, a log book for each road roller shall be maintained by the Department for recording hours of working of the road roller. In case, however, when the contractor shall arrange road rollers from sources other than the Department. A log book for each road roller shall be maintained by him for recording hours of working of the road roller. Entries in the log book shall be signed by the Contractor or his authorised representative and by the Engineer-in-Charge.

32.3 To ensure proper consolidation, roller must work for at least the number of days assessed, on the basis of output given hereinafter. If the roller has not worked for the number of days so assessed, recovery shall be effected from the contractor for the number of days falling short of the days assessed on the basis of output stipulated. The recovery shall be effected as under :-

(a) Where road roller is hired out only by the department to the contractor; at rates given in Schedule 'C'.

(b) Where road roller is hired by the contractor only from sources other than the department; @Rs.1400/- per working day of 8 hours for 8 to 10 tonne roller.

(c) Where road roller is hired by the contractor from the department and also from sources other than the department; at higher of the two rates given in Schedule 'C' of the contract and para- (b) above.

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

32.5 Output of Road Roller per day of Eight hours work of power roller (8 to 12 tonne).

(i)	Consolidation of formation surfaces / subgrade	1850 Sq.Metres.
(ii)	Consolidation of stone soling 22 to 23 cm thick with 8 to 10 tonne roller.	518 Sq.Metres.
(iii)	-do- but 15 cm thick.	800 Sq.Metres.
(iv)	Consolidation of water bound macadam (stone metal) /WMM 7.5 cm consolidated spread thickness including spreading and consolidation with binding material.	372 Sq.Metres
(v)	-do- but 10 cm consolidated thickness	279Sq.Metres.
(vi)	-do- but 11 cm consolidated thickness	248Sq.Metres.
(vii)	Consolidation of single coat surface dressing	774 Sq.Metres.
(viii)	Consolidation of two coats surface dressing.	558 Sq Metres.
(ix)	Consolidation of 4 cm thick premixed carpet including seal coat.	118 Sq Metres.
(x)	Consolidation of 3 cm thick premixed carpet including seal coat.	446 Sq Metres
(xi)	Consolidation of 2.5 cm thick premixed carpet including seal coat.	595 Sq Metres.
(xii)	Consolidation of 2 cm thick premixed carpet including seal coat.	744 Sq Metres
(xiii)	Consolidation of bituminous mixture, 2 parts of broken stone metal and one part of sand bitumen consolidated thickness 4 cms.	372 Sq Metres
(xiv)	Consolidation of 15 cm thick earth berms.	1800 Sq Metres
(xv)	Consolidation of 150 mm thick broken stone base.	500 Sq Metres.
(xvi)	Premix macadam 5 cm thick	500 Sq Metres.

33. CONTRACTOR SITE LABORATORY AND TESTING CHARGES :-

33.1 A site laboratory shall be set up by the contractor for carrying out the tests as required under the contract. The laboratory shall fully equipped and shall be approved in writing by the Garrison Engineer. The calibration of equipment shall be periodically checked by the Garrison Engineer.

SPECIAL CONDITIONS (CONT....)

- 33.2 The types of test and frequency of tests to be carried out in such site laboratory are attached as Appendix 'E'. However keeping in view the nature of work, Garrison Engineer may add additional test checks to this list or modify the list as required.
- 33.3 The contractor shall be responsible for such tests to be carried out and for that they shall employ a competent technical representative as approved by the Garrison Engineer and all such tests shall be carried out in the presence of Engineer-in-Charge.
- 33.4 The charges for the tests carried out in site laboratory of the contractor shall not be recovered, as the test shall be carried out by the contractor at his own cost in his site laboratory. However, the charges for test shall be recovered from the contractor only if he does not carry out the tests catered for in the contract and these are got done at MES laboratory.
- 33.5 Where testing of contractor's materials is carried out in Zonal Laboratory/ Command Testing Laboratory testing charges shall be recovered from the contractor's running payment/final bills as the case may be.
- 33.6 A percentage/selected checks as decided by the Accepting Officer, shall got done independently in the Zonal Laboratory/ Command Testing Laboratory, National Test House, SEMT Wing CME, Regional Research labs, IIT, NABL approved Labs, Govt Engineering Collage or Any Govt Lab and expenditure for such tests shall be borne by the department.
- 33.6A The lump sum amount quoted by the contractor is deemed to be inclusive of the expenditure towards tests to be carried out as per Appendix 'E' enclosed here-in-after
- 33.7 Level of testing shown in legend as "A", "B" & "C" are defined as under :

LEVEL 'A'

- (a) "Site lab" means own site lab established by Contractor at the work site for such tests. This lab shall house all the facilities including T& P, machinery, equipment, manpower, etc required for conducting tests. This lab shall be operative for the entire duration of the contract till its completion. Tests shall be carried out in the presence of Engineer-in-Charge to be nominated by GE or any other departmental official to be nominated by the GE. Random check of compliance of frequency of testing shall be done by GE.
- (b) Records shall be maintained at work site. These test results shall be signed by Contractor or this authorised representative and aforesaid departmental official.
- (c) Within 15 days of placement of work order No. 1, site lab shall be established and fact reported by the contractor to GE in writing who will verify the fact and satisfy himself of the facilities provided. There after GE shall issue a certificate to this effect in writing listing out equipment particulars etc of each material test. Only after issue of this certificate by GE the tests shall be carried out and materials so approved shall be incorporated in the work.
- (d) Manpower, material and infrastructure like electricity, water etc required for conducting these tests shall be provided by the Contractor.
- (e) Tenderer is deemed to cater for above provisions in his quoted lump sum.
- (f) Remedial measures, if any, required to achieve/obtain desired results for each test shall be taken promptly by Contractor.
- (g) In case, during any point of time, Contractor fails to adhere to the laid down frequency of the tests for any reasons whatsoever, the Contractor shall get the tests done from any other lab whose name shall be approved by GE in writing. The testing charges payable by Contractor to such labs shall be paid by the Contractor. Contractor's quoted lump sum is deemed to include for this eventuality and nothing extra shall be payable to the Contractor. No extension of time shall be admissible on this account.

SPECIAL CONDITIONS (CONT....)**LEVEL 'B'**

(a) " Zonal Laboratory/ Command Test Laboratory " means lab of **CE Eastern Command Test Laboratory, located at SE Falls, Shillong** or at any other location within the Eastern Command as notified by the Accepting Officer.

(b) The tests shall be conducted as per frequencies laid down for these tests in these labs for which Contractor shall provide all requisite facilities like samples, cubes, material etc, transportation to these labs for testing purpose. It will be Contractor's responsibility to adhere to the laid down frequency of testing. Test results shall be sent by lab to the GE whose copies can be made by Contractor at his own expense. Testing charges for the tests so conducted shall be recovered at the rates indicated in Appx 'E' from the running payments. The Contractor's quoted lump sum is deemed to quote for above provision.

LEVEL 'C'

(a) Level 'C' lab stands for National Test House, SEMT Wing CME, Regional Research labs, IITs, National Institutes of Technology, NABL Labs, Command Test Laboratory, Govt Engineering Collage or Any Govt laboratories where such facilities exists.

(b) Rest provision contained in para (b) of Level 'B' above shall be applicable here except that Contractor shall obtain test results from these labs and handover to GE. The testing charges payable to these labs for conducting these tests shall be borne by the Contractor and his quoted lump sum is deemed to include this provision.

34. TRAINING OF MES STAFF

34.1 The contractor shall give training to MES staff as detailed by the Engineer-in-Charge for 15 days period regarding operation, running and maintenance of various equipments, installed by him, as desired by the Engineer-in-Charge. Unit rates lump sum quoted by the contractor shall be deemed to have include the rates for the same and no extra payment shall be made to the contractor on this account.

35. QUALIFIED TRADESMEN:

35.1 The compliance with the condition 26 of IAFW-2249 (General Conditions of Contract), the contractor shall employ skilled/semi skilled tradesmen who are qualified and possessing certificate in particular trade from Industrial Training Institute (ITI)/National Institute of Construction Management and Research (NICMAR)/ National Academy of construction (NAC) Hyderabad Similar reputed and recognised Institute by State/Central Government to execute the works of their respective trade. The number of such qualified tradesmen shall not be less than 25% of total skilled/semi skilled tradesmen required in each trade. The contractor shall submit the list of such tradesmen alongwith requisite certificates to Garrison Engineer for verification and approval. Notwithstanding the approval 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 revoke such tradesmen within a week after written notice to this effect by the GE and shall engaged other qualified tradesmen after prior approval of GE. GE's decision whether a particular tradesmen possesses requisite qualification, skill and expertise commensurate with nature of work, shall be final and binding. No compensation whatsoever on this account shall be admissible.

36. CLEANING DOWN

36.1 Refer condition 49 of IAFW-2249 (General conditions of contracts).

36.2 The contractor shall clean all floor, walls, remove cement/lime/paint marks/drops, etc clean the joinery glass panes etc, touch up all painters work and carryout all other necessary items of work in connection herewith and leave the whole premises clean and tidy before handing over the building(s).

37. GRANITE STONE PLATE FOR GUARANTEE

37.1 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 :-

SPECIAL CONDITIONS (CONT....)

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

37.2 Granite stone plate shall be fixed over 15 mm thick cement screed in cm (1:3)

37.3 All figures /words engraved shall be painted with golden paint of approved make.

37.4 The cost of above is deemed to included in the lump sum amount of quoted by the contractor against Schedule 'A' Part-I.

38. **CONCILIATION**

38.1 **CONCILIATION BY DRB OR CONCILIATORS:-**In this connection please refer condition 71 of IAFW 2249 amended as per amendment No. 40 vide Govt of India, MOD, New Delhi letter No. PC-1 to 33487/ IAFW-2249/R/01/2011/D (works-II) dt 24 Mar 2015.

38.2 **APPOINTMENT OF DRB / CONCILIATOR:-** During execution of the works or after completion or after determination/cancellation/termination of the contract all dispute 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) (for Contracts valuing more than Rs 10 crore) and to sole conciliator (for the Contracts valuing less than Rs 10 crore) viz Serving Officer having degree in **Engineering** or equivalent or having passed final/direct final examination of sub division-II of Institution of Surveyors (India) to be appointed by the Engineer-in-Chief, Army HQ, New Delhi or in his absence the officer officiating as Engineer-in-Chief or Director General of Works specifically delegated by the Engineer-in-Chief in writing. In case of disagreement with the decision of such DRB or conciliator, any party may invoke arbitration clause.

38.2.1 The constitution of the DRB shall be a three member body as under :-

- | | | |
|------------------------------|---|--|
| (i) <u>Chairman</u> | : | 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 Officer posted in CE Comd shall be nominated by Comd CE at his sole discretion. |
| (ii) <u>Member 1</u> | } | Col/Director rank officers of Comd CE or any other Zonal CE to be nominated by Comd CE. |
| to | | |
| (iii) <u>Member 2</u> | | |

38.2.2 The name of Chairman and Members shall be notified by the Accepting officer within one month of the date of acceptance of contract.

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

38.2.4 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.

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

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

SPECIAL CONDITIONS (CONT....)

- 38.2.7 The requisite administrative support to the DRB shall be provided by the Accepting Officer.
- 38.2.8 All the contract documents pertaining to the case shall be provided by the Accepting Officer for reference by the DRB.
- 38.2.9 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.
- 38.2.10 All the decisions given by the DRB shall be by majority and such decisions shall be communicated in writing by Chairman to the parties.
- 38.2.11 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 provision of condition 70 of IAFW 2249 General Conditions of Contract.
- 38.2.12 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.
- 38.2.13 The mandate of the DRB shall terminate on completion of one year from the date of completion/determination/cancellation/termination of the contract.
- 38.2.14 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.
- 38.2.15 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.
- 38.2.16 Accepting officer shall ensure implementation of the decision of the DRB which attain finality, i.e, except those which are objected by him or by contractor within 30 days as per Para 38.2.11 above.
- 38.2.17 Findings and decision of DRB shall be admissible as evidence, to the extent permissible as per law, in the subsequent Arbitration and /or litigation.
- 38.2.18 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.
- 38.2.19 During execution of work the disputes may be referred to the DRB as per the requirement of each party after having exhausted the decision making process provided in the contracts. In case of completion of work or after determination/cancellation/termination of the contract all the disputes including payment/non-payment/delay in final bill shall be simultaneously referred to the DRB within six months of completion/determination/cancellation/termination of the contract.
- 38.2.20 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.
- 38.3 **STATUS OF EFFECT OF SETTLEMENT AGREEMENT** :- The settlement agreement signed by the parties as a result of conciliation proceedings shall have the same status and effect as it is an arbitral award on agreed terms.

39. **PERFORMANCE EVALUATION AND MONITORING OF WORKS:-**

- (a) The works shall be inspected by Accepting officer and performance evaluation and monitoring of works shall be done as under:-

(i) First Evaluation	:	Within two months from the date of Commencement of work as per Work Order No. 1
(ii) Second/Intermediate Evaluation	:	Every six months from the date of Commencement of work as per Work Order No. 1
(iii) Third Evaluation	:	Evaluation one month prior to original / extended date of

SPECIAL CONDITIONS (CONT....)

		completion.
(iv) Final evaluation	:	One month after actual date of completion

(b) The details of performance evaluation and monitoring of works to be exercised have been issued vide IHQ of MOD E-in-C's Branch letter No. A/37696/OSDPL/pol/E2W (PPC) dt 13 Aug 2014, A/37696/OSDPL/pol/E2W (PPC) dt 25 Aug 2014 and A/37696/OSDPL/pol/ E2W (PPC) dt 29 Dec 2014 & 66546/Manual/18/E8 dt 10 Dec 2018. These letters can be seen in any of the MES formations and are also available on MES web site www.mes.gov.in.

(c) Contractor is advised to be fully aware with these instructions and the requirements.

40. **FEES CHARGABLE BY POLICE AUTHORITIES FOR VERIFICATION OF ANTECEDENTS**

40.1 Verification of antecedents of Proprietor/Partners/Directors of the firm in connection with issue of tender and of Enlistment shall be Govt responsibility and accordingly payment to police authorities towards verification of antecedents shall be borne by Govt.

40.2 Verification of antecedents of Contractor's representatives/labour deployed at site in connection with execution of work under the contract, as per security requirement of User Unit/Installation shall be the responsibility of the contractor and all expenses in connection with verification of antecedents by Police Authority/Security Agency shall be borne by the contractor.

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

42. **DAMAGE TO EXISTING STRUCTURES** Any damage to the existing structures, any existing road etc, during the execution of work shall be made good by the contractor at his own expense. Rectification, replacement, making good any touching up etc shall be carried out, conforming to the materials and workmanship originally provided and to the satisfaction of the Engineer-in-Charge. In case of any dispute on this account, the decision of the GE shall be final, binding and conclusive.

43. **Location of Buildings and Works**. There may be some changes in location/siting of building shown in site (layout) plan (s) to suit local conditions and/or departmental requirements. The contractor shall have no claim what-so-ever consequent to such changes in the location/sitting of works.

44. **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 entire site on award of work and for giving site gradually, will be tenable.

45. **CONDITION 25 OF IAFW-2249 (GENERAL CONDITION OF CONTRACTS) AND AMENDMENT NO 27.-** Refer Amendment No 27 Of IAFW 2249

- | | |
|--|---|
| (a) For contract amount more than Rs. 1000 lakh and upto 2500 lakh | (a) 1 no Graduate Engineer from a Government recognized institution with minimum experience of 5 years. |
| | (b) 2 nos Diploma Engineers from Government recognized institution with minimum experience of 8 years. |
| (b) For contract amount more than Rs. 2500 lakh and upto 5000 lakh | (a) 2 nos Graduate Engineers from a Government recognized institution with minimum experience of 5 years. |
| | (b) 3 nos Diploma Engineers from Government recognized institution with minimum experience of 8 years. |
| | (c) Any one of the Engineers should have capability to use Project Management Software like MS Projects/Primavera in all projects |
| (c) For contract amount more than 5000 lakh | (a) 3 nos Graduate Engineers from a Government recognized institution with minimum experience of 5 years. |
| | (b) 3 nos Diploma Engineers from Government recognized institution with minimum experience of 8 years. |
| | (c) Any one of the Engineers should have capability to use Project Management Software like MS Projects/Primavera in all projects |

SPECIAL CONDITIONS (CONT....)**46. REQUIREMENT OF T&P, MACHINERY & TRANSPORT**

- 46.1.** Contractors shall ensure deployment of 'T&P, Machinery & Transport' required for executing the work shall be deemed to be provided and deployed at site. Inadequate deployment of T&P, Machinery & Transport as per contract conditions shall be considered as serious lapse attracting ban/removal/downgrading/debarment of the firm/company or any other action as deemed fit will be taken by the Accepting officer/Department.
- 46.2.** Stage wise deployment of T&P/ Machinery / Transport shall be ensured.
- 46.3.** GE will be the sole authority to decide the optimum requirement of minimum Nos & type of T&P/ Machinery / Transport at site at a particular stage of work ensuring that no delay is encountered due to any shortage of T&P/ Machinery / Transport.

SIGNATURE OF CONTRACTOR
DATED :

JT DIR (CONTRACTS)
FORACCEPTING OFFICER

PARTICULAR SPECIFICATIONS**1. GENERAL****1.1. GENERAL REQUIREMENTS**

- 1.1.1. The Work under this CONTRACT shall be carried out in accordance with SCHEDULE 'A', PARTICULAR SPECIFICATIONS, DRAWINGS and GENERAL SPECIFICATIONS and other provisions in MES STANDARD SCHEDULE OF RATES 2009 (PART I - SPECIFICATIONS) and MES STANDARD SCHEDULE OF RATES 2010 (PART II - RATES) (here in after called as MES SCHEDULE) read in conjunction with each other.
- 1.1.2. General Specifications referred to/mentioned in GENERAL CONDITIONS OF CONTRACTS (IAFW 2249) (1989 - PRINT) and in other documents mean Specifications including other provisions given in MES Schedule including Amendments and Errata as applicable.
- 1.1.3. Materials & Workmanship required for these Works/Services shall be as described against 'Specifications & Workmanships' in the various Trade/Sections of the MES Schedule duly modified by these Particular Specifications here-in-after.
- 1.1.4. Reference to some Paragraphs of MES Schedule has been made in these Particular Specifications, but other Paragraphs and Provisions as applicable are also to be followed e.g. reference to Clause No. pertaining to General Workmanship for Brick Masonry, Joinery, Iron and Steel Work, etc. have not been made but provisions therein as required for the work are applicable.
- 1.1.5. Provisions contained in the MES Schedule Part II in the Preambles to the relevant Items of SCHEDULE 'A' shall also be read in conjunction with the Provisions contained in these documents.
- 1.1.6. Where Specifications/Provisions for any Item of Work given in these Particular Specifications are at variance with the Provisions/Specifications given in MES Schedule, Specifications/Provisions given in these Particular Specifications shall be followed. However for pricing of Deviation Orders, Rates given in MES Schedule Part II shall be adopted.
- 1.1.7. Where Specifications for any Item of Work are not given in MES Schedule or in these Particular Specifications, Specifications given in relevant Indian Standard Specifications or Code of Practice shall be followed.
- 1.1.8. Particular Specifications given here-in-after shall be read in conjunction with the Provisions in the MES Schedule and relevant **Bureau of Indian Standards** referred to thereto and in these Particular Specifications. In case of any discrepancy, the Provisions in these Particular Specifications shall take precedence.
- 1.1.9. Materials/Accessories/Equipments for which MAKE have not been specified in these Particular Specifications, shall be of BIS Makes and shall strictly comply with Current Appropriate BIS Specifications, for which BIS Specification has not been issued/available, they shall comply with the Currents BS Specifications or as approved by GE.
- 1.1.10. These Particular Specifications shall deem to be includes the APPENDICES attached here-in-after.

1.2. SCOPE OF WORK

- 1.2.1. This Contract includes for the full, final and entire completion of Works described in SCHEDULE 'A' included in GENERAL SUMMARY and specified in these Particular Specifications and shown on Drawings forming part of the Tender documents.
- 1.2.2. Tenderers are advised to visit the SITE(S) and ascertain for themselves the exact scope of Work and its Working Conditions, viz Working Hours, Availability of Site(s), etc. and quote their Tenders accordingly. Any Claim whatsoever, on such/these accounts will not be entertained by the Government at a later Date/Stage.
- 1.2.3. The contractor shall submit **Quality Control Plan Part I as per Appendix 'A' to the GE within 30 days of the commencement of work**. The Part II of Quality Control Plan shall be completed by GE and shall be forwarded to CWE for approval. **The quality Control Plan shall be approved by CWE and a copy thereof shall be forwarded to Accepting Officer.**

1.3. SITE OF WORK

- 1.3.1. The Works shall be carried out at different Locations/Site(s). The Contractor shall finalize the programmed with the Engineer-in-Charge well in advance in such a way that neither the USERS feel inconvenience nor Work is delayed.

PARTICULAR SPECIFICATIONS (CONTD.....)

1.3.2. Buildings under occupation of USERS where Works are to be executed, the Contractor shall make himself aware about the Nature of the Work involved for carrying out Works against the Items catered for in SCHEDULE 'A'. The Contractor is deemed to have inspected the Site of Work and nothing extra shall be admissible to Contractor on this ground.

1.3.3. The proposed Location of Various Works shall be as directed by the Engineer-in-Charge at Site(s) of Works.

1.4. VISIT TO SITE

1.4.1. The Tenderers are advised to Contact GE on any Working Day during Working Hours, who will arrange for their Visit to Site of Work.

1.4.2. The Tenderer shall be deemed to have visited the Site of Work before Quoting their LUMP SUM AMOUNT/ PERCENTAGE/UNIT RATES and no Claim for any EXTRA PAYMENT on account of any misunderstanding, etc. will be entertained by the Department, irrespective of the fact whether they have actually visited the Site or not.

2. MATERIALS**2.1. GENERALLY**

2.1.1. All Materials to be supplied by the Contractor for incorporation in the Work shall conform to relevant IS Specifications. In case Specification of any Materials needed for incorporation in work is not contained in any of the Contract Documents, the Specification of such Materials/Articles to be incorporated in work shall be got approved in writing from the GE before their incorporation in work by the Contractor without any Price Adjustment.

2.1.2. The relevant **Bureau of Indian Standards** shall be of Latest Revision including Amendments if any. The Contractor shall incorporate in the work Materials complying with the requirements of relevant Bureau of Indian Standards of the Latest Publication (Edition) including all amendments/revision issued by **Bureau of Indian Standards on and before** bid submission end date, thereof without any Price Adjustment in the Quoted Lump Sum.

2.1.3. As far as practicable all manufactured Materials/Articles other than those manufactured in Contractor's Workshop at Site shall bear IS Certification Marks. In case, any Article not bearing IS Certification Marks but conforming to relevant Specification is proposed to be incorporated in the Work, Samples of the same shall be got approved in writing from GE before their incorporation in work. The Contractor shall submit sufficient evidence to the GE to show that such Articles conform to the relevant Specifications and no Price Adjustment shall be made on this account.

2.1.4. Manufactured Materials/Articles shall be brought at Site in Original Sealed Containers/Packing bearing Manufacturer's marking unless the quantity required is a fraction of smallest packing.

2.1.5. Materials of Proprietary nature such as Paints, Water Proofing Compound, Chemicals for Anti-Termite Treatment and the like, Quantity of which cannot be Checked after incorporation in the Work shall be Measured and Recorded in the MEASUREMENT BOOK as soon as those are brought at Site. These Measurements shall be signed both by the Engineer-in-Charge and the Authorised Representative of the Contractor. ORIGINAL STAMP RECEIPTED BILLS alongwith the relevant INVOICES from the Manufacturers or their AUTHORISED DEALERS (if any) in support of having brought the Full Quantity required for incorporation in the Work, shall be produced to Engineer-in-Charge.

2.1.6. The Contractor shall carry out such Instructions that are given to him in Writing by the Engineer-in-Charge to ensure that Full Quantity of such Materials goes in to Work.

2.2. APPROVED MAKES/BRAND OF MATERIALS

2.3. Materials/Accessories/Equipments for which MAKE have not been specified in these Particular Specifications, shall be of Standard Makes and shall strictly comply with Current Appropriate **BIS** Specifications, for which IS Specification has not been issued/available, they shall comply with the Currents **BIS** Specifications or as approved by GE.

2.4. A list of certain items for which specific manufacturers/ make only are to be provided in this contract (other than steel and cement) are given in Appendix 'B'

2.5. APPROVED SOURCES OF LOCAL ORIGIN MATERIALS

2.5.1. Materials such as Bricks, Aggregates, etc., shall generally conform to the Samples kept in GE's Office in addition to their conformity with relevant Specifications given in the Tender documents.

PARTICULAR SPECIFICATIONS (CONTD.....)

The Sources and Sample for all such Materials shall be got approved from GE in writing before these Materials are brought at Site in bulk.

2.5.2. The sources of some of the Materials as applicable to the place of execution of the work are indicated in **APPENDIX 'C'** given here in after for the guidance of the Tenderer.

2.5.3. Contractor at his own may procure materials from any other sources without any extra cost to the Department provided that the same conform to respective IS as stated here-in-before.

2.6. **APPROVAL OF SAMPLES/MATERIALS**

2.6.1. Approval of Samples/Materials by GE shall be recoded in a Register labeled as 'SAMPLE APPROVAL REGISTER' to be maintained by the Engineer-in-Charge which interalia shall mention Sources of Supply, Name of Manufacturer, Trade Name/Brand (if applicable) and reference to Clause of Tender Documents containing Specifications of Particular Materials.

2.7. Letters conveying Approval of Samples/Materials by Garrison Engineer shall interalia mention sources of Supply, Name of Manufacturer, Trade Name/Brand (if applicable) and reference to Clause of Tender documents containing Specifications of Particular Materials.

2.8. **STANDARD OF QUALITY & WORKSMANSHIP**

2.8.1. **GENERAL**

2.8.2. The Work shall strictly comply with the provisions contained in the Latest Edition of INDIA STANDARD CODE OF PRACTICE and/or IS SPECIFICATION as applicable, Works except where such Regulations and Rules are modified by these Particular Specifications.

2.9. All Works shall be carried out by properly Skilled Trademan. The Contractor shall on demand shall produce such evidence of Qualifications of his Workmen / Skilled Trademan / Supervisors/ Engineers, either at the commencement of Work or at any time thereafter/during currency of the Contract. The entire Work shall be High Class with the best Workmanship and to the entire satisfaction of Engineer-in-Charge/ GE.

3. **EXCAVATION & EARTH WORK**

3.1. **GENERALLY**

3.1.1. The Lump Sum Amount against Schedule 'A' Part-I shall be deemed to be included for all Excavation and Earth-work in foundation in **soft / loose soil** (including earth required for raising of existing ground level to made-up-ground level / Road level etc.) if required as per drawing. If during execution, any other type of strata is met with, the same shall be ordered through a Deviation order.

3.2. **HARD ROCK:-**

3.2.1. If Hard Rock is met with in Excavation, the same shall be intimated to the GE in writing by the Contractor and shall be entered in the Measurement Book duly signed by Engineer in Charge and Contractor. Hard Rock / Boulders obtained from Excavation shall be properly stacked, measured and recorded in Measurement Book and will be the property of the Contractor. Credit at the Rate of **₹ 500.00 PER CUBIC METRE** of hard rock/Boulder obtained shall be recovered from the Contractor. The measurement shall be signed by the Contractor and the Engineer-in-Charge. Hard rock thus obtained can be reused in the execution under this Contract subject to fulfillment of requisite specification specified here-in-after and after written approval of GE.

3.2.2. Mode of measurement of stones/boulders for the purpose of recovery shall be as follows:

(a) Refer IS **IS 1200 part-I**

(b) Boulders (**size as per IS 1200 part-I**) obtained during excavation from hard/dense soil and boulders (size as per IS 1200 part-I) shall be neatly stacked at site by the contractor without any extra cost to the Department. A deduction of 40%(Maximum) shall be made for voids in stack measurements and accordingly quantity of stones/boulders shall be worked out.

(c) In case hard rock is met at site, complete quantity of hard rock obtained during excavation shall be issued to the contractor. Quantity of hard rock for issue purpose shall be considered same as that of excavation done in Hard Rock.

(d) The hard rock/stone boulders shall be issued to the extent available from the excavation

3.2.3. In case due to encountering of hard rock /boulders during excavation , extra earth work is required for returning filling in foundations as per drawing, the contractor shall re-use any surplus earth retrieved from Schedule 'A' Part-II. However, approved earth required for returning filling beyond the surplus earth retrieved from Schedule 'A' Part-II, may be obtained from outside Defence land which the same will be regularized through deviation order (DO).

PARTICULAR SPECIFICATIONS (CONTD.....)

3.2.4. If Soft/Disintegrated Rock or any other type of Soil is met with the same shall be disposed off/re-used in filling as and where permitted by the GE. The decision of GE in this regard shall be Final, Conclusive and Binding.

3.2.5. If hard strata are met with, which can neither be treated as the Soft rock nor Hard rock within the definition of MES Schedule, the same shall be treated as Hard soil.

3.2.6. **Blasting of rock is not permitted during execution of Work at Site.**

3.3. SITE CLEARANCE AND SURFACE DRESSING

3.3.1. Site Clearance and Surface Dressing for the areas covered by Buildings extending upto 3.0 Metre around the Outer Perimeter of the Plinth Protection or External Wall of the Building (wherever Plinth Protection is not shown or not to be provided) and/or upto 3.0 Metre from the outer most execution details as per Drawings for works other than Buildings shall be carried out as per Clause No. 3.6 and 3.10 of MES Schedule Part-I to the entire satisfaction of the Engineer-in-Charge. All Rubbish obtained from Site Clearance and all Spoil obtained from Surface Dressing shall be removed, spread and leveled as directed by Engineer-in-Charge. The Cost of Site Clearance and Surface Dressing shall be deemed to be included in the quoted Lump Sum Amount against Schedule 'A' Part I.

3.4. EXCAVATION IN TRENCHES AND OVER AREAS

3.4.1. Excavation in Trenches and Over Areas shall be carried out as described in Clause No. 3.13.1 to 3.13.5 of MES Schedule Part-I.

3.4.2. Excavation shall be restricted to Dimension as shown on Drawings and as specified in MES Schedule. Excavation made if any, in excess of required Depth/ Authorised Width shall be made good by the Contractor with Cement Concrete 1:5:10 (40 mm graded stone aggregate) without any Extra Cost to the Govt.

3.4.3. In case of Excavation in Hard Rock, Extra Depth of Excavation in excess to the required Depth shall be made with Cement Concrete 1:4:8 (40 mm graded stone aggregate) without any Extra Cost to the Govt.

3.4.4. Beds of the Trenches/Column shall be watered and well rammed and any depression thus formed shall be filled with approved earth as required and level and slope as directed by the Engineer-in-Charge.

3.4.5. After construction and before handing over any Building, the Area around shall be dressed without any Extra Cost to the Govt.

3.4.6. For the purpose of reckoning the depth of Foundation, the Average Level of the Ground after Surface Dressing shall be considered.

3.4.7. If Rock (Soft/Disintegrated and Hard) is met at Site, Contractor shall immediately notify the facts to GE in writing.

3.5. BAILING AND PUMPING

3.5.1. A Tenderer shall ascertain himself the Level of Sub-Soil Water at Site of Work to allow in his Tender for any Bailing and Pumping out of Water, etc. as per Site Condition. Bailing and Pumping out of Water, if required, will be done as described in Clause No. 3.17 of MES Schedule Part-I. No Extra Payment shall be admissible for the above mentioned operations. In the event of Deviation, no Adjustment shall be made for Cost of Bailing, Pumping and De-watering as specified here-in-before.

3.6. FILLING IN TRENCHES, UNDER FLOORS :-

3.6.1. Refer Para 3.19 and sub paras of 3.19 of MES Schedule Part-I.

3.6.2. Soil obtained from excavation (except earth / spoil obtained from surface dressing/ surface excavation) may be used for filling under floor & filling around foundation, if only the earth so obtained is of **non-expansive type** and same shall be approved by GE & CWE in writing.

3.6.3. Approved soil as obtained from excavation (other than **expansive soil**) shall be utilized 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. Filling under floors/sides of trenches shall be in layers not exceeding 250 mm and each layer shall be compacted by rammers of 7 to 10 Kg weight. Earth filling shall be adequately watered for achieving maximum compaction. Thickness shown on drawings shall be consolidated thickness. In case due to actual site conditions excess earth is required to make up height of finished floor level including raising ground level as shown in drawings and as specified in these tender documents the contractor shall arrange earth at his own from outside Defence land and his rate against schedule 'A' Part I shall be deemed to include for the same. In case of pricing of deviation the approved earth/sand

PARTICULAR SPECIFICATIONS (CONTD.....)

obtained from outside Defence land shall be priced at applicable rates of MES Schedule Part II adjusted by contractor's percentage for rough excavation in soft/loose soil and removal. The distance shall be considered as exceeding 1.5 KM but not exceeding 5 KM. No royalties for earth obtained from outside MOD land shall be paid extra. However, in case the hard rock is met with at site, the provisions as per para 3.2.3 here-in-before shall be applicable

3.6.4. In case due to encountering of **expansive soil** during excavation , extra approved earth is required for returning filling in foundations as per drawing, same shall be obtained from outside Defence land which shall be regularized through deviation order after approval of Accepting Officer.

3.7. EARTH FILLING/CUTTING FOR SITE/AREA DEVELOPMENTS/ TRAVERSES

3.7.1. Refer Para 3.22 and subsequent Clauses of MES Schedule Part-I.

3.7.2. The excavation shall be carried out as under :-

3.7.2.1. A Board of Officers shall be **ordered by CWE** to take the initial level of the **original existing ground of proposed enter site(s) as per site plan**. Further the final formation levels of earth filling site(s) shall be taken. The formation quantities shall be worked out based on the levels. Initial and final levels of proposed earth fill/cutting site(s) shall be worked out based on the level sheet prepared by the Board of Officers and quantity shall be computed using software for Total Station, random check of quantity computed by the software shall be made by the GE as per method given here-in-after to satisfy himself for the correctness of the quantity computed by the software.

3.7.2.2. Before commencing the work, the existing ground levels of the whole area under proposed work shall be taken by Board of Officers as under :-

3.7.2.2.1. Existing ground levels shall be taken at 3m grid and upto 3m beyond the outer edges of the proposed work.

3.7.2.2.2. All these levels will be recorded in level books and contour shall be plotted on graph papers. The level book and graph papers shall be signed by the Contractor and BOO.

3.7.2.2.3. Contractor shall provide Total Station and other instrument as required with operators of total station for taking the initial level and final levels for Board of Officers without any extra cost to the Govt. and quoted lump sum in by the bidder/tenderer shall be deemed to inclusive of this provision.

3.7.2.2.4. 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 bldgs with flags on all boundaries /four corners.

3.7.2.2.5. FINALISATION AND APPROVAL OF INITIAL LEVELS :- Recording of initial levels at site as mentioned in here-in-above shall be completed within a period of 30 days from the date of commencement of work as per BOO ordered by CWE. The level sheet alongwith the board proceedings and proposed modified ground level and formation level of road shall be forwarded by GE duly recommended, immediately to CWE for approval /concurrence **under intimation to AO**. Only after approval of Initial levels and propose modified ground level and formation level of road by CWE , any earth work shall be commenced and the original existing ground levels shall not be disturbed till approval of level sheet by CWE.

3.7.2.2.6. The work in cutting and filling shall be carried out as instructed by the GE.

3.8. METHOD OF MEASUREMENTS AND CALCULATION FOR EXCAVATION AND EARTH WORK

3.8.1. The area of cutting / filling in each cross sections shall be separately computed by Simpson's Rule as described here-in-after. The volume (Cubic contents) of cutting and filling shall be separately computed by Prismoidal Formula.

3.8.2. For computing area of cross sections the interval between two ordinates shall be as decided by the Engineer-in-Charge to suit the site conditions but in no case it should exceed 3 m.

3.9. REMOVAL OF SURPLUS SOIL

3.9.1. Surplus Soil and/or Rubbish obtained from Excavation shall be disposed unless otherwise specified in Particular Specifications here-in-after, upto a distance of exc. 50 Metre and not exc. 100 Metre at the Location(s) as directed by Engineer-in-Charge, deposited, spread and levelled as specified in MES Schedule Part-I.

3.9.2. Soil/earth obtained from excavation shall be used for returning filling in places where any other type of filling like moorum/sand is not specified or shown in drawings after separating it from grass, vegetations and other foreign materials.

PARTICULAR SPECIFICATIONS (CONTD.....)**3.10. HARD CORE**

- 3.10.1. Refer Clause No. 3.27 and subsequent Clauses thereof of MES Schedule Part-I as applicable.
- 3.10.2. The material for Hardcore wherever mentioned in Particular Specifications here-in-after or as indicated in Drawings shall be of Crushed/Broken Stone Aggregate (at the discretion of Contractor without any Price Adjustment) of gauge not exc. 63 mm conforming to IS-383. In case Coarse Aggregate does not conform to CA provision, the same shall be replaced by the Contractor, with out any Extra Cost to the Govt., so as to conform the Aggregate to the relevant IS and CA provision.
- 3.10.3. The Hardcore shall be spread, watered and rammed. The thickness of Hardcore shown in Drawings/ Sch A are the consolidated thickness. Where thickness is not indicated in Drawings, it shall be 150 mm thick consolidated.

3.11. PRECONSTRUCTION ANTITERMITE CHEMICAL TREATMENT

- 3.11.1. Pre-constructional anti-termite chemical treatment shall be done as per Para 3.26 of MES Schedule Part-I and IS: 6313 Part-1 and Part-2:2013/2016(latest) .
- 3.11.2. Anti-termite treatment shall be got done through approved specialist agency which is registered by the Pest Control Association of India (PCAI) / Indian Pest Control Association (IPCA). Persons employed to do the anti-termite treatment in this work shall be qualified as per rule 10 of the rules framed under the inspection rule 1971. The specialist agency may be any one from list approved by E-in-C Branch/Headquarter Chief Engineer Eastern Command/ Headquarter Chief Engineer Shillong Zone(SE Falls), which are located and active in the area with prior approval of GE.
- 3.11.3. Chemical for ATT shall be **Chloropyriphos** EC 20% (as per IS: 8944-2005) or **imidacloprid** 30.50 SC (as per IS: 16131) all as specified in **Table 1 on page 2 of IS 6313 (Part 2) : 2016**. The chemical shall be brought in original sealed containers & should be purchased from valid BIS license holder (CML) or their authorized agents and any other firm manufacturing ISI marked chemical after taking written approval from GE .The Contractor shall submit test certificates of the chemical from manufacturers. The contractor shall be required to get the chemical tested from any laboratory approved by GE for its properties and the cost of chemical for testing, testing charges and any other charges such as transportation charges etc. shall be borne by the contractor irrespective of its test results.
- 3.11.4. Concentration of the chemical as emulsifiable concentration is indicated on the sealed containers. For obtaining specified concentration, chemical shall be diluted with water in the required quantity before it is used. Graduated containers shall be used for the dilution of the chemical.

4. CEMENT CONCRETE WORK**4.1. MATERIALS**

4.2. **CEMENT** :- Refer paras 4.3 & 4.3.1 of MES Schedule Part I.

4.2.1.1. **TYPE OF CEMENT** : Cement shall be Ordinary Portland cement Grade 43 conforming to IS: 8112 of 2013 or Portland Pozzollana cement conforming to IS 1489.

4.2.1.2. The following checks and procedures shall be followed before the cement supplied by the contractor is accepted and is approved for incorporation in the works.

4.2.2. PROCUREMENT.

4.2.2.1. Cement supplied by the contractor shall be procured from main producers of cement

4.2.2.2. The following are the approved main cement manufacturers company of OPC and PPC.

(A) PAN INDIA LEVEL CEMENT MANUFACTURER'S			
Sl No	Company Name	Address	Approved grade of cement
1.	M/s The Associated Cement Companies Ltd (Brand : ACC)	414-421, Splendor Forum (4th Floor} , 3, District Centre, Jasola, New Delhi – 110044, Ph- 011 46583600	All Grade of OPC & PPC
2.	M/s Ultra Tech Cement Ltd (Brand : ULTRATECH)	'B' Wing, 2n Floor, Mahakali Caves Road, Andheri (East), Mumbai- 400093, Ph-002-66917800	All Grade of OPC & PPC

PARTICULAR SPECIFICATIONS (CONTD.....)

3.	M/s The India Cement	Dhun Building, 827, Anna Salai, Chennai- 600002	All Grade of OPC & PPC
4.	M/s Dalmia Cement (Bharat) Ltd (Brand : “DALMIA” & “KONARK”)	Dalmiapuram, Dist-Truchirappalli, Tamil Nadu - 621651	All Grade of OPC & PPC
5.	M/s Century Cements (Brand : CENTURY)	Industry House, 159 Church gate Reclamation, Mumbai -400020, Ph-22-22023936	All Grade of OPC & PPC
6.	M/s Saurashtra Cement (Brand : SAURASHTRA)	Gala No A-1, Ground Floor. Udhyog, Sadan No 3 MIDC, Central Road, Andheri (East), Mumbai- 400093, Ph-022 32955557/67 MO-9320290081	All Grade of OPC & PPC
7.	M/s The Ramco Cements Ltd. (Formerly Madras Cement) (Brand : RAMCO)	Auras Corporate Centre, 98-A, Dr. Radhakrishnan Salai, Mylapore, Chennai – 600004, Ph-044 28478666	All Grade of OPC & PPC
8.	M/s Mangalam Cement Ltd (Brand : MANGALAM)	PO Adityanagar, Morak, Dist-Kota, Rajasthan - 326520 Ph-9351468076	All Grade of OPC & PPC
9.	M/s Birla Corporation Ltd (Brand : BIRLA)	Birla Building (3rd & 4th Floor), 9/1 , R.N Mukherjee Road, Kolkata -700001, Ph-033-30573700	All Grade of OPC & PPC
10.	M/s Orient Cement (Brand : ORIENT)	5-9-22/57/D, 2nd and 3rd Floor, GP Birla Centre, Adarsh Nagar, Hyderabad-500063, Pin-044 23688600	All Grade of OPC & PPC
11.	M/s Nuvoco Vistas Corporation Ltd (Formerly Lafarge Cement) (Brand : NUVOCO)	Equinox Business Park Tower-3, East Wing, 4 th Floor LBS Marg, Kurla (West), Kurla Mumbai, Maharashtra – 400 070	All Grade of OPC & PPC
12.	M/s Shree Cement (Brand : SHREE)	Bangur Nagar, Beawar, Dist:-Ajmer, Rajasthan-305901 Ph -01462 228101-06	All Grade of OPC & PPC
13.	M/s J K Cement (Brand : J K)	Kamla Tower Kanpur-208001	All Grade of OPC & PPC
14.	M/s J K Lakshmi Cement Ltd (Brand : J K LAKSHMI)	Jaykaypuram, Dist-Sirohi, Rajasthan Ph- 02971 244409/10	All Grade of OPC & PPC
15.	M/s Jaypee Rewa Cement (Brand : JAYPEE)	Jaypee Nagar, PO-Jaypee Nagar, Rewa- 486450, M.P	All Grade of OPC & PPC
16.	M/s Ambuja Cement Ltd (Brand : AMBUJA)	Kodinar, PO-Ambujanagar, Taluka-Kodinar, Dist-Junagadh, Gujarat-362715 Ph-02795 237000	All Grade of OPC & PPC

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17.	M/s Shree Guru Kripa Cement (Pvt) Ltd (Brand : SARTAJ)	4/4 Trikuta Nagar Jammu, Phone no-0191-2472043	OPC-43 Grade & PPC
18.	M/s Parasakti Cements Ltd (Brand : PRASAKTI Cement)	123/3 RT, Plot # 8-3-214/21, Srinivasa Nagar Colony(West), Hyderabad-500038, Tel- 040-44119100 /200, Fax- 040-23747562	OPC-43 Grade & PPC
19.	M/s My Home Industries Ltd (Brand : MAHA CEMENT)	9 Floor, Block-3, My Home Hub, Madhapur, Hyderabad- 500081, Ph- 040-66929696, Fax- 040-66929797/98	OPC-43 Grade, PPC & PSC
20.	M/s Chettinad Cement Corporation Ltd (Brand : CHETTINAD Cement)	4 Floor, Rani Seethai Hall Building, 603, Anna Salai Hall, Chennai-600006, Tel No. 044-42951800, Fax No. 044-28291558, Email: -info@chettinadcement.com Website- www.chettinadcement.com	OPC-43 Grade & PPC
21.	M/s Sanghi Industries Ltd (Brand : SANGHI)	10 th Floor, Kataria Archade, Offs S G Highway, PO-Makarba, Dist-Ahmedabad, Pin-380051 Mob. 09825803690, Tel. 079 26838000, Fax. 079 26838111. Website : www.sanghiment.com	OPC-53 Grade & PPC
22.	M/s Wonder Cement Ltd (Brand : WONDER CEMENT)	17, Old Fatehpur Seva Mandir Road, Udaipur – 313004 Rajasthan (India) Tele : +91-294-33991133 Fax : +91-294-3006333 Email : corp.office@wondercement.com	OPC-43, OPC-53 Grade & PPC
23.	M/s Kesoram Industries Ltd (Brand : Birla Shakti)	Cement Division, Office No. 613 to 616 White House, Block-III, VI Floor, 6-3-1192/1/1 Kundanbagh, Begumpet, Hydrabad – 500016 (Telengana) Tele : +91-40-4334-4555 Fax : +91-40-4334-4534	OPC-43, OPC-53 & PPC
24.	M/s JSW Cement Ltd, A.P {Brand : JSW PSC (Portland Slag Cement)}	JSW Centre Opp MIMRDA Ground Bandra Kurla Complex, Bandra (East) Mumbai – 400051 Tele : +91-22-4286-5047 Fax : +91-22-2650-2001 Website : www.jswcement.in	PSC

(B)	REGIONAL LEVEL CEMENT MANUFACTURER'S		
1.	M/s Shiva Industries, Kathua (Only for J&K Region)	6, Industrial Extn Area Kathua-184102, J&K	OPC

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2.	M/s Star Cement Manghalaya (Only for CE Shillong Zone & CE(AF) Shillong area)	Lumshnong, PO-Khaliehriat, Dist-Jantia Hills, Meghalaya, Ph-03655 278215/16/18	OPC & PPC
3.	M/S Meghalaya Cements Ltd (Only for Eastern Region) (Brand : TOP CEM)	Lohia House, M. G Road Factory Bazar, Guwahati-781001. Tel 0361 -260367/671	OPC & PPC

4.2.2.3. The following conditions shall have to be satisfied before PPC shall be allowed to be used in the work:-

- (a) **PPC should meet the strength criteria of 43 Grade OPC as laid down in IS-8112-2013.**
- (b) The minimum period before striking off form work while using PPC shall be as given in relevant PS clause here-in-after.
- (c) In cold climate regions where temperature is lower than 15° C only OPC shall be used.
- (d) Mixing of OPC & PPC shall not be allowed in a work. However with the strict control of ground executives different buildings can have different types of cement.
- (e) While procuring PPC, the following requirements are to be ensured and certificate to the effect is to be obtained by the contractor for each batch from the manufacturer and the same shall be submitted to the GE for approval to procure PPC :-
 - (i) The quality of fly ash is strictly as per IS-1489(Part-I)- 2002.
 - (ii) Fly ash is inter-ground with clinker not mixed with clinker.
 - (iii) Dry fly ash is transported in closed containers and stored in silos. Only pneumatic pumping have been used.
 - (iv) The fly ash received from thermal power plants using high temperature combustion above 1000 ° C have been used.

4.2.2.4. The particulars of the manufacturer /main producer of cement along with the date of manufacture shall be submitted by the contractor for every lot of cement separately. The documents in support of purchases of cement shall be verified by the site staff and GE.

4.2.3. STORAGE

4.2.3.1. There will be two separate godowns provided by contractor at site of works exclusively for storage of cement :-

4.2.3.1.1. "First Godown" will have the cement lot(s) for which independent testing is to be got done and/or under process.

4.2.3.1.2. "Second Godown" will have the cement lot(s) whose independent testing has been got done and which after successful testing stands approved by GE for incorporation in the work.

4.2.3.2. Cement shall be stored over dry platform with gap of 20 cm from walls around and at least 20 Cm high from floor level. Compliance of provisions in clause 4.3.1 of MES Schedule Part I shall be ensured. Godowns shall have easy access for proper inspection and cement shall be protected from dampness/moisture to minimise storage deterioration or intrusion of foreign matter.

4.2.3.3. Both the godowns shall be provided with two locks on each door. The key of one lock at each door shall remain with the Engineer-in-Charge or his representative and that of the other lock with the contractors' authorised agent at the site of works so that cement is removed from the godown only according to the requirements for independent testing purposes or for daily consumption purposes with the knowledge of both the parties.

4.2.4. TESTING OF CEMENT

4.2.4.1. Contractor shall submit particulars of manufacturer of cement along with the date of manufacture for every lot of cement separately. The manufacturer is to carry out inspections and testing of cement in accordance with the relevant BIS provisions. Contractor shall also submit manufacturer's test certificates in original alongwith the test sheet or an authenticated copy thereof giving results of each physical test as applicable and the chemical composition of cement. The documents giving above particulars shall be verified by site staff and GE in support of the

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purchases of cement and these details shall be recorded in the Cement Acceptance Register as per proforma given in Appendix 'D' to the tender documents here-in-after.

4.2.4.2. The GE shall organise independent testing of random samples of cement drawn from the various lots which shall be got tested by the contractor under his own arrangements and the cost of both materials and labour required for sampling, testing, packing, transportation of samples to the testing places and testing charges thereof, and for subsequent identification of cement sampled, shall be borne by the contractor. The independent testing shall be got done from any of the following where facilities exist for all the tests required, viz, National Test House, SEMT Wing CME, Regional Research labs, IITs, National Institutes of Technology, Zonal Laboratory/ Command Testing Laboratory testing , NABL laboratories, Govt Engineering Collage or Any Govt laboratories.

4.2.4.3. The independent testing shall be got done as per :-

- (a) IS--3535 : Method of sampling hydraulic cement.
- (b) IS-4031 : Methods of Physical test for hydraulic cement.
- (c) IS-4032 : Method of chemical analysis of hydraulic cement.

The other relevant IS shall also be followed. However the tests shall be restricted to those indicated in Appendix 'E' to the tender documents here-in-after.

4.2.4.4. The above tests shall be independent tests. The samples shall be taken immediately within one week of delivery at the site of works and all the tests got carried out by contractor within one week of sampling. In case it is not possible to test the samples within one week, the samples shall be packed and stored in air tight containers as decided by GE till such time that they are tested.

4.2.4.5. The entire lot(s) of Cement shall stand rejected, if it does not comply with any of the requirement of IS specifications and the test results on samples are not within the acceptable limits. The rejected lot(s) shall be removed from the site of works by the contractor under their own arrangement and cost. The cost of tests shall be borne by the contractor irrespective of the results.

4.2.4.6. The contractor shall use only one type brand of cement for entire structural/reinforced concrete work. In the event of contractor desiring use of any different brand of cement, fresh design mix shall be carried out and submitted for approval without any extra cost to the Govt.

4.2.5. **DOCUMENTATION**

4.2.5.1. The contractor shall submit original paid vouchers from the main manufacturers for the total quantity of cement supplied under each consignment brought to the site of work.

4.2.5.2. All consignments so received at the work site shall be inspected by GE alongwith the relevant documents for permitting storage in the "first godown" defined here-in-before.

4.2.5.3. The original vouchers and the test certificates shall be kept in record in the office of GE duly authenticated and with cross reference to the Control Number recorded in the Cement Register as per format given in Appx 'D' in the tender, maintained for "first godown" duly signed by JE (Civ), Engineer-in-charge, GE and the contractor.

4.2.5.4. After the independent testing has been got done by GE and satisfactory results obtained and kept on record, the consignment so got tested shall be removed from the "first godown" and transferred to "second godown" as defined here-in-before. Original vouchers and the test certificates submitted by the contractor alongwith the consignment and test certificates of independent testing shall be defaced by Engineer-in-charge and kept on record of GE duly authenticated and with cross reference to the control Number rendered in the cement register maintained for the "Second Godown". This second register shall be termed as "Cement Acceptance Register" which shall be signed by JE (Civ), Engineer-in-Charge, GE and the contractor. It shall be as per format given at Appx 'D' to this tender as an extra provision similar to "Details of test certificates" and termed as "Details of Independent test certificate". Besides this the quantity of cement shall be also suitably recorded in the Measurement Book for record purposes before incorporation in the work and shall be signed by Engineer-in-charge and the contractor.

4.2.5.5. The Accepting Officer may order a Board of officers in which contractor shall also be a member for random check of cement and verification of connected documents.

4.2.5.6. Daily inspection shall be carried out by Engineer-in-charge or his representative and contractor's authorised agent and separate register shall be maintained in both the godowns duly indicating on daily basis the inspection carried out and indicating holding in godown at beginning of the day, inward supplies in the day, removal in the day and balance at the close of the day duly signed by above persons. In the removal column particulars of lot removed and purpose for which removed shall be indicated.

4.2.5.7. The purchase voucher and test certificate of manufacturer shall be linked.

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4.2.6.1. Random sample of 5 bags per 100 bags shall be got weighed by Engineer-in-charge in presence of representative of contractor from each consignment to arrive at average weight per bag for calculating total quantity of cement brought at site for incorporation in the work. All arrangement for weighing of cement bags including labour etc shall be provided by the contractor at their own cost.

4.2.6.2. The quantity of cement arrived at as aforesaid shall be considered for payment as applicable in accordance with IAFW-2249, General Conditions of Contracts.

4.2.6.3. Only when the test results of independent tests carried out on the cement are found satisfactory and it is permitted to be stored in the "Second Godown" and quantity entered in MB, then only this lot shall be considered for payment in RARs.

4.2.6.4. Payments shall be restricted as per provisions in clause "Advance on Account" of General Conditions of Contracts (IAFW-2249).

4.2.6.5. **CURING AND MINIMUM PERIOD FOR STRIKING OFF FORM WORK WHEN** PPC is used for RCC works in various locations, the minimum period for curing and striking off form work shall be as under in lieu of that specified in clause 4.11.6.3 of MES Schedule Part-I.

(a)Curing :-

- (i) Structural RCC work, : 21 days
- (ii) PCC work, plastering etc : 14 days

(b) Striking off form work :-

- (i) Walls ; columns and vertical sides of beams : 3 to 4 days.
- (ii) Slabs (Props left under) : 8 days.
- (iii) Beams soffits (Props left under) : 9 days.
- (iv) Removal of props to slab/beam :-
 - (a) Spanning upto 6 M Span : 16 days
 - (b) Spanning beyond 6 M Span : 22 days
- (v) For cantilever portion of slab form work with support shall be retained until the completion the casting of the entire frame work of the building.

4.2.6.6. In case of bad weather, periods mentioned above may be revised at the discretion of the Engineer-in-Charge. The contractor shall be deemed to have considered the above provision before tendering and quote lump sum accordingly. No claim will be entertained if longer periods required for striking off form work and curing and all such effected matters are looked into upon the use of pozzolana cement as a result being issued to the contractor in full or part of for bad weather.

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

4.3. COARSE AND FINE AGGREGATE FOR PLAIN & REINFORCED CEMENT CONCRETE

4.3.1. Coarse aggregate for all concrete shall be graded crushed hard granite, trap or basalt stone as approved by the GE and shall conform to the requirements laid down in clause 4.4 of MES schedule Part I. Hand broken stone aggregate shall not be permitted for use in the work. Size and grading of aggregate shall be as per clause 4.4.7.1 of MES Schedule Part I.

4.3.2. GRADING OF AGGREGATES

4.3.2.1. **GRADING OF COARSE AGGREGATE** - Grading of Coarse Aggregate for Plain and Reinforced Concrete i.e. Stone Aggregate shall be as per Clause No. 4.4.7 (1) of MES Schedule Part I.

4.3.2.1.1. Grading of Coarse Aggregate unless otherwise specified shall be as follows :-

- (a) For Reinforced/Structural Element of depth/thickness 50mm or under : 12.5mm graded
- (b) For Reinforced/Structural Element of depth/thickness over 50mm : 20mm graded
- (c) For Plain Cement Concrete thickness exc. 25mm but not exc. 75mm : 20mm graded
- (d) For Plain Cement Concrete thickness 75mm and over : 40mm graded

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(e) Lime Concrete

: 40mm graded

- 4.4. **Fine Aggregate:** Fine aggregate for all concrete work shall be naturally occurring river sand conforming to the specification in Para 4.4.7.2 of MES schedule Part I. Use of sand conforming to grading Zone IV of IS 383 (1970 second revision or as amended) shall not be allowed for RCC works.
- 4.5. **WATER PROOFING COMPOUND**
- 4.5.1. Refer Clause No. 4.8 of MES Schedule Part I.
- 4.5.2. Integral water proofing compound shall conform to IS: 2645 and only liquid water proofing compound shall be used in the work. The brand thereto shall be got approved in writing from the GE before they are brought to site. Proportion of mix and method of mixing shall be as per manufacturer's printed instructions. However for the purpose of pricing deviation, it shall be considered at 200 ml per 50 Kg bag of cement.
- 4.6. **WATER**
- 4.6.1. Water shall conform to the requirement stipulated in IS-456 and as per Clause No. 4.9 and 4.9.2 of MES Schedule Part-I.
- 4.7. **PLASTICISER**
- 4.7.1. Plasticiser shall be used in Design Mix Concrete as per the Manufacturer's instruction without any Extra Cost to achieve the desired Results Strength and Workability. Plasticiser manufactured by M/s SIKA INDIA Pvt. Ltd./ M/s BASF INDIA Ltd. / M/s CICO TECHNOLOGIES Ltd. / FOSROC CHEMICALS Pvt. Ltd. / MC BAUCHEMIE INDIA Pvt. Ltd. shall be used. However Plasticiser should confirm to IS-9103.
- 4.8. **WORKMANSHIP**
- 4.8.1. **GENERAL**
- 4.8.1.1. Refer Clause No. 4.11 of MES Schedule Part-I as applicable and as directed by the Engineer-in-Charge.
- 4.9. **MIX OF CONCRETE**
- 4.9.1. **VOLUMETRIC MIX CONCRETE** – Wherever the Concrete is specified/ordered in Volumetric Proportion the same shall be provided by Volumetric Mix. Volumetric Mix shall be done all as specified in Clause No. 4.11.2.4 of MES Schedule Part-I.
- 4.9.2. **DESIGN MIX CONCRETE**
- 4.9.2.1. Refer Clause 4.11.2.1 of MES Schedule Part-I. M-25 and M-30 Mix Design shall be carried out as per provisions of IS-456 :2000/IS 3370/IS 2911 where as applicable and guidelines given in IS-10262 and SP 23 with the following conditions unless otherwise specified :-
- | | | |
|-------|---|------------|
| (i) | Exposure Condition for Mix Design M-25 | : Moderate |
| (ii) | Degree of Quality Control for Mix Design M-25 | : Good. |
| (iii) | Exposure Condition for Mix Design (M-30) | : Severe |
| (iv) | Degree of Quality Control for Mix Design (M-30) | : Good. |
- 4.9.2.2. For Design Mix Concrete of M-25 and M-30 Grade, the Minimum Cement Content and water cement ratio shall be as per IS 456/IS 3370/IS 2911. The Contractor is required to Design each Grades of Concrete as per IS 456/IS 3370/IS 2911 and IS-10262 to work out the Cement Content of the above Grade of Design Mix.
- 4.9.2.3. Design Mix shall be got designed from National Test House, SEMT Wing CME, Regional Research labs, IITs, National Institutes of Technology, **Command Test Laboratory**, Govt Engineering College.
- 4.9.2.4. In case Design Mix got other than Command Test Laboratory, the Design Mix Concrete shall be approved by the Accepting Officer prior to incorporation in the work.
- 4.9.2.5. The Design Mix furnished by the laboratory shall include the following details :-
- | | |
|-------|--|
| (i) | Grading of individual coarse and fine aggregate used in Design Mix . |
| (ii) | Proportion by weight of each component of aggregate of Design Mix. |
| (iii) | Water cement ratio for recommended proportions of aggregates. |
| (iv) | Slump and compaction factor values for the recommended Design Mix. |
| (v) | Use of plasticiser/ super plasticiser is permitted to the extent allowed in clause no 10.3.3 of IS 456-200 |

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- (vi) Initial standard deviation to be adopted for acceptance criterion as per IS-456 of 2000.
 - (vii) 28 days Compressive strength of cement supplied for Design Mix.
 - (viii) Actual cement content in the Design Mix.
 - (ix) The maximum free water cement ratio shall be as per table 5 of IS 456-2000. Sampling and acceptance of concrete shall be as per clause 15 & 16 of IS-456 of 2000. The maximum size of aggregate for reinforced cement concrete shall be 20mm.
 - (x) Recommendation of mixed proportions at site.
- 4.9.2.6.** Cost of designing the mix shall be borne by the Contractor. All material required for carrying out the design shall be provided by the contractor at the laboratory. In case of design mix is carried out from Command Test Laboratory and cost testing charge shall be recovered from RARs bill.
- 4.9.2.7.** In case contractor fails to submit the samples of design mix soon after commencement of work, the delay shall solely be attributable to the contractor and no claim of whatsoever nature shall be admissible on this account.
- 4.9.2.8.** The Tenderer shall quote their Lump Sum Amount/Rate for the applicable Items considering the Actual Quantity of Cement required to be incorporated in the Work which is to be assessed by them.
- 4.9.2.9.** No Plus DO (Deviation Order) shall be admissible even if the required/approved quantity of Cement is more than specified in IS 456/IS 3370/IS 2911. Contractor shall be responsible/guarantor to that provide M-25 and M-30 Design Mix Concrete. This shall not be considered as misrepresentation of fact and no claim what so ever on this provision shall be admissible.
- 4.9.2.10.** The Contractor is advised to assess the realistic quantity of Cement for the Design Mix specified above before quoting. If considered necessary, they may get the Design Mix done on their own before quoting the Tender. However, the Design Mix done prior to quoting of Tender shall not be considered for incorporation in the Work after conclusion of Contract and shall have to be done as specified above.
- 4.9.2.11.** A re-verification of Mix proportions for Design mix concrete shall be essential for any different brand of cement. With any change in aggregate source, mix design or grade of cement, fresh design mix shall be done by the contractor. Nothing extra shall be paid on this account. The decision of GE regarding the necessity for re verification or redesign of mix will be final and binding.
- 4.9.3. BATCHING**
- 4.9.3.1.** Refer Clause No. 4.11.3 of MES Schedule Part I.
- 4.9.3.2.** Concrete for all PCC and RCC (design mix and nominal mix) shall be mixed in **semi automatic movable weigh batching machine of capacity as decided by GE based on requirement at site**. The batching machine shall have digital display weighing gauge with weighing accuracy of $\pm 1\%$ (One Percent). The machine shall be located in the vicinity of the site. The machine shall produce the concrete required as per mix design and complete quality assurance and control shall be maintained by the contractor in accordance to IS-456:2000 and best modern Engineering practice. The record of quality assurance tests shall be submitted to the GE for approval and record.
- 4.9.3.3.** Where requirement of concrete is less than 1 cum in a day, the same can be mixed using normal weigh batcher and hopper type mixer.
- 4.9.4. SAMPLING AND TESTING OF CONCRETE OF GRADE M-30 AND M-25 (DESIGN MIX)**
- 4.9.4.1.** Refer Clause No. 4.11.17 of MES Schedule Part-I and as per IS-456. Testing of Concrete shall be carried out by the Contractor as directed by the GE without any Extra Cost to the Department and usages of following Test Equipment at Site shall deemed to be included in Unit Rate of Schedule 'A' :-
- (a) A set of IS Sieves for Fine Aggregate Sieve Analysis (Reference IS-2386).
 - (b) A set of IS Sieve for Coarse Aggregate Sieve Analysis (Reference IS-2386).
 - (c) Two graduated Jars of 500 ml capacity for Silt Test (Reference IS-2386).
 - (d) A set of 6 No. Cube moulds of 7.06 cm size for Testing Strength of Cement.
 - (e) Vicat Needle Apparatus for testing Initial and Final Setting Time.
 - (f) A Physical Balance.
 - (g) Three set of 6 Standard 15 Cm Cube Moulds for testing Compressive Strength.
 - (h) Slump Test Apparatus.
 - (j) Compressive Strength Testing Machine (Automatic operated).

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- (k) Electric Oven.
- (l) Flakiness Index Testing Apparatus

4.10. FREQUENCY OF TESTING

4.10.1. Frequency of Testing of Concrete is given in APPENDIX 'E' here-in-after. Following further requirements are to be met with as regards Testing of Concrete :-

- (i) Each Sample shall consist of 3 Cubes.
- (ii) At least One Sample shall be taken for each shift.
- (iii) In addition to number of Samples specified in APPENDIX 'E' for Testing 28 Days Compressive Strength One Additional Sample for 7 Days Strength shall be casted and tested for each Shift.

4.11. WORKABILITY OF CONCRETE – Refer Clause No. 4.11.4 of MES Schedule Part-I and Clause No.7 of IS-456-2000 and as directed by the Engineer-in-Charge.

4.12. MIX & GRADE OF CEMENT CONCRETE

4.12.1. Refer Clause No. 4.11 of MES Schedule Part-I. The type and grade of concrete shall be as shown on drawings. In case of any discrepancy between structural and architectural drawings the provisions in structural drawings in respect of type and grade of concrete shall supersede. If the details are missing on drawings concrete shall be of following mix/grade at the situation mentioned below: -

- | | | |
|-----|--|---------------------|
| (a) | PCC, Lean Concrete under Wall, Base/Column Footing, Foundation for Ramps, Steps, Lean Concrete under Plinth Beam/Toe Beam/ Steps and the like | M-7.5 (Nominal Mix) |
| (b) | All RCC Work except Water Retaining Structures . | M-25 (Design Mix) |
| (c) | RCC Work in all structural member for Water Retaining Structures . | M-30 (Design Mix) |
| (d) | PCC in Bed Block, Benching, Cill, Coping, Plinth Protection, Pre-cast Articles and Plain Cement Concrete in any Situation not specified elsewhere | M-15 (Nominal Mix) |
| (e) | PCC Filling in back of Pressed Steel Door Frame, Drain, Solid PCC Block and Plugging of Holes left due to Scaffolding, etc. and the like(unless otherwise specifically indicated in Drawing/here-in-after) | M-10 (Nominal Mix) |

4.13. FORM WORK & SCAFFOLDING**4.13.1. GENERAL**

4.13.1.1. Form work shall comply with the requirements of clause No. 4.11.6 & 7.15.1 to 7.15.12 of MES Schedule Part I. The shuttering shall be of steel only except at places where it is not feasible to use steel shuttering on technical grounds plywood shuttering can be used with written approval of GE.

4.13.1.2. Exposed Surfaces of RCC Lintel, Beams, Columns and the like which are continuous with plastered surface of Wall shall be Plastered as that for adjoining Walls Surfaces.

4.13.1.3. Irrespective of whatever mentioned elsewhere in these Tender documents and/or Drawings, all Formwork used in the work shall be **properly designed Steel Formwork (both Vertical Props and Surfaces)**. However all other relevant provisions as mentioned in the MES Schedule Part I Clauses reflected above and relevant Drawings and other documents forming part of this Contract shall be followed.

4.13.1.4. Exposed Surfaces of Concrete such as Soffits/Sides of RCC Chajja, Beams, Stairs Case and Shelves, etc. which are not in continuation with the Adjoining Plastered Surfaces shall be finished as specified in Clause No. 4.11.16.2(a) of MES Schedule Part-I. However, the Soffit of RCC Roofs/Floor Slab shall be finished as specified in Clause No. 4.11.16.2(b) of MES Schedule Part-I. Refer Clause No. 14.14.3 of MES Schedule Part-I in this connection.

4.13.2. CLEANING & TREATMENT OF FORMS

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4.13.2.1. Refer Clause No. 4.11.6.2 of MES Schedule Part-I (as applicable) and as directed by the Engineer-in-Charge.

4.13.3. **STRIPPING TIME WHERE PORTLAND POZZOLLANA CEMENT IS USED**

4.13.3.1. Refer Clause No. 4.11.6.3 of MES Schedule Part-I. Where Pozzolana Cement is used for RCC Works in various Locations, the Minimum Period for Striking Off Formwork shall be as under in lieu of that specified in MES Schedule Part-I :-

Walls ; Columns and Vertical Sides of Beams : 3 to 4 Days

Slabs (Props left under) : 8 Days

Beams Soffits (Props left under) : 9 Days

Removal of Props to Slab/Beam :-

(aa) Spanning upto 6.0 METRE Span : 16 Days

(ab) Spanning beyond 6.0 METRE Span : 22 Days

For Cantilever Portion of Slab Formwork with Support shall be retained until the completion the Casting of the Entire Frame Work of the Building.

4.13.4. **REMOVAL OF FORMWORK**

4.13.5. Refer Clause No. 4.11.6.4 and 4.11.6.5 of MES Schedule Part-I and as directed by the Engineer-in-Charge.

4.13.6. In case of Bad Weather, Periods mentioned here-in-above may be revised at the discretion of the Engineer-in-Charge. The Contractor shall be deemed to have considered the above provision before tendering and Quote Lump Sum accordingly. No Claim will be entertained if Longer Periods required for Striking Off Formwork and Curing and all such effected matters is looked into upon the use of Pozzolana Cement as a Result being issued to the Contractor in Full or Part of for Bad Weather.

4.13.7. **FINISHES**

4.13.8. Refer Clause No. 4.11.16 of MES Schedule Part-I (as applicable) and as directed by the Engineer-in-Charge. Form work (as required) for Concrete surface where exposed to view shall be 'Rough Finished'

4.13.9. **DEVIATIONS INVOLVING FORM WORK**

4.13.9.1. Irrespective of whatever mentioned in Clause No. 5.2.6.5 Particular Specifications here-in-before, all Deviations involving Formwork shall be priced as per relevant Item(s) of Formwork in MES Schedule Part-II (Section 7) for the appropriate Location(s) as mentioned thereover duly enhanced by Quoted (DERIVED) Percentage in GENERAL SUMMARY here-in-before.

4.14. **ASSEMBLY OF REINFORCEMENT** – Refer Clause No. 4.11.7 of MES Schedule Part-I (as applicable) and as directed by the Engineer-in-Charge.

4.15. **COVER TO REINFORCEMENT** – Refer structural drawing and Clause No. 4.11.8 of MES Schedule Part-I (as applicable) and as directed by the Engineer-in-Charge.

4.16. **TRANSPORTING** – Refer Clause No. 4.11.9 of MES Schedule Part-I (as applicable) and as directed by the Engineer-in-Charge.

4.17. **PLACING** – Refer Clause No. 4.11.10 and 4.11.10.3 of MES Schedule Part-I (as applicable) and as directed by the Engineer-in-Charge.

4.18. **COMPACTION** – Refer Clause No. 4.11.11 of MES Schedule Part-I. Compaction of Concrete in RCC Slab, Beam Walls and Columns shall be done with Approved Mechanical Vibrator. In other Locations Hand Compaction may be permitted by Tamping or Rodding as approved by the GE.

4.19. **CURING :-**Refer Clause No. 4.11.13 of MES Schedule Part-I (as applicable) and as directed by the Engineer-in-Charge.

4.19.1. Curing shall be carried out using Pump of suitable capacity at no Extra Cost to the Govt. all as directed by Engineer-in-Charge.

4.20. **PROTECTION** – Refer Clause No. 4.11.14 of MES Schedule Part-I and as directed by Engineer-in-Charge.

PARTICULAR SPECIFICATIONS (CONTD.....)

- 4.21. INSPECTION** – Refer Clause No. 4.11.15 of MES Schedule Part-I and as directed by Engineer-in-Charge.
- 4.22. SEISMIC STRENGTHENING MEASURE** :- Seismic strengthening measure as shown on drawing shall be adopted in construction of all buildings and the cost of the same shall be deemed to have been included in the lump sum cost of buildings in Schedule 'A' Part I.
- 4.23. PROJECTION OF CHAJJA, CILL & LIKE ITEMS**
- 4.23.1.** All Projections of Chajjas, Cills and the like shall be provided with proper drip and/or throating in Plastering only and not while casting of RCC. Whether shown on Drawing or not, PCC Cills shall be extended in Walls at both sides by 75mm. However, the Projection Drip shown in Drawing shall be provided only in External Walls Cills.
- 4.23.2.** All Flat Surfaces exposed to weather shall be provided with imperceptible slopes for smooth run of Rain Water.
- 4.24. PRECAST ARTICLES**
- 4.24.1.** Precast articles such as RCC Shelves, Isolated Lintels (i.e. not in continuation with Lintel Band) upto 1.5 Metre length, Blocks/Plates, Cover Slab, Fins and Jali can be made Pre-cast instead of Cast-in-situ at the Contractor's option and shall be set in Cement Mortar 1:4 without any Price Adjustment. In case of deviation for these Items, Pricing shall be done on the basis of cast-in-situ work. In case of continuous Lintels even spanning less than 1.5 Metre, shall be considered as if it is exc. 1.5 Metre for the purpose of Deviation Orders. The identity of the Top surface of Pre-cast Articles shall be marked while casting.
- 4.24.2. PRE-CAST RCC JALLI** :- Irrespective of whatever shown/mentioned in the drawings RCC Jali wherever shown shall be 50 mm thick Pre-cast RCC M-20 and set with cement mortar (1:6). RCC Jalli shall be reinforced with 8 mm dia TMT Bars irrespective of what is shown on Drawing. Unless otherwise shown/mentioned in the drawings pre-cast RCC jalli shall be provided 50mm thick type-B.
- 5. BRICK WORK**
- 5.1. MATERIALS**
- 5.1.1. CEMENT** – Cement shall be as specified for Cement Concrete Work here-in-before.
- 5.1.2. SAND** – Sand for Mortar shall be as specified in Clause No. 5.4, 5.4.1 of MES Schedule Part I.
- 5.1.3. BRICKS**
- 5.1.3.1. BRICKS** :-Brick for brick work shall the burnt bricks of normal size of bricks shall be specified in Appedix 'C' and should have minimum crushing strength of 75 Kg/Cm² when tested in accordance with clause 26 of IS-1077. The dimension of bricks when tested in accordance with clause no 6.2.1 of IS-1077 shall be within the following tolerance limits per 20 bricks:
- | | | For 250x 125x 75 mm | For 230x 115x 75 mm |
|-----|--------|--------------------------------|--------------------------------|
| (a) | Length | 4920 mm to 5080mm (5000±80 mm) | 4520 mm to 4680mm (4600±80 mm) |
| (b) | Width | 2460 mm to 2540mm (2500±40 mm) | 2260 mm to 2340mm (2300±40 mm) |
| (c) | Height | 1460 mm to 1540mm (1500±40 mm) | 1460 mm to 1540mm (1500±40 mm) |
- 5.1.3.2.** Compressive strength :- The bricks when tested in accordance with the procedure laid down in IS-3495 shall have a minimum average compressive strength as 75 Kg/cm².
- 5.2.** The drawings for this work are prepared taking size of Full Brick thick as 230 mm and Half Brick thick as 115 mm and deviation if any shall also be priced on this basis irrespective of actual size of bricks used. Center line dimensions of Buildings shown in drawings, shall however, be maintained in case of variation in size of bricks from that specified in the Tender and Drawings. No adjustment for extra cost due to increase in width of Foundation Concrete, Walls, Lintels, Bands and Blocks, etc. shall be admissible to the Contractor on this account.
- 5.3.** All brick work shall be built in English bond except in half brick walls which shall be in Stretcher bond.
- 5.4.** Deviation for brick work shall be priced at the rates for sub class 'B' brick in MES Schedule Part II subject to Contractor's derived percentage for concerned Part of SCHEDULE 'A'.
- 5.5. WATER** – Refer Clause No. 5.18 of MES Schedule Part I.

PARTICULAR SPECIFICATIONS (CONTD.....)**5.6. WORKMANSHIPS**

5.6.1. BRICK WORK – Mix of mortar for brick work unless otherwise specified here-in-after, shall be as follows :

(i) Brick work in Half Brick thick Walls, Isolated Pillars, Parapet Walls, Steps shall be built in Cement Mortar 1:4

(ii) All other brick work in various situations unless otherwise specified shall be built in Cement Mortar 1:6.

5.6.2. HALF BRICK THICK WALLS

5.6.2.1. Refer Clause No. 5.36 of MES Schedule Part I. Brick work in Half Brick Walls exceeding 1200 mm in height from Floor Level, shall be reinforced with 2 No. 8 mm dia TMT Bars at every Fourth Course with Ends embedded at least 75 mm in the adjoining Walls/Columns, starting from top of the First Course from Floor Level.

5.6.2.2. The foundation for Half Brick thick Walls shall be provided as shown in Foundation Plan. Where Foundations for Half Brick thick Walls is/are not shown in drawings, the same shall be constructed sub-base level. Half Brick thick Walls in First Floor and onwards shall be constructed from the RCC Floor Slab.

6. PRECAST SOLID CONCRETE BLOCK MASONRY**6.1. GENERAL**

6.1.1. CEMENT :- Cement shall be as specified for Cement Concrete Work here-in-before.

6.1.2. Irrespective of whatever shown or mentioned on drawings the all external wall & internal shall be wall provide of precast, solid concrete block **PCC M-10(nominal Mix)** using 20mm aggregate.

6.1.3. Precast, Solid Concrete Block shall be Semi-automatic weigh batching plant made. These shall be of Grade "A" conforming to provision of **Table -1 of IS-2185 (Part-II)**.

6.1.4. Nominal dimension of Full Size Solid Concrete Block shall be as under:-

(a) For 200 mm thick wall : 300mm x 200mm x 200mm

(b) For 100 mm thick wall : 300mm x 100mm x 200mm

6.1.5. In addition, the Blocks shall be manufactured in half lengths of 200mm to achieve proper break in Masonry Joints and achieve proper length of Wall/Panel.

6.1.6. The PCC Block shall be tested independently as per appendix of testing of materials. The Cost of the Testing Charges shall be deemed to be included in the Lump Sum Amount of concerned Schedule 'A' Part(s).

6.1.7. The thickness of PCC Solid Block Masonry Wall corresponding to One Brick/One and Half Brick/Two Bricks wherever shown on Drawings, shall be taken as 200mm, 300mm and 400mm respectively.

6.2. AGGREGATES

6.2.1. The Coarse Aggregate shall be 20mm graded aggregate, conforming to IS-383-1970. Fine Aggregates shall be Sand, confirming to IS-383-1970. Sand shall not be finer than Zone III of IS-383-1970.

6.2.2. Sand for Cement Mortar for Setting and Jointing the Concrete Blocks shall conform to IS-383-1970.

6.3. WATER – Refer Clause No. 4.9 and 4.9.2 of MES Schedule Part-I.

6.4. WORKMANSHIPS

6.4.1. 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.

6.4.2. Solid Concrete Block shall be set and jointed in Cement Mortar 1:6 except 100mm thick Wall.

6.4.3. 100 mm thick Partition Walls shall be set and jointed in Cement Mortar 1:4 and shall be reinforced horizontally with 2 No. 8mm dia TMT bar (Fe500D) at every Second Course. Reinforcement shall be anchored 75mm at each End into adjoining Walls / Columns, unless otherwise shown on Drawings.

PARTICULAR SPECIFICATIONS (CONTD.....)

- 6.5. **DEVIATIONS** :- Deviation Orders for PCC Block Masonry if any shall be priced on the basis of PCC 1:3:6 (20mm graded aggregate) irrespective of the actual Mix of Concrete incorporated by the Contractor for pre-casting to achieve the desired Strength. Cement Content for Concrete PCC Block Masonry shall be determined by actual Test carried out at Site by the GE.
7. **FILLING OF HOLES** :-Any hole left in the masonry work for the purpose of Centering / Scaffolding shall be filled up with Cement Concrete 1:3:6 (using 20mm graded Stone aggregate) and mixed with WPC as per Manufacturer's instructions.
8. **BEARING OF FLOOR, ROOF, ETC.** :- Refer to Clause No. 5.34.14 of MES Schedule Part I, Tops of walls bearing the edges of RCC Floors, Roofs, Slabs, Beams shall be finished with a layer of Cement Mortar 1: 4, 15 mm thick and the plastered surface shall be white washed. Two layers of Chisel Craft Paper shall be provided above the plastered surface. Where the bottom of slab does not coincide with the level of brick course after cement plaster, the level shall be make up either by increasing the thickness of slab at bearing or where feasible by using brick tiles so that the bearing is directly on the plaster.
9. **DAMP PROOF COURSE**
- 9.1. Damp Proof Course for the Buildings shall be 40 mm thick M-15 using 12.5 mm graded stone aggregates mixed with water proofing compound (IS. 2645) as per manufacturer's instructions and apply evenly two coats of hot blown bitumen grade VG-10 @ 1.20 kg per sqm blended with clear sand @ 0.05 cum/sqm. each coat and fixing polythene film 150 micron over coat of bitumen over full width of wall including thickness of internal and external plaster.
- 9.2. The width of the DPC shall be equal to the width of Masonry Wall Plus Thickness of Internal and External Plaster. The Plaster of Masonry Wall below DPC will be done first and the DPC will be laid thereafter. The Plaster shall not cover DPC layer from sides.
- 9.3. Where Plinth Beam/Band are shown on Drawings at Plinth Level, Damp Proof Course as specified here-in-before shall not be provided.
- 9.4. In the event of deviation, pricing shall be done taking Water Proofing Compound at the rate of 3% by Weight of Cement.
10. **STONE MASONRY**
- 10.1. Refer Clause No. 6.2, 6.5, 6.6, 6.6.1, 6.6.5, 6.7.1, 6.8, 6.9 and 6.10.1 including other provision (as applicable) of MES schedule Part-I.
- 10.2. Stone Walling of Random Rubble Masonry shall be **granite and trap (harder stone)**.
- 10.3. Pre-cast PCC M-10(Nominal Mix)(using 20mm Graded Stone Aggregate) Bond Stone Set in Cement Mortar shall be provided in lieu of Stone Bond Stone is deemed to be included in Unit Rate of SCHEDULE 'A'. PCC Bond Stone shall be set in Cement Mortar 1:4 unless otherwise specified in SCHEDULE 'A'.
- 10.4. Unless otherwise specified, all Surfaces of Stone Masonry shall be hammer dressed from the Wall Face not more than 40mm for an Exposed Surface and 20mm on the surface to be rendered.
- 10.5. Sand for Mortar as specified in Clause No. 5.4, 5.4.1 of MES Schedule Part-I.
- 10.6. **WATER** :-Refer Clause No. 5.18 of MES Schedule Part-I.
11. **WOOD WORK (CARPENTER'S & JOINERY WORK)**
- 11.1. **MATERIALS**
- 11.1.1. **TIMBER** – Refer Clause No. 7.3 of MES Schedule Part-I.
- 11.1.1.1. **DEFECTS IN TIMBER** – Refer Clause No. 7.4 of MES Schedule Part-I for 'STRUCTURAL & CARPENTER'S WORK' and Clause No. 7.5 of MES Schedule Part-I for JOINER'S WORK.
- 11.1.1.2. **SEASONING** – Refer Clause No. 7.6 of MES Schedule Part-I.
- 11.1.1.3. **MOISTURE CONTENT** – Refer Clause No. 7.7 of MES Schedule Part-I. Moisture Contents shall be as specified for Zone.
- 11.1.1.4. **SPECIES** – Refer Clause No. 7.8 of MES Schedule Part-I. Timber for 'STRUCTURAL & CARPENTER'S WORK & JOINER'S WORK' (except Particle Board and Block Board) shall be of Second Class Hardwood of the following Species as approved by GE, if otherwise not specifically indicated here-in-after/Drawings :- (i) BONSUM (ii) HOLLOCK (iii) TITA CHAMPA (iv) KOKKO (v) KALA SIRIS (vi) CHAPLASH
- 11.2. **WOODEN CHOWKATS OR FRAME (WHEREVER SPECIFIED/SHOWN IN DRAWINGS)**

PARTICULAR SPECIFICATIONS (CONTD.....)

11.2.1.1. Refer Clause No. 8.18 of MES Schedule Part-I for Timber Frames and Chowkats and shall be of Second Class Hard Wood of the species mentioned here-in-before and as approved by GE.

NOTE: The Surfaces of Wooden Chowkats or Frame. coming in contract with Concrete or Brick Works, etc. shall be treated with Two Coats of Bituminous Paint after thoroughly cleaned from Dirt, Oil, etc. The cost of the same shall deem to be included in the quoted Lump Sum Amount by the Tenderer.

11.3. FLUSH DOOR SHUTTER

11.3.1. Flush door shutter including builder's hardware shall be provided as per shown/ mentioned on TD drawings no CESZ/2015/TD/003 and other as specified in para 8.25 of MES Schedule Part-I and as per IS 2202 (Part I -1999).

11.3.2. 35 mm thick flush door shutter shall be solid core types with block core, and shall conform to IS 2202 (Part I) - 1999, Specification for wooden flush door shutters (solid core type) Part I, factory made pre-laminated plywood face both side and laminated sheet shall be 1 mm thick. In case flush door shutters directly exposed to weather, 1mm PVC sheet fixed to external surface of shutter.

11.3.3. All timber used shall be well seasoned and chemically treated. Adhesive shall be phenol formaldehyde synthetic resin BWP type specified in IS:848-2006. All dimensions shall be finished dimension and Manufacture's Test Certificate for test specified in IS: 2202 (Part I) shall be rendered.

11.3.4. Flush doors to be provided with teakwood beading as per drawings and painted to match the door shutter.

11.3.5. Make : GREEN PLY / CENTURY PLY./ ARCHID PLY

11.4. PLYWOOD

11.4.1. Plywood shall conform to IS-303 and shall be ISI marked. Plywood wherever shown on drawing shall be of BWR grade, type 'BB' of thickness as mentioned in drawings and number of ply shall be as specified in MES Schedule Part-I.

11.4.2. Refer Clause No. 12.10 and subsequent Clause No. thereof of MES Schedule Part I for Plywood as applicable.

11.5. VENEERED PARTICLE BOARD

11.5.1. Refer Clause No. 8.8 of MES Schedule Part-I.

11.6. NAILS, WOOD SCREWS & GLUE

11.6.1. Refer Clause No. 7.10 to 7.12 of MES Schedule Part-I.

11.7. WORKMANSHIP

11.7.1. **GENERALLY** – Refer Clause No. 7.13 of MES Schedule Part-I for 'STRUCTURAL & CARPENTER'S WORK' and Clause No. 8.15 of MES Schedule Part-I for JOINER'S WORK.

11.7.2. **LENGTHENING OF MEMBERS** – Refer Clause No. 8.16 of MES Schedule Part-I.

11.7.3. CHEMICAL/PRESERVATIVE TREATMENT

11.7.3.1. Before painting or French polishing all joinery and timber incorporated in the work to be manufactured at site shall be treated as mentioned in IS-401 by modified hot and cold treatment, the minimum quantity of chemical impregnated in each cubic meter of timber shall be at the rate as specified in table 2 group 5 of said IS and all joinery manufactured at site, which has been exposed by chiseling/planning/cutting after treatment by hot and cold process, except those in factory made paneled shutters, which shall be chemically treated in factory, shall be treated with two coats of any of the approved chemicals such as ASCU etc. as directed by GE for protection against termite.

11.7.3.2. Cost of Antitermite Treatment to Wood Work shall be deemed to have been included in the Lump Sum Cost of Building Work under Schedule 'A' Part-I. The quantity and application of chemicals shall be as per manufacturer's instructions.

11.7.3.3. Wood work shall be painted or polished as specified after second coat of antitermite treatment has completely dried.

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11.7.3.4. Pricing of deviations involving use of carpenters and joiners work shall be done at the applicable rates in MES Schedule enhanced by the deviation provided vide special condition here-in-before without making any adjustment for chemical treatment specified above.

11.7.4. **FIXING OF TIMBER FRAMES & CHOWKATS (WHEREVER SPECIFIED/SHOWN IN DRAWINGS)**

11.7.4.1. Fixing of Chowkhat Frame is permitted as per 'Prepared Opening Method' without any Price Adjustment as specified in Clause 8.19.2 of MES Schedule Part I.

11.7.5. **FIXING OF SHUTTERS**

11.7.5.1. **GENERALLY** – Refer Clause No. 8.20 and 8.21 of MES Schedule Part-I as applicable and as directed by Engineer-in-Charge.

11.7.5.2. **STANDARD DIMENSIONS OF SHUTTERS FOR DOORS, WINDOWS, ETC.** – Refer Clause No. 8.24 of MES Schedule Part-I as applicable for Panelled, Glazed, Gauzed or Partly Panelled and Glazed Shutters.

11.8. **FABRICATION**

11.8.1. Refer to relevant Clause No. of MES Schedule Part-I and as directed by Engineer-in-Charge.

11.8.2. Styles and Rails including Lock Rail of Shutters shall be One Piece only and shall be Jointed to each other by Mortise and Tenon Joints at Right Angles. Rails more than 150mm width shall have Two Tenons. The Bottom, Lock and Up Rails shall be inserted 25mm short of the width of the Styles.

11.8.3. The Edges of the Panel shall fit into groove to the full depth leaving an Air Gap of 1.5mm. Edges of the Panel insert shall be sealed by application of Glue.

11.8.4. All Members of the Shutter shall be straight without any Warp or Bow. They shall have smooth well planned surfaces at Right Angle to each other. The Right Angles of the Shutter shall be checked by measuring the True Diagonals from One Extreme Corner to the Opposite One and the surfaces of Mortise and Tenon Joints shall be Glued before putting together. All Joints shall be Pinned with Bamboo Pins Two per Tenon in staggered position.

11.8.5. **PRESSED STEEL DOOR FRAME**

11.8.5.1. Pressed steel frames where shown on drawings shall be as per IS-4351 and as specified in clause 10.27 of SSR Part I. If size of frame not shown on drawing the PSD frame shall be 105x60 mm for single shutter frames and 125x60 for double shutter frames irrespective of whatever is shown on drawings. The tolerance over the profile size shall be ± 2 mm. The thickness of sheet shall be 1.6mm irrespective of whatever is shown on drawings and it shall be bent to shape as per drawing. The inner surface of the frames shall be treated with a coat of tar. Shop coat and red oxide shall be applied outside before erecting in position. Mild Steel Tie Bar of 16 mm dia Round Bars shall be provided at the bottom of frames by welding to the frame and this tie bar shall be embedded and left inside floor as per drawing/IS. The frame shall be filled with PCC M-10 (Nominal Mix) using 12.5 mm graded stone aggregate. Cold rolled steel hinges as per IS shall be bolted to pressed steel frame.

11.8.5.2. Irrespective of whatever shown on drawings the Mild Steel Tie Bar of 16 mm dia Round Bars shall be provided at the bottom of frames by welding to the frame and this tie bar shall be embedded and left inside floor.

11.8.5.3. The Frames, Fittings, Hinges and Shock Absorber shall conform to specification given in IS-4351.

11.8.5.4. Mild Steel Conduit 20mm dia of 16 gauge closed at one end shall be welded to inner face of frame for receiving shoot of bolt. M.S. sockets for housing shoot of tower bolt shall also be provided as directed by Engineer-in-Charge.

11.8.5.5. The fixing lugs and inner surfaces of door frames coming in contact with concrete shall be treated with two coats of bituminous paint. The door frame shall be thoroughly cleaned, made free from rust, dirt, oil, etc. and exposed surfaces shall be painted with two coats of synthetic enamel paint over a coat of red oxide zinc chrome primer.

11.8.5.6. The fixing of Pressed Steel Door Frames shall be done as per Clause No. 5.34.5(A) of MES Schedule Part -I. All Door Frames shall be fixed while Masonry Work is in progress.

11.9. **PVC DOORS WITH FRAME**

PARTICULAR SPECIFICATIONS (CONTD.....)

11.9.1. Clause No. 8.34 of MES Schedule Part-I

11.9.2. **FACTORY MADE SOLID PVC MOULDED DOOR SHUTTERS WITH FRAMES** : Factory made solid PVC moulded door shutters with frames shall be provided as per drawings no CESZ/2015/TD/008.

11.9.3. **SOLID PVC DOORS FRAMES:** Where shown or mentioned on drawings solid PVC door frame shall be Solid PVC Door Frame of size 50mm x 47mm made out of 5mm plain colour PVC sheet reinforced with M.S. Square tube, suppling & fixing in opening and all as specified in SSR part-I & part II .

11.9.4. **SOLID PVC DOOR SHUTTER**

11.9.4.1. **PARTICLE BOARD CORE SOLID PVC MOULDED DOOR SHUTTER:-** Where shown particle board core solid PVC moulded door shutter shall be provided 28 to 30 mm thick factory made Solid PVC Moulded Door shutter shall be of 2, 4 or 6 raised panel design with solid core of particle board of 24mm thick (12mm x 2) as indicated. The particle board shall be lipped with 25mm thick baton made from PVC sheets on the stile where hinges are to be fitted. On the three other sides the lipping shall be of 15mm thick PVC baton. 2mm thick moulded PVC sheet shall be stuck on the front face of the particle board suitable prepared to accept the moulded design and 2mm PVC sheet shall be stuck on the back face of the particle board with thermosetting adhesive. The 2mm PVC sheets shall be stuck with lipping by using solvent cement.

11.9.4.2. **EPS CORE SOLID PVC MOULDED PVC DOOR SHUTTER:-** Where shown EPS Core Solid PVC Moulded PVC Door Shutter shall be provided 28 to 30mm thick factory made EPS Core Solid PVC Moulded Door Shutter shall consists of frame made out of MS tube. The core panel shall consist of 25mm thick high density EPS conforming to IS 4671, routed with design, sandwiched in between 2mm thick moulded PVC sheet on one face and 2mm PVC sheet on the other side. The door on all the edges to be sealed with lipping of 10mm (5mm X 2) thick X 25mm wide PVC sheet for three sides & 60mm wide PVC sheet for lock side. The lipping shall be bonded to the 2mm moulded/plain PVC sheet solvent cement.

11.9.4.3. **SOLID PVC DOORS SHUTTER:-**Where shown or mentioned on drawings solid PVC door shutter shall be factory made solid panel PVC door shutter 30 mm thick (style) consisting of frame made out of M.S. tubes for top & bottom rails. M.S. frame shall be covered with heat moulded plain colour PVC 'C' channel having a PVC sheet strip of 20mm width stuck inside with solvent cement for stiles and plain colour PVC sheets for top rail, lock rail & bottom rail on either side & as gap insert for top rail & bottom rail, panelling of plain colour PVC sheet to be fitted in the M.S. frame welded / sealed to the stiles & rails with suitable PVC sheet beading, and joined together with solvent cement, manufacturer's instructions and and shown in relevant drawings in SSR part-I & part II .

11.9.4.4. The size of door shall be specified in TD drawing.

11.9.5. Irrespective of whatever is shown or mentioned on drawings all builder's hardware fittings required for solid PVC door shall be provide stainless steel fitting (Grade-304).

11.9.6. The PVC door shutter shall be tested in the reputed testing house/lab as approved by GE as per IS-4020. The number of door samples shall be as per requirements laid down in IS-4020. In case, the results are not satisfactory, the entire lot shall be rejected. The cost of the testing and the cost of the door shutters samples is deemed to be included in the rates quoted by the tenderer.

11.10. **CABINET SHUTTER:** - Cabinet shutter and shelf shall be pre-laminated plywood (1mm thick laminated) shall be exterior grade. All edges properly sealed with 5 mm thick 2nd class hardwood beading fixed with water resistant adhesive except rebate side which shall be same thick of shutter thickness. In case thickness of shutter is not mentioned in drawing , the 12 mm thick pre-laminated plywood shutter shall be provide.

12. **BUILDER'S HARDWARES**

12.1. **GENERAL**

12.1.1. Unless otherwise specified all articles of builder's hardware (other than for steel windows) except butt hinges shall be of aluminum anodized bearing ISI mark as specified here in below. The sizes shall be as given on Drawings/Schedule of fittings.

12.1.2. **BARREL TOWER BOLTS** :-Refer Clause No. 9.3 of MES Schedule Part-I.

PARTICULAR SPECIFICATIONS (CONTD.....)

- 12.1.3. **SLIDING DOOR BOLTS** :-Sliding Door Bolt where shown on drawing shall be of aluminium alloy all as specified in Clause No.9.5 of MES Schedule Part I, ISI marked. In case of deviation, the rates mentioned in MES Schedule for sliding bolts, plate type shall be applicable for sliding bolts, bolt type without any price adjustment. Unless otherwise specified here-in-after/drawings the length of sliding door bolt shall be 300 mm.
- 12.2. **BUTT HINGES** :-
- 12.2.1. Refer Clause No. 9.7.2 of MES Schedule Part-I.
- 12.2.2. Butt hinges shall be of cold rolled mild steel medium weight bearing IS marked irrespective of whatever shown on drawings.
- 12.3. **DOOR HANDLES** :-All door shutters shall be provided with aluminum alloy fabricated all as specified in clause No. 9.11 of MES Schedule Part I. However, Aluminum alloy handle shall be of 'D' type with base plate cast type, ISI Marked.
- 12.4. **DOUBLE ACTION SPRINGS** :-Refer Clause No. 9.7.7 of MES Schedule Part I. These shall be of mild steel double action spring hinges with steel wire spring.
- 12.5. **HYDRAULIC DOOR CLOSERS** :- The hydraulic door closer wherever shown on drawings shall be of Aluminium(extruded section body) hydraulically regulated heavy duty, universal type of suitable designation as per size and weight of door. These shall be ISI marked and as per Para 9.16 of MES Schedule Part I. Make Godrej or equivalent.
- 12.6. **BALL CATCH** :-This shall be of with 8mm dia steel ball and brass body and all as specified in Clause No. 9.14 of MES Schedule Part I.
- 12.7. **HASP AND STAPLE** :-This shall be of safety type made of aluminium anodized as specified in Clause No. 9.10 of MES Schedule Part-I.
- 12.8. **RAT TAIL DOOR SPRINGS (WHERE INDICATED)** :-Refer Clause No. 9.7.8 of MES Schedule Part I. These shall be of mild steel.
- 12.9. **Blank**
- 12.10. **DRAPERY ROD** :- Wherever as curtain rod(CR)/ drapery rod(DR) has been marked on drawings the contractor shall provide curtain drapery rod of length required as per size of opening including matching wall brackets and end finials. The drapery rod shall be electric resistance welded MS pipe of minimum 19mm dia having a coating of corrugated virgin PVC extrusion. The finish of the rod shall be as approved by GE. The finials shall be of ABS plastic in matching color all as per specified in TD no CESZ/2015/TD/013
- Make: SOFFIO-I model of VISTA or equivalent model of NOVA. The spacing of brackets and fixing of rod shall be as per manufacturer literature and instructions.
- 12.11. **STAINLESS STEEL WIRE CLOTHING**:-
- 12.11.1. Refer Clause No. 9.25 and 9.32 of MES Schedule Part I.
- 12.11.2. Wire Cloth shall be Stainless Steel Wire of 0.36mm dia and avg aperture 1.40mm & grade 304 fixed with Stainless Steel Wire Clips.
- 12.12. **MSG WINDOW** :-MSG window wherever shown on main Arch Plan Drawings shall be provide of mild steel grill with stainless steel wire mesh and all others details as specified in TD drawing no CESZ/2015/TD/004.
- 12.13. **ALUMINIUM WORKS (DOORS, WINDOWS, VENTILATORS, PARTITIONS, ETC.)**
- 12.13.1. **MATERIALS**
- 12.13.1.1. **ALUMINIUM SECTIONS & BEADS, ETC.**
- 12.13.1.2. Refer Clause No. 10.37 of MES Schedule Part-I as applicable and as approved by GE.
- 12.13.1.3. Aluminum Door shall be provided as per main drawings and TD drawings no CESZ/2015/TD-005.
- 12.13.1.4. Aluminum sliding window shall be provided as per main drawings and TD drawings no CESZ/2015/TD-007.
- 12.13.1.5. Aluminum casement window shall be provided as per main drawings and TD drawings no CESZ/2015/TD-0020.

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- 12.13.1.6. Aluminum Composite shall be provided as per main drawings and TD drawings no CESZ/2015/TD-0021.
- 12.13.1.7. Specification for aluminium door and window shall be 15 micron anodized (colored) aluminum section having embossment of the name of the manufacturer on each section at every metre and thickness of colour anodizing shall be not less than 15 micron. The section particulars shall be provided as per drawing and clause 10.37 of SSR Part-I, 2009. In case of non availability of any particular section mentioned the next available section (having higher per Kg/Rm weight) shall be provided without any price adjustment. The test certificate from Govt authorized testing laboratory shall be produced by the contractor to conform thickness of anodizing
- 12.13.1.8. The contractor shall submit the manufacturer's test Certificate in original along with the test sheet giving the results as per relevant IS and duly signed by the section manufacturer with each consignment.
- 12.13.2. **ALUMINIUM FITTINGS, ETC.:** Aluminium Doors and Windows shall be provided with the Standard Aluminium Fittings as specified in relevant Clause No. of MES Schedule Part-I, bearing ISI Mark and as approved by GE
- 12.13.3. **ALUMINIUM DOORS/WINDOWS/VENTS**
- 12.13.3.1. Aluminium Doors/Windows/Vents shall be fabricated, erected and fixed in position and as per the details/ size shown in TD drawings . These shall be in conformity with the standard aluminium fittings conforming to the specifications of relevant IS.
- 12.13.3.2. The cleats for mechanical, vertical/ horizontal joints shall be of extruded aluminium section so as to avoid any play between jointed members.
- 12.13.3.3. Glazing for aluminium doors shall with 8 mm thick toughened solar reflective glass(**Make ICE ST 167 of Saint Gobian or equivalent material of Appendix B**) , for windows/vents(**excepted** aluminum **sliding window**) shall be with 4mm thick float glass.
- 12.13.3.4. All the Aluminum sliding window/vents glass shall be with **5mm thick float glass/frosted glass** as shown on plan/ TD drawing **excepted administrative & Officers MESS** building and Aluminum sliding window/vents of administrative & Officers MESS building shall be **5 mm thick toughened solar reflective glass.**
- 12.13.3.5. Neoprene crest glazing gasket shall be provided with snap or beveled glazing beads. Glass shall be fixed with PVC/rubber gasket so as to avoid metal to glass contact and no projection at any bending shall be visible thereby making it flush glazed.
- 12.13.3.6. Door shutter shall be provided with Floor Spring Door Closure of standard door pattern with all necessary fixing arrangement and all doors shall be provided with mortice lock of Godrej make.
- 12.13.3.7. All aluminium work shall be deemed to include in various items to complete work including Fittings, Fixtures, Stays, Locks, Handle, Special Hinges, Floor Springs, Neoprene/Rubber Linings, Gaskets, Bushes, Rollers, Sealants, etc. as directed and approved by the GE.
- 12.13.3.8. **MS grill** with powder coated shall be provided as per shown on TD drawings
- 12.13.3.9. The items of Aluminium Glazing, Windows, Vents and Louvers Window Work shall include the provision of mullions, coupling bars, as required to join various units of Glazing, Windows and Louvers etc to form larger glazing, windows vents or louvers cum window/glazing area as per drawings. Also the necessary jointing through Cleats, Glazing Clips, Rubber Packing, Anodized Aluminium Snap Beading, Screws, etc. complete all as specified. No extra payment shall be made for Coupling Members, Mullions, etc.
- 12.13.3.10. Aluminium Sections used for Windows, Vents, Louvers and fixed glazing shall be of weight as specified on drawing. This shall be suitable for use to meet Architectural designs of relevant works and shall be subject to **approval of GE** who would require to be satisfied about their being appropriate on Technical, Structural Functional and Visual Considerations.
- 12.13.3.11. All joints shall be accurately fabricated and be hair line in appearance. The finished surface shall be free from visible defects.
- 12.13.3.12. Each aluminum frame shall be Tailor Made as per openings at site. No cuttings and making good of concrete surfaces shall be permitted.
- 12.13.3.13. Frames shall be fixed to concrete or brick work with approved dash fasteners. Method of fixing shall be got approved by the GE before installation.

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12.13.3.14. Samples of complete set of aluminum door / window with glazing shall be made and **got approved from CWE before mass fabrication.**

12.13.3.14.1. All hardware items shall conform to the relevant IS Specifications. Design, quality type, number and fixing of hardware shall be got approved by the GE.

12.13.3.15. No visual variation in shade shall be permitted. The fabricator shall clearly indicate the shade variation tolerance as measured by standard equipment.

12.13.3.16. The requirements, provisions, for all aluminium work shall conform to requirements and specifications and Clause No. meters given in this tender drawings / instructions and shall at least provide for or conform to fabrication, finishing, erection installation etc.

12.13.4. ALUMINUM GRILLS:

12.13.4.1. If aluminum grill as shown on main architectural drawing, the aluminum grill shall be provided as per shown on Main / TD drawings.

12.13.4.2. The type of aluminum grill shall be provided as shown on TD drawing no CESZ/2015/TD/2014 but in no case weight of grill / grill frame shall be less than 3.13 Kg per sqm and 0.297 kg/m respectively.

12.13.5. WORKMANSHIP

12.13.6. GENERAL

12.13.6.1. Aluminium Doors and Windows shall be Fabricated, Erected and fixed in Position and as per the Details /Size all as directed by Engineer-in-Charge.

12.13.6.2. The thickness and Type of Glazing for Aluminum Doors and Windows shall be all as shown in Drawings. Neoprene Crest Glazing Gasket shall be provided with Snap or Beveled Glazing Beads. Glass shall be fixed with PVC/Rubber Gasket so as to avoid Metal to Glass contact and no projection at any bending shall be visible thereby making it Flush Glazed.

12.13.6.3. The Cleats for Mechanical, Vertical/ Horizontal Joints shall be of Extruded Aluminium Section so as to avoid any play between Jointed Members.

13. STEEL & IRON WORK

13.1. GENERAL

13.1.1. Refer relevant Clause No. of MES Schedule Part-I and as approved by GE. All Steels require to incorporate in the Work shall be Contractor's Supply.

13.2. TYPES OF STEEL

13.2.1. REINFORCEMENT STEEL FOR ALL LOCATIONS:- Steel bars for concrete reinforcement wherever shown on drawings shall be TMT bars produced by Thermo Mechanical Treatment Process and grade of steel shall be mention on structural drawing, unless other wise the grade of steel is not specified on drawing , the grade of steel shall be (Grade 500D) and meeting all requirement of IS-1786-2008. Where ever mild steel reinforcement bars are shown on drawings these shall be amended to read as TMT bars of same dia or nearest higher dia and accordingly to be provided.

13.2.2. STRUCTURAL STEEL

13.2.2.1. STANDARD QUALITY : Structural steel except hollow steel sections shall be conform to IS-2062-2006, E-250(Fe 410W). This steel shall be provided in the location mentioned in the drawings and as specified in Clause 10.4.1 of MES Schedule Part-I. . In case the quality of structural steel i.e. A, B or C is not mentioned in drawings then quality A shall be used and same shall be followed for deviation if any

13.2.2.2. ORDINARY QUALITY : Unless otherwise specified, Mild Steel Members in Grills/Guard Bars, Holdfasts, Door and Window, Frames, Railing, Steel Windows, Steel Doors and the like shall be ordinary quality of Steel conforming to IS-2062-2006, E-165 (Fe 290).

13.2.2.3. HOLLOW STEEL SECTIONS FOR STRUCTURAL USE : Hollow steel sections for structural steel section shall be conform to IS-4923-1997 and grade of steel shall be YSt 310. This steel shall be provided in the location mentioned in the drawings.

13.2.3. SOURCE OF PROCUREMENT

13.2.3.1. REINFORCEMENT STEEL (TMT STEEL Fe- 500D) :- TMT steel bars of all sizes shall be procured directly from following primary producer.

PARTICULAR SPECIFICATIONS (CONTD.....)

1. Rashtriya Ispat Nigam Limited (RINL)
Visakhapatnam Steel Plant
Visakhapatnam- 530 031, India
Tel: (91 891) 518226, 518376
Fax: (91 891) 518316
Email: cmdvsp@itpvis.ap.nic.in
Brand: "RINL"
(TMT Steel of All Grade)
2. Tata Iron & Steel Company (TISCO, or Tata Steel)
Bombay House, 2, 4 Hoi 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)
Brand: "TATA"
(TMT Steel of All Grade)
3. Steel Authority of India Limited (SAIL)
Central Marketing Organization.
Northern Region, 17th Floor, scope
Minar, Laxmi Nagar Distt. Centre.
Delhi- 110 092
Brand: "SAIL"
(TMT Steel of All Grade)
4. M/S Jai Balaji Industries Ltd
5 Bentek street, Kolkata- 700001
Delhi Office
510, Block-b, Navraung House
21 Kasturba Gandhi Marg,
New Delhi-110 001
011-43620219,43620220
Mob: 7838272772/9958936103
E-mail- Info@jaibalajigroup.com
Brand: "BALAJI SHAKTI"
(TMT Bars of Gde Fe 500 & Fe 500D)
5. M/s Shyam Steel Industries ltd,
Shyam Towers EN-32, Sector-V,
Salt Lake. Kolkata-700 091
Tel : 033-40074007,
Fax-033-40074010,
E-mail-marketing@shyamsteel.com
Brand: "SHYAM"
(TMT Bars of Gde Fe 500, Fe 500D & CRS)
6. M/s SPS Steels Rolling Mills Ltd.,
Elegant Tower, 68A, Ballygunge Circular
Road, Kolkata-700019
Ph- 033- 2895160/67
Fax- 033- 22894386
E-mail- spsdelhi@spsgroup.co.in
Brand: "ELEGANT TMT"
(TMT Bars of Gde Fe 500/Fe 500D & Fe 550)
7. M/s Steel Exchange India ltd,
My Home Laxminivas Apartments.
Ameerpet, Hyderabad-500 016, A.P.
Tel-040-23403725
Fax-040-23413267,
E-mail-info@seil.co.in
Brand: "SIMHADRI TMT"
(TMT Bars of Gde Fe 500, Fe 500D & HSCRM)
8. M/s Jindal Steels and Power Ltd.
OP Jindal Road, Hissar, Hararyana, PIN-
125 005
Tel- +91 1662 222471-84
Fax- +91 1662 220476.
Brand: "JINDAL PANTHER"
(TMT Bars of Gde Fe 500/Fe 500D & Fe 550/Fe 550D)
9. M/s SRMB Srijan Pvt Ltd
SRMB House, 7, khetra das lane
Kolkata-700 012
Tel : 033- 6600 6600
Fax: 033- 2211 0483
Brand: "SRMB"
(TMT Bars of Gde Fe 500/Fe 500D & Fe 550/Fe 550D) (Size 8-32 mm)
10. M/s Concast Steel & Power Ltd
21 Hemant Basu Sarani, Suit Nos — 511
& 512, 5th Floor, Kolkata — 700 001 Tel
— 91- 33 - 2213 0481 — 87/ 91- 33 –
2213 0488
Email: info@concastgroup.com
Brand: "CONCAST MAXX"
**(TMT Bars of Gde Fe 500/Fe 500D)
(Size 8-32 mm)**
11. M/s Shri Bajrang Power & Ispat ltd,
Viii - Borjhara, Urla Industrial Area.
Raipur- 493 221, Chhattisgarh.
Tel : 0771 4288019/29 / 39
Brand: "GOEL TMT"
(TMT Bars of Gde Fe 500/Fe 500D) (Size 8-32 mm)
12. M/s JSW Steel Ltd,
JSW Centre, Bandra Kurla Complex,
Bandra (East),
Mumbai – 400 051, Maharashtra
Phone : 022-42861000
022-4286-3000
Brand: "NEOSTEEL"
(TMT Bars of Gde Fe 500/Fe 500D & CRS) (Size 8-40 mm)

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13. M/s Electrosteel Steels Ltd,
G K Tower, 2nd & 3rd Floor. 19
Camac Street. Kolkata, WB- 700017
Tel No: 91-33-2283-9990 / 91-33-
7103-4400
Fax No : 91-33-2290-2882
Website : www.electrosteel.com
Brand: "ELECTROSTEEL"
(TMT Bars of Gde Fe 500D
(Size 8-36 mm)
14. M/s Shyam Metalics & Energy Ltd
Viswakarma, 1st Floor, 86 C, Topsi Road,
Kolkata-700 046
Ph: +91 33 2285 2212
Website: www.shyamgroup.com
Brand: "SEL"
(TMT Bars of Gde Fe 500/Fe500D)
(Size 8-32 mm)
15. M/s Kamachi Industries Limited,
ABC Trade Centre, 3rd Floor (Inside
Devi Theatre Complex), Old No. 50,
New No. 39, Anna Salai, Chennai-
600 002, India Tel:+91-044-4296
1100, Fax: +91-044-4296 1122
E-mail: sales@kamachitmt.com
Website: www.kamachitmt.com
Brand: "KAMACHI"
(TMT Bars of Gde Fe 500, Fe
500D, Fe 550, Fe 550D & HCRM
(Size 8-40 mm)
16. M/s BDG Metal & Power Ltd
HMP House, 4 Fairlie Place, 5th Floor,
Kolkata-700 001, India, Tel : +91-33-
4005-9005, Fax : +91-33-4005-9095,
Email: info@goyalgroup.in
Website: www.goyalgroup.in
Brand: "BDG 6"
(TMT Bars of Gde Fe 500/Fe500D &
Fe550D) (Size 8-32 mm)
17. M/s Gallantt Metal Ltd
Ward 10BC, Plot No. 123, Ground
Floor, Gandhi Dham Kutch, Gujarat-
370 201, Tel: +91-2836-228164,
Fax: +91-2836-235787,
Email: gml@gallantt.com
Website : www.gallantt.com
Brand: "GALLANTT TMX"
(TMT Bars of Gde Fe 500/Fe500D
& CRS) (Size 8-32 mm)
18. M/s Rashmi Metaliks Ltd,
Premlata Building
39, Shakespeare Sarani
6th Floor, Kolkata-700 017, Tel : 033-
22894255/56, Fax : 033-22894254,
Email:
mkt.domesticdip@rashmigroup.com
Website : www.rashmigroup.com
Brank : "RASHMI TMT"
(TMT Bars of Gde Fe 500 (Size 8-32
mm, Fe 500D & Fe 550D (Size 8-25
mm)
19. M/s Shyam Sel and Power Ltd
Corp Office :
SS Chambers, 5 C.R, Avenue
Kolkata-700 072
Tel- +91 33 4011 1000
Fax- +91 33 4011 1031
Website : www.Shyamgroup.com
Plant :
Bijoynagar More
Vill-Bijaynagar
P.O Bhadurpur
Burdwan, West Bengal-713 362
Brand : "SEL"
(TMT Bars of Gde Fe500D, (Size
8-32mm)
20. M/s Super Smelters Ltd, Kolkata
Premlata, 39, Shakespeare Sarani
3rd Floor, Kolkata – 700 017
Tele / Fax : +91-33-2289-2734/36
E-mail : info@supershakti.in
Website : www.supershakti.in
Brand : 'SUPER SHAKTI'
(TMT Bars of Gde Fe-500, Fe 500D,
Fe550, Size 8-32mm)

PARTICULAR SPECIFICATIONS (CONTD.....)

- | | |
|--|---|
| <p>21. M/s Shree Nakoda Ispat Ltd
 Corp Office :
 Near Railway Crossing
 Mowa, P.O. Shankar Nagar
 Raipur-492007 (C.G.)
 Plant :
 Plot No. 74, 75 & 109
 Phase-II, Industrial Area,
 Siltara, Raipur (C.G.)
 Pin-493 221
 Website : www.nakodagroup.com
 Tele : 91-771-2282130
 Mob – 7898989741, 7898989205
 Brand : “NAKODA TMT”
 (TMT Bars of Gde Fe-500, Fe 500D, (Size 8-32mm))</p> | <p>22. M/s Real Ispat & Power Ltd
 Corp Office :
 Vrindavan, Near IDBI Bank
 Civil Lines
 Raipur- 492 001, Chhattisgarh
 Tel +91-771-4224000
 Fax +91-771-4224010
 E-mail real@realispat.com
 Website: www.realispat.com
 Plant :
 Plot No. 315-321
 Urla Industrial Area
 Raipur-493 221
 Chhattisgarh
 Tele : 0771-3051000
 Fax : 0771-3051010
 Brand : “G K TMT”
 (TMT Bars of Gde Fe-500, Fe 500D & Size 8-36mm)</p> |
|--|---|

13.2.3.2. **STRUCTURAL STEEL(EXCEPT HOLLOW STEEL SECTIONS):-** Structural steel any section/plate (except hollow steel sections) shall be procured from following main producers.

- | | |
|--|---|
| <p>1. M/s Rashtriya Ispat Nigam Limited (RINL)
 Visakhapatnam Steel Plant
 Visakhapatnam-530031, India
 Tel: (91 891) 518226, 518376
 Fax: (91 891) 518316
 Email: cmdvsp@itpvis.ap.nic.in
 Brand: “RINL”
 Structural Steel (Angle, Beam, Column, Channel, Plate)</p> | <p>2. Tata Iron & Steel Company (TISCO or Tata Steel)
 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)
 Brand: “TATA”
 Structural Steel (Angle, Beam, Column, Channel, Plate)</p> |
| <p>3. Steel Authority of India Ltd (SAIL)
 Central Marketing Organization,
 Northern Region, 17th Floor, Scope
 Minar, Laxmi Nagar Distt Centre,
 Delhi-110 092
 Brand: “SAIL”
 Structural Steel (Angle, Beam, Column, Channel, Plate)</p> | <p>4. M/s Jindal Steels and Power Ltd
 Jindal Centre,
 Plot No. 2, Sector-32,
 Gurgaon-122 001, Haryana
 Tel: 0124 661 5000
 Fax: 0124 661 2125
 Website : www.jindalsteelpower.com
 Brand: “JINDAL”
 Structural Steel (Angle, Beam, Column, Channel, Plate)</p> |

13.2.3.3. However in case of its non availability with above mentioned primary producers, the same can be procured from approved secondary producers with a reduction of 5% (Five percent) of the accepted rates of structural steel. In case the desired section of structural steel is not rolled / manufactured by above mentioned primary producers, there shall be no price adjustment in use of structural steel procured from approved secondary producers for such sections of structural steel. In case the quality of structural steel i.e. A, B or C is not mentioned in drawings then quality A shall be used and same shall be followed for deviation if any.

13.2.3.4. Steel section for railings, gate, fencing, guard bars, grills, steel chowkhat, holdfasts etc which do not constitute structural members, can be procured from main producers/ secondary producer/ BIS marked manufacturers or their authorized dealers at the option of contractor without any price adjustment. Tests will not be insisted upon for such steel sections.

13.2.3.5. **STRUCTURAL STEEL(HOLLOW STEEL SECTIONS):-** Structural hollow steel sections shall be directly procured from TATA (STRUCTURA)/JINDAL STAR/ ISI Marked .

13.2.4. **TESTING OF STEEL**

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13.2.4.1. The manufacturer is to carry out inspections and testing of steel in accordance with the relevant BIS provisions. The contractor shall submit the manufacturer's test Certificate in original along with the test sheet giving the results of each mechanical test as applicable and the chemical composition of the steel or authenticated copy thereof, fully signed by the manufacturer with each consignment. The Engineer-in-Charge shall record these details in Steel Acceptance Register, as given at Appendix 'F' after due verification and send a certified true copy of test sheet to GE for his records. The GE/CWE shall also organize independent testing of random samples of steel drawn from various lots from National Test House, SEMT Wing CME, Regional Research labs, IITs, National Institutes of Technology, NABL Approved laboratories, Command Testing Laboratory, Govt Engineering Collage or Any Govt laboratories as per the recommended minimum frequency shown in para here-in-after. Samples from each lot should be tested for quality and elongation. The elongation shall not be less than 18%. Cost of samples, transportation and testing shall be borne by the Contractor. The records of such checks would be maintained in the steel test register.

13.2.4.2. Nominal mass of any size of finishes bar/section of steel shall be checked as specified in relevant IS code. The nominal mass so determined shall be recorded in steel testing register giving cross reference to consignment number. Nominal mass of any size of finished bar/section of steel if found to be beyond the tolerance limits on minus side as specified in relevant IS code, the same shall be rejected and the contractor shall remove the same at his own cost without any extra cost to the Government. However, if the weight of steel section is beyond the tolerance limit on higher side the same can be provided with approval of the GE but without any extra cost to the Government.

13.2.4.3. If any Test Result of any particular size of Bar/Section of steel of any consignment is not found satisfactory as specified in relevant IS, the contractor shall remove the same at his own cost and no claim of contractor shall be entertained on this account.

13.2.4.4. TYPE OF TESTING

13.2.4.4.1. REINFORCEMENT STEEL

(a) High Strength Deformed– Steel Bars – Nominal Mass Test, Tensile Test, Bend Test and Re-bend Test shall be carried out as per Clause No. 8 of IS-1786-1985 and Test Specimens shall be as per Clause No. 10 of IS-1786-1985.

(b) Mild Steel Bars – Nominal Mass Test, Tensile Test and Bend Test shall be carried out as per Clause No. 9 of IS-432 (Part-I)-1982. Re-bend Test is not required to be carried out for Mild Steel Bars.

13.2.4.4.2. STRUCTURAL STEEL

(a) Structural Steel (Standard– Quality) – Tensile Test and Bend Test shall be carried out as per Clause No. 6, 7 and 8 of IS-226-1975 for Standard Quality of Steel Sections.

(b) Structural Steel (Ordinary– Quality) – Tensile Test and Bend Test shall be carried out as per Clause No. 6, 7 and 8 of IS-1977-1975 for Ordinary Quality of Steel Sections.

(c) Structural Steel (hollow– steel sections) – Tensile Test shall be carried out as per IS-4923-1997 for Standard Quality (Hollow Steel Section) of Steel Sections.

13.2.4.4.3. FREQUENCY OF TESTING

13.2.4.4.4. REINFORCEMENT STEEL:-Normal Mass Test, Tensile Test, Bend and Re-bend Test shall be carried out as per Minimum Frequency given below :-

NOMINAL SIZE OF BARS	FREQUENCY
----------------------	-----------

(a) Bars size less than– 10mm – 1 SAMPLE (3 SPECIMENS) for Each Test for Every 25 TONNES or Part thereof.

(b) Bar size 10mm to– 1 SAMPLE (3 SPECIMENS) for Each Test for Every 35

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16mm TONNES of Part thereof.

- (c) Bar size over 16mm – 1 SAMPLE (3 SPECIMENS) for Each Test for Every 45 TONNES of Part thereof.

13.2.4.4.5. **STRUCTURAL STEEL(FOR ALL GRADE):-** Tensile Test and Bend Test shall be carried out as per Minimum Frequency given below :-

NOMINAL SIZE OF BARS	FREQUENCY
(a) TENSILE TEST	– 1 SAMPLE (3 SPECIMENS) for Each Test for Each Individual Section for Every 25 TONNES of Steel or Part thereof.
(b) BEND TEST	– 1 SAMPLE (3 SPECIMENS) for Each Test for Each Individual Section for Every 25 TONNES of Steel or Part thereof.

NOTE : For various Tests, Acceptance Criteria, Tolerance, etc. refer to STEEL SUPPLY & ACCEPTANCE REGISTER given in APPENDIX 'F' and relevant BIS Codes.

13.2.4.5. **TESTING CHARGES** :-The Unit Rate/Amount quoted by the Contractor in the Tender shall be inclusive of Cost of all sorts of Testing to the extent as specified here in before and in relevant Indian Standards.

13.2.5. **DOCUMENTATION** :- The contractor shall submit Original Purchase Vouchers and Test Certificate from the Main Producer/ Secondary Producer/BIS marked manufacturer/authorized dealer as applicable for the total quantity of steel supplied under each consignment to be incorporated in the work. All consignments received at the work site shall be inspected by the GE alongwith the relevant documents before acceptance. The Original Purchase Vouchers and Test Certificates shall be defaced by the Engineer in Charge and kept on record in the office of the GE duly authenticated and with cross reference to the consignment number recorded in the Steel Acceptance Register. The steel Acceptance Register will be signed by the JE (Civil), Engineer in Charge, GE and the, Contractor. The Accepting Officer may order a Board of Officers for random check of steel and verification of connected documents. The entire quantity of steel items 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.

13.2.6. **STORAGE, ACCOUNTING, PRESERVATION & MAINTENANCE OF STEEL:** The storage, accounting, preservation and maintenance of steel supplied by the contractor shall be done as per standard engineering practice till the same is consumed in the work and the cost of the same shall be deemed to be included in the unit amount quoted by the tenderer. The GE shall inspect at regular interval to verify that steel lying at site are stored, accounted, preserved and maintained as per the norms. The steel shall be stored so as to differentiate each consignment separately. If the GE is not satisfied with the storage/preservation of any size of bar/section of steel, he may order for any test (s) of steel as applicable for that size of bar/section of steel and as specified in tender documents and relevant Indian Standard to recheck the acceptability criteria for the same. The contractor shall bear the cost of necessary testing(s) in this regard and no claim whatsoever shall be entertained by the Govt.

13.2.7. **MEASUREMENTS AND PAYMENT OF STEEL :-**

13.2.7.1. The entire quantity of all steel items 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.

13.2.7.2. The nominal mass conversion factor for various steel sections/size of finished bars as given in relevant IS codes shall be considered standard for measurement.

13.2.7.3. The payment of steel shall only be allowed after production of Original Purchase Vouchers, Test Certificates by the contractor for each consignment of steel and results of testing carried out by the Department are found satisfactory after testing.

13.2.8. **CORNER REINFORCEMENT/SUPPORT BARS/CHAIRS, ETC.**

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- 13.2.8.1. These shall be provided all as shown in TD & STD drawing. In case these provision have been modified in main drawings specifically, then the provision of main drawing shall be followed.
- 13.2.8.2. Reinforcement bars shall be TMT bars and shall be provided as indicated in drawings. For the purpose of pricing deviation involving reinforcement bars, the length of each bar shall be considered as 12.00 meters for calculating laps unless otherwise shown on drawings.
- 13.2.8.3. In case of pricing deviations 10mm and over dia TMT bars as stirrups shall be priced at the rate of TMT bar stirrups of 5 to 10 mm in MES Schedule Part-II subject to contractor's percentage.
- 13.2.9. Mild Steel guard bars shall be of 12 mm x12mm square bars of Fe-310-0 or Fe-410-0 quality. Guard bars shall be provided to all windows & vents as shown on drawings. The guard bars including window shall be painted with 2 coats of synthetic enamel paints over a coat of red oxide zinc chrome primer.
- 13.2.10. Other steel items like steel door with PGI sheet covering, railing in balconies and stair case, water meter and switch board boxes etc shall be fabricated to the dimensions as shown on drawings as directed by Engineer-in-Charge. Welding, bolting, drilling holes etc shall be as specified in MES Schedule.

13.3. STEEL WINDOWS/VENTILATOR & STEEL DOOR**13.3.1. STEEL WINDOWS/VENTILATOR**

13.3.1.1. Refer Clause No. 10.25 of MES Schedule Part-I.

13.3.1.2. **PRESSED STEEL WINDOW/ VENTILATOR** :- Pressed steel windows/ventilators shall be provided as per shown/mentioned TD drawings no CESZ/2015/TD/019 and as specified following :-

- (a) Steel required for steel window shall be of cold reduced low carbon steel sheet of designation CR2 and grade D as per IS 513 :2008. MAKE of sheet : **SAIL, Rashtriya Ispat Nigam Ltd, IISCO, TISCO, M/S Jindal Steels and Power Ltd.**
- (b) While supplying, steel windows shall have one shop coat of anticorrosive paint (Red oxide zinc chrome primer).
- (c) Window shall be given another coat of anticorrosive priming and two coats spray painting before fixing of glass and wire mesh.
- (d) Steel windows shall be fixed as per IS-1081 embedding in cement concrete block of appropriate size.
- (e) All steel windows, ventilators shall be factory made and of approved make and shall be procured from any of the approved firms listed in Appendix 'B' to Particular Specification.
- (f) Pressed steel frame shall conform to IS 4351.
- (g) Glass and frame shall be joint with 6x6 mm silicone polymer base sealant.
- (g) The fitting shall be provided as following:-
 - (i) 70 mm long MS Box type hinge with two nos stainless steel washer(each end) all as specified in clause no 6.2.1.1 of IS 1038 :- 02 nos each shutter (both glazed shutter and gauged (fly proofing) shutter)
 - (ii) 250mm long 1.5 mm thick MS telescopic stay with lock screw as shown on drawing :- 01 no each gauged (fly proofing) shutter.
 - (iii) MS spring Latch :- 01 no each glazed shutter
 - (iv) 75 mm long 'C' section MS handle :- 01 no each shutter gauged (fly proofing) shutter.
 - (v) 75 mm long MS tower bolt :- 02 no each gauged (fly proofing) shutter
 - (vi) Any other fitting as per manufactures requirement

13.3.1.2.1. **FABRICATION** :-Refer Clause No. 10.25.2 of MES Schedule Part-I and relevant Clause of IS-1038.

13.3.1.3. **PRECOATED STEEL WINDOW/ VENTILATOR**: Providing and fixing windows & ventilators fabricated from Rolled formed sections made of Galvanised Steel colour coated powder coated (Base Steel as per IS 513 'D' Quality Galvanised as per IS 277 with zince of 120 Gms/SqMtr) with total thickness of 0.06mm. Minor variations (in over all sizes to suit the standard practice of the manufacture will however, be accepted, without any price adjustments. Precoated steel windows/ventilators shall be provided as per mentioned / shown on BOQ and TD drawings no CESZ/2018/TD/35, Sheet 1/2, 2/2 and as specified following :-

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- a) Steel required for steel window shall be of cold reduced low carbon steel sheet of designation CR2 and grade D as per IS 513 :2008. MAKE of sheet : **SAIL, Rashtriya Ispat Nigam Ltd, IISCO, TISCO, M/S Jindal Steels and Power Ltd.**
- b) Steel windows (glazed) shall be provided with grills made of 10mm MS square bares welded to 6mm x 12 mm MS flat. Distance between bars should not be more than 100mm centre to centre. Grill shall be given two coats of synthetic enamel paint over a coat of zinc chrome primer & fixed to window frame with screws.
- c) Hinges for shutters (glazed) shall be SS pivot hinges.
- d) Steel windows shall be fixed as per IS-1081 embedding in cement concrete block of appropriate size as per notes on respective drawings.
- e) Peg stays and handles for steel windows shall be as per notes on respective drawings.
- f) Centre hung windows shall be mounted on antifriction brass pivots.
- g) Steel windows shall be factory made using ISI marked sections.
- h) Powder coating should be with pure polyester powder upto 50-60 microns thick over a coat to Epoxy primer of 5-7 microns.
- i) Grill shall be provided all as shown on drawings.
- j) Windows / vents shall be obtained from the firm of which the sample have been approved by GE.
- k) Hardware fittings / iron monger for windows / vents shall be provided as shown in drawings or in relevant IS.
- l) Irrespective of whatever is specified, roll formed galvanized pre-painted steel windows/ vents shall be painted again with synthetic enamel paint as these are pre-painted steel windows / vents. However, contractors will ensure that no damage is done to the pre-painted surface during the handling / fixing, the contractor shall replace such windows / vents without extra cost to the Govt. The decision of the GE in this regard shall be final and binding.
- m) All steel windows, ventilators shall be factory made and of approved make and shall be procured from any of the approved firms listed in Appendix 'B' to Particular Specification.
- n) Glass and frame shall be joint with silicone polymer base sealant.

13.3.1.3.1. **FABRICATION** :- Refer Clause No. 10.25.2 of MES Schedule Part-I and relevant Clause of IS-1038.

13.3.2. GUARD BARS TO STEEL WINDOS & VENTILATORS:-

- 13.3.2.1. All steel windows shall be provided with guard bars as shown on drawing. However, in case of double windows in the same opening guard bars shall be provided to glazed windows only.
- 13.3.2.2. Guard bars to steel windows unless otherwise shown on drawings shall be mild steel 12mm square. The guard bars shall be integrated during the manufacture of the windows.
- 13.3.3. The process of welding adopted shall be of flush butt welding. Prior to procurement of entire quantity of steel windows and ventilators, the contractor shall produce a sample to the GE who shall after its inspection /examination and after satisfying himself with regards to above mentioned requirements, approve the samples and convey in writing to the contractor.
- 13.3.4. **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/ vents required as per lot size is deemed to be included in the quoted lump sum by the contractor.

13.4. STEEL DOORS

- 13.4.1. Mild steel sliding door shall be provided as per main drawings and TD drawings.
- 13.4.2. Steel doors shall conform to IS-1038 as indicated and detailed on drawings. The section particulars shall be provided as per TD drawing and clause 10.25 of SSR Part-I.

13.5. COLLAPSIBLE GATE

- 13.5.1. Refer SSR Part I clause 10.24 and IS 10521 -1983. Collapsible gate shall be provided in the locations and as per details all as shown / mentioned in the drawing. Specification for collapsible steel gate shall be all as specified in SSR Part I clauses as mentioned above. Collapsible steel gate shall be of double leaf, top hung type. All the surfaces of collapsible steel gate shall be painted

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with two coats of synthetic enamel paint of approved tint over red oxide zinc chrome primer unless otherwise mentioned in the drawing.

13.5.2. Collapsible Steel Gate shall be of approved design.

13.6. **STEEL ROLLING SHUTTER**

13.6.1. **GENERALLY** :- Refer Clause No. 10.23 of MES Schedule Part I, 2009.

13.6.1.1. Steel rolling shutter shall be of approved make . The size of rolling shutters shall be all as per drawings. The position of fixing of the rolling shutters shall be as decided by the Engineer-in-charge.

13.6.1.2. Rolling shutters shall be self coiling type without ball bearing, push and pull manually operated upto a maximum of about 8 Sqm clear area and upto clear area of about 12 Sqm with ball bearing.

13.6.1.3. Gear-Operated Type Shutters (Mechanical Type) shall be fitted with ball bearings. These are used up to a maximum of about 25 sq.m clear area, if operated by a bevel gear box and crank handle and upto a maximum of about 35sq.m clear area, if operated by chain mounted directly on the worm shaft.

13.6.1.4. In case rolling shutter required for **Transformer Room, Substation Room & Repair Bay Room** etc, rolling grill shall be provide as per Clause No. 10.23.12 of MES Schedule Part I.

13.6.2. **CURTAINS** :- The curtain shall be built up of interlocking lath sections made from cold rolled steel strips 1.25mm thick. The lath sections shall be rolled so as to have interlocking curls at both edges and a deep corrugation at the center with a bridge depth of not less than 12 mm. Each lath section shall be continuous single piece without any welded joints. When inter lock the lath section shall have a distance of 75 mm between rolling centers. Each alternate lath section shall be fitted with malleable cast iron or mild steel clips securely riveted at either ends.

13.6.3. **LOCK PLATE** :Refer Clause No. 10.23.3 of MES Schedule Part I.

13.6.4. **GUIDE CHANNELS** :-Refer Clause No. 10.23.4 of MES Schedule Part-I, but the depth of guide channel shall be 65 mm upto 3.5 Metre clear width of shutter.

13.6.5. **BRACKET PLATE** :- Refer Clause No. 10.23.5 of MES Schedule Part-I.

13.6.6. **ROLLER**:-The size of pipes for suspension shafts for rolling shutter shall be 50 mm (Nominal) bore medium grade for shutter width upto 6 meter. The suspension shaft shall be made of steel pipe conforming to IS -1161 and shall be provided with steel or preferably cast iron pulleys and helical wire spring or flat spiral springs for counter balancing the weight of the shutter adequately.

13.6.7. Hood Covers, Gears, Safety Device, Safety Lever Locks, etc, the specification shall be all as per Clause No. 10.23.7, 10.23.8, 10.23.9 and 10.23.11 of MES Schedule Part I.

13.7. **STEEL STRUSS/TUBULAR TRUSS & PURLINS : BLANK**

14. **ROOF COVERING : BLANK**

15. **RCC ROOF**

15.1. All RCC Roof Slabs where shown on drawings shall be having the slope as indicated in the drawings.

15.2. **WATER PROOFING TREATMENT TO ALL RCC ROOFS**

15.2.1. RCC Roof Slabs shall be laid to proper slope. The Water Proofing Treatment to RCC Roof shall be provided with the following Specification irrespective of whatever shown on Drawings or specified elsewhere in the Tender documents :-

15.2.2. **FOR ACCESSIBLE ROOF (OPEN TERRACE) EXCEPT SLOPING RCC ROOF** :-

- (i) Roof surface shall be plastered with 15mm thick cement mortar(1:4) with water proofing compound as in screed bed over slab when Concrete is still green.
- (ii) Curing of slab by ponding with water shall be done all as specified.
- (iii) Cleaning of plastered roof surface and applying one coat of cold bituminous primer @ 0.25 Litres per Sqm conforming to IS: 3384-1986.
- (iv) A layer of APP based polymeric membrane, 3mm thick (minimum), weighing 3.5 kg/Sqm reinforced with polyester non woven fabric matt (weighing not less than 160 gms/Sqm) shall be applied over bituminous primer as specified above. Application of polymeric membrane shall be by torch application. The overlaps shall be minimum 100mm on the transverse direction and 75mm on longitudinal direction.
- (v) 22mm thick plain cement concrete tiles (conforming to IS) of size 250mmx250mm using grey cement laid over a bedding layer of 15mm screed in Cement Mortar 1:6, jointing with

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cement slurry and joints shall be 4mm wide and sealed with 2 mm deep polysulphide compound.

15.2.3. SLOPING RCC ROOF:

15.2.3.1. Half round glazed concrete tile/ Magalore roof tiles/ Teracota tiles over RCC sloping roofing wherever shown / mentioned on main drawing / Schedule of finishes drawings shall be provided with half round glazed concrete tile and shall be laid over 10mm thick screed bed in Cement Mortar 1:3 over sloping RCC roof slab and **colour, size and pattern of tiles shall be approved by GE.**

15.2.3.2. Make of half round glazed tiles: Bangalore Tile or equivalent quality as approved by GE. Where ever tile symbol / pattern has been shown / marked on sloping roof in the drawing, the provisioning of tile shall be considered as above.

15.2.4. FOR NON ACCESSIBLE ROOF

(i) All layer same as per accessible roof treatment except Sl No. (v) i.e. PCC Tiles.

(ii) Two coats of Bitumen based UV reflective and water proofing paint with aluminium finish over APP membrane and maximum coverage 8.00 Sqm per litre per coat. **Make “STP Ltd” Brand-“Super silver Shield” or equivalent quality** of makes mentioned in Appendix ‘B’. The Membrane and this paint shall of same manufacturer.

NOTES ; FOR CLAUSE No. ACCESSIBLE ROOF/ NON ACCESSIBLE ROOF

(a) For parapets membrane shall be taken to the height of PCC curved fillet as specified here-in-after and then inserted inside the parapet/PCC curved fillet in groove.

(b) Curved fillet in PCC (1:2:4) type BO of radius 75mm 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 30/40 conforming to IS:73 @ 1.20 kg/Sqm over a coat of bituminous primer, conforming to IS : 3384 applied @ 0.30 litre per Sqm.

(c) **ATACTIC POLYPROPYLENE POLYMER MODIFIED WITH NON - WOVEN POLYESTER MATT PREFABRICATED MEMBRANE(APP) :-** The APP modified membrane shall be 3mm thick APP (Atactic Polypropylene Polymer) modified prefabricated five layer, weight not less than 3.50 Kg/Sqm water proofing membrane, black finished reinforced with non woven polyester matt and weight not less than 160 gms/Sqm. APP modified membrane shall be as specified in para 11.44 (including sub paras) of MES Schedule Part I

(d) In no case damage / puncture of APP modified proofing membrane shall be permitted.

(e) The entire work of water proofing treatment to RCC roof slabs shall be carried out by engaging authorised applicator of the manufacturer. For this purpose, contractor shall submit the details of authorised applicator alongwith supporting documents to GE well in time and the work shall be executed only after written approval by GE, all materials used for water proofing treatment shall be of same manufacturer. However, the main contractor shall give guarantee for efficiency of water proofing treatment for a period of Ten Years as specified here-in-before.

(f) Random samples of Polymeric Water Proofing membrane, as selected by GE, shall be got tested from National Test House, SEMT Wing CME, Regional Research labs, IITs, National Institutes of Technology, NABL laboratories, Govt Engineering Collage or Any Govt laboratories where such facilities exists before incorporation in the work.

(g) In case the test result does not meet the specifications given above, the entire lot shall be rejected by the GE. In such a case, the contractor shall bring the fresh lot of desired quantity of APP modified Water Proofing Membrane and the same procedure of testing repeated till the time satisfactory test results are obtained. Nothing extra will be paid to contractor on this account.

(h) The work of fixing membrane shall be got executed through the authorized applicator of the manufacturer of the membrane.

15.2.5. WATER PROOFING TREATMENT TO SUNKEN SLABS (INCLUDING LOCAL SUNK) : BLANK**15.3. TESTING OF WATER PROOFING TREATMENT**

15.3.1. After the water proofing treatment is completed, leak proof tests 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

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Engineer-in-Charge. (These ponds shall be filled with potable water so that an average 50 mm (minimum 25 mm and maximum 75 mm) height of water is maintained during the test period.

- 15.3.2. Test shall be carried out continuously for a period of 48 hours. Any seepage notified shall be rectified by the contractor and making good the defective portion to entire satisfaction of the GE, who will pass this stage.
- 15.3.3. All mud fillet bends shall be removed and surface made clear and tidy after completion of satisfactory testing.
- 15.3.4. Satisfactory completion of test shall not absolve the contractor from his responsibility of rectification of defects, which may arise during Defect Liability Period.
- 15.4. **PREVENTION AND CURE OF LEAKAGE, SEEPAGE, DAMPMESS**
- 15.4.1. Prevention and cure of Leakage, Seepage, Dampness in the building shall be carried out as shown on Drawings No. CESZ/2015/TD/011, Sheet No. 1/2 to 2/2.
16. **CEILINGS : BLANK**
17. **FLOORING & FLOOR FINISHES**
- 17.1. **GENERAL**
- 17.1.1. Refer Clause No. 13.2, 13.4, 13.5, 13.8, 13.14, 13.21, 13.23, 13.24, 13.25, 13.27, 13.32, 13.38, 13.39, 13.40, 13.46 and 13.47 of MES Schedule Part-I are to be adopted for Materials and Workmanship of laying Floor/ Skirting/Dado.
- 17.1.2. Floors shall be laid to levels or to falls as shown on drawings and as directed by Engineer-in-Charge. Floor finish shall be extended over dwarf wall, doors and other opening.
- 17.1.3. Sinking of floors in toilet and WCs etc, if shown on drawing shall not be achieved by reducing RCC slab thickness.
- 17.1.4. Steps and connected ramps shall have the same type of floor as adjoining floors of building unless otherwise specifically mentioned and shall have chequered finish in addition.
- 17.1.5. Treads and landing of stair case, risers and skirting steps on entrance, shall have matching finish as of floor if otherwise not indicated in Schedule of finishes.
- 17.1.6. In case of floor or suspended slabs (except sunken suspended slab and floor or roof) slope in the floor as required shall be given in the finishing layer of the concrete as directed by the Engineer-in-Charge. Thickness of finishing layer of concrete in above location indicated here-in-after is average thickness.
- 17.1.7. Where two different types of floors finish are provided on either side of the opening the superior floor finish shall be extended over the opening.
- 17.1.8. Finishing layer of floor shall be carried out through all opening and over dwarf wall.
- 17.1.9. PCC floor shall be finished even and smooth using extra cement unless otherwise specifically mentioned in drawings of schedule of finishes or here-in-after.
- 17.1.10. Unless otherwise shown/mentioned in the drawings 1.5mm thick Plastic dividing strips shall be provided in PCC/terrazzo floor upto 100 mm thick. The height of the plastic strip shall be 2mm less than the thickness of floor.
- 17.1.11. Terrazzo cast-in-situ flooring shall be in cement as given in schedule of finishes and in case nothing is mentioned it shall be with gray cement and no pigment. Terrazzo surfaces shall be grinded well and polished as specified in MES Schedule Part-I. Terrazzo floor shall be polished using wax.
- 17.1.12. Wherever PCC/terrazzo floor is required to be provided on RCC member/slab, the top surface of RCC member shall be spread with cement slurry @ 3.0 Kilogram per Square Metre before providing flooring. The cost of the same shall be deemed to be included in the Lump Sum Cost quoted by the contractor.
- 17.1.13. Marble aggregate and marble powder for terrazzo topping shall be as specified in Clause No. 13.5 of MES Schedule Part-I. Marble aggregate for floor shall be Grade-I and for dado/skirting and other situation/ location it shall be Grade No. 0. The colour of marble chips shall be as approved by GE.
- 17.1.14. Polythene film shall conform to IS-2508, 150 micron thick of 01.0 Grade. If full width of polythene film is not available, the same shall be laid with an overlap of 150mm pasted with the resin solution.

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- 17.1.15. Tiles (Non Skid/Glazed/PVC) shall be laid all as specified in Clause No. 13.39, 13.40 and 13.44 of MES Schedule Part-I.
- 17.1.16. Sub floor may not be laid in panels. Under layer and topping layer of casting PCC/terrazzo cast-in-situ floor shall be laid in square or rectangular panel as directed by Engineer-in-Charge. Length of panel shall not exceed 2.0 Metre. Length width ratio shall not exceed 1.5 times in rectangular panels.
- 17.1.17. Polished Kota stone shall be of machine cut polished and thickness shall be all as mentioned in the schedule of finishes. The stone slab shall be hard, even, sound, durable, tough, and regular in shape of shade as approved.
- 17.1.18. Unless otherwise shown/mentioned in the drawings PCC & terrazzo case-in-situ flooring shall be provided with 1.5 mm thick, 38 mm wide plastic dividing strips all as specified.
- 17.1.19. Unless otherwise shown/mentioned in the drawings PCC sub-base for ground floor only shall be provided with 75 mm thick PCC M-7.5 using 40 mm graded stone aggregate) over 75mm thick sand layer covered with 150 micron polythene film over well rammed earth filling.
- 17.1.20. If the finishes missing in schedule of finishes on paved area/ hard standing /apron adjoining the building specified on plan shall be provided with 60mm thick, M-35 Grade precast cement concrete interlocking paver blocks over 100 mm sand filling over rammed earth.
- 17.2. **TYPES OF FLOORING** - Various types of flooring of buildings indicated in Drawings/Schedule of Finishes shall be provided with following specifications: -
- 17.2.1. **PCC FINISH /PCC CHEQUERED FLOOR**
- 17.2.1.1. **PCC FLOOR:**
- 17.2.1.1.1. The concrete mix shall be nominal mix. PCC floor shall be provided all as shown on drawings. For 40 mm thick PCC M-15 type B-1 floor, the size of glass dividing strips shall be 3 mm x 38 mm irrespective of whatever is specified in Schedule of finishes.
- 17.2.1.1.2. PCC floor shall be finished as specified in Schedule of finishes and in case no finish is specified it shall be considered finished smooth and even using extra cement. Where floors to be laid directly on RCC slab shall be given a coat of cement slurry @ 3 Kg/Sqm before floor is laid as specified in clause No 13.27 of MES Schedule Part I except to portion of sunken slab.
- 17.2.1.1.3. The earth wherever specified shall be approved earth as approved by GE.
- 17.2.2. **JOINT IN PCC HARDSTANDING /APRON / PAVED AREA:-**
- 17.2.2.1. Irrespective of whatever shown or mentioned on drawings or schedule of finishes the expansion / contraction (dummy) joint shall be provided in all PCC hard-standing /apron / paved area as mention as below.
- 17.2.2.2. Refer Clause no 13.18 of MES Schedule, Part-I and IRC 15.
- 17.2.2.3. **Expansion Joint** :- The expansion joint shall be provided along perimeter (full length & full width) of hardstanding /apron / paved area and longitudinally every 20 meter(max) and transversely 9 meter (Max) interval. The joints shall be provided upto full thickness of hardstanding /apron / paved area and filled with 12 mm wide pre-formed bituminous filler and top 30mm thick primed and sealed with polysulphide sealant as specified in MES Schedule Part-I.
- 17.2.2.4. **Contraction(Dummy) joint** :- The contraction(dummy) joint shall be provided at 4.5 meter interval (max) in both direction. The joints shall be provided 10 mm wide and depth equal to $\frac{1}{3}$ of the thickness of PCC hardstanding /apron / paved area and filled with polysulphide sealant as specified in MES Schedule Part-I.
- 17.2.3. **WEAR RESISTANT FLOOR TOPPING**
- 17.2.3.1. The wear resistant flooring wherever shown in schedule of finishes drawings shall be provided with metallic floor hardener compound. The metallic floor hardener compound shall be applied as per manufacturer's instructions over PCC flooring and maximum coverage area shall be 5 Kg/Sqm.
- 17.2.3.2. The metallic floor hardener shall be of Makes : ShaliFloor M DH of M/s STP Ltd or equivalent product of M/s Fosroc Chemicals / M/s Sika India Pvt Ltd / BASF/ PIDILITE.
- 17.2.4. **CERAMIC/VITRIFIED TILES:**
- 17.2.4.1. All type ceramic tiles shall be conforming to **IS : 15622 – 2017**.
- 17.2.4.2. Refer Clause no's 13.14, 13.15, 13.40 & 13.41 of MES Schedule, Part-I.

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- 17.2.4.3. The size of tiles shall be provided as mentioned on drawings or schedule of finishes but in no case size of tiles shall be less than 300 mm x 450 mm x 6 mm for ceramic wall tiles, 300 mm x 300 mm x 7 mm for non-skid ceramic floor tiles and 600 mm x 600 mm x 9-10mm for vitrified tiles.
- 17.2.4.4. The vitrified tiles shall be fully vitrified and fully polished.
- 17.2.4.5. The floor ceramic tiles shall be **matt finish** of best Quality Superior type.
- 17.2.4.6. The wall ceramic tiles shall be '**glossy' matt or semi-matt finish** of best quality Superior type.
- 17.2.4.7. The top surface of vitrified tiles shall be **double charged finishing**.
- 17.2.5. **POLISHED KOTA STONE FLOORING**
- 17.2.5.1. Refer Clause No. 13.47 of MES Schedule Part-I.
- 17.2.5.2. Kota stone shall be laid all as specified in Para 13.47.3 (including sub paras) & 13.47.4 (including sub paras) of MES Schedule Part I. Thickness of Kota stone if not indicated in drawings shall be 18-20 mm thick and **Size of Kota Stone for floor shall be minimum 600 x 600 mm**. For any location above floor level such as counters, work benches, laboratory counters etc. and risers and treads as per mention on Drawings/Schedule of Finishes the slab the kota stone shall be in one piece upto a minimum length of 2.00 meters as per site requirement.
- 17.2.5.3. Kota stone flooring wherever shown in Schedule of finishes drawings shall be provided of 18-20 mm thick & 100 mm width green / white marble border all round of room as per direction of GE.
- 17.2.6. **UDAIPUR GREEN MARBLE:-**
- 17.2.6.1. Udaipur green marble flooring tiles floor wherever indicated in Drawings / Schedule of Finishes shall be provided 18-20 mm thick baroda green marble shall be laid over 15mm thick screed bed in Cement Mortar 1:4 over sub base floor / RCC slab / any other location as specified. The marble shall be set and jointed in neat cement slurry and pointed in coloured cement to match including granite cutting and polishing. The joints shall be almost invisible and shall not exceed 1 mm thickness in any case. The size of marble slab shall be minimum 1200 x 1200 mm. For any location above floor level such as window cill as per mention on Drawings/Schedule of Finishes the slab the kota stone shall be in one piece upto a minimum length of 2 meters as per site requirement.
- 17.2.6.2. Quality of green marble slabs shall be green marble Baroda, Adu or Bundi and all as specified in clause No 6.20.3 & 13.12.1 of MES Schedule Part I and drawing.
- 17.2.7. **PCC TILES/ PCC CHEQUERED TILE FLOOR**
- 17.2.7.1. Refer Clause no 13.17 of MES Schedule, Part-I. The PCC chequered Tiles shall conform to IS: 13801.
- 17.2.7.2. PCC Chequered tiles floor wherever shown in Schedule of finishes drawings shall be provided with PCC chequered tiles (factory made) shall be of size 300 mm x 300 mm x 25 mm. Tiles shall be laid over 15 mm thick screed bed in Cement Mortar 1:4, set, jointed and pointed in neat cement slurry over sub base floor/RCC slab/any other location as specified.
- 17.2.8. **GRANITE STONE FLOORING:-**
- 17.2.8.1. Granite stone floor wherever shown in Schedule of finishes drawings shall be provided with granite stone flooring of 18-20 mm thick granite stone slab flooring shall be laid over 15mm thick screed bed in Cement Mortar 1:4 over sub base floor/RCC slab/any other location as specified. The marble shall be set and jointed in neat cement slurry and pointed in coloured cement to match including granite cutting and polishing. The joints shall be almost invisible and shall not exceed 1 mm thickness in any case. The size of granite stone slab shall be minimum 1000 x 2000 mm.
- 17.2.8.2. For any location above floor level such as counters, work benches, laboratory counters etc the slab the granite stone shall be in one piece upto a minimum length of 2 meters as per site requirement.
- 17.2.9. **VITRIFIED PAVING OUTDOOR TILES :-**
- 17.2.9.1. Vitrified paving tiles / Outdoor vitrified / Heavy duty Endura tiles floor wherever indicated in Drawings/Schedule of Finishes shall be provided Outdoor vitrified Paving tiles shall be antiskid, polka dot, vitrified, coloured tiles of minimum size 300 mm x 300 mm x 12 mm and over 20 mm screed bed in Cement Mortar 1:4 over sub base floor / RCC slab / any other location as specified. The joints shall almost invisible. The tiles shall be laid all as specified in

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para 13.40.1 & 13.40.2 of MES Schedule Part I, set and jointed in grey cement and pointed in white cement mixed with pigment to match tile colour.

17.2.9.2. Vitrified paving outdoor tiles shall be conforming to **IS : 4457 – 2007**.

17.2.9.3. Make of vitrified paving tiles: JHONSON (POLKA STRIP, POLKA STRIP DOTS) or same color and quality of makes mentioned in Appendix 'B'.

17.2.10. **SPLIT STONE/ ROCK FACE WALL CLADDING :-**

17.2.10.1. Split stone/ rock face wall cladding wherever shown / indicated in Drawings/Schedule of Finishes shall be provided 16mm to 18 mm thick Dholpur stone cladding, gang saw cut with machine cut edges, uniform colour of each stone size not exceeding 0.10 sqm (maximum width 80mm) laying over 3 mm thick polymer base tile adhesive and grouting of joints between tiles & filled with polymer modified cement based grout laying over plaster surface and silicon treatment on exposed surface of tiles. The colour of Dholpur stone shall be approved CWE.

17.2.10.2. Make as approved by GE.

17.2.11. **PRECAST CEMENT CONCRETE INTERLOCKING PAVING BLOCKS**

17.2.11.1. Interlocking PCC tiles flooring wherever shown in Schedule of finishes drawings shall be provided with 60mm thick, M-35 Grade precast cement concrete interlocking paver blocks over 100 mm sand filling over 75 mm thick hardcore over rammed earth.

17.2.11.2. Refer Clause no 13.18 of MES Schedule, Part-I.

17.2.11.3. The precast cement concrete interlocking blocks shall be glazed top with colour and shall be confirming to IS: 15658.

17.2.12. **MARBLE STONE FLOORING:-**

17.2.12.1. Refer Clause No.6.20.3 &13.39 of MES Schedule Part-I.

17.2.12.2. The marble sote flooring shall be set and jointed in neat cement slurry and pointed in coloured cement to match including granite cutting and polishing. The joints shall be almost invisible and shall not exceed 1 mm thickness in any case. The size of marble stone slab shall be minimum 1000 x 1000 mm.

17.2.13. **CERAMIC UNGLAZED VITREOUS ACID RESISTING TILES**

17.2.13.1. Refer Clause no's 13.23 of MES Schedule, Part-I and conforming to IS 4457 of 2007.

17.2.13.2. The size of tiles shall be provided as mentioned on drawings or schedule of finishes but size of tiles shall not be less than 300mm x 300mm x 15 mm.

17.2.13.3. The acid resistance tiles shall be laid, set and jointed in sodium base acid resistant mortar as per manufacturer's instruction over 20 mm screed bed in cm (1:6) over sub base as specified.

17.2.13.4. The manufacturer is to carry out inspections and testing of ceramic unglazed vitreous acid resisting tiles in accordance IS provisions. The Contractor shall submit the Manufacturer's Test certificate in original.

17.2.13.5. Make of ceramic vitreous acid resisting tiles: JHONSON (ENDURA) or equivalent quality of makes mentioned in Appendix 'B'.

17.2.14. **SKIRTING/DADO :-**Skirting/dado of various types as shown on Drawings and Schedule of Finishes shall be provided as specified here-in-after.

17.2.15. **CEMENT SKIRTING/DADO :-**5 mm thick Setting Coat in Cement Mortar 1:3 over 10mm thick Cement Screed in Cement Mortar 1:6 finished even and smooth using extra cement. Edges of skirting and dado to be chamfered.

17.2.16. **GLAZED CERAMIC TILES SKIRTING/DADO –**

17.2.16.1. Refer Clause No. 13.14 of MES Schedule Part-I. Irrespective of whatever shown on drawings/schedule of finishes, glazed ceramic tile skirting/dado shall be with coloured glazed ceramic tiles not be less than 300 mm x 450 mm x 6 mm laid over 10 mm thick screed in Cement Mortar 1:3, set and jointed in neat cement slurry and pointed in coloured cement to match. The contractor may provide the tiles of thickness more than 5.5mm in case it is not available without any extra cost to the Govt. However, this will not be treated as any deviation.

17.2.16.2. Unless otherwise indicated in schedule of finishes/main drawings/TD drawing the height of skirting shall be 100mm high, height of dado for bath room/Kitchen Room shall be 2000mm and height of dado for WC/ remaining portion of toilet room shall be 1200mm.

17.2.17. **PLAIN CEMENT CONCRETE TILES SKIRTING/DADO**

17.2.17.1. Refer Clause No.13.16 and 13.39 of MES Schedule Part-I.

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- 17.2.17.2. Cement Concrete Tiles (Factory Made) of size 250 x 250 x 22mm shall be laid over 10mm thick screed bed in Cement Mortar 1:3, set, pointed and pointed in neat cement slurry grouting and polishing.
- 17.2.18. **POLISHED KOTA STONE SKIRTING** :-Machine Cut Kota Stone Slab in skirting 18-20mm thick and 600 mm long shall be laid over 10mm thick Screed Bed in Cement Mortar 1:3. The edge of skirting shall be half round of or as per MES Schedule Part-I. The slab shall be fixed, set and jointed with grey cement slurry mixed with pigment to match the shade of slab including granite cutting and polishing.
- 17.2.19. **GREEN MARBLE** :- 20 mm thick marble shall be laid over 10mm thick screed bed in Cement Mortar 1:4. The marble shall be set and jointed in neat cement slurry and pointed in coloured cement to match including granite cutting and polishing. The joints shall be almost invisible and shall not exceed 1.0 mm thickness in any case. The size of marble slab shall be minimum 300 x 100 mm.
- 17.2.20. **VETRIFIED TILE/SKIRTING/DADO** :- Vitrified tile (factory made) shall be of size and make as specified for flooring and shall be laid over 10mm thick screed bed in Cement Mortar 1:4. The tile shall be set and jointed in neat cement slurry. The joints shall be almost invisible and shall not exceed 1mm thickness in any case.
- 17.2.21. **STAIR CASE (TREAD, RISER AND LANDING) / STEPS**
- 17.2.21.1. Stair case (Tread, Riser and Landing) / Steps as shown on Drawing and Schedule of Finishes shall be provided with the following Specifications:-
- 17.2.21.1.1. **KOTA STONE FINISH**
- 17.2.21.1.1.1. **TREAD/LANDING** : 20-25mm thick Polished Kota Stone as shown on Drawings shall be laid over 20mm thick screed in Cement Mortar 1:4 with Cement Slurry @ 3.0 Kilogram per Square Metre and over RCC step. The stone slab shall be set and jointed with Grey Cement Slurry mixed with Pigment to match the shade of the slab including granite cutting and polishing. The Kota stone shall be provided in single piece with round edge nosing.
- 17.2.21.1.1.2. **RISER** :- 20-18mm thick Kota stone shall be fixed over 10mm thick screed in Cement Mortar 1:3 in single piece.
- 17.2.22. **PCC STEP** :-Unless otherwise specified here-in-before/in drawings/Schedule of finishes the following specifications shall be followed :-
- PCC M-15(Nominal Mix)(using 20 mm graded stone aggregate).
 - Riser of PCC steps shall be plaster with 15mm thick in Cement Mortar 1:3 finished even and smooth without using extra cement.
 - 18 to 20mm thick polished Kota stone in one piece shall be laid over 20mm thick screed bed in Cement Mortar 1:4 with cement slurry @ 3.0 Kilogram per Square Metre over PCC steps
- 17.2.23. **PLINTH PROTECTION**:-Unless otherwise specified in drawing/here-in-before, plinth protection shall be 75 mm thick PCC M-15(Nominal Mix) (using 40 mm graded stone aggregate) over 75 mm thick (consolidated thickness) hard core over rammed earth. Plinth protection shall be laid in 1:40 slope. The concrete shall be laid at a stretch not exceeding 3 Metre in length. Top surface of concrete shall be finished even and smooth without using extra cement. Joints between adjoining slabs shall not exceed 10 mm in thickness and shall be filled with bitumen mastic i.e. bitumen and sand in proportion 1:2. Hard core for plinth protection shall be crushed/broken stone aggregate (at the discretion of contractor (conforming to IS-383, not exc. 63 mm gauge. Unless otherwise specified in drawings, the width of plinth protection shall be 750mm.
- 17.2.24. **PCC DRAIN/SAUCER DRAIN** :-PCC drain shall be in PCC M-10(Nominal Mix)(using 20 mm graded stone aggregate) and constructed wherever and to the extent as shown on drawing. The inside surface of the drain shall be finished smooth using Extra Cement.
18. **PLASTERING & POINTING**
- 18.1. **MATERIALS**
- 18.1.1. **CEMENT** – Cement shall be as specified for Cement Concrete Work here-in-before.
- 18.1.2. **SAND** – Refer Clause No. 14.5, 14.5.1 and 14.5.2 of MES Schedule Part-I.
- 18.1.3. **INTEGRAL WATER PROOFING COMPOUND** – Refer Clause No.4.8 of MES Schedule Part-I and as approved by GE.

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- 18.1.4. **WATER** – Water shall be as specified for Cement Concrete Work here-in-before.
- 18.2. **WORKMANSHIPS**
- 18.2.1. **GENERALLY**
- 18.2.1.1. Refer to Clause No.14.16 of MES Schedule Part-I (as applicable) and as directed by the Engineer-in-Charge.
- 18.2.1.2. The thickness of plaster mentioned here-in-after is finished thickness exclusive of dubbing out. Plastering and dubbing out shall however, be done in one operation.
- 18.2.1.3. The External and Internal Finishes (Plastering and pointing) shall be returned in the Jambs of the openings upto frames and taken around cup boards and other similar projections. All external finishes shall stop at plinth protection.
- 18.2.1.4. External Plaster shall be finished fair and even. Internal plaster shall be finished even and smooth without using extra cement.
- 18.2.1.5. All corner, angle, junctions and edges shall be truly vertical or horizontal as the case may be and shall be carefully finished. Corners around jambs of opening and junctions of wall plaster shall be rounded to minimum radius of 5mm. 12mm wide groove to the entire thickness of plaster shall be provided at the junction of walls and RCC roofs/beams. 10mm wide and 10mm deep shall groove shall also be provided at junctions of walls and RCC columns or any other dissimilar materials i.e. wooden/steel chowkhats etc.
- NOTE : Irrespective of what is mentioned above, 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 and 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*
- 18.2.1.6. **SCAFFOLDING** – Refer Clause No.14.12 of MES Schedule Part-I and all as directed by Engineer-in-Charge.
- 18.2.1.7. **PREPARATION OF MORTAR FOR PLASTERING** – Refer Clause No.14.13 of MES Schedule Part-I as applicable and all as directed by Engineer-in-Charge.
- 18.2.1.8. **PREPARATION OF BACKGROUND FOR APPLICATION OF PLASTER** – Refer Clause No.14.14 of MES Schedule Part-I as applicable and all as directed by Engineer-in-Charge.
- 18.2.1.9. **ONE COAT PLASTER WORK** – Refer Clause No.14.17 of MES Schedule Part-I and as directed by Engineer-in-Charge.
- 18.2.1.10. **TWO COATS PLASTER WORK** – Refer Clause No.14.18 of MES Schedule Part-I and as directed by Engineer-in-Charge.
- 18.2.1.11. **CURING** – Refer Clause No.14.24, 14.24.1 of MES Schedule Part-I and as directed by Engineer-in-Charge.
- 18.2.1.12. **WATER PROOFING PLASTER** – Refer Clause No.14.25 of MES Schedule Part-I and as directed by Engineer-in-Charge.
- 18.3. **INTERNAL PLASTER**
- 18.3.1. Rendering on Brick wall/PCC solid block wall shall be 10 mm thick with cement mortar (1:6) including dubbing coat, above skirting/dado finished even and smooth without using extra cement. The junctions of wall and floor, wall and ceiling wall and columns and roof slab and beam must be rounded off at a radius of 50mm to prevent accumulation of dust. The surface of plaster/rendering and skirting dado shall be same so as to avoid collection of dust on skirting/dado.
- 18.3.2. Irrespective of what is mentioned here-in-before, internal plaster to exposed surface of concrete such as soffit of RCC Roof/Floor Slab, Soffits and sides of beams, stair case shelves etc. which are not continuous with the adjoining surface of wall, shall be of 5 mm thick in Cement Mortar 1:3 finished even and smooth without using extra cement. However, if thickness of plaster in Cement Mortar 1:3 is required to be increased in excess of 5 mm to achieve even and smooth surface, the same shall be provided by the contractor without any extra cost to the Government.
- 18.4. **EXTERNAL PLASTER**
- 18.4.1. External surface of walls shown to be plastered shall have 15 mm thick plaster in Cement Mortar 1:4 in Two Separate Coats (10 mm thick backing coat and 5 mm thick finishing coat).

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Finishing coat shall be mixed with integral water proofing compound as per manufacturer's instruction. Plaster shall be taken upto 150 mm below GL for walls without plinth protection and external plaster shall be taken upto top of plinth protection for walls with plinth protection. Both the surfaces of parapet walls of roofs and verandahs shall be treated as external surfaces. In case of deviation for External Plaster Pricing shall be done by taking Water Proofing Compound as 3% by weight of cement.

- 19. WHITE & COLOUR WASHING, CEMENT BASE PAINT, DISTEMPERING, PLASTIC EMULSION PAINT, WEATHER PROOF PAINT**
- 19.1. LIME** :-Refer Clause No.15.2 of MES Schedule Part-I.
- 19.2. BLUE VITRIOL** :-Refer Clause No.15.4 of MES Schedule Part-I.
- 19.3. WHITE WASHING / COLOUR WASH**:-Where indicated in schedule of finishes, white wash/ colour wash shall be applied on internal faces of walls. White wash shall be applied three coats including preparation of plastered surfaces and as per clause No 15.2,15.3,15.4&15.12 of SSR part I 2009 and colour wash shall be applied two coats over a coat of white wash including preparation of plastered surfaces and as per clause No 15.2,15.3,15.4&15.12 of SSR Part-I 2009.
- 19.4. CEMENT BASE PAINT**
- 19.4.1.** Refer Clause No.15.7 of MES Schedule Part I.
- 19.4.2.** Where cement base paint is mentioned in schedule of finishes two coats of cement base paints over a coat of alkali resistant primer shall be applied. Cement base paint shall be of superior quality manufactured by standard firms given in APPENDIX 'B' here-in-after.
- 19.5. ACRYLIC DISTEMPER/OIL BOUND DISTEMPER:** Acrylic distemper / washable acrylic distemper /Oil bound distemper wherever shown in Schedule of finishes drawings shall be provided of two coats acrylic distemper over a coat of primer and as per clause No 15.21 of SSR part I 2009. The wall surfaces over which acrylic distemper/oil bound distemper is to be applied shall be treated with two coats of cement based white wall putty of minimum thickness of 1.5 mm in two coats to make the surface even and smooth. However for the purpose of pricing deviation, acrylic distemper shall be considered as oil bound distemper.
- 19.6. PLASTIC EMULSION PAINT** :-Where indicated in schedule of finishes, plastic emulsion paint shall be applied on internal faces of walls plastic emulsion paint shall be applied two coats over a coat of primer and as per clause No 17.16 of SSR part I 2009. The wall surfaces over which plastic emulsion paint is to be applied shall be treated with two coats of cement based white wall putty of minimum thickness of 1.5 mm in two coats to make the surface even and smooth.
- 19.7. ACRYLIC EXTERIOR WEATHER RESISTANT PAINT(WEATHER PROOF PAINT):-**
- 19.7.1.** External plastered surfaces of walls/RCC/cill/jamb/RCC facia of chajja/Roof/RCC wall/parapet/soffit of slab shall be applied weather coats paint as mentioned in Schedule of finishes & shall be applied with two coats of acrylic exterior weather resistant paint(weather proof paint) and Maximum coverage of 5.00 Sqm per litre per two coats paint over a coat of acrylic primer as per clause No 17.17 of SSR Part-I 2009
- 19.7.2.** Newly plastered surfaces shall be scrapped to remove dust, loose or flaking materials, grease & dirt to ensure a smooth and clean surface. Priming shall be done with chalk whitener or other approved primer suitable for use with the paint as approved by GE. Paint shall be thinned down as per manufacturer's instructions. Application shall be done using brush or roller. The recoating time between two coats shall be around 1 to 6 hours.
- 19.7.3. Make :- Apex of ASIAN PAINT or equivalent model of approved make as per Appendix 'B'.**
- 19.7.4.** The period of Guarantee for the acrylic exterior weather resistant paint(weather proof paint) treatment shall be 7 (Seven) years from the certified date of completion. The contractor shall be responsible for effectiveness of the acrylic exterior weather resistant paint(weather proof paint) during this period and any damage/ discolor noticed therein during this period shall be made good by him at his own cost.
- 19.7.5.** The contractor shall furnish guarantee in favour of the Garrison Engineer for the efficacy of the acrylic exterior weather resistant paint(weather proof paint) during the guarantee period.

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- 19.7.6. An amount of security deposit equal to the individual security deposit calculated based on the amount of acrylic exterior weather resistant paint(weather proof paint) at contract rates for the building for which paint to be carried out shall be retained from the contractor's final bill as security deposit for the acrylic exterior weather resistant paint(weather proof paint) which shall be released to the contractor only after expiry of guarantee period. The contractor may alternatively furnish a fixed deposit receipt in favour of GE in lieu of sum to be retained as security deposit for acrylic exterior weather resistant paint(weather proof paint) from any approved Schedule Bank.
- 19.7.7. Condition 46 of the General Conditions of Contracts (IAFW 2249) shall be deemed to be amended to the extent mentioned above.
20. **GLAZING**
- 20.1. **SHEET GLASS**
- 20.1.1. Refer Clause No.16.2 and subsequent Clause No. thereof of MES Schedule Part-I.
- 20.1.2. The sheet glass shall be of 'B' quality ie, ordinary for glazing purpose if not specifically mentioned in drawings. Unless otherwise specified/shown in drawings or not specified any here in tender document , the thickness of glass shall be 4.00 mm thick for window/cup board and 6.00 mm thick for door.
- 20.2. **FIGURED GLASS (PIN HEADED GLASS)**
- 20.3. Refer Clause No.16.3 of MES Schedule Part-I.
- 20.4. The thickness of pin headed glass shall be 4.0 mm. Windows and vent in WC/toilet and bath shall have Pin Headed Glass Panes except top panels which shall be of sheet glass.
- 20.5. **SILICONE SEALANT**:-Glass and steel frame of window shutter shall be joint with 6x6 mm **silicone polymer base sealant.**
- 20.6. **PREPARATION OF GLAZING** :-Refer Clause No.16.7.1, 16.7.2 to 16.7.4 of MES Schedule Part-I.
- 20.7. **GLAZING IN STEEL SURROUNDS** :-Refer Clause No.16.10 and subsequent para thereof of MES Schedule Part-I.
- 20.8. **GLAZING IN WOOD SURROUNDS** :-Refer Clause No.16.9 and subsequent para thereof MES Schedule Part I.
21. **PAINTING**
- 21.1. **PAINTS AND ALLIED MATERIALS**
- 21.1.1. Refer Clause No.17.2 of MES Schedule Part-I.
- 21.1.2. Paint shall be of first quality and manufactured by Standard firms given in APPENDIX 'B' to tender documents here-in- after.
- 21.2. **PAINTING WORK GENERALLY** :-Refer Clause No.17.3 and subsequent thereof MES Schedule Part-I.
- 21.3. **PAINTING TO WOOD WORK**
- 21.3.1.1. Refer Clause No.17.6 and subsequent thereof MES Schedule Part-I.
- 21.3.1.2. Filler coat is not required to be applied. Where painting is indicated in Schedule of finishes it shall be done in 3 coats viz primer, under coat and finishing coat. Primer for wood work shall be pink primer and under coat and finishing coat shall be synthetic enamel paint.
- 21.3.1.3. Block boards and veneered particle boards, where indicated to be painted in Schedule of finishes/as specified shall be painted as for wood work. For unvennered particle board refer Clause No.17.7.6 of MES Schedule Part-I.
- 21.3.1.4. All surfaces of wood work and joinery other than those specified to be treated otherwise, shall be applied a priming coat and under coat and finishing coat of synthetic enamel paint.
- 21.4. **PAINTING TO STEEL AND IRON WORK.**
- 21.4.1.1. Refer Clause No.17.8 of MES Schedule Part-I.
- 21.4.1.2. Filler coat is not required to be applied. Where painting is indicated in Schedule of finishes, it shall be done in three coats viz primer, under coat and finishing coat. Primer for steel surfaces shall be red oxide zinc chrome and under coat and finishing coat shall be of synthetic enamel paint.

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- 21.4.1.3. All exposed surfaces of iron and steel other than galvanised surfaces and reinforcement shall be painted with two coats of synthetic enamel paint over a coat of primer. Primer for steel work shall be red oxide zinc chrome primer. Steel brackets of cisterns/WHB shall be given two coats of aluminium paint over a coat of primer. However, steel members of roof, hidden by ceiling shall be painted with two coats of red oxide primer.
- 21.4.1.4. Painting for **Pressed steel windows/ventilators** frame & shutter, paint shall be applied by spray gun all as specified in appendix B and other relevant clause of IS 1477 Part-II. Colour of paint shall be approved by GE.
- 21.5. **FRENCH POLISH**
- 21.5.1. Refer Clause No.17.7.4 and subsequent thereof MES Schedule part I
- 21.5.2. **COAL TAR PAINTING** :-Wooden, iron and steel surfaces in contact with or embedded in masonry or concrete (except steel reinforcement) shall be treated with two coats of tar paint conforming to IS-290. Tarred surfaces except wood shall be sanded before use.
- 21.6. **CREOSOTING:-** Hidden wood work shall be given two coats of creosote oil.
- 21.7. **PAINTING TO CONCRETE/PLASTERED SURFACES** :-Irrespective of what is shown on drawing, plastered/concrete surfaces of inside wardrobe, lofts, cupboard and open shelves shall be applied two coats of synthetic enamel paint over a coat of primer (white).
22. **SANITARY APPLIANCE**
- 22.1. **GENERAL**
- 22.1.1. Refer Clause No.18.32.1 and 18.32.1.1 of MES Schedule Part-I.
- 22.1.2. The size and type of sanitary fittings to be provided are given in drawings. These shall be first quality, white, vitreous china & ISI marked.
- 22.1.3. Flush pipe and socket of flushing rim of WC shall be jointed with white and red lead cement white & red lead (in equal portion by weight) and linseed oil added to form paste.
- 22.1.4. CI 'P' or 'S' long arm trap shall be jointed to WC pan with epoxy compound.
- 22.1.5. Brackets for the relevant Sanitary and Toilet Fittings shall be given two coats of aluminum paint over a coat of primer as specified here-in-before.
- 22.1.6. **SQUATTING PAN (ORISSA PATTERN)** :-Squatting pans water closet wherever shown on drawing shall conform to IS-2556 (Part-III) and their pattern shall be Orissa pattern size 580 mm x 440 mm (minimum) with 'P' or 'S' trap even if mentioned otherwise in the drawings. Squatt pattern WC shall be provided with PVC low level flushing cistern, manually operated with all standard accessories, 10 litres capacity and 32mm dia PVC flush pipe. All other details shall be as per MES schedule Part-I.
- 22.1.6.1. Surrounds of squat pattern WCs shall be Cement Concrete 1:4:8 (using 40 mm graded stone aggregate) all as directed by Engineer-in-Charge.
- 22.1.6.2. **Make :- Cat no 20042 (Orissa Pan ECO) of Hindware or equivalent model of approved make as per Appendix 'B'.**
- 22.1.7. **EUROPEAN TYPE WC (PEDESTAL PATTERN):-**
- 22.1.7.1. Wash down water closet wherever shown on drawing shall conform to IS-2556 (Part-II) and their pattern shall be Pattern – 4 (Pedestal WC with independent cistern and concealed S-trap or P-Trap), white, 410 mm high (minimum). WC shall be provided with 10 litres capacity PVC flushing cistern as mentioned here-in-before and 32mm bore PVC flush pipe for pedestal pattern WC and plastic water closet seat cover, flat with hinging device. All other details shall be as per MES schedule Part-I.
- 22.1.7.2. **Make :- Cat no 20079 of Hindware or equivalent model of approved make as per Appendix 'B'**
- 22.1.7.3. Refer Clause No. 18.32.2 of MES Schedule Part-I.
- 22.1.7.4. EWC where shown in drawings shall be ISI marked and shall conform to IS 2556 (Part-III), white in colour, of pattern, height 390 mm having integral trap.
- 22.1.7.5. Other accessories like Flush Pipes, Bracket etc as approved by GE.
- 22.1.8. **UNIVERSAL WATER CLOSET (ANGLO-INDIAN TYPE)** : Universal Water Closet (Anglo-Indian Type) wherever shown on drawing shall conform to IS-2556 (Part-15) and their pattern shall be Size-1 i.e 560 mm x 460 mm (minimum) with S-trap or P-Trap, WC shall be provided with 10 litres capacity PVC flushing cistern with PVC connection 15 mm size with PTMT nuts of length 450 mm and 32 mm bore PVC flush pipe for pedestal pattern WC and Universal plastic water closet seat cover, flat with hinging device. All other details shall be as per MES schedule Part-I.

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- 22.1.8.1. **Make :- Cat no 20012 of Hindware or equivalent model of approved make as per Appendix 'B'.**
- 22.2. **PLASTIC WATER CLOSET SEATS AND COVERS**
- 22.2.1. Refer Clause No. 18.36 of MES Schedule Part-I.
- 22.2.2. Plastic water closet seat and cover shall be ISI marked on ISI 2548 recessed bottom made out of moulded poly propylene.
- 22.3. **LOW LEVEL FLUSHING CISTERN**
- 22.3.1. Refer Clause No. 18.34 and 18.87 of MES Schedule Part-I.
- 22.3.2. Irrespective of what is shown on drawings, the flushing cistern of 10 Litre discharge capacity shall be of PVC "feather touch" with symphonic fittings ISI marked moulded from vergin poly propylene.
- 22.3.3. Where flushing cistern cannot be fixed in walls due to window/lintels as per sanitary plan, the same shall be fixed in the side walls with additional bend. The cost of which shall be deemed to be included in the lump sum cost of buildings given in Schedule 'A' Part I.
- 22.4. **URINAL**
- 22.4.1. Refer Clause No. 18.32.7 and 18.88.8 of MES Schedule Part I.
- 22.4.2. Unless otherwise specified in drawings, the urinal shall be of vitreous china half stall, flat back type. The size of urinal shall be 590mm x 400 mm x 380mm(minimum) white .These shall be with grating and unions, waste pipe 32mm dia nominal bore GI medium grade of required length.
- 22.4.3. **Make :- Cat no 60002 of Hindware or equivalent model of approved make as per Appendix 'B'**
- 22.4.4. **PARTITION WALL IN URINAL:-**Irrespective of what is shown on drawings, partition wall in urinal shall be of 18mm thick polished black granite slab.
- 22.4.5. **PVC FLUSHING CISTERN FOR URINAL**
- 22.4.5.1. Refer Clause No. 18.34, 18.88.2 and 18.88.3 of MES Schedule Part-I.
- 22.4.5.2. Flushing cistern shall be PVC automatic flushing cistern of capacity 5.0 Litre. The size of flush pipe shall be as specified in MES Schedule Part-I. The cost of flush pipe main and distribution shall be deemed to be included in the lump sum.
- 22.4.6. The flushing cistern shall be of PVC "Feather Touch" operated bearing IS-7231, diaphragm bearing IS-13049 and detrim valve, float valve.
- 22.5. **WASH BASIN**
- 22.5.1. WHB shall be provided as per drawings no CESZ/2016/TD/033.
- 22.5.2. Refer Clause No. 18.32.5 and 18.89 of MES Schedule Part-I.
- 22.5.3. **Oval Type Wash Hand Basin:-** Oval Shaped Ceramic Basin to be provided at places as shown on drawings. It shall be of size 550mm x 445mm(minimum) oval below counter basin. The basin shall be provided with a granite slab counter even if it is not shown in drawings wherever Oval Type Wash Hand Basin is shown. The diameter of the opening in the counter slab over the basin shall be 10mm less than the diameter of the said basin. The counter slab shall be of 18mm thick granite slab and all exposed edges of the counter slab shall be grinded with portable power driven grinder to smoothness and rounded finished and to be polished for shining of size as shown on drawings. The pillar tap shall be fixed on the counter slab. The granite facia in front shall be in one piece fixed to the RCC band behind with polymer based cementations adhesive and supported on brick walls on both sides. **Make :- C-0466 of Parryware or equivalent model of make as per Appendix 'B'.**
- 22.5.4. Wash hand basin (WHB) shall conform to IS-2556 (Part-IV), white. Flat back pattern WHB shown on the drawing shall be of size 550mm x 400mm and corner WHB shall be of 400 mm x 400 mm. The WHB shall be with single tap hole.
- 22.5.5. The WHB of any type including oval shaped shall be provided with the following accessories:-
- (i) 32mm bore brass chromium plated waste fittings with gratings.
 - (ii) 32 mm bore brass chromium plated bottle trap
 - (iii) A pair of mild steel bracket wherever required.
 - (iv) PVC connector pipes.
- 22.6. **PVC CONNECTOR**
- 22.6.1.1. Refer Clause No. 18.5 of MES Schedule Part-I.

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- 22.6.1.2. PVC connector of required length (but not less than 0.40m) with and including two chromium plated brass coupling suitable for 15 mm bore pipe. Weight of chromium plated coupling adopted for connection of polythene pipe shall not less than 40 Gram each.
- 22.7. **MIRROR OVER WHB AND SHELVES**
- 22.7.1. Mirror over WHB shall be provided as per drawings no CESZ/2016/TD/033.
- 22.7.2. Refer Clause No. 18.37, 18.38, 18.91 and 18.92 of MES Schedule Part-I.
- 22.7.3. The size of mirror shall be all as shown on drawings. Mirror shall be of selected quality glass of 8 mm thick set in 6 mm thick PVC sheet fixed with Stainless steel screw on wall surface. If size of mirror has not indicated in drawings, then size of mirror shall be of 600 mm x 450 mm for each HWB.
- 22.7.4. The glass shelf shall consist of an assembly of glass shelf placed or sealed on stainless steel angle frame. The size of shelf shall be 60x12cm unless otherwise indicated. The shelf shall be of size 5.5mm thick sheet glass, ordinary quality with edge rounded off. The shelf shall be supported on chromium plated brass brackets which shall be fixed with chromium plated brass screw to rowl plugs.
- 22.7.5. **MIRROR :-**The mirrors shall be of indigenous of make as per APPENDIX 'B', copper plated at the back free from ripples, spats, bubbles, and other defects with edges slightly rounded off around.
- 22.8. **TOWEL RAIL**
- 22.8.1. Refer Clause No. 9.24 of MES Schedule Part-I.
- 22.8.2. The towel rails shall be of stainless steel with flanged ends for fixing. These shall be of minimum 600 mm long. **Make: Cat No. AKP-35711PS of Jaquar or equivalent model of make as per Appendix 'B'.**
- 22.9. **STAINLESS STEEL PEG SET :-**Stainless steel peg set shall have 3 Pegs (if otherwise not specifically indicated/shown on drawing) on stainless steel plate. The steel plate shall be fixed on walls with rawl plug.
- 22.10. **GLASS SHELVES:-**Glass shelves if not specified in drawing shall be of 6.0mm thick plain glass.
- 22.11. **PLUMBING**
- 22.11.1. **GENERAL**
- 22.11.2. Refer Clause No. 18.13 to 18.23, 18.40 and 18.62 of MES Schedule Part-I.
- 22.11.3. Layout of Plumbing Works shall be as shown on drawings and as directed by Engineer-in-Charge.
- 22.12. **SERVICE WATER TANK :-** Refer Clause No. 18.19 and 18.60 on of MES Schedule Part-I.
- 22.12.1. HDPE water tanks including PCC platform shall be provided all as per manufacturer's instructions. Inlet connection shall be of appropriate size. Overflow pipe shall have perforated polythene pipe screwed to one end. Wash out pipe shall be provided with GI plug. Float valve shall be of brass body with PVC float and of appropriate size. Tank shall be of rotational molded polyethylene water storage tanks in double layers and cylindrical vertical type with manhole lids(closed top) with ISI marked and Make as given in APPENDIX 'B' here-in-after.
- 22.13. **UNPLASTICIZED POLYVINYL CHLORIDE (PVC-U) PIPE FOR RAIN WATER SOIL/WASTE/VENT PIPES & FITTINGS**
- 22.13.1. Refer Clause No. 11.20, 18.67.2 and 18.67.2.1 of MES Schedule Part-I and IS 13592-2013.
- 22.13.2. **TYPES OF PIPES:-**
- 22.13.2.1. *Type A* — for use in ventilation pipe work and rain water and rain water harvesting applications.
- 22.13.2.2. *Type B* — for use in soil and waste discharge systems.
- 22.13.3. **COLOUR OF PIPE:-** Surface colour of the pipes shall be dark shade of grey.
- 22.13.4. **RAIN WATER PIPE:-** Rain Water Pipe shall be unplasticized polyvinyl chloride (PVC-U) pipes, ISI marked. Rain water pipe shall be 110mm dia unless otherwise dia of pipe shown on drawings.
- 22.13.5. **SOIL/WASTE/VENT PIPES & FITTINGS :-**
- 22.13.5.1. Irrespective of what is mentioned and shown on drawing soil/waste/vent pipe shall be unplasticized polyvinyl chloride (PVC-U) pipes. The dia of pipe (Nominal outside diameter) shall be provided as per TD drawing . In case of non availability of any diameter (Nominal

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outside diameter) mentioned the next available diameter (Nominal outside diameter) as per IS 13592 shall be provided without any price adjustment. Waste/Soil pipes under floor/ concealed portion shall be in single piece except where single piece cannot be provided due to long length. Fitting/accessories such as Bends, Junctions, Branch Pieces shall be provided with access door.

22.13.5.2. Except for WC connection the contractor may use pipe pieces without sockets in shorter length (less than one pipe length) if approved by the GE and connect these to pipe fittings with double sockets/collars, including additional joints as specified above without extra cost to the Govt.

22.13.6. The contractor shall submit the manufacturer's test Certificate in original along with the test sheet giving the results as per IS 13592 and duly signed by the manufacturer with each consignment.

22.14. GULLY TRAPS

22.14.1. Gully traps shall be of unplasticized polyvinyl chloride (PVC-U) 150x150mm size with 'P' or 'S' trap with square/round mouth conforming to IS-651. PVC Gratings shall be of heavy quality as approved by GE. Gully Traps shall be provided with two cast iron gratings of size 150x150mm bituminous coated and fixed as directed

22.14.2. Gully trap shall be set in PCC (1:3:6) type C1 block measuring 45cm square thickness of bed concrete shall be 10 cm Jointing to drawing pipe shall be done in cement mortar (1:1).

22.15. NAHANI TRAPS/FLOOR TRAPS

22.15.1. Refer Clause No. 18.25 of MES Schedule Part-I.

22.15.2. (PVC-U) Nahani/Floor Trap shall be provided in situation as shown on drawings. These shall conform to IS 3989. Nahani trap shall be provided with cast iron grating. These shall have outlets of nominal diameter of 75 mm.

22.15.3. Where Nahani/Floor Trap of 15cm depth cannot be accommodated in sunken floor, a 300mm x 300mm portion of the RCC slab shall be sunken to the extent it accommodates the Nahani/Floor trap without any extra cost.

22.15.4. Nahani Trap/Floor Trap shall be long arm type so that the joint must come outside the external walls. Multi Nahani Trap/Floor Trap shall be provided at junctions wherever two or more traps are to be jointed.

22.16. (PVC-U) COWLS

22.16.1. Refer Clause No. 18.24 of MES Schedule Part-I.

22.16.2. (PVC-U) perforated cowl over (PVC-U) vent pipe shall be provided. The dia of cowl shall be 50mm bore.

22.17. **TESTING :-** Refer Clause No. 18.67.7 of MES Schedule Part-I.

22.18. MISCELLANEOUS ITEMS**22.18.1. PVC HAND RAIL**

22.18.1.1. Whenever shown on drawings PVC hand rail shall be of 4mm thick sheet fixed over flat iron of size 40x6mm welded to 16mm square bar. The colour of PVC hand rail shall be got approved by GE.

22.18.2. **MILD STEEL RAILING:-** Mild Steel Railing (other than detail shown on main drawing/specified here-in-before) shall be provide as per drawing No. CESZ/2015/TD/016.

22.18.3. STAINLESS STEEL RAILING:-

22.18.3.1. Stainless steel railing shall be provide as per drawing No. CESZ/2015/TD/016.

22.18.3.2. The stainless steel railing shall be of Grade SS304 and shall be provided as per the design given in drawings at various locations given in drawings. The pipes shall be seamless with elegant glossy finish without any marks on surface. The railings shall be fixed with stainless steel accessories only providing adequate strength as per the purpose for which the railing is being provided. The minimum weight per running meter for 20, 40 and 50mm pipes shall not be less than 1.25, 3.10 and 3.9 Kg respectively. The wall thickness of any component of the railing shall not be less than 1.65mm.

22.18.4. MILD STEEL CHROMIUM HAND RAIL :-

22.18.4.1. Whenever shown on drawings mild steel (MS) chromium hand rail shall be of 65 mm nominal bore, light grade with hard chromium plated conforming to IS-1986 and thickness of coating

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shall not be less than 20 micron and shall be procured from standard manufacturers as approved by GE.

22.18.4.2. The contractor shall be submit original manufacturer's test Certificate duly signed by the manufacturer befor any payment from Deptment.

22.18.5. **CI STEPS/RUNGS:-** Wherever MS rungs/steps shown in drawings of Septic Tank, Manhole, etc. and/or other locations, the same shall be cast iron conforming to IS-5455. The CI rungs/steps shall of be pattern 2 as per IS having minimum weight 5.30 Kg/Each. The steps shall be treated with 2 coats of tar.

22.18.6. **PVC WATER BAR:** PVC water bar/water stop seal shall be provided at construction joint as shown on structural drawing. The PVC water bar shall be 3.5 mm minimum thickness and 200 mm minimum width. Make : Sika/Softex Industrial products pvt ltd.

22.18.7. **RCC SHELVES & RECEPTION / SERVICE COUNTER**

22.18.7.1. RCC shelves & reception / service counter shall be constructed all as shown on drawing No. CESZ/2015/TD/010 and as specified here-in-below:-

- (a) All RCC works shall be M-25 Design mix irrespective of what is shown on drawings.
- (b) Reinforcement shall be as specified here-in-before.
- (c) Unless otherwise shown on drawing, top and sides of shelves shall be finished with 20mm thick kota stone as specified for kota stone floor here-in-before. Soffits of shelves shall be given two coats of dry distemper as specified here-in-before irrespective of what is shown in drawings or specified else where in this tender.

22.18.8. **MANHOLES/ INSPECTION CHAMBER**

22.18.8.1. Manholes/ Inspection Chamber shall be built all as specified in Clause No. 18.78 of MES Schedule Part-I, shown on Drawings and specified in Schedule 'A'.

22.18.8.2. Manholes and Drain Pipes shall be tested for Water Test all as specified in Clause No. 18.79.3 of MES Schedule Part-I.

22.18.8.3. CI Rungs/Steps shall be of Cast Iron as specified here-in-before. The Steps/Rungs shall be treated with Two Coats of Tar. The Cost of which is deemed to be included in the Unit Rate/Amount.

22.18.9. **NUMBERING OF BUILDING :-**

22.18.9.1. Numbering of Buildings shall be done in all Buildings on the format as shown on Drawing No TD/N/76 Sheet No. 1/1 with following specification and cost of the same is deemed to be included in quoted Lump Sum of Building :-

- (a) Plaster : Raised plaster 10mm thick in Cement Mortar 1:3
- (b) Letters : Letter shall be painted in black colour and white ground

22.18.9.2. The Letters/Words/Figure to be written shall be intimated by the Engineer-in-Charge. The cost of the same is deemed to be included in Cost of Buildings.

23. **INTERNAL WATER SUPPLY**

23.1. **GENERAL REQUIREMENTS**

23.1.1. **KNOWLEDGE OF WORK:-** The tenderers shall be deemed to have thorough working knowledge of the exact requirement of the job. In case of any doubt clarification may be sought from CESZ before tender is submitted. Tenderers are advised to visit the site and get themselves conversant with site conditions. No claim what so ever shall be entertained/accepted in case the tenderer is coming up with an excuse of having incomplete knowledge of work involved.

23.1.2. **WORK IN ACCORDANCE WITH SPECIFICATION:-** Work under this contract shall be carried out as per brief description given in Schedule 'A', Particular Specifications and as shown on drawings. Work shall also be in conformity with IE Rules, relevant IS specification and MES Schedule which are forming part of the contract. The entire work shall be carried out properly with due care and under the supervision of competent technical personnel.

23.2. **MATERIALS OF SAMPLES:-**

23.2.1. All materials incorporated in the work shall generally be of indigenous make conforming to relevant IS. Where ever IS marked product has been asked for, same shall be provided.

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- 23.2.2. Before starting the work, the contractor shall produce to GE, the samples of all materials for his approval and the materials so approved i.e. type, make and quality shall only be incorporated in the work. One set of samples shall be retained by the GE duly signed both by the GE and the contractor till the completion and final acceptance of the work.
- 23.2.3. Samples of materials/fittings are not however required in respect of major items of equipment except specified otherwise. The test certificate shall be however be produced in respect of such items.
- 23.3. **SUBMISSION OF COMPLETION OF E/M PORTION:-**On physical completion of work, contractor is to submit the following drawings and other relevant literature as enumerated below to the deptt. This is a pre-requisite before Completion Certificate is issued to the Contractor.
- 23.4. **DRAWINGS:-**
- 23.4.1. The contractor shall submit Six **copies Auto CAD-2008 with soft copy** of the below said drawings and literature shall be supplied in calico bound book form with duly signed by him and the Engineer-in-Charge on completion of the work.
- 23.4.2. Schematic Diagram of Pipe Line including sizes.
- 23.4.3. Pipe Line Layout separately showing each Services i.e. Rising Mains and Distribution Mains of Water Supply.
- 23.5. **INTERNAL WATER SUPPLY**
- 23.5.1. **TUBES AND FITTINGS**
- 23.5.2. GI Tube and Fittings shall be of Mild Steel Galvanised Medium Grade bearing IS-1239 mark. Fittings conforming to IS-1239 if not available readily may alternatively comply with the requirement of IS-1879 for malleable Cast Iron Fittings but these shall also be ISI marked. GI Pipe shall be laid in floor/ on surface/ concealed in Wall/Floor conforming to provision given in IS-2065 and IS-12183.
- 23.5.3. Change in diameter and in direction shall preferably be gradual rather than abrupt to avoid undue loss of head. No bend or curve in piping shall be made which is likely to materially diminish or alter the cross-section.
- 23.5.4. Where the Service Pipe is of diameter less than 50 mm, the Stop Valves shall be of the screw-down type and shall have loose Washer Plates to act as Non-Return Valves (Refer IS:781-1977). Other Stop Valves in the Service Line may be of the Gate Type (IS:778-1980).
- 23.5.5. When it is necessary for a pipe to pass through a wall or floor, a sleeve shall be fixed therein for reception of the pipe and to allow freedom for expansion and contraction and other movement. Piping laid in timber floors shall, where possible, be parallel with the joints.
- 23.6. **PP-R PIPES AND FITTINGS**
- 23.6.1. Refer Clause No. 18.114 of MES Schedule Part-I.
- 23.6.2. PP-R Pipes and Fittings shall be as described in Schedule 'A'. Pipes and Fittings shall be of make mentioned in APPENDIX 'B' as approved by GE.
- 23.7. **C-PVC PIPES AND FITTINGS**
- 23.7.1. Refer IS 15778 and Clause No. 18.114 of MES Schedule Part-I for fitting and laying.
- 23.8. **PP-R/CPVC Pipes and Fittings** shall be as described in Schedule 'A'. Joint of pipes should be done executed through authorized applicator of the pipe **manufacturer and performance certificate** from the manufacturer shall be submitted by the contractor before execution of work and applicator shall be approved by the GE.
- 23.9. **BIB TAPS AND STOP VALVE:-** These shall be screw down type and shall bear ISI marking. Bib taps & Stop valve shall be polished bright.
- 23.10. **FANCY BIB TAPS AND STOP VALVES :-**They shall be cast copper alloy screwed down type and shall conform to IS-8931. They shall be approved by the GE and shall be nickel chromium plated as given in Schedule 'A'.
- 23.11. **GATE VALVES AND GLOBE VALVES:-** These shall be standard quality Class I conforming to IS:778, Specifications and as approved by the GE. Valve shall be of Class I suitable for 1.0 MPa Working Pressure.

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- 23.12. **BALL VALVE:-** Ball Valves for Water Tanks shall be high pressure type of brass with Polythene Ball conforming to IS-1703.
- 23.13. **SHOWER ROSE:-** Shower Rose shall be brass chromium plated as specified in Schedule 'A'.
- 23.14. **EARTH WORK AND LAYING OF PIPE**
- 23.14.1. GI Pipe shall be laid in Floor/ on Surface/ Concealed in Wall/Floor conforming to provision given in IS-2065 and IS-12183.
- 23.14.2. In planning the layout of the Pipe Work, due attention is paid to avoid airlocks, noise transmission and unsightly arrangement.
- 23.14.3. To reduce frictional losses, piping shall be as smooth and possible inside. Method of jointing shall be such as to avoid internal roughness and projection at the joints, whether of the jointing material or otherwise.
- 23.15. **JOINTING OF PIPES TO STORAGE TANKS:-**For jointing steel pipes to storage tanks, the end of the pipe shall be threaded, passed through a hole in the tank and secured by backnuts both inside and out side. The Pipe End shall be flush with the face of the inside backnut to obviate corrosion of the pipe threads.
24. **FOR INTERNAL ELECTRIFICATIONS**
- 24.1. **GENERAL REQUIREMENTS**
- 24.1.1. **KNOWLEDGE OF WORK:-** The tenderers shall be deemed to have thorough working knowledge of the exact requirement of the job. In case of any doubt clarification may be sought from CESZ before tender is submitted. Tenderers are advised to visit the site and get themselves conversant with site conditions. No claim what so ever shall be entertained/accepted in case the tenderer is coming up with an excuse of having incomplete knowledge of work involved.
- 24.1.2. **WORK IN ACCORDANCE WITH SPECIFICATION:-** Work under this contract shall be carried out as per brief description given in Schedule 'A', Particular Specifications, **NATIONAL ELECTRICAL CODE 2011 (NEC-2011)** and as shown on drawings. Work shall also be in conformity with **NATIONAL ELECTRICAL CODE 2011** and MES Schedule which are forming part of the contract. The entire work shall be carried out properly with due care and under the supervision of competent technical personnel.
- 24.2. **SUBMISSION OF COMPLETION OF EM PORTION:-**On physical completion of work, contractor is to submit the following drawings and other relevant literature as enumerated below to the deptt. This is a pre-requisite before Completion Certificate is issued to the Contractor.
- 24.3. **DRAWINGS**
- 24.3.1. The contractor shall submit Six **copies Auto CAD-2008 with soft copy** of the below said drawings and literature shall be supplied in calico bound book form with duly signed by him and the Engineer-in-Charge on completion of the work.
- 24.3.2. LT Cable Route/ HT/ LT over head line route from tapping point to termination.
- 24.3.3. Power Distribution Net Work.
- 24.4. **TECHNICAL LITERATURE**
- 24.4.1. Technical literature of Gen Set, various Pumps, Starter containing Operation and and Maintenance Instructions, Spare Parts, Catalogue shall be submitted to the department.
- 24.4.2. Six copies of the above said drawings and literature shall be supplied in calico bound book form. Drawings should not be submitted on Ammonia print but it shall be a Xerox copy on white paper. Front and back cover shall be of laminated hard material or any other superior material approved by GE. Any cost incurred on this account is deemed to be included in the quoted rate for the Gen set. It should also indicate part list of all major items like pumps, motor, Gen set and list of tools and spares.
- 24.5. **INTERNAL WIRING**
- 24.5.1. **MATERIALS**
- 24.5.1.1. All the Electrical Accessories incorporated in the work shall conform to the relevant IS and shall bear ISI mark. The steel conduit shall be of maximum 16 SWG thickness and rigid PVC conduit shall be suitable for heavy mechanical stresses as given in IS and will be ISI marked.

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- 24.5.1.2.** Work under this part will cover the point wiring and fixing of various light fittings in the building as per drawing. Work will be carried out as per provision of IS 732-1989. IE Rules as per MES Schedule and as per Sound Engineering Practices.
- 24.5.1.3.** The general layout of light fittings is shown in drawing. The location of fitting may be altered by Engineer- in-Charge to suit the site requirement in which case the contractor shall have no claim for any extra amount on account of such changes in point wiring.
- 24.5.1.4.** No price adjustment in rates shall be made on account of changes in location of fittings and accessories shown on drawings.
- 24.5.1.5.** Recessed terminal boxes for housing switches, socket outlets, power plug, regulator etc. shall be provided flush with the walls. In case of half brick wall, boxes may be fixed on surfaces of walls. The covers of these boxes shall be modular.
- 24.5.1.6.** The internal wiring shall be in concealed PVC conduits. The PVC conduits and its fittings shall conform to the requirements of IS-9537-1983 and IS-3480-1966. PVC conduit shall be suitable for heavy duty as asked in IS. The size of wiring cable shall be as stipulated in Schedule 'A'. The PVC unsheathed cable should conform to IS-694-2010 and suitable for 650/1100 volt grade. All cables and switches in work shall have ISI mark.
- 24.5.1.7.** It shall however be noted by the contractor that layout of the fittings shall be completed to match the casted structural members and cost of extension/supports considered unavoidable and essential by the tenderer shall deemed to be inclusive in the unit rate quoted for wiring.
- 24.5.1.8.** The switch boards shall be located in such a manner that they are easily accessible and such that there is adequate working space around the switch boards. The tentative location shall be actually marked on the walls in chalk and written approval of Engineer-in-Charge shall be obtained before proceeding with the erection of the switch boards. The Engineer-in-Charge and the contractor shall associate themselves during the civil work so as to finalize the firm locations of switch boards, DBs, etc in consultation with departmental staff while executing the civil work.
- 24.5.1.9.** All conductors used in point wiring/ sub-main wiring shall be FR-LSH (Flame retardant low smoke and halogen) Copper conductor conforming to IS 694-2013 and shall have ISI mark. Insulated wire used in point wiring will have colour code matching with phase i.e. wire starting from 'R' phase will have red colour and similarly with 'Y & B' phase will have yellow and blue respectively. In neutral, only black colour wire will be used. No joints in PVC sheathed Copper conductor for phase and neutral or in earth wire is permitted. All stranded wires will be crimped with suitable Copper lug before they are connected to MCB. Green colour wire shall be used in earth wire along with other wires.
- 24.5.1.10.** The cable and the flexible cords shall be stranded Copper conductor. Same colour code suggested in above said para shall be followed.
- 24.5.1.11.** The surface wiring for points outside the building shall run on internal face of wall as far as practicable. Only at terminal points it shall be taken out by puncturing the wall and connect with light fitting/switches.
- 24.5.1.12.** The maximum number of point wiring of light/socket 5 Amp on an independent circuit from DB shall not exceed 8 Nos in any case and not more than two power points in an independent circuit from DB.
- 24.5.1.13.** Each circuit will have its independent neutral and looping is only permitted with in the circuit only. For example if five circuits are going out from one distribution board then five neutral wire will also go along with phase from neutral bus-bar.
- 24.5.1.14.** For concealed wiring, it is advisable not to lay conduit horizontally in wall but all horizontal running of conduit should be done in RCC slab. As far as possible, only vertical run of conduit should be laid in the wall.
- 24.5.1.15.** Wherever more than two conduits are running together vertically concealed in wall, tenderer is advised to wrap the PVC conduits in wire mesh and then do plaster otherwise cement plaster may not stick to the PVC conduit and it is likely to come out. Cost of wire mesh used is deemed to be included in the quoted cost of wiring.
- 24.5.1.16.** Wherever Tube Light Fitting has been shown suspended by Conduit from Soffit of Roof Slab, to fix Conduit, Contractor shall fix Mild Steel Flat of suitable size in Slab while casting the Roof Slab/Floor Slab.

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- 24.5.1.17. PVC Conduit used in Point Wiring for flushed Florescent Fitting and Ceiling Fan fixed at False Ceiling Area, can be laid on False Ceiling.
- 24.5.1.18. Mild Steel Conduit used for suspension of Tube Light Fittings shall conform to IS-9537.
- 24.5.2. **PVC CONDUIT:**
- 24.5.2.1. PVC conduit to be used for point wiring/sub main wiring shall be 'Heavy Grade' and all as specified in Para 19.29 of MES Schedule Part-I.
- 24.5.2.2. PVC circular box and bend used for PVC conduit shall also be conforming to IS-3419
- 24.5.3. **FLEXIBLE CABLE** Flexible cable shall be with tinned annealed stranded copper conductors of 1 Sqmm 3 runs (phase, neutral and earth) with PVC insulation.
- 24.5.4. **CEILING ROSES:** Ceiling rose shall be surface type and shall comply with IS-371 having three terminals plate and as specified in Para 19.32 of SSR 2009 Part – I.
- 24.5.5. **EARTH WIRE**
- 24.5.5.1. Copper PVC insulated wire conforming to IS-694 green in colour of size given in Schedule 'A' will be continuously laid along with other colour coded wire of the each circuit as asked in Schedule 'A'.
- 24.5.5.2. The cables shall be with multistranded copper conductor PVC insulated unsheathed suitable for 1100 volts, for PVC conduit as specified. For point/sub main wiring color code of cables as per IE rule shall be maintained.
- 24.5.5.3. Earthing shall conform to IS - 3043. Min. distance between Two Earth Pits shall be kept 4.5 Metre.
- 24.5.6. **MCB AND DISTRIBUTION BOARD**
- 24.5.6.1. Extra length of cable shall be kept inside the distribution board for connection with MCB. All cable terminals with MCB shall be provided with suitable crimping lugs. All MCB and their distribution board shall comply with IS 8828-1978 and shall have minimum rupturing capacity as 10.0 KA.
- 24.5.6.2. All MCB, DBs shall be located at Load Centre (as per as possible) irrespective of whatever is shown on Drawings.
- 24.5.6.3. All MCB, DBs shall be same manufacturers.
- 24.5.7. **SWITCH BOXES:-**The Switch Box to accommodate Switches for Light, Fan and Socket shall be fabricated with 16 SWG sheet conforming to IS-5133. The box will have cover of minimum 3 mm thick Laminated Sheet of suitable shade approved by GE. The Switch Boxes shall be of adequate sizes to house all Switches/Regulator/ 3 Pin Plug. If space inside the box is found to be insufficient due to number of Wires then Two Switch Boxes shall be provided side by side. Before fixing the box, outer and inner surface will be treated against corrosion.
- 24.5.8. **FIXING OF FITTINGS AND FANS:-**All tube light fittings if suspended will be fixed at 2.60 Metre from finished floor level or as directed by Engineer-in-Charge. All ceiling fans will be kept at 2.70 Metre from finished floor level or as directed by Engineer-in-Charge. Air circulator will be fixed on wall with proper MS bracket grouted properly either with MS bolt or split bolt. Cost of MS brackets is deemed to be included in the quoted cost of air circulator.
- 24.5.9. **ELECTRICAL TEST**
- 24.5.9.1. On completion of wiring, following tests shall be carried out conforming to IS 732.
- (a) Insulation Test.
 - (b) Polarity Test
 - (c) Testing of Earth Continuity
- 24.5.10. **LED LIGHTS/LUMINARIES:**
- 24.5.10.1. All LED lights/luminaries shall be meet the provision laid down in IS No-16101, IS No - 16102 Part I/II, IS No -16130 Part I, IS No -15885 Part II/ Sec 13, IS No -16104, IS No - 16105, IS No -16106, IS No - 16108: 2012 and LM 79 & LM 80.
- 24.5.10.2. All LED light products shall be replacement warranty of complete **LED luminaries fitting shall not less than three years from the date of completion** and Life expectancy of LED's minimum 50,000 burning hrs. The product will replace free of cost in the following cases :-
- (i) Manufacturing defects.
 - (ii) Failure due to mechanical and electrical impact.

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(iii) Drop in lumen (or lux at 1m) below 90% of claimed values of lumen (or lux at 1m) of the LED/Luminaries.

24.5.10.3. The above warranty shall not include natural disaster, sudden surge in voltage recorded by digital electronic meter or due to wrong handling of light fittings

24.5.10.4. Manufacturer's test certificate of LED light fitting shall be submitted by the contractor before any payment.

24.5.10.5. Guarantee certificate of LED light fitting shall be submitted by the contractor before any payment. Contractor shall be responsible for replacing at his cost any parts which are rendered defective and unserviceable during the above period.

24.6. **INSULATION TEST**

24.6.1. The insulation resistance shall be measured by applying between earth and the whole system of conductor or any section thereof with all fuses in place and all switches closed, and except in earthed concentric wiring, all lamps in position or both poles of installation otherwise electrically connected together, a DC voltage of not less than twice the working voltage, provided that it does not exceed 500 volts for medium voltage circuits. Where the supply is derived from three-wire (AC or DC) or a poly-phase system, the neutral pole of which is connected to earth either direct or through added resistance the Working Voltage shall be deemed to be that which is maintained between the outer or Phase Conductor and the Neutral.

24.6.2. The insulation resistance in megohms of an installation measured as in Particular Specification Clause No. 2.6.2.1 here-in-above shall not be less than 50 divided by the number of points on the circuit, provided that the whole installation need not be required to have an insulation resistance greater than one megohm.

24.6.3. **POLARITY TEST:-** Each Switch of Light Fitting, Ceiling Fan, Exhaust Fan and other Fixtures shall be connected with phase and not with neutral. For this Each Point should be tested by opening Switch Boxes and recorded in the Test Sheet.

24.6.4. **EARTH CONTINUITY TEST**

(a) The Earth Resistance of Each Electrode shall be measured.

(b) The Earth Resistance of Earthing Grid shall be measured.

(c) All Electrode shall be connected to the Grid and the Earth Resistance of the entire Earthing System shall be measured.

(d) These Test shall preferably be done during the Summer Months.

24.6.5. **CABLES:-**Cable installation shall be checked as follows :-

(a) It shall be ensured that the Cables conform to the relevant Indian Standards. Tests shall also be done as laid down in IS:1255-1983. The insulation resistance before and after the Tests shall be checked.

(b) The Insulation Resistance between each Conductor and against Earth shall be measured. The Insulation Resistance varies with the type of insulation used and with the type of insulation used and with the length of Cable.

(c) The following empirical Rule gives reasonable guidance

$$\text{Insulation resistance in megohms} = \frac{10 \times \text{voltage in KV}}{\text{Length in KM}}$$

24.6.5.1. The Test Results shall be recorded and signed by Engineer-in-Charge and the Contractor.

24.7. **ELECTRONIC BALLAST**

24.7.1. Manufacturer of Electronic Ballast should have tested its proto type at any of the Electronic Regional Test Laboratory, Deptt of Electronics.

24.7.2. This should meet the standard laid out in IS-1534-1977 and IS-13021 Part I & II 1991.

24.7.3. In case of failure of the lamps connected across the ballast, the circuit should be designed to switch OFF to prevent repeated attempts at re-ignition. The ballast should switch on automatically after replacement of failed lamps without the need or any manual resetting. There should be provision of fuse within the ballast to prevent any Short Circuit from affecting the Main Supply. Power Factor of the system when used with filter coil should be > 0.96.

24.7.4. Ballast will have filter coil either fixed inside or outside the ballast. Ballast will offer min 32 Watts of power to fluorescent tube and tube should offer same lumen output as with 36 Watts TLD. The ballast should ensure a low stroboscopic effect of less than 4% meeting the requirement of IS-13021 Part II.

24.8. **EARTHING**

24.8.1. Earthingshall be as specified for External Electrification specified here-in-after.

PARTICULAR SPECIFICATIONS (CONTD.....)**25. FOR EXTERNAL WATER SUPPLY****25.1. GENERAL REQUIREMENT**

25.1.1. All as specified for Internal Water Supply here-in-before.

25.2. EXTERNAL WATER SUPPLY**25.2.1. LAYING OF GI PIPES**

25.2.1.1. GI Pipes shall be laid conforming to various provision of IS-2065-1983. All overhead pipe line shall be clamped to the supporting structure with Clamps of Mild Steel Flat of 50 x 3 mm size. Rate/Amount quoted for laying of Pipe Line deemed to include the Cost of Clamps, Nut, Bolt and Washer etc.

25.2.1.2. The trench shall be so dug that the pipe may be laid to the required alignment and at the required depth. When pipe line is crossing a road, a minimum cover of 1.0 mtr is required. Width of trench shall be kept to a minimum consistence with the working space required. At the bottom between the faces, it shall be such as to provide not less than 200 mm clearance on either side of the pipe.

25.2.1.3. Proper implements tools and facilities satisfactory to the Authority shall be provided and used for the safe and convenient prosecution of the work. All Pipes, Fittings, Valves and Hydrants shall be carefully lowered into the trench, piece by piece, by means of a derrick, ropes or other suitable tools or equipment, in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench. Pipes over 300 mm diameter shall be handled and lowered into trenches with the help of chain pulley blocks. Tripod supports used for this purpose shall be regularly checked to prevent all risks of accidents.

25.2.1.4. The pipe and fittings shall be inspected for defects and be rung with a light hammer preferable while suspended to detect cracks. If doubt persists, further confirmation may be obtained by pouring a little paraffin on the inside of the pipe at the suspected spot; if a crack is present, the paraffin seeps through and shows on the outer surface.

25.2.1.5. All lumps, blisters and excess coating materials shall be removed from the socket and spigot end of each pipe and the outside of the spigot and the inside of the socket shall be wire-brushed and wiped clean and dry and free from oil and grease before the pipe is laid.

25.2.1.6. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. If the pipe-laying team cannot put the pipe into the trench and in place without getting earth into it, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. Before lowering the pipe into the trench during laying operations, no debris, tools, clothing or other material shall be placed in the pipe.

25.2.1.7. After placing a length of pipe in the trench, the spigot end shall be centered in the socket and the pipe forced home and aligned to gradient. The pipe shall be secured in place with approved backfill material tamped under it except at the socket. Pipe and fittings which do not allow a sufficient and uniform space for joints shall be removed and replaced with pipe and fittings of proper dimensions to ensure such uniform space. Precautions shall be taken to prevent dirt from entering the joint space.

25.2.1.8. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the GE.

25.2.1.9. Joints of pipe in the trench which cannot be poured shall be caulked with jointing material to make them as watertight as possible.

25.3. DUCTILE IRON PIPE AND FITTINGS

25.3.1. Refer Clause No. 18.94 of MES Schedule Part-I.

25.3.2. DI Pipe shall be conforming to IS 8329-2000. In case nothing is mentioned in Sch 'A' class & type of DI pipe shall be provide K-7 and Spigot and socket type I pipe for water supply. The DI pipe shall be used for drinking water supply purpose only and accordingly **excise duty(ED)** shall be applicable as per GOI notification. When pipe is crossing a road, a minimum cover of 1.0 Metre is required.

25.3.3. **DUCTILE IRON PIPE AND FITTINGS:-**All Fittings and Appliances shall be inspected, before delivery at the Site to see whether they bear where appropriate, the certification mark of the Indian Standards Institution or the mark of the testing station of the Authority. All fittings shall be inspected and tested by the manufacturers at their factory and shall comply with the requirements of this code. These shall be tested hydraulically under a pressure equal to twice the maximum permissible working pressure or under such greater pressure as may be specified.

PARTICULAR SPECIFICATIONS (CONTD.....)

The pipes and fittings shall be inspected on site before laying and shall be sounded to disclose cracks. Any defective item shall be clearly marked as rejected and forthwith removed from the site.

25.3.4. After laying and jointing, the main shall be slowly and carefully charged with water, so that all air is expelled from the main by providing a 25mm inlet with a stopcock allowed to stand full of water for few days if time permits, and then tested under pressure. The test pressure shall be the working pressure of Pump or the OH Tank as the case may be.

25.4. **PITS FOR JOINTS**

25.4.1. For Lead Joint additional excavation as specified in IS and SSR shall be provided.

25.5. **PP-R PIPES AND FITTINGS**

25.5.1. Refer Clause No. 18.114 of MES Schedule Part-I.

25.5.2. PP-R Pipes and Fittings shall be as described in Schedule 'A'. Pipes and Fittings shall be of make mentioned in APPENDIX 'B' as approved by GE.

25.6. **C-PVC PIPES AND FITTINGS**

25.6.1. Refer IS 15778 and Clause No. 18.114 of MES Schedule Part-I for fitting and laying.

25.7. **PP-R/CPVC** Pipes and Fittings shall be as described in Schedule 'A'. Joint of pipes should be done executed through authorized applicator of the pipe manufacturer and performance certificate from the manufacturer shall be submitted by the contractor before execution of work and applicator shall be approved by the GE.

25.8. **SLUICE VALVE**

25.8.1. All sizes of Sluice Valve shall conform to IS-14846. It shall have Gun Metal Non-Rising Spindle with Gun Metal Check Nut.

25.8.2. All cut off valve shall be of the right hand type. Valve Wheels should have an arrow head engraved or cast thereon showing direction for turning 'Open' and 'Close'.

25.9. **VALVE PIT:-** The Valve Pit shall be constructed all as shown on Drawing No. TD/EM/06, Sheet No. 1/2 to 2/2 with the following Specifications:-

- | | | | |
|---------------------------------------|-----|---|--|
| (a) Excavation and Earth Work | and | : | In Soft/Loose Soil. |
| (b) Foundation | | : | PCC M-10(Nominal Mix)(using 40 mm graded stone aggregate) |
| (c) Masonry Work | | : | Brick masonry in Cement Mortar 1:4 |
| (d) Floor | | : | 100 mm thick PCC 1:4:8 (using 20 mm graded stone aggregate) over 75 mm thick Hardcore |
| (e) Plaster | | : | 20 mm thick in Cement Mortar 1:4 mixed with Water Proofing Compound as per Manufacturer Instructions |
| (f) PCC Block / Benching | | : | PCC M-15(Nominal Mix)(using 20 mm graded stone aggregate) for Block/ PCC M-15(Nominal Mix)(using 12.5 mm graded stone aggregate) for Benching. |
| (g) Mild Steel Cover with Angle Frame | | : | All Steel shall conform to be 410-SW of IS-226 |
| (h) Painting | | : | All Exposed Steel Surfaces shall be painted with Two Coats of Bituminous Paint. Embedded Portion of Steel shall be treated with Two Coats of Tar |
| (j) Rest all as per Drawings | | : | |

25.10. **RECORD DRAWINGS:**

25.10.1. The contractor shall submit Six **copies Auto CAD-2008 with soft copy** of the below said drawings and literature shall be supplied in calico bound book form with duly signed by him and the Engineer-in-Charge on completion of the work.

25.10.2. Overall layout plan for external water supply scheme showing entire details of the installation complete with actual layout of various pipe lines (indicating clearly different sizes in different colours) various valves and all other information necessary for record, maintenance and operation, all as directed without any extra cost.

25.10.3. Specification for all other materials and workmanship shall be all as mentioned here-in-before.

PARTICULAR SPECIFICATIONS (CONTD.....)**26. EXTERNAL ELECTRIFICATION****26.1. STANDARD OF QUALITY & WORKSMANSHIP**

26.1.1. KNOWLEDGE OF WORK:- The tenderers shall be deemed to have thorough working knowledge of the exact requirement of the job. In case of any doubt clarification may be sought from CESZ before tender is submitted. Tenderers are advised to visit the site and get themselves conversant with site conditions. No claim what so ever shall be entertained/accepted in case the tenderer is coming up with an excuse of having incomplete knowledge of work involved.

26.1.2. WORK IN ACCORDANCE WITH SPECIFICATION:-Work under this contract shall be carried out as per brief description given in Schedule 'A', Particular Specifications and as shown on drawings. Work shall also be in conformity with IE Rules, relevant IS specification and MES Schedule which are forming part of the contract. The entire work shall be carried out properly with due care and under the supervision of competent technical personnel.

26.2. GENERAL

26.2.1. Refer Clause No. 19.2 of MES Schedule Part-I and requirements of Clause No. shall be strictly followed.

26.2.2. Supply and Installation of Electrical Equipments and Accessories shall strictly comply with the provisions contained in the Latest Edition of India Standard Code of Practice and/or IS Specification as applicable, Works except where such Regulations and Rules are modified by these Particular Specifications.

26.2.3. All Electrical Work shall be carried out in conformity with the requirements of the Indian Electricity Act 1910, Indian Electricity Rules 1956 framed there under, Indian Standard Codes of Practice, Fire Insurance Act as applicable and also the relevant Regulations for Electric Supply and Installations of all Electrical Equipments, Fittings and Accessories as amended from time-to-time.

26.2.4. The supply and installation of all Electrical Equipments and Accessories shall strictly comply with the provisions contained in the latest edition of Indian Standard code of Practice IS Specification as applicable to above mentioned work except where such regulations and rules are modified by these specifications.

26.2.5. QUALIFIED ELECTRICAL SUPERVISORS/ENGINEERS:-Refer Condition 25 of General Conditions of Contracts, IAFW-2249. All Electrical Works shall be carried out by properly Skilled and Licensed Electricians under the supervision of qualified Electrical Supervisors/ Engineers. The Contractor shall on demand shall produce such evidence of qualifications of his Workmen/ Supervisors/Engineers, either at the commencement of Work or at any time thereafter/ during currency of the Contract. The entire Work shall be High Class with the best Workmanship and to the entire satisfaction of Engineer-in-Charge/ GE.

26.2.6. LAYOUT OF EQUIPMENT:-Layout of various Equipments, Cables, Poles, etc., shown on various Drawings attached with this Tender are tentative. Exact layout shall be as directed by the Engineer in Charge to suit the site requirements. No adjustment in the Quoted Rate/Amount shall be made on account of such varied layout.

26.2.7. TECHNICAL LITERATURE:-Technical literature of Gen Set, various Pumps, Starter containing Operation and and Maintenance Instructions, Spare Parts, Catalogue shall be submitted to the department.

26.2.8. Six copies of the above said drawings and literature shall be supplied in calico bound book form. Drawings should not be submitted on Ammonia print but it shall be a Xerox copy on white paper. Front and back cover shall be of laminated hard material or any other superior material approved by GE. Any cost incurred on this account is deemed to be included in the quoted rate for the Gen set. It should also indicate part list of all major items like pumps, motor, Gen set and list of tools and spares.

26.2.9. SUBMISSION OF COMPLETION OF E/M PORTION:-On physical completion of work, contractor is to submit the following drawings and other relevant literature as enumerated below to the deptt. This is a pre-requisite before Completion Certificate is issued to the Contractor.

26.3. DRAWINGS

PARTICULAR SPECIFICATIONS (CONTD.....)

- 26.3.1. The contractor shall submit Six **copies Auto CAD-2008 with soft copy** of the below said drawings and literature shall be supplied in calico bound book form with duly signed by him and the Engineer-in-Charge on completion of the work.
- 26.3.2. Schematic Diagram of Power Wiring including cable sizes.
- 26.3.3. LT Cable Route/ HT/ LT over head line route from tapping point to termination.
- 26.3.4. Power Distribution Net Work.
- 26.4. **EXCAVATION, EARTH WORK, CONCRETE, FORM WORK, STEEL WORK, ETC.**
- 26.4.1. Refer respective Clause No. of MES Schedule Part-I and as specified here-in-before.
- 26.5. **CABLE WORK**
- 26.5.1. **GENERAL:-** Refer clauses 19.19 & 19.73 to 19.96 of MES Schedule Part-I. Where the cables are to be laid in the trenches, 80 mm thick cushion of clean dry sand shall be provided below the bottom of cable. The cable shall be covered by a further layer of clean dry sand above the bottom of the Cable, to the height as mentioned in MES Schedule. The Cable Cover shall be laid dry and side by side to protect the cable from Mechanical Injury, the cables shall be looped at ends for furthers joints. The above additional length of cable as directed by Engineer-in-Charge shall also be measured and paid for under the respective items of cable in Schedule 'A'. Laying Bricks at places where Cables are laid, shall be done as directed by the Engineer-in-Charge shall also be Measured and Paid for under the respective Items of in Schedule 'A'. Cable gland shall be provided at Cable Termination in the DBS and Feeder Pillar Box, the cost of which is deemed to be included in the Rate of Cable.
- 26.5.2. All Jointing Materials such as Tape, Cables Compound and Cable Boxes, etc. for Straight Joints shall be provided by Contractor without Extra Cost to Government.
- 26.5.3. The cables being of Short Length for various Connections, there shall be no Straight Through Joints. The cable shall be terminated in Switch Fuse Units through suitable Pin Type Lugs.
- 26.5.4. The cost of cutting through Roads/Drains/Path for laying cable under the Road/Drain/Path and Making Good shall be deemed to be included in the Unit Rate/Amount quoted against GI Pipes.
- 26.5.5. **SAND CUSHIONING** :The sand shall be local sand as approved by GE. For laying of Cable in trenches, provision of cushioning shall be carried out all as specified in Clause No. 19.75 and 19.77 of MES Schedule Part-I.
- 26.5.6. **LAYING OF CABLES**
- 26.5.6.1. The LT underground cables shall be of 1100 volts, grade PVC armoured, heavy duty underground cable, conforming to IS-1554.
- 26.5.6.2. The cable should be laid at a depth of not less than 460 mm.
- 26.5.6.3. LT cable shall bear ISI certification mark.
- 26.5.6.4. Both ends of pipe protecting the cable shall be sealed with wooden bushes cut into two halves of appropriate size.
- 26.5.6.5. The cable shall be protected by means of 15 cm of Sand Cushion on top and under the cable as described in MES Schedule Part-I. On top of Sand Cushion, Pre-cast Cover shall be provided as protection.
- 26.5.6.6. Earth Work, Sand Cushioning and Cable Protection shall be Measured and Paid separately.
- 26.5.6.7. Cable path indicators shall be provided at a distance of 30 Metre and Every Turning Point and Cost of the same is deemed to be included in Unit Rates/Amount.
- 26.5.6.8. The scope of work will include proper laying of Cable in trenches/in pipes/on wall, fixing Identification Tags, crimping with Crimping Lugs, fixing Compression Glands at Termination Point in Panel/Marshalling Box. The above shall be deemed to be part of the installation work and the Contractor shall not be eligible for any Extra Charges other than those specifically mentioned in Schedule 'A'.
- 26.5.6.9. LT Cable shall be 3½ Core aluminum conductor PVC insulated inner sheathed armoured and PVC sheathed conforming to IS-1554 suitable for 1100 Volt grade. LT Cables shall be laid on Cable Trays in Pipes /on stanchion as directed by Engineer-in-Charge. Cable shall be laid as per provision of IS-1255- 1983. The cable drum and the cables shall be handled in the correct manner so as to ensure safety for personal and obviating kinks or other damage to the cable insulation, armouring or cable sheath.

PARTICULAR SPECIFICATIONS (CONTD.....)

- 26.5.6.10. All LT Cables shall be tested at manufacturer works as laid down in relevant Indian Standard Specifications including Physical Tests, Insulation Resistant Test and Voltage Tests. The Test Certificate shall be submitted to the Engineer-in-Charge. Termination of cable shall be carried out by means of crimping socket of aluminium. The glands shall be of brass double compression type and shall be provided at the termination. Armouring of cable shall be bonded to the earthing system at the termination through the Compression Glands. Joints in cable length is not permitted unless length of the cable between two terminating Ends is more than 400 Metre.
- 26.5.7. **TEST:-** After laying the HT and LT Cables, each core of HT/LT cables will be subjected to High Voltage Tests before commissioning. High Voltage Value for HT and LT Cable shall be as given in MES Schedule Part-I vide Clause No. 19.94. Each core of cable shall be subjected to high voltage for a duration of 15 Minutes. The results will be recorded and submitted to Engineer-in-Charge. Testing shall be done in the presence of Department Representative. Contractor is to make arrangements for High Voltage Test of cable at no Extra Cost to the Department. Apart from this Test, IR Value Test will also be conducted as given in IS-1255 and in MES Schedule Part I. The Contractor shall note that these Tests shall be carried out before connecting Cable to Switches.
- 26.6. **TUBULAR STEEL POLES SWAGED:-**
- 26.6.1. Tubular steel poles shall be swaged type as specified in clauses 19.3 of MES Schedule Part-I & shall conform to IS 2713 (Parts 1 to 3) 1980 specification for Tubular poles for overhead power lines (Second Revision). The tubes for making poles shall be out of steel conforming to grade YSt 240 (with minimum tensile strength of 410 Mpa) except that Manual metal arc welding process may also be used to manufacture tubes and Cold bend test need not be conducted.
- 26.6.2. Swaged poles shall be made of seamless or welded tubes of suitable lengths swaged and joined together. No circumstantial joints shall be permitted in the individual tube length of the poles. If welded tubes are used, they shall have longitudinal weld seam only, and the longitudinal welds shall be staggered at each swaged joints. Pole shall be well finished, clean and free from harmful surface defects. Ends of the poles shall be cut square. The poles shall be straight, smooth and cylindrical.
- 26.6.3. The dimensions of poles shall be as per clause 19.3.3 of SSR Part – I, 2009.
- 26.6.4. Workmanship shall be as per clause No. 19.50 of MES SSR Part – I, 2009.
- 26.6.5. Painting of pole shall be as per clause No. 19.71 of MES SSR Part – I, 2009.
- 26.6.6. The contractor shall procure steel tubular poles from the manufactures listed at Appendix-B. The contractor shall produce manufacturer test certificate before in-corporation in the work.
- 26.7. **STEEL CROSS ARMS:-**
- 26.7.1. Steel cross arms shall as specified in clause No. 19.9 of MES SSR Part – I, 2009.
- 26.7.2. Workmanship shall be as per clause No. 19.53.3 of MES SSR Part – I, 2009.
- 26.7.3. Painting of cross arm shall be as per clause No. 19.71 of MES SSR Part – I, 2009.
- 26.8. **PIN AND SHACKLE INSULATOR:-**
- 26.8.1. Pin and Shackle type insulator shall as specified in clause No. 19.6.1 to 19.6.1.2 of MES SSR Part – I, 2009 and shall comply with IS 1445-1977, Specification for porcelain insulators for overhead power lines with a nominal voltage upto and including 1000 volts and IS 731-1971, Specification for porcelain insulators for overhead power lines with a nominal voltage greater than 1000V. The porcelain shall be sound, free from defects, thoroughly vitrified and smoothly glazed.
- 26.8.2. Insulator Fittings Insulator fittings shall comply with requirements of IS 2486. Insulated fittings for overhead power lines with nominal voltage greater than 1000 volts (Part 1)1993, General requirements and tests and (Part 2)-1989, Dimensional, requirements.
- 26.8.3. Workmanship shall be as per clause No. 19.54 of MES SSR Part – I, 2009.
- 26.9. **STAY WIRES:-**
- 26.9.1. The stay wires shall as specified in clause No. 19.7 of MES SSR Part – I, 2009 shall be of grade 4 quality with minimum tensile strength of 700N/sqm and conform to IS 2141-2000 Specification for galvanised stay strand and of size as indicated.
- 26.10. **STAY ASSEMBLIES:-**

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- 26.10.1. The stay assemblies shall comprise of stay clamp, stay wire, stay insulator, stay grips, thimble stay bow, stay-rod and stay-plate and shall as specified in clause No. 19.8 of MES SSR Part – I, 2009.
- 26.10.2. Workmanship shall be as per clause No. 19.55 of MES SSR Part – I, 2009.
- 26.11. **DANGER NOTICE PLATES**
- 26.11.1. Danger Notice Plate shall be provided on all Electrical Equipment like Transformer, HT/LT Switch Gear, Bus Duct, etc. The Danger Notice Plate shall conform to IS-2551-1963 250 x 250 mm and 200 x 150 mm size Danger Notice Plate for 11 KV and 433/380 Volts respectively shall be provided as directed by Engineer-in-Charge.
- 26.11.2. The Plates shall be made from 1.6 mm thick Mild Steel Sheet, Vitreous Enamel White. The Letter, Figures and Conventional Skull and Bones in Signal Red Colour shall be on Front Side. The Danger Notice Board shall be fixed either with 25 x 3 mm GI Clamps or Rivet/Nut Bolts.
- 26.12. **LIGHTNING PROTECTION**
- 26.12.1. Arrangement for lightning protection shall be made on Locations as directed by Engineer-in-Charge. The arrangement shall conform to IS-2309. On Ridge of Building aluminium Strip of 25 x 3.150 mm shall be fixed with J Bolts on both side of Ridge as shown in Drawing. Both side, aluminium Strip shall be in contact with each other through Air Termination Point. If Air Termination Point is separately fixed and not giving contact to both the aluminium strip in that case at every 10 Metre both the aluminium Strip shall be connected separately by a piece of same aluminium Strip so that Lightning have an easy and Shortest Passage to ground.
- 26.12.2. All the Roof Conductors and Down Conductors (i.e aluminium Strip 25 x .15mm) and Air Termination Copper Rod (12 mm dia & 300mm long) shall be mounted on suitable size of Porcelain Insulator. Due care be taken to ensure that any portion of the Lightning Protection Air Termination Rod and the Strip are not in contact with the Building. The cost of porcelain insulator is deemed to be included in the Quoted Rate/ Amount of the concerned.
- 26.13. **DISTRIBUTION / FEEDER PILLARS BOX**
- 26.13.1. Refer clauses 19.21 of MES Schedule Part-I, IS 5039 and TD drawing
- 26.13.2. The feeder pillars box shall be factory made and CPRI approved. Feeder pillars box shall be obtained from the specified manufacturers and shall be epoxy powder coated factory made and tested as per IS. All feeder pillars boxes shall have extra space for installing one MCCB in future.
- 26.13.3. The contractor shall design & submit drawings of panel board before bringing same to the site.
- 26.13.4. The cable chamber of the board shall be with adequate space for housing cable and connecting for safety of working and for avoiding accidental contacts with live parts by providing barriers.
- 26.13.5. In case nothing is mentioned in Sch 'A' bus bar shall be copper.
- 26.13.6. In case mounting of panel board has not been mentioned in Sch 'A' the same shall be floor mounted and the fixing arrangement shall be provided by the contractor and the unit rate quoted shall be deemed to inclusive for the same.
- 26.14. **LT SWITCH GEAR PANEL:-**
- 26.14.1. Refer Para (including sub paras) 19.100 of MES Schedule Part-I and IS 2147.
- 26.14.2. The panel board shall be factory made and CPRI approved. Panel boards shall be obtained from the specified manufacturers and panels will be epoxy powder coated factory made and tested as per IS. All LT panels shall have extra space for installing one MCCB in future.
- 26.14.3. The contractor shall design & submit drawings of panel board before bringing same to the site.
- 26.14.4. The cable chamber of the board shall be with adequate space for housing cable and connecting for safety of working and for avoiding accidental contacts with live parts by providing barriers.
- 26.14.5. In case nothing is mentioned in Schedule 'A' bus bar shall be copper.
- 26.14.6. In case mounting of panel board has not been mentioned in Sch 'A' the same shall be floor mounted and the fixing arrangement shall be provided by the contractor and the unit rate quoted shall be deemed to inclusive for the same.
- 26.15. **MOULDED CASE CIRCUIT BREAKERS (MCCBS):-**

PARTICULAR SPECIFICATIONS (CONTD.....)

- 26.15.1.** Moulded case circuit breakers (MCCBs) shall be suitable for operational voltage of 415V AC, 50 Hz, 3 phase, 4 wire system for a rated current and ultimate breaking capacity and it shall conform to IS : 13947 (Part 3, 1993) and IEC-60947 (Part 2).
- 26.15.2.** MCCBs shall be provide **earth leakage module type**.
- 26.15.3.** MCCBs shall be of compact and elegant design suitable for reversible load and line terminations without affecting its performance. MCCBs shall be suitable for fixing flush on the panels and shall be provided with handle operating mechanism including Rotary Handle vari-depth type.
- 26.15.4.** The insulating case and cover of MCCBs shall be made of high resistant and flame retardant thermosetting insulating materials. The switching mechanism shall be quick make, quick break and trip free. The position of the operating knob/handle shall clearly indicate ON, OFF and TRIP position.
- 26.15.5.** Each pole shall be provided with a pair of contacts, which shall open at a high speed over a large distance under short circuit faults. The special designed arc chutes of insulating materials shall be provided to contain the arc by providing effective arc quenching device.
- 26.15.6.** The tripping mechanism shall be hydraulic type or Electronic release or thermal magnetic release for protection for over load and short circuit as per the details given below. –

Capacity Of MCCBs	Ultimate breaking Capacity	Overload release	Short circuit release
Upto 125 Amps	16 KA	Adjustable Thermal release (0.7 to 1.0 In)	Fixed magnetic type suitable for 10.0 In.
160 or 250 Amps	36 KA	Adjustable Thermal release 0.64 to 1.0 In	Adjustable magnetic release (3.5 to 10.0 In)
400 and 630 Amps	36 KA	Electronic release with over load Zone of adjustment 0.4 to 1.0 In	Electronic release with Short circuit Zone of adjustment 1.5 to 10.0 Ir. (Adjusted current) with time.

- 26.15.7.** Under voltage trip, mechanical interlocks etc shall be provided as per standard practice and ISS. Under voltage trip shall be designed to operate when the control voltage drops below a tripping threshold i.e. 20% to 70% of rated voltage and shall be suitable for operation on 230V/415V AC.
- 26.15.8.** The terminals shall be suitable for both copper terminations.
- 26.15.9.** In case number of poles of MCCB are not specified in Sch A then 4 pole shall be provided.
- 26.15.10.** After erection at site and before being connected to the power supply, all items of electrical equipment, all circuits shall be fully tested to prove correct connection, defects in installation pointed out/noticed shall be rectified immediately by repairing or replacing the defective part of the equipment at no extra cost. All instruments appliances, oil, grease and other materials etc, required for carrying out the test shall be provided by the contractor at his own cost. The insulation and other safety measures will be inspected and checked by electrical inspector before commissioning. The electrical inspector shall be nominated by the Accepting Officer.
- 26.15.11.** If owing to storage or other cause, the electrical insulation resistance has deteriorated, the equipment shall be thoroughly dried out or replaced or other steps taken to restore proper insulation resistance before connection it to the power supply.
- 26.15.12.** After installation of the equipment and laying and jointing of cables, necessary tests including relay co-ordination as per relevant ISS shall be carried out by the contractor to the satisfaction of GE.
- 26.15.13.** After connection the power supply, the whole of the installation shall be tested to demonstrate its ability to operate satisfactorily.
- 26.15.14.** The installation shall be deemed to be complete only after satisfactory completion of all tests. Approval by the Engineer-in-Charge for materials, workmanship etc, during manufacture of items at site will not relieve the contractor from his obligations to comply with all the requirements of the contract. The contractor shall supply schematic diagrams (Three copies) of the equipment installed by him on completion of the work.
- 26.15.15.** One month before expiry of the defects liability period, the contractor shall arrange an experienced Engineer together with any additional labour required to attend at the site to open

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up the equipment to check the various connections clearances etc. The detail checks shall be done by the contractor in the presence of the GE before the end of the defects liability period.

26.16. EARTHING

26.16.1. Earthing shall be carried out by Earth Electrodes as shown in Electrical Plate No. 3 of MES Schedule Part-I and as specified in IS-3043 including upto date amendments therto. The Earth Electrodes shall be placed all as shown on Drawings and 2.0 Metre away from the Main Structure. The surplus soil obtained from the excavation shall be removed to distance not exc. 50 Metre. The Concrete for Chamber shall be PCC 1:3:6 (using 20 mm graded stone aggregate) and exposed surfaces need to be finished fair. Funnel shall be prepared out 3.15mm thick PGI Sheet by welding and shall be leak proof. It shall be provided with wire gauge with 1.18mm average width of aperture and 0.45mm average dia of wire soldered to Funnel Cover. Dust shall be used for Medium Grade 20mm with 12mmdia holes drilled staggered @ 300mm C/C through out Pipe. The bottom of Pipe shall be layed at an angle of 45°. Two numbers Earthing shall be interconnected with 32 x 6mm into GI Strip. GI Pipe for Earthing shall not be issued under Schedule 'B'.

26.16.2. The following Tests shall be carried out to the entire satisfaction of the Engineer-in-Charge :-

(a) Earth Resistance Test : Resistance of each Earthing shall be measured individually and shall not exceed 0.5 Ohm in ordinary soil and 3 Ohm in Rocky situation.

(b) In case the Resistance is more than as specified, the Contractor shall increase the depth of the Bore hole, quantity of Charcoal, Salt and length of Electrodes to bring the Resistance of Earth to the Value specified above, without any Extra Cost to the Government.

26.17. VOLTAGE STABLIZER

26.17.1. Voltage stabilizers shall be oil cooled, servo type conforming to IS. 9815 (Part-II) and as specified in clause No. 19.100A of MES SSR Part – I, 2009 and suitable for 3 phase AC system to give a guaranteed out put voltage of 415 V +- 1%without spikes at 50HZ. Speed of correction of voltage shall be high enough to give jerkless out put voltage and in any case it shall not be less than 50 volts per second per phase without under/overshooting.

26.18. GUARANTEE/ PRODUCTION OF TEST CERTIFICATE

26.18.1. After completion of work the contractor shall guarantee that materials and workmanship of the equipment, power system and connected items offered and installed by him are new and best quality in every respect and he will make good the defects, damages which are not attributed to normal wear and tear or misuse for which decision of the GE is final and binding. Contractor shall be responsible for repairing and or replacing at his cost any parts which are rendered defective and unserviceable during the defect liability period.

26.18.2. Manufacturer's test certificate in respect of **HT/LT cables, water cooler, air cooler, refrigerator, transformer, DG Set, Solar Water Heating System** other equipment as directed by GE are to be submitted to the GE by the contractor before any payment from Deptment.

26.18.3. INSPECTIONS MANUFACTURERS WORKSHOP PREMISES AND TESTING :- All equipments such as HT/LT cables (more then 500merte each type), DG Set and transformer shall be tested in the manufacturers workshop according to tests specified in the relevant Indian Standard Specification and elaborated in these specifications. The equipment shall bear the IS testing marks where manufactured accordingly. The HT/LT cables, DG set, transformer and VCB shall be inspected in presence of the rap of the Accepting Officer in factory/ manufacturers workshop premises before dispatch of the material. The contractors shall be facilitating for inspection/testing in factory/ manufacturers workshop premises. The contractor shall give one month notice to the Accepting Officer indicating readiness of equipments for testing. The cost of the representative's 1st visit to the factory shall be borne by the Department.

27. SOLAR POWER PLANT**27.1. GENERAL SCOPE OF WORK OF SOLAR POWER PLANT**

27.1.1. The general scope of work involves Engineering, Procurement and Construction (EPC) of the grid-connected solar photovoltaic power plant with Plant Capacity of 1 MWP.

27.1.2. The scope of work includes commissioning of the power plant. The Contractor shall construct and commission plant to deliver guaranteed plant performance.

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- 27.1.3. Work includes Comprehensive Operation and Maintenance (O&M) of the plant wherein the plant shall generate at least equivalent to the Guaranteed Performance of Plant as defined in concern schedule.
- 27.1.4. Tentative line diagram for Solar Power Plant is shown in **Appendix 'G'**.
- 27.2. **CIVIL WORK**
- 27.2.1. Design, fabricate and erection of RCC cum structure steel foundation for anchoring the module mounting structure, design, supply, fabricate and installation of module mounting structures, UG cable trenches and different ancillary electrical installations, construction of Substation Building for inverter with electrical fixtures and proper air circulation, civil foundations for transformers; provide pipeline network with necessary pump, control panel, pipeline, taps, flexible hoses etc. for washing of modules and gardening etc. **These items are catered for under relevant Schedules.**
- 27.3. **ELECTRICAL WORK** : Electrical works consists of two categories:-
- 27.3.1. The Primary works concerning the SPV directly like Supply, installation of solar PV modules, grid-tied string inverter, junction box, string junction box, array junction box and main junction box, automatic weather station, string-level SCADA and remote web-based communication & monitoring hardware and software etc.; CCTV system, interconnection of facility through wires, cables, bus bars, etc.; comprehensive testing of all equipments and system and commissioning, training of department engineers on O&M of plant; human safety and protection equipment including danger signs, etc. The scopes each of the primary works are detailed under each specific item in BOQ. The general and specific requirements are further detailed here-in-after.
- 27.3.2. The ancillary works consisting of UG cable works, transformers, VCB panel boards, plant lighting, internal electrification of control room, earthing for various modules, lightning protection which shall be measured under relevant Schedules under mentioned otherwise.
- 27.4. **GENERAL REQUIREMENTS**
- 27.4.1. The Bidder shall submit in the Bid a comprehensive project execution schedule as well as Operation and Maintenance (O&M) schedule with resource planning.
- 27.4.2. All construction, operation and maintenance procedures shall be carried out through appropriate relevant standards, regulations laid by MNRE / SECI / RERC / CEI / CEA .and / or any other agency as and when applicable. Further, this shall comply to the applicable labour laws and take necessary safety measures during construction and O&M period. The Contractor shall make itself aware of such requirements and shall not solely depend on the GE to avail full information.
- 27.4.3. Any civil / electrical / other work, which is not mentioned or included in this tender document but necessary for the plant shall be borne by the Contractor.
- 27.4.4. The Contractor shall submit in the Bid technical specifications / Drawings / Designs and data sheets for all electrical work including but not limited to electrical component of the power plant including photovoltaic modules, cables, connectors, junction boxes, inverters, transformers, monitoring and auxiliary systems, etc.
- 27.4.5. The contractor shall ensure that the OEM (to execute the work) shall be the one for whom MOU has been submitted prior to receipt of tender. However, in case the said OEM fails to perform his obligation as per MOU, the bidder may be allowed to get the work executed through any other OEM approved by MNRE till date of receipt of tender with prior approval of Accepting officer. However in such cases matter may be taken with E-in-C's Branch for disciplinary or other suitable action against the defaulter OEM.
- 27.4.6. Bidder shall also provide required set of onsite testing instruments/equipments viz. earth resistance tester, rheostats, insulation tester, multimeters, clamp meters, CRO, Function Generator, Transformer oil BDV kit, Relay testing kit, infra red thermal imaging hand held temp. meter, inverter testing kit etc.
- 27.4.7. The Contractor shall not, without the GE's prior written consent, disclose the Contract or any provision thereof or any specification, plan, drawing, pattern therewith to any person other than person employed by the Contractor in performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend strictly for purpose of performance only.

PARTICULAR SPECIFICATIONS (CONTD.....)

- 27.4.8. The Contractor shall not, without GE's prior written consent, make use of any document or information except for purpose of performing the Contract.
- 27.4.9. Any document other than the Contract itself shall remain the property of the GE.
- 27.5. **PATENT RIGHTS**
- 27.5.1. The Contractor shall indemnify the GE against third party claims of infringement of patent, trademark or industrial design rights arising from use of goods or any part thereof in India.
- 27.6. **MATERIALS AND WORKMANSHIPS**
- 27.6.1. All materials shall be of the best quality and workmanship capable of satisfactory operation under the operating and climatic conditions as may be specified. Unless otherwise specified, they shall conform in all respect to the latest edition of the relevant Bureau of Indian Standard (BIS) specification wherever Indian specifications apply or British Standard (BS) or internationally accepted standard.
- 27.6.2. The Contractor shall supply & deliver all equipment and materials for installation at site. The Contractor shall arrange for transportation, loading & unloading and safe storage of materials at project site at his own cost & risk.
- 27.6.3. The Plant, equipment, and materials offered by the Contractor should comply with one consistent set of Standards only as far as possible.
- 27.7. **INTER-CHANGEABILITY**
- 27.7.1. All the parts shall be made accurately to Standard gauges so as to facilitate replacement and repairs. All corresponding parts of similar apparatus shall be inter-changeable.
- 27.8. **PACKING AND MARKING**
- 27.8.1. The Contractor shall be responsible for securely protecting and packing the plant & equipment as per prescribed standards in force to withstand the journey and ensuring safety of materials and also arrival of materials at destination in original condition and good for contemplated use. Packing case size & weight shall take into consideration the remoteness of the goods final destination and absence of heavy material handling facilities at all points in transit.
- 27.8.2. Packing lists of materials shall be provided in each package to facilitate checking up of the contents at the destination.
- 27.9. **PLANNING AND DESIGNING**
- 27.9.1. The Contractor shall plan and design for the electrical / mechanical / civil requirements including but not limited to plant configuration, space optimization, distance between rows of modules, sufficient passage for vehicle and man-power movement in the plant, mounting structures, location of inverter room, cable routing, selection of equipments and items, procurement plan etc. to enhance plant output.
- 27.9.2. The Contractor shall carry-out Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal usage of space, material and labour.
- 27.9.3. All designs & drawings have to be developed based on the governing standards and requirements of the project and also keeping in mind basic design specifications.
- 27.9.4. GE may approve minor deviations in the same which are meant for increasing plant performance without sacrificing quality / workmanship norms.
- 27.9.5. Accepting Officer reserves right to modify the specifications at any state as per local site conditions / requirements.
- 27.9.6. Packing lists of materials shall be provided in each package to facilitate checking up of the contents at the destination.
- 27.10. **APPROVAL OF DESIGNS AND DRAWING**
- 27.10.1. All designs, construction and procurement - electrical and civil, shall comply with regulations laid by RERC/ CEI(G)/ MNRE/ SECI/ CEA and/or any other agency as and when applicable. Contractor shall make itself aware with such requirements and shall not depend on the GE to avail full information.
- 27.10.2. All designs, specifications, reports, etc. submitted or used by the Contractor at any point in time shall first be approved by "GE" and shall be revised by Contractor as per instructions given by "GE" if required prior to execution.

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27.10.3. The Contractor shall submit in the Bid general engineering drawings of all civil work, including but not limited to, layout of the power plant at different buildings indicating rows of photovoltaic modules, SLD, location of control panels, DC and AC Distribution Boxes, MMS design, civil foundations and anchoring design / details, shading analysis and generation estimation report etc.

27.11. SOLAR CELLS AND PV MODULES

27.11.1. Technical specifications of PV Module for use in Grid/Off Grid Solar Power Plants will be as under :-

(a) The PV modules used in the solar power projects must confirm to the latest edition of the following **International Electro-technical Commission (IEC)** PV module qualification test or equivalent BIS standards. All PV modules shall be same make and model.

(i) Crystalline Silicon Solar Cell Modules IEC 61215 / BIS 14286.

Additional Checks

(ii) PV Modules (For construction and safety) IEC 61730 (Part I & II) / Equivalent BIS.

(iii) PV Modules corrosive atmosphere IEC 61701/ BIS 61701.

(iv) PV Modules in sandy environment IEC 600068-2-68.

(b) Each PV module used in any solar power project must use a RF identification tag. The following information must be mentioned in the RFID used on each module :-

(i) Name of the manufacture of PV module & Solar cells

(ii) Month and Year of the manufacture of PV module & Solar cells

(iii) I-V curve for the module

(iv) Wattage, Im, Vm and EE of the module.

(v) Unique serial No and Model No of the module

(vi) Date and year of obtaining IEC PV module qualification certificate

(vii) Name of the test lab issuing IEC certificate

(viii) Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001

(ix) The solar module shall be made in India.

(c) The PV modules must be tested and approved by one of the IEC authorized test centers. In addition a PV module qualification test certificate as per IEC standard, issued by **ETDC, Bangalore** or Solar Energy Centre will also be valid.

(d) The PV Modules shall be approved by the **Accepting Officer**.

(e) Warranty on output and life structure should be as under:-

(i) Output wattage of PV modules **should not be less than 90% at the end of 10 years and 80 % at the end of 25 years.**

(ii) The mechanical structure, electrical works and overall workmanship of the grid solar power plants must be warranted for a minimum of 5 years.

(f) All grid solar PV power plants must install necessary equipment to measure solar radiation, ambient temperature, wind speed and other weather parameters continuously. Simultaneously measurement of the generation of DC power as well as AC power from the plant must be done. These data will be kept in record of the concerned GE.

27.12. TECHNICAL SPECIFICATIONS FOR INVERTORS

27.12.1. Technical specifications for Invertors are as under:-

- | | | | |
|-------|----------------------------|---|----------------------------------|
| (i) | Nominal Voltage | - | 415 V +/-10%, 3 phase, 50 Hz |
| (ii) | Control | - | Micro processor / DSP |
| (iii) | Switching Device | - | IGBT / MOSFET |
| (iv) | Grid Freq. Synchronization | - | +/- 3Hz or more |
| (v) | Ambient Temp | - | (-)20°C to (+) 50° C |
| (vi) | Humidity | - | 95% non condensing |
| (vii) | Protection of enclosure | - | IP 54 (indoor) / IP 65 (Outdoor) |

PARTICULAR SPECIFICATIONS (CONTD.....)

- | | | | |
|--------|---------------------|---|---|
| (viii) | No Load Losses | - | < 1 % of rated power |
| (ix) | Inverter Efficiency | - | >97% (without inbuilt galvanic isolation) |
| | | - | >93% (with inbuilt galvanic isolation) |
| (x) | PF | - | >0.9 |
| (xi) | THD | - | < 3% |

27.12.2. Inverter should have internal protection arrangements against any sustainable fault in feeder line and against the lightning on feeder.

27.12.3. Should have isolating transformer

27.12.4. Inverter generated harmonics, flicker, DC injection limits, Volt range, frequency range and anti-islanding measures should follow latest CEA Guidelines / IEC 62116 / BIS Code.

27.13. TECHNICAL REQUIREMENT OF BOS ITEMS OF SPV PLANTS

27.13.1. Technical specifications of Power Conditioners including MMPT & Protection for use in Grid Solar Power Plants are as under:-

- | | | | |
|--------|------------------------------|---|---|
| (i) | Environmental Testing | - | IEC 60068-2/Eq. IS |
| (ii) | Efficiency Measurement | - | IEC 61683/IS 61683 |
| (iii) | Product Safety | - | IEC 62109 -1 & 2 |
| (iv) | Grid Connectivity Interface | - | IEC 61727 : 2004 |
| (v) | Interconnection PV Invertors | - | IEC 62116 |
| (vi) | Electromagnetic Interface | - | IEC 610002,3,6 |
| (vii) | Ingress Protection | - | IP 54 (indoor) / IP 65 (Outdoor) |
| (viii) | Batteries | - | As per relevant BIS Std |
| (ix) | Cables | - | IEC 60227 / IS 694. (UV resistant, DC rated, plug& play). |
| (x) | Earthing / Lightning | - | IEC 62561 /IS 3043 : 1986 |
| (xi) | Surge Arrestors | - | IEC 60364-5-53 / Relevant IS code |
| (xii) | Circuit Breakers | - | IEC 60947 1, 11, III/ IS 60947, EN 50521 |
| (xiii) | Junction Boxes & Enclosures | - | IP 54 (indoor) / IP 65 (Outdoor) |
| (xiv) | Meters | - | As per DISCOM guidelines / IS 16444 |
| (xv) | Grid Connectivity | - | As prevalent in the State/as per CEA |

27.13.2. The net rated and certified capacity of the modules at Standard Testing Conditions (STC) shall be as detailed in BOQ (with a positive tolerance of $\leq 3\%$).

27.13.3. The module mismatch losses for modules connected to an inverter should be less than 2%.

27.13.4. The SPV module shall be made up of high transitivity glass & front surface shall give high encapsulation gain and the module shall consist of impact resistance, low iron and high transmission toughened glass of size not less than 3.2 mm. The module frame shall be made of corrosion resistant material, which shall be electrically compatible with the structural material used for mounting the modules.

27.13.5. The SPV modules should have suitable encapsulation and sealing arrangements to protect the silicon cells from environment. The encapsulation arrangement shall ensure complete moisture proofing for the entire life of solar modules.

27.13.6. Solar modules must have the rated output of not less 80% by the end of 25th year and not less than 90% by the end of 10th year of operation as per MNRE Standards. Manufacturer test certificates to be submitted.

27.14. THIRD PARTY AUDIT AND WARRANTY

27.14.1. Before commissioning of SPV modules third party audit should be carried out by Independent body i.e. IIT Guwahati/NISE/Any other institute approved by MNRE.

27.14.2. The PV modules will be warranted for minimum period of 25 years from the date of supply. (Output wattage should not be less than 90% at the end of 10 year and 80% at the end of 25 years.

PARTICULAR SPECIFICATIONS (CONTD.....)

- 27.14.3. The mechanical structure, electrical works including inverters/charge controller's distribution board/meters and overall workmanship of the SPV power system must be warranted for a minimum of 5 years.
- 27.15. **EFFICIENT OF SOLAR POWER PLANT (SPP) AND PENALTY ON PERFORMANCE**
- 27.15.1. The power generation of Solar Power Plant (SPP) shall be overall 900K Units per annum for the period of first one year and there after reduction of 1% of total generation of first year shall be ensure for every subsequent year up to next 5 years.
- 27.15.2. In case of power generation is less than as defined here-in-before, a penalty @ maximum tariff per unit during the year charged by DISCOM shall be recovered from the contractor for each unit of reduced power.
- 27.16. **SOLAR PV MODULE MOUNTING STRUCTURE (MMS)**
- 27.16.1. The MMS should be designed as described in BOQ for maximum energy generation throughout the year based on location and local weather variables for each module technology.
- 27.16.2. The MMS should be safe, and designed to allow easy replacement of any module and easy access to the O&M staff. It should be designed for simple mechanical and electrical installation, should support Solar PV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly and there should be no requirement of welding or complex machinery at site.
- 27.16.3. The array structure shall be so designed that it will occupy minimum space and optimum performance without sacrificing the output from Solar PV panels at the same time it will withstand severe cyclonic storm with wind speed up to maximum 150 kmph as per relevant IS Code / NBC.
- 27.16.4. Seismic factors for the site to be considered while making the design of the foundation/ramming etc. or any technology. The design of array structure shall be based on soil test report of the site and shall be approved from GE.
- 27.16.5. The frames and leg assemblies of the array structures shall be made of hot dip Galvanized steel per ASTM A123.
- 27.16.6. In case of galvanization of structures, thickness of galvanization should be at least 85 microns. Ensure inner side should also be galvanized.
- 27.16.7. Modules shall be clamped / bolted with the structure properly. The material of construction shall be GI Clamps / bolts shall be designed in such a way so as not to cast any shadow on the active part of a module.
- 27.16.8. Modules shall be isolated electrically from the MMS through EPDM sheet of appropriate thickness and all the modules shall be separately earthed through proper earthing arrangements.
- 27.16.9. Module mounting structures shall also be earthed through proper separate earthing which shall be paid under relevant item.
- 27.16.10. Mounting structure should also be equipped with suitably designed spikes at its high end to avoid bird standing.
- 27.16.11. The material of construction, structural design and workmanship shall be appropriate with a factor of safety of not less than 1.5.
- 27.16.12. For multiple module mounting structures located in a single row, the alignment of all modules shall be within an error limit of 10 mm in vertical / horizontal line.
- 27.16.13. The Contractor shall provide to GE the detailed design, specifications and calculations of the MMS.
- 27.16.14. The Contractor / manufacturer shall specify installation details of the Solar PV modules and the support structures with appropriate diagrams and drawings.
- 27.16.15. The Module Mounting Structure design shall be certified by a chartered structural engineer.
- 27.16.16. The material shall be corrosion resistant and electrolytically compatible with material used in module frame
- 27.16.17. The fasteners should be of stainless steel and should allow easy replacement of any module.

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- 27.16.18. The mounting structure should mild steel, hot dipped galvanized (min 80 microns withstand wind load of 150 Km/hr as per relevant IS Code/NBC.
- 27.16.19. The mounting steel structure shall be as per IS 2061-1992 and galvanizing as per IS-4759.
- 27.16.20. The material shall be corrosion resistant and electro technically compatible used in module frame and size of angle iron should not less than 50 mm x 50 mm x 5 mm.
- 27.16.21. All fasteners shall be of Stainless steel - SS 304. Nut & bolts, supporting structures including the entire MMS shall have to be adequately protected against all climatic condition specially protected from sulphur attack.
- 27.16.22. The Contractor should design the structure height considering highest flood level at the site. The minimum clearance between the lower edge of the module and the ground shall be the higher of (i) above highest flood level at the site and (ii) minimum 800 mm.
- 27.16.23. The structure shall be designed for simple mechanical and electrical installation. It shall support solar PV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly. Cable should be passed from Pipes and Cable-ties shall be used to hold and guide the Pipes (cables/wires) from the modules to inverters or junction boxes.
- 27.16.24. The Contractor shall be permitted ramming of the module mounting structure provided that they obtain consent of the GE. The GE shall provide such consent once it is convinced that such ramming shall not in any way deteriorate the strength of the structure and shall not reduce the structure's strength to enjoy life of more than 25 years.

27.17. CABLES AND WIRES POWER AND CONTROL CABLES

- 27.17.1. Once a solar panel is exposed to sunlight, it will generate electricity. Care must be taken when selecting the size of the cable to be used.
- 27.17.2. Cables are always double insulated and polarized. Cable or fuses should never be disconnected when under load. Cable from the solar PV modules should follow route to the array junction boxes.
- 27.17.3. All cables should be PVC insulated 1100v grade conforming to IS are clearly identifiable and connected appropriately. The two ends of the modules series should be brought to the panel junction box mounted on panel structure.
- 27.17.4. All modules of the panel should be mounted on structure and connected together in series in the daisy chain manner.
- 27.17.5. Wiring size of PV array will be designed such that maximum voltage drop at full power from the PV modules to the inverter will be less than 2% (including diode voltage drop). The wiring for module interconnection will be with hard HDPE conduit running through cable trays.
- 27.17.6. Series blocking diodes should be located in the panel junction box and the panel output should be taken field junction box where outputs of all the panels should be brought for paralleling.
- 27.17.7. All cables shall be supplied in the single largest length to restrict the straight-through joints to the minimum number.
- 27.17.8. All cable/wires shall be marked with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.
- 27.17.9. Data sheets of the joints and kits shall be submitted for approval by GE.

27.18. JUNCTION / COMBINER BOX

- 27.18.1. All junction/ combiner boxes including the module junction box, string junction box, array junction box and main junction box should be equipped with appropriate functionality, safety (including fuses, grounding, etc.), string monitoring capabilities, and protection.
- 27.18.2. The terminals will be connected to copper bus-bar arrangement of proper sizes to be provided. The junction boxes will have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.
- 27.18.3. Each Array Junction Box will have Suitable Reverse Blocking Diodes of maximum DC blocking voltage of 1000 V with suitable arrangement for its connecting. The Array Junction Box will also have suitable surge protection. The Junction Boxes shall have suitable arrangement for the followings:

PARTICULAR SPECIFICATIONS (CONTD.....)

- (a) Combine groups of modules into independent charging sub-arrays that will be wired into the controller.
- (b) Provide arrangement for disconnection for each of the groups. Provide a test point for each sub-group for quick fault location.
- (c) To provide group array isolation.

- 27.18.4. The current carrying rating of the Junction Boxes shall be suitable with adequate safety factor to inter connect the Solar PV array.
- 27.18.5. The junction boxes shall be dust, vermin, and waterproof and made of thermoplastic/ metallic in compliance with IEC 62208, which should be sunlight/ UV resistive as well as fire retardant & must have minimum protection to IP 65(Outdoor)/ IP 54(indoor) and Protection Class II.
- 27.18.6. In addition, over voltage protection shall be provided between positive and negative conductor and earth ground such as Metal Oxide Variaster (MOV).
- 27.18.7. A lightning protection coil in each sub-array line shall be provided to prevent the high current transients from entering into the DC bus.
- 27.18.8. The bypass & reverse blocking diodes should work for temperature extremes and should have efficiency of 99.98%, confirmed by appropriate IEC standards.
- 27.18.9. Adequate capacity solar DC fuses & isolating miniature circuit breakers should be provided if required.
- 27.18.10. Detailed junction box specifications and data sheet shall be provided in the Bid document.
- 27.19. **WEATHER STATION AND DATA LOGGER (REMOTE MONITORING SYSTEM – RMS)**
- 27.19.1. Contractor shall provide the data over remote web-server with rights to control or modify the same through appropriate arrangements.
- 27.19.2. Contractor shall provide necessary licensed software and hardware solution to offer monitoring of electrical parameters of grid and solar generator monitored at individual string level over remote web server. Contractor shall provide all necessary accessories like power supply, connection cords, sensors, active SIM card with appropriate data plan etc. so as to make the system complete in all respect.
- 27.19.3. The cost of data plan during the project and O&M shall be borne by the Contractor. At the end of the O&M, the same shall be transferred to the GE at no extra cost.
- 27.19.4. It shall also have local data logging and communication through Bluetooth / Wi-Fi and Ethernet port.
- 27.19.5. The Remote Monitoring System shall be capable of sustaining maximum – minimum temperature, rainfall, wind gusts and UV radiation. The enclosure shall be IP65 for outdoor installation / IP54 for indoor installation.
- 27.19.6. The Remote Monitoring System shall have capability to log and send data from weather sensors.
- 27.19.7. The data shall be available for every minimum 15 minutes interval.
- 27.19.8. The system shall have sufficient internal memory storage to retain data for one complete year and shall have provision of expanding memory through external memory card / USB drive.
- 27.19.9. The system shall be able to communicate wirelessly in a close proximity
- 27.19.10. The Contractor shall provide to GE the detailed specifications, and all administrative rights/ privileges / passwords to the string monitoring system.
- 27.19.11. Contractor shall provide following measuring instruments with all necessary software & hardware compatible with the Data logging and web based monitoring system.
- 27.19.12. The contractor shall provide all administrative rights/ privileges/ passwords of the RMS system to the GE.
- 27.20. **PERFORMANCE PARAMETERS**
- 27.20.1. The Plant performance will be evaluated through Performance Ratio (PR) test as per IEC 61724 and Capacity Utilization Factor (CUF).

PARTICULAR SPECIFICATIONS (CONTD.....)

- 27.20.2. The initial acceptance of the Plant will be evaluated during commissioning by measuring PR for continuous 7 days. However, contractor must demonstrate the PR for a period of 30 days as per the PR test procedure.
- 27.20.3. During O&M contract, the Plant performance will be evaluated based on annual Capacity Utilization Factor. Second year onwards linear degradation of the module output (i.e., 0.80% of DC capacity at STC per year) shall be considered for the calculated CUF every year.
- 27.20.4. During the O&M period, the bidders need to maintain 90% uptime of the Plant to achieve the proposed CUF at the end of each year. Any routine repair, replacement, overhauling, etc. are to be performed during night times so that no generation loss will be there in day time.
- 27.20.5. Bidders are expected to make their own study of solar radiation profile and other related parameters of the area & make sound commercial judgment about the Performance Ratio and CUF. It shall be the responsibility of the Bidder to assess the corresponding solar insolation values and related factors of solar Plant along with expected grid availability.
- 27.20.6. The Bidder should access all related factors about the selected Site for the Project before giving commitments of PR and CUF of the proposed Project. 7.9.
- 27.20.7. The bidders are free to install additional DC capacity any time during O&M period, with proper consent by the Employer, to meet the desired performance parameters with no additional cost to the Employer.
- 27.20.8. The Contractor shall be responsible for achieving PR and CUF.

27.21. GUARANTEE FOR SOLAR POWER PLANT

- 27.21.1. The components of Solar Power Plant are grouped into two for purpose of Guarantee as under:-

- (a) Solar Module including framework of module.(For 25 years)
- (b) Module mounting structure, Power Condition Unit, SCADA system, CCTV system, Weather Monitoring System.(For 05 Years)

- 27.21.2. A security deposit of value **as detailed below in table** of the rate quoted for Solar Power Plant under the above groups shall be retained from payment due to the contractor for the entire guarantee period. **The contractor shall also enter into an MOU with the and also furnish a written guarantee from the agency executing the Design, Supply, Installation, Testing and Commissioning of Solar Power Plant which shall however not relinquish the contractor's responsibility.** The security deposit shall be released after successful expiry of the guarantee period. The amount so with held shall not carry any interest. The contractor may however, furnish a fixed deposit receipt in lieu, from a Scheduled Bank pledged in favour of Garrison Engineer for the period of guarantee. The FD receipt shall be furnished in two parts to facilitate release after successful expiry of the guarantee period.

Sl No	Amount of Solar Power Plant Item Sl No. 11.22 under Schedule "A" Part-XI at contract rate	Amount to be retained from contractors dues rounded to nearest thousand rupees
(i)	Up to ₹ 50.00 lakh	2% of amount subject to minimum of ₹ 5000/- and enhanced by 25%
(ii)	Over ₹ 50.00 lakh and up to ₹ 100.00 lakh	₹ 1.00 lakh + 1.50% of amount exceeding ₹ 50.00 lakh and enhanced by 25%
(iii)	Over ₹ 100.00 lakh and up to ₹ 500 lakh	₹ 1.75 lakh + 1% of amount exceeding ₹ 100.00 lakh and enhanced by 25%

- 27.21.3. The liability of the contractor under this contract shall not be extended beyond the period of as detailed above from the certified date of completion unless the GE has previously given notice to the contractor. Should the GE at any time during the currency of contract or before expiry of guarantee period, find defects in the quality of materials or performance of Solar Power Plant, the contractor shall undertake forthwith to carryout rectification of the same at his own expense on receiving a demand in writing from the GE, notwithstanding the same may have been inadvertently passed, certified and paid for. In the event of his failing to do so within a period to be specified in the aforesaid demand by GE, the GE may undertake such treatment at the risk and expense in all respects of the contractor. The liability of the contractor under this condition shall not extend beyond the period as given here-in-above from the certified date of completion, unless the GE had previously given notice to the contractor to rectify the defects.

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The defects liability period mentioned under condition 46 of IAFW-2251 General Conditions of Contracts shall be amended accordingly for the purpose of this condition.

27.21.4. The Security Deposit referred to Condition 22 of General Conditions of Contract (IAFW-2249) is independent of the guarantee amount referred hereinbefore. Conditions 40 and 68 of General Conditions of Contracts (IAFW-2249) is deemed to be amended to the extent mentioned above.

27.22. **NET METERING SYSTEM**

27.22.1. Necessary Liaison / discussion with supply agency of concerned State / Union Territory where the work is being executed for net metering system. Grid connection and synchronization of generated power supply shall be responsibility of the contractor without any extra cost.

27.23. **TRAINING AND CERTIFICATE COURSE**

27.23.1. The contractor should arrange training program/certificate course for minimum 05 person regarding operation and maintenance of SPV project by IIT Guwahati / NISE or any other Institute approved from MNRE.

27.24. **COMPLETION DRAWINGS :**

27.24.1. The contractor shall submit **six copies completion drawing with Auto CAD-2008 with soft copy** of the following drawings duly signed by him and the Engineer-in-Charge before completion.

27.24.2. Overall layout plan for Solar Power Plant showing entire details of the installation complete with actual layout of various element / equipment, various pipe lines (indicating clearly different sizes in different colours), various valves and all other information necessary for record, maintenance and operation, all as directed without any extra cost.

28. **MANNING AND OPERATION OF SOLAR POWER PLANT**

28.1. The scope of work (Phase-II) includes Comprehensive Maintenance and Operation of 1 MW Solar PV Plant including commissioned by the contractor **upto 55 (Fifty Five) months (approximate)** from the date of commencement of work of Phase-II. Work catered in phase-II shall commence from next day to certified date of completion of work catered in Phase-I. It will be the responsibility of the contractor to ensure safe, smooth and un-interrupted functioning of the system in sound condition during the period mentioned above.

28.2. The operation and maintenance of Solar Power plant shall be carried out such that the Solar system life is preserved and sustained as long as possible to original conditions of the systems and to make the system a reliable operation the following Solar components are to be maintained properly as follows:-

28.2.1. **Solar Panel Maintenance:** The solar array (a number of solar panels connected together) is often thought to be maintenance free. However, occasional maintenance i.e once in fortnight and inspection of the solar array must be performed to ensure the optimal use of the solar panels by the following activities:-

(a) Keeping the surface (glass) area of the module clean from any excess dirt. To remove a layer of dust and dirt from the modules, the panel shall be simply washed with water. If the module has thick dirt or grime and bird droppings, which are harder to remove, it shall be washed with cold water and the panel surface rubbed with a sponge. Use of metal brush and Detergents to clean solar panel surface is strictly prohibited.

(b) A visual inspection of the modules can then be done to check for defects in the modules such as cracks, chips, de-lamination, fogged glazing, water leaks and discoloration. If any obvious defects are found, their location shall be noted in the system logbook, so they can be monitored in the future in case further deterioration affects the modules output.

(c) The condition of the array mounting frame should also be noted such as array mounting bolts (e.g. bolt rusting) and checked to ensure that the frame and modules are firmly secured.

(d) The junction boxes should also be checked to ensure that the wires are not chewed by rodents or insects.

28.2.2. **Inverter:-** Since Inverter is the heart of the Solar power system, it can be maintained by minimizing dust accumulation by the following activities:-

(a) A dry cloth should be used to wipe away any accumulated dirt / dust once in a month.

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- (b) A visual inspection should be done of every visit to ensure that all the indicators such as LED lights are working and that the wires leading to and from this device are not loose and tightening of all loose cable terminals must be done once in a month.

28.2.3. Wiring and Connections : The following activities shall be followed to ensure good maintenance:-

- (a) Wiring of installations should be checked for any cracks, breaks or deterioration in the insulation / conduits.
- (b) The panels shall be inspected to ensure that they do not house rodents and insects.
- (c) Also connections shall be inspected for any corrosion and / or burning.
- (d) Switches should not spark when turned on or off.
- (e) The following stretches of conduit and wiring shall be checked for any signs of damage- Solar panels to the array junction box - Array Junction Box to the Inverter-Inverter to the Adopter box and If damage is found, the same shall be repaired / replaced.
- (f) All ground wires should be checked to ensure they are not broken.

28.2.4. SCADA SYSTEM : The following aspects shall be tracked :-

- (a) Monitoring system parameters like Amps, Voltages, Frequency etc., of input and output components relevant to the SPV system through the PC and Data logger
- (b) Monitoring the weather system complete from the Solar module till the bidirectional meter.
- (c) If any problem arises in the parameters, the problem in the system shall rectified immediately.

28.3. Maintaining the monthly generation of the Solar PV system and Reporting to the MES personnel.

28.4. Ensure that the generated supply is fed to the **State Electricity Board** Grid complete.

28.5. Inspection of the structural members used for mounting solar modules for wear and tear once in a month and touch up of exposed steel surfaces if required with zinc oxide paint to prevent rusting / corrosion.

28.6. Frequent tightening of structural member on every visit.

28.7. The operation and maintenance crew engaged shall be under expert supervision of one degree / Diploma Engineer (Supervision shall be done once in fortnight or as required in shorter intervals) and their attendance and work shall be monitored by the Engineer-in-charge.

28.8. **Maintaining the visit and event logbook**. The Log book should also make note of any event that has occurred due to which the SPV system has underperformed or had stopped. The event book should also note the corrective action taken, the mention of the equipment or part replaced and the same shall be authorized by Engineer-in-Charge.

28.9. **Recovery / Penalty**: If the minimum specified manpower is not deployed or found absent the following recovery shall be effected.

- (a) If any tradesmen found absent during the specified time the penalty at the rate of double the minimum wages as fixed by the labour commissioner (as applicable) shall be recovered from the contractor.
- (b) No claim on this account shall be admissible and in case of any dispute the decision of GE shall be final.

28.10. In addition the following requirements shall also be followed while carrying operation and comprehensive maintenance.

28.10.1. The Contractor shall submit a comprehensive maintenance schedule for operation and maintenance of the photovoltaic power plant and shall be liable for abiding by the schedule. All construction, operation and maintenance procedures shall be carried out through appropriate relevant standards, regulations and labour laws.

28.10.2. Keeping the Solar Power Plant neat & clean at all time and the work assigned by JE E/M / AGE E/M from time to time. The fenced area or a distance of 6 metres shall be kept clear of all bushes and grass. The lighting in the rooms shall be fully functional and the same shall be maintained at no extra cost.

28.10.3. Safeguard the Power Plant which are being operated and ensure no entry of unauthorized persons into the installation.

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28.11.1. All the stationeries required during currency of the contract like registers, log books etc are covered under the scope of work. The rate quoted shall be deemed to include the cost of stationeries.

28.12. GENERAL REQUIREMENTS TO BE ADHERED TO BY THE TENDERER

28.12.1. The contractor will be responsible for safety of his personnel including transport and government property in the installation.

28.12.2. The contractor shall provide the necessary attendance record of both employee of Solar Power before entering & before leaving of every shift duly signature of AGE & contractor before any payment and also record proper log book attendance register for reflecting and measurements parameters of the plant up to the entire satisfaction of Engineer-in-Charge/GE. The cost of biometric machine shall be borne by contractor.

28.12.3. The operating staff shall have thorough knowledge of safety precautions during emergency cases and also shall be well conversant with water supply/electricity acts/rules as applicable.

28.12.4. Necessary notice boards containing instructions for precautions to be followed in case of emergency/risks/accidents shall be displayed at locations as required under law and as directed by Engineer-in-Charge.

28.12.5. First aid box/first aid chart required as per statute shall be maintained at installations.

28.12.6. The operating personnel shall be provided with protective clothing and shall wear them while on duty. In case of any accident / injury fatal or partial disability the contractor shall be solely responsible for settling all claims / compensation. Department will have the right to recover any sum indicated / claimed by labour commissioner / court directive. GE however will ensure that the contractor has provided all adequate and required means to the workmen. The contractor may get his personnel insured at his own discretion.

28.12.7. No compensation will be payable to contractor consequent on accident/loss of life of his employees caused due to his negligence.

28.12.8. The installation shall be manually operated on all days irrespective of holidays and Sundays. Contractor shall be required to employ reserve operators if performance of contract consequent on labour regulation statute on working of personnel on national holidays etc and also on any day when operator(s) is/are absent from duty. Nothing extra will be payable on the account.

28.12.9. The contractor shall maintain required registers as directed by Engineer-in-Charge which shall be signed by contractor's representative/Engineer-in-charge.

28.12.10. The tools required for the manning and operation shall be brought by the contractor.

28.12.11. Contractor will test and check the Solar Power Plant covered in the contract immediately after taking over the site and sign the documents for taking over after commissioning and teasting.

28.12.12. Tenderers are requested to visit the site of works to ascertain the working conditions and location of the Solar Power Plant and no claim or extra payment will be allowed due to any misunderstanding. Once quoted tender is received, it is deemed to have been quoted considering the conditions prevalent at site even though tenderers might not have visited the site. The tenderers are also deemed to have gone through the technical specifications of the plants for which manning has to be carried out before quoting the tender.

28.12.13. No recovery for water, electric supply consumed will be made in this contract.

28.12.14. GE's decision as to what constitutes major/minor repairs shall be final and binding. Major repairs to Solar Power Plant are outside the scope of this contract. BOQ rates deemed to include for minor repairs, repairs and rectification to installation to be necessitated due to negligence or wrong operation of the installation on the part of the operator. The decision of the GE whether the repair/rectification is necessitated due to negligence on the part of operator or not shall be final and binding.

28.12.15. The contractor shall ensure that the tradesmen employed by him is not employed in the nature of work which is perennial in nature and such tradesmen are not employed continually. Any claim arising out of such continuous work shall not be entertained by the department and shall be the sole responsibility of contractor.

28.12.16. On completion of each month, a completion certificate is to be issued by the Engineer-in-Charge for purpose of interim payment to contractor supported by attendance register duly

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signed by contractor and Engineer-in-Charge. The register shall be submitted to the Accepting Officer on the completion of each month.

- 28.12.17. Any material / repairs required for efficient operation shall be brought to the notice of JE / Engineer-in-Charge for immediate supply of spares / repairs through other agencies.
- 28.12.18. In case of failure Solar Power Plant due to negligence/absence of operation staff, the contractor shall be liable to pay compensation at double the minimum fair wages prevailing at that time as fixed by the Labour Commissioner. Decision of GE as to what extent constitutes contractor's negligence shall be final and binding.
- 28.12.19. In case of operating staff / tradesmen is absent for operation of the above installations and no substitute is provided, contractor shall be liable to pay compensation equivalent to the amount given below. Rate of recovery to be effected for 8 hours absence per individual at double the minimum fair wages prevailing at that time as fixed by the Labour Commissioner.
- 28.12.20. These penalties are in addition to what is given in SI No.26.11.21 here-in-after which shall be recovered from the contractor through running accounts receipts, final bill or any other amount due to him from the department.
- 28.12.21. No compensation will be payable to contractor consequent on accident/loss of life of his employees caused due to his negligence.
- 28.12.22. In the event of any loss or damage caused to any item of the Solar Power Plant, any other structures in respect of the above work during the currency of the contract the same shall be made good by the contractor at no extra cost to the government. If the contractor fails to do so, the government reserves the right to make recoveries from the contractor for the loss or damage at double the prevailing market rates as decided by the Garrison Engineer whose decision shall be final and binding.
- 28.12.23. The Solar Power Plant alongwith details of inventories will be handed over to the contractor by Engineer-in-Charge before commencement of work and taken over by joint inspection after completion of work.
- 28.12.24. The contractor shall comply with all the provisions laid down in Contract Labour Act such as payment of minimum fair wages.
- 28.12.25. The operation personnel shall limit their movement to the particular installation and shall not trespass to the surrounding areas.
- 28.12.26. Shift duty roster will be prepared in advance by the contractor of the Solar Power Plant and will be produced for the approval of Engineer-in-Charge before it is implemented. Three copies of the approved duty roster will be submitted in the office of Engineer-in-Charge and copy will be displayed at the installation. Any change in duties thereafter will only permissible in consultation with the Engineer-in-Charge.
- 28.12.27. Routine maintenance Schedule shall be carried out by the contractor and the same shall be recorded in the proper proforma and duly countersigned by the representative of the Department i.e Engineer-in-Charge/ JE E/M in charge.
- 28.12.28. Daily log sheet will be for all the modules of the Solar Power Plant as described under BOQ as advised by JE E/M / Engineer-in-Charge.

28.13. **QUALIFICATION AND EXPERIENCE**

- 28.13.1. The contractor shall employ tradesmen as per qualification and experience as mentioned hereunder:-

SI No	Workman	Minimum Educational Qualification & Experience
(i)	Qualified Tradesman	Govt ITI qualified in the trade with minimum 4 years experience.
(ii)	Un-skilled labourer	

- 28.13.2. The contractor is responsible for submitting original certificates for the verification of qualifications, experience of persons who are proposed to be employed by him to the Engineer-in-Charge. The decision of the Accepting Officer regarding the suitability of an individual to a particular trade shall be final and binding.
- 28.13.3. The supervisor engaged by him shall have a minimum experience of one year in similar works.

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28.13.4. All the personnel engaged by the contractor shall have undergone training in operation and maintenance of Solar Power Plant in the course sponsored by MNRE.

28.13.5. Atleast two numbers of Departmental personnel shall be given hands on training by the contractor for a period of one month in in operation and maintenance of Solar Power Plant.

28.14. ISSUE OF PASS AND SECURITY

28.14.1. The contractor shall employ tradesmen as per qualification and experience as mentioned hereunder:-

28.14.2. Immediately after acceptance of tender, the contractor shall submit list to the Engineer-in-Charge giving address of tradesmen who are proposed to be employed. The list should give number of personnel required as per BOQ plus not less than 51% more number of personnel so that substitute can be deputed by the contractor in case of absence / not reporting of any tradesmen so selected and after verification of antecedents. Engineer-in-Charge will approve the personnel by name for appointment by contractor and necessary passes shall also be issued to the main contractor for handing over the passes to his employees. After the works are completed the passes shall be returned back to the Engineer-in-Charge.

28.14.3. The installations under this contract are located in defense establishment. The entry to the installation is restricted. All the personnel employed by the contractor shall be in possession of security pass and kept in custody while in duty during the entire contract period and the pass shall be issued by the department. For this purpose the contractor shall provide 2 passport size photographs of each individual. No extra payment shall be allowed on account of cost of security pass.

28.14.4. Before commencement of work and taking over any installation for operation, the contractor shall produce such evidence of qualification / experience of his workmen and supervisor to the Engineer-in-Charge for his approval in original and two photocopies. During currency of the contract, the department reserves the right to ask for such certificates for verification.

28.14.5. In case change of operator is required, the same process of approval as brought out here-in-before shall be required.

28.15. DISCIPLINE OF TRADESMEN WHILE WORKING IN INSTALLATIONS

28.15.1. The persons working installations are expected to exhibit a high sense of discipline, punctuality and neat turnover. They should not leave the installation unattended without prior permission of Engineer-in-Charge. The persons employed by the contractor shall be amenable to the discipline and other security and standing order issued by the defence authorities for installation from time to time. The contractor is also advised to go through the standing orders for E/M installations displayed for charter of duties and discipline expected from persons employed by the tenderer. The persons employed should not consume alcohol / liquor, drugs or smoke while on duty. They shall work in cohesion with other defense employees and shall be capable of working as a team. They shall take orders / instructions from Engineer-in-Charge / JE in charge of the installation and shall implement the same with great care and interest. Accepting officer has the right for removal of those persons whose performance and integrity is not satisfactory. The contractor shall replace such persons at a weeks notice. The decision of the Accepting Officer in this regard shall be final and binding and the contractor shall have no claim of compensation on this account.

29. FIRE FIGHTING CAUTION

29.1. The persons employed by the contractor shall have the basic knowledge of using fire fighting equipment such as fire extinguisher etc., maintained in the installation. They shall ring the fire gang and telephone the fire fighting units nearby and Engineer-in-Charge and GE for further help / assistance. They will not risk their lives containing the fire / damage to the installations. No compensation shall be payable to the persons employed the contractor for any injuries caused in such acts.

30. AREA DRAINAGE**30.1. GENERAL**

30.1.1. Refer relevant Clauses of of MES Schedule Part I and all specified in Particular Specifications here in before for various Trades.

30.1.2. Drains shall be constructed all as specified in Schedule 'A' and shown on Drawing. All Materials/ relevant materials shall be as specified here-in-before.

PARTICULAR SPECIFICATIONS (CONTD.....)**30.2. EARTHWORK**

30.2.1. GENERAL – Refer to relevant Particular Specifications Clause No. (as applicable) as specified for Building Works here-in-before.

30.3. CEMENT CONCRETE**30.3.1. MATERIALS**

30.3.2. CEMENT – Cement shall be all as specified in Cement Concrete Work for Building Works here-in-before.

30.3.3. FINE AGGREGATE (SAND) – Fine Aggregate (Sand) shall be all as specified in Cement Concrete Work for Building Works here-in-before.

30.3.4. COARSE AGGREGATE (STONE) – Coarse Aggregate (Stone) shall be all as specified in Cement Concrete Work for Building Works here-in-before.

30.3.5. WATER – Water shall be all as specified in Cement Concrete Work for Building Works here-in-before.

30.4. WORKMANSHIP

30.4.1. GENERAL – Cement Concrete Work shall be carried out all as specified in Cement Concrete Work for Building Works here-in-before.

30.5. PCC DRAIN

30.5.1. PCC Drain shall be constructed all as directed by the Engineer-in-Charge. The Inside Surface of Drain shall be finished Even and Smooth with using Extra Cement which shall be measured separately under relevant Item(s) of Schedule 'A'.

31. SEWAGE DISPOSAL**31.1. GENERAL**

31.1.1. Refer relevant Clauses of of MES Schedule Part I and all specified in Particular Specifications here in before for various Trades.

31.2. MATERIALS

31.2.1. CEMENT – Cement shall be all as specified in Cement Concrete Work for Building Works here-in-before.

31.2.2. FINE AGGREGATE (SAND) – Fine Aggregate (Sand) shall be all as specified in Cement Concrete Work for Building Works here-in-before.

31.2.3. COARSE AGGREGATE (STONE) – Coarse Aggregate (Stone) shall be all as specified in Cement Concrete Work for Building Works here-in-before.

31.2.4. BRICKS – PCC block Work for Building Works here-in-before.

31.2.5. SAND – Sand for masonry work and Mortar shall be all as specified in Brick Work for Building Works here-in-before.

31.2.6. WATER – Water shall be all as specified in Cement Concrete Work for Building Works here-in-before.

31.2.7. REINFORCEMENT – Reinforcement shall be all as specified in Steel & Iron Works for Building Works here-in-before.

31.2.8. SEWERAGE PIPE :-

31.2.8.1. SGSW PIPES – Unless otherwise mentioned in Schedule 'A', Salt Glazed Stone Ware Pipes and Fittings shall be of Grade 'A' conforming to IS 651 and shall be of Approved make. Jointing shall be done in Cement Mortar 1:1 as specified in Clause No. 18.70 and 18.70.1 of MES Schedule Part I.

31.2.8.2. HDPE PIPE FOR SEWERAGE SYSTEM :- High density polyethylene (HDPE) for sewerage shall be conform to IS 16098-2013. The contractor shall submit the **manufacturer's test Certificate** in original along with the test sheet giving the results of each physical test as applicable and the chemical composition text and authenticated copy thereof, fully signed by the manufacturer with each consignment.

31.2.9. SPUN YARN :- Refer to Clause No. 18.10 of MES Schedule Part-I.

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31.2.10. **CONCRETE PIPES** :- Refer Clause No. 18.29 MES Schedule Part-I. Unless otherwise mentioned in Schedule 'A', Reinforced Concrete Pipes for Drains and Culverts shall be non-pressure type Class NP2 and shall conform to IS- 458-2003. The Ends of Pipes shall be suitable for Butt End Joints. The Butt Ends shall be prepared for for Collar Joint with Grooves. The Pipe Joints shall be capable of withstanding the same pressure as the Pipe. Pipes shall be procured from manufacturers as approved by GE.

31.2.11. **DOUBLE WALL CORRUGATED HDPE PIPE FOR SEWERAGE SYSTEM**

31.2.11.1. Double Wall Corrugated HDPE pipes for sewerage, shall be stiffness classes-8 (SN-8), ISI marked with smooth internal and corrugated (profiled) external surface with anti rodent property and shall be conforming to IS-16098 (Part-2) : 2013.

31.2.11.2. Single length of pipe shall not be less than 6 meter.

31.2.11.3. The contractor shall submit the **manufacturer's test Certificate** in original along with the test sheet giving the results of each physical test as applicable and the chemical composition text and authenticated copy thereof, fully signed by the manufacturer with each consignment.

31.2.11.4. Minimum trench width for pipe shall be as per IS and complete all as per manufacturer's instruction.

31.2.11.5. If excavated soil is a loose soil i.e. black cotton, marshy and loamy, it shall not be used for backfilling. In that case it shall be replaced by suitable recommended soil i.e. sand / stone dust / granular material.

31.2.11.6. Final backfilling materials shall be used as per recommendation of manufacturer.

31.3. **WORKMANSHIP**

31.3.1. **GENERAL** – Refer relevant Clauses of MES Schedule Part I and all specified in Particular Specifications here in before for various Trades.

31.3.2. **EARTH WORK** – Refer relevant Clauses of MES Schedule Part-I as applicable. Earthwork and Excavation involved in this Contract shall be in Soft / Loose Soil to the depth and gradient as required at Site and ordered by Engineer-in-Charge. Excavation for sewer trenches shall be in straight lines and to the correct depths and gradients.

31.3.3. **CONCRETE BEDDING** – Refer to Clause No. 18.68.2 and 18.68.3 of MES Schedule Part-I and all as directed by Engineer-in-Charge.

31.3.4. **CONCRETE HAUNCHING** – Refer to Clause No. 18.68.4 of MES Schedule Part-I and all as directed by Engineer-in-Charge.

31.3.5. **CONCRETE SURROUND OR ENCASING** – Refer to Clause No. 18.68.5 of MES Schedule Part-I and all as directed by Engineer-in-Charge.

31.3.6. **TESTING** – After laying of Salt Glazed Stoneware Pipes Testing shall be done all as specified in Clause No.18.79.3 of MES Schedule Part-I.

31.4. **MANHOLES**

31.4.1. Manholes shall be built all as specified in Clause No. 18.78 of MES Schedule Part I, shown on Drawings and specified in Schedule 'A'.

31.4.2. Manholes and Drain Pipes shall be tested for Water Test all as specified in Clause No. 18.79.3 of MES Schedule Part I.

31.4.3. CI Rungs/Steps shall be of Cast Iron as specified here-in-before. The Steps/Rungs shall be treated with Two Coats of Tar. The Cost of which is deemed to be included in the Unit Rate/Amount.

31.5. **LLDPE SEPTIC TANK**

31.5.1. LLDPE Septic Tank shall be provided all as per manufacturers instruction and specified here in below :-

- (a) Excavation and Earth Work : Excavation of pit approximately 600 mm larger than the diameter of the tank in Soft/Loose Soil. Surplus spoil shall be removed to a distance not exc. 50 Metre and deposited as directed by Engineer-in- Charge.

PARTICULAR SPECIFICATIONS (CONTD.....)

- (b) Lean Concrete in Foundation Bed : 150 mm thick PCC 1:4:8, type D-2 (using 40 mm graded stone aggregate) finished even and fair.
- (c) Backfilling : Excavated soil if it is silt, sand or soft murum but incase of black cotton, loomy or marshy soil, only granular material i.e. sand / stone dust / gravels (max size 10 mm) should be used as backfill material.
- (d) Slope of septic tank : Fall between drain head and inlet of the septic tank shall be maintained as 1:40 to 1:60 or as manufacturers instruction.
- (e) Inlet & Outlet Pipes including Fittings : HDPE pipes of appropriate size shall be provided as per manufacturer instruction. The cost of inlet and out let HDPE Pipe of length 4.0 Metre each (upto and including beyond external face of the wall) shall be deemed to be included in the quoted rate. All Joints shall be made as per manufacturer's instructions.
- (f) Vent Pipe and Cowl : All as per manufacturer's instructions.
- (h) Other Details : All as per manufacturer's instruction to be follow.

31.5.2. The contractor shall submit the original manufacture's test certificate in connection with mechanical & physical properties of panel, hydrostatic test, deflection, suitable for waste sludge and also submit manufacturer's guarantee certificate of product conformation of the standard.

31.6. SOAK WELL

31.6.1. Soak Well shall be provided all as per details shown on Drawings No. TD/SZ/502, Sheet No. 1/1 and specified here in below : -

- (a) Excavation and Earth Work : In Soft/Loose Soil. Surplus spoil shall be removed to a distance not exc. 50 Metre and deposited as directed by Engineer-in- Charge.
- (b) Lean Concrete in Foundation : PCC 1:4:8 (using 40 mm graded stone aggregate)
- (c) All RCC Work : M-25 (Design Mix) using 20 mm graded coarse aggregate
- (d) Masonry Work : Brick masonry in Cement Mortar 1:6
- (e) Plastering (External) : 15 mm thick in Cement Mortar 1:4 upto 15 cm below ground level
- (f) Inlet Pipe : 150 mm dia Cast Iron (Sand Cast) Inlet Pipe including Tee. All Joints shall be with Lead Joint.
- (g) Vent Pipe : 110 mm dia PVC Vent Pipe with PVC Slotted Cowl and as specified in Clause No. 18.27 of MES Schedule Part-I.
- (h) Brick Bat Filling : Loose filling with 150mm to 80mm graded broken stone aggregate for filling the bottom layer and 80 mm to 40 mm graded broken stone aggregate for the top layer all as specified in Clause No.3.28 of MES Schedule Part-I.
- (j) Other Details : All as shown on Drawings to be follow

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32. DEMOLITION/DISMANTLING:

32.1. PRECAUTIONARY MEASURE: Precautionary measure prior to demolition / dismantling as described in SSR Part-I shall be adopted and work shall be executed as per Schedule 'A'.

32.2. REMOVAL / SITE CLEARANCE: Old demolished materials considered under Schedule of credit shall be the property of the contractor and will remove by the contractor at his custody. Debris and other materials if any shall be disposed off and sites to be cleared to the entire satisfaction of the GE.

**SIGNATURE OF CONTRACTOR
DATED:**

**Jt/Dy Dir (Contracts)
FOR ACCEPTING OFFICER**

PARTICULAR SPECIFICATION(CONT.....)**LIST OF DRAWINGS**

Ser No	Description	Drawings no	Sheet no	Date	
				Original	Last revision
1	2	3	4	5	6
<u>MAIN DRAWINGS</u>					
1.	PART SITE PLAN (B/R AND E/M SERVICES)	JOR/2020/LP-81	1/1	03.06.20	-
<u>SUB STATION</u>					
2.	PLAN, ELEVATIONS, SECTIONS, ROOF PLAN, TOILET DETAIL, E/M PLAN AND SCHEDULE OF FINISHES	JOR/2020/WD-262	1/2	03.06.20	-
3.	FOUNDATION, COLUMN, PLINTH BEAM, ROOF BEAM, ROOF SLAB LAYOUT PLAN AND MISC DETAILS	JOR/2020/WD-262	2/2	03.06.20	-
<u>ALL BUILDING</u>					
4.	GENERAL NOTES & REFERENCES	CESZ/STD/26	1R/6	08.09.15	-
5.	TYPICAL DETAIL OF BEAM COLUMN JUNCTION AND OTHER DETAILS.	CESZ/STD/26	2R/6	08.09.15	-
6.	TYPICAL DETAIL FOOTINGS, LINTEL BEAM, RIDGE BEAM/SLAB.	CESZ/STD/26	3/6	09.10.14	-
7.	TYPICAL DETAIL OF RCC ROOF PROJECTION AND RCC CHHAJJA.	CESZ/STD/26	4/6	09.10.14	-
8.	TYPICAL DETAILS/ SCHEDULE OF STEEL HOLLOW SECTION TRUSS	CESZ/STD/26	5R/6	08.09.15	-
9.	TYPICAL DETAILSE OF STEEL HOLLOW SECTION TRUSS	CESZ/STD/26	6/6	09.10.14	-
<u>TD DRAWINGS</u>					
10.	GENERAL NOTES AND ARCHITECTURAL NORMS FOR VARIOUS FITTING/ FIXTURE	CESZ/2015/TD-001	1/2	05.01.15	-
11.	GENERAL NOTES AND ARCHITECTURAL NORMS FOR VARIOUS FITTING/ FIXTURE	CESZ/2015/TD-001	2/2	05.01.15	-
12.	DETAILS OF WOODEN DOORS WITH PRESSED STEEL FRAME.	CESZ/2015/TD-002	1/2	05.01.15	16.05.15
13.	DETAILS OF WOODEN DOORS WITH PRESSED STEEL FRAME.	CESZ/2015/TD-002	2/2	05.01.15	16.05.15
14.	DETAILS OF ALUMINIUM DOORS	CESZ/2015/TD-005	1/1	05.01.15	-
15.	DETAILS OF MOULDED PVC DOORS	CESZ/2015/TD-008	1/3	05.01.15	-
16.	DETAILS OF MOULDED PVC DOORS	CESZ/2015/TD-008	2/3	05.01.15	-
17.	DETAILS OF MOULDED PVC DOORS	CESZ/2015/TD-008	3/3	05.01.15	-
18.	MISC TYPICAL DETAILS-1	CESZ/2015/TD-010	1/3	05.01.15	27.04.15
19.	MISC TYPICAL DETAILS-1	CESZ/2015/TD-010	2/3	05.01.15	-
20.	MISC TYPICAL DETAILS-1	CESZ/2015/TD-010	3/3	05.01.15	27.04.15
21.	TYPICAL DETAILS OF PREVENTION & CURE & LEAKAGE I SEEPAGE & DAMPNES	CESZ/2015/TD-011	1/2	05.01.15	-
22.	TYPICAL DETAILS OF PREVENTION & CURE & LEAKAGE I SEEPAGE & DAMPNES	CESZ/2015/TD-011	2/2	05.01.15	5.10.15

PARTICULAR SPECIFICATION(CONT....)**LIST OF DRAWINGS(CONT...)**

1	2	3	4	5	6
23.	TYPICAL DETAIL OF CABLE DUCT (INSIDE BUILDING)	CESZ/2015/TD-018	1/1	04.02.15	-
24.	Typ details of counter type wash hand basin etc.	CESZ/TD/2016/33	1/1	22.11.16	-
25.	TYPICAL DETAILS OF PRECOATED STEEL WINDOWS AND VENTS (BOX SECTION) WITH / WITHOUT FLY PROOF AND WITH GRILL / GUARD BARS (ELEVATIONS)	CESZ/2018/TD/35	1/2	30.07.18	-
26.	TYPICAL DETAILS OF PRECOATED STEEL WINDOWS AND VENTS (BOX SECTION) WITH / WITHOUT FLY PROOF AND WITH GRILL / GUARD BARS (SECTIONA AND DETAILS)	CESZ/2018/TD/35	2/2	30.07.18	-
27.	STANDARD ROAD CROSS SECTION	MISC/CPT/01/2011	1/1	08.09.11	-
28.	Plumbing (single stack system)	CESZ/TD/31	1/2	14.10.97	-
29.	Plumbing (single stack system)	CESZ/TD/31	2/2	14.10.97	-
30.	Detail of Indian type WC, single stack system	CESZ/TD/38	1/2	14.10.97	-
31.	Detail of Indian type WC, single stack system	CESZ/TD/38	2/2	14.10.97	-
32.	Detail of water proofing treatment to bath and WC	CESZ/TD/39	1/1	14.10.97	-
33.	Typical detail of gully trap and man hole	CESZ/TD/40	1/1	14.10.97	-
34.	Typical detail of fixing HDPE water storage tank over RCC roof slab	CESZ/TD/41	1/1	14.10.97	-
35.	Details of fixing exhaust fan	CESZ/TD/42	1/1	14.10.97	-
36.	FIXING DETAILS OF FAN HOOK	CESZ/TD/97	1/1	14.07.00	-
37.	Detail of HT/LT single, double pole structure (Tubular)	TD/EM/04	1/3	8.12.99	-
38.	Detail of HT/LT single, double pole structure (Tubular)	TD/EM/04	2/3	8.12.99	-
39.	Detail of HT/LT single, double pole structure (Tubular)	TD/EM/04	3/3	8.12.99	-
40.	Tubular steel pole for street light	TD/EM/05	1/1	20.02.89	-
41.	TYPICAL DETAILS OF VALVE PIT	TD/EM/06	1/2	08.12.99	-
42.	TYPICAL DETAILS OF VALVE PIT	TD/EM/06	2/2	08.12.99	-
43.	E/M Notes & Legends	TD/EM/07	1/1	24.08.00	28.01.05
44.	STANDARD STREET LIGHT FITTING WITH CAP / WITH OUT CAP TYPE	TD/EM/09	1/1	25.09.02	-
45.	Method of earthling	TD/EM/11	1/1	22.01.04	-
46.	LT Panel stage (outdoor)	TD/EM/14	1/1	28.12.04	-
47.	Cable route indicator	TD/EM/17	1/1	30.07.05	-
48.	General notes on RCC works	CESZ/STD/1	1/4	15.05.98	10.04.01
49.	General notes on RCC works	CESZ/STD/1	2/4	15.05.98	-
50.	General notes on RCC works	CESZ/STD/1	3/4	15.05.98	-
51.	General notes on RCC works	CESZ/STD/1	4/4	15.05.98	07.10.04
52.	Typical masonry details	CESZ/STD/3	1/5	12.05.98	-
53.	Typical masonry details	CESZ/STD/3	2/5	12.05.98	-
54.	Typical masonry details	CESZ/STD/3	3/5	12.05.98	-

PARTICULAR SPECIFICATION(CONT.....)LIST OF DRAWINGS

1	2	3	4	5	6
55.	Typical masonry details	CESZ/STD/3	4/5	12.05.98	-
56.	Typical masonry details	CESZ/STD/3	5/5	12.05.98	-
57.	Typical structural details	CESZ/STD/4	1/10	12.05.98	-
58.	Typical structural details	CESZ/STD/4	2/10	12.05.98	-
59.	Typical structural details	CESZ/STD/4	3/10	12.05.98	-
60.	Typical structural details	CESZ/STD/4	4/10	12.05.98	-
61.	Typical structural details	CESZ/STD/4	5/10	12.05.98	18.02.05
62.	Typical structural details	CESZ/STD/4	6/10	12.05.98	23.03.05
63.	Typical structural details	CESZ/STD/4	7/10	12.05.98	-
64.	Typical structural details	CESZ/STD/4	8/10	12.05.98	-
65.	Typical structural details	CESZ/STD/4	9/10	12.05.98	-
66.	Typical structural details	CESZ/STD/4	10/10	12.05.98	-
67.	TYPICAL DETAILS OF REINFORCEMENT	CESZ/STD/17	1/1	04.02.02	30.12.03
68.	SOAK WELL FOR 25 TO 250 USERS BK/PCC BLOCK CONSTRUCTION	TD/SZ/502	1/1	07.02.02	09.03.15
69.	Numbering to the building	TD/N/76	1/1	31.03.73	21.05.73

NOTES :-

- Under column 3 of List of Drawings (TD drawings covered in booklet), reference to drawings No. "CESZ/TD" and "CESZ/STD" have been made and may not be upload alongwith tender documents. Contractor are deemed to be in possession of all said standard drawings amended upto date as issued by "Chief Engineer Shillong Zone", Shillong / Engineer – in -Chief, New Delhi. These drawings may however be referred to in this HQ/CWE/GE office during working hours. No claim whatsoever shall be admissible to the contractors on account of any misunderstanding if any on this account.
- In case of any discrepancy in Drawings no, Sheet No, Original date and Revision Date in between the “LIST OF DRAWINGS” as stated above and mentioned in architectural Drawings, the details as shown in “LIST OF DRAWINGS” above shall take precedence over the Drawings. In this regards, decision of Accepting Officer shall be final and binding.
- In case of varying provisions between main drawing and typical drawing (TD), the main drawing(s) shall take precedence over TD drawings.
- In case of varying provisions between 2015 & 2016 series (CESZ//2015/TD, CESZ//2016/TD or CESZ/STD) TD drawing and Older version typical drawing, the provision catered in 2015/2016 series (CESZ//2015/TD, CESZ//2016/TD, CESZ//2017/TD, CESZ//2018/TD or CESZ/STD) TD drawing (s) shall take precedence.

SIGNATURE OF CONTRACTOR

Dated : _____

**JT/DY/ASST DIR (CONTRACTS)
FOR ACCEPTING OFFICER**

FORMAT FOR QUALITY CONTROL PLAN

(To be submitted by contractor within 30 days of commencement of work)

PART I

- 1. Contract Agreement Reference No :
- 2. CPM network prepared and approved by GE :
- 3. Resource scheduling done based on CPM :
- 4. Site Laboratory (With Equipments) Set Up As Per Contract Agreement (CA) :
- 5. Concrete mix design submitted and approved :
- 6. Preliminary works completed to standard engineering practice :
- 7. Arrangements for water made (including testing of water) :
- 8. Arrangement for electric supply made :

9. Materials

Sl No	Item	Source as per CA	Contractor's plan of sourcing	Refer to testing clause	Agency for testing	Responsibility for testing

- 10. List of all T & P, make and numbers that the contractor would deploy at site of work
- 11. Name of person nominated by contractor for exercising quality control :
- 12. Qualifications/Experience of person at Serial No.11 above :
- 13. Names of supervisors with their qualifications/experience employed by contractor :
- 14. Confirmation that contract requirements relating to quality of all materials and quality standards of workmanship and finishes and acceptance criteria are explained and understood by all
- 15. Confirmation that requirement of tests to be conducted on materials before approval of sample and during execution, test on workmanship, tests before acceptance including the testing procedure, sampling techniques, frequency and agencies responsible for testing are understood and shall be complied with.
- 16. Method to be adopted for maintaining records of test result

17. Certificate that contractor shall maintain a log of all materials received at site as per the following format.

Sl No	Date	Material	Quantity received	Source	Whether as per approved sample or not	Tests carried out by supplier	Tests to be carried out before incorporation

18. General Remarks by contractor of his plan of actions to ensure that quality standards

Date :

(Signature of Contractor)

**LIST OF PRODUCTS FOR WHICH SPECIFIC MAKES
ARE TO BE INCORPORATED IN WORKS****GENERAL**

Materials to be incorporated in the Work shall be any one of the following MAKE as approved by the GE in writing before incorporated in the Work. These shall strictly comply with latest appropriate Indian Standard Specification or where IS Specification is not available these shall comply with the latest BS Specification.

Sl No.	MATERIALS	MAKE / NAME OF MANUFACTURER
1	2	3

A. BUILDING MATERIALS

1. ATT CHEMICALS – ISI Marked with valid CML NO of BIS
2. PLASTICISER – M/S FOSROC CHEMICALS INDIA LTD./ MC-BAUCHEMIE (INDIA) PVT. LTD./ SIKA QUALCRETE LTD.
3. WATER PROOFING COMPOUND – BAUCHEMIC INDIA / CICO / FOSROC / PIDILITE / ROFF
4. FACTORY MADE 2ND CLASS HARD WOOD PANELED DOOR SHUTTER/SKELETON SHUTTER (Sample of Item as per Scales of Testing given in IS:1003 shall be subject to Testing at reputed Test House/Govt. Test House as approved by GE at Contractor's Cost and after getting satisfactory Test Result Payment shall be released)
 - M/S ASCU HICKSON LIMITED.
7A, Elgin Road, Calcutta -700020 Phone : 2401174/247059
Fax : 2470598/2263167/2254478
 - M/S DOORKING INDUSTRIES
27 Gr block, Sector –V, Salt Lake, Kolkata
Phone : 033-22511334
 - M/S GOYAL INDUSTRIES CORPORATION,
(Factory)
14/5 Milestone, Mathura Road, Faridabad (Haryana)
Tele : (019) 91-275828
 - M/S JOINERY WOOD PRODUCTS PVT LTD.
Mamorani, Digboi Road, Makum Jn, Assam – 786170
Tele (RES) : 0374-22643
 - M/S KAJI RANGA WOOD PRODUCTS, PVT LTD.
517 Shimanta Market, AT Road, Guwahati, Assam
 - M/S NARMADA WOOD PRODUCTS
Industrial Area (Kheda) Itarsi (MP)
 - M/S PREMIER WOOD CRAFTS (P) LTD.
Jessore Road, PO Ganganagar, Dist-24 Parganas (WB)
 - M/S PURBANACHAL INDUSTRIES
C/O Purbanchal Wood Products
Near Ganesh Mandir, RP Road, Dispur, Guwahati
Phone : 0361-2222130
 - M/S DOORKING
20 Central South Road Kolkata-15
Phone : 033-22511334
 - M/S VINOD PATTERNS & FURNITURE INDUSTRY
I, Industrial Area, Govind Pura, Bhopal - 462023 (MP)
 - M/S JAIN WOOD INDUSTRIES
(BRAND : JAYANA)
A-228, Vardhaman Grand Plaza, Mangalam Place,
Sector – 3, Rohini, New Delhi-85

Tele: 9313694205 / 8860055818

5. PVC DOORS & FRAMES, – M/S RAJSHRI PLASTIWOOD/ M/S ACCUCCEL
WINDOWS, PARTITIONS, POLYTECH PVT LTD/ M/S SINTEX INDIA LTD.
FALSE CEILINGS & WALL / DUROPLAST
CLADDINGS
6. FRP DOOR – KRAFTO DOOR/ M/S Fibreways technology(254
A/1, Gr floor, TK House, Malviya Nagar Delhi-17) ,
M/S Syntax Ind. Ltd, M/S Deelux Poly Fab Pvt Ltd,
M/S S M Fibre, M/S Ashoo Model Arts
7. MILD STEEL BUILDER'S – CROWN/ EVERLITE/ GODREJ/ HARRISON/
HARD-WARES VIZ BARREL MOWJEE/ SANDHU/ SARTAJ/ UNIVERSAL OR
TOWER BOLT, SLIDING DOOR ANY MAKE BEARING IS CERTIFICATION
BOLT, BUTT HINGE, HANDLE, MARK
DOOR CLOSER, ETC.
8. ALUMINIUM BUILDER'S HARD- – ARGENT/ CLASSIC/ POINEER OR ANY MAKE
WARES VIZ BARREL TOWER BEARING IS CERTIFICATION MARK
BOLT, SLIDING DOOR BOLT,
HANDLE, DOOR CLOSER, ETC.
9. ALUMINIUM DOOR , WINDOW – HINDALCO/ INDALCO/ JINDAL
SECTION, ALUMINUM SNAP
GRID or Any other ALUMINIUM
SECTION
10. FACTORY MADE STEEL – M/S DOORWYN INDUSTRIES, 55, Dharamtalla
WINDOWS/ VENTILATORS (IS Road, Salkia, Howrah
1038-1980) & FACTORY MADE
PRESSED STEEL DOOR
FRAMES (ISI -4531) & SHALL
BE FLASH BUTT WELDED AND
PRESSED STEEL WINDOWS/
VENTILATORS
M/S HOPES METAL INDUSTRIES LTD. P-23,
Transport Depot Road, Calcutta - 700 027
M/S MADHU INDUSTRIES 63, N.S Palya, Banner
Ghatla Road, Bangalore - 560 076 Phone :
080-6688907/6685195/ 6682263, Fax : 080-6688907
M/S MODERN FABRICTORS
23-J, Radhamadhab Dutta Garden Lane, Calcutta - 700
010 Phone : 3507353 (Office), Fax : 3505379
M/S MULTIWYN INDUSTRIAL CORP,
Camac Street (B Block, 2nd Floor), Calcutta - 700 016
Phone : 033-2299543/2297525/2298904, Fax :
033-2290748
M/S PURBANCHAL INDUSTRIES
C/O Purbanchal Wood Products
Near Ganesh Mandir, RP Road, Dispur, Guwahati
Phone : 0361-2222130
M/S STEEL ENGINEERS
203, Kabiguru Ravindra Path, Kancharapara -743145
M/S THE ANKUR INDUSTRIES
726, Andul Road (Podra), P.O. Danesh Sheikh Lane
Howrah - 711 109
M/S TRISUL INDUSTRIES
284-A, Chappel Street, Meerut Cantt (UP)-250 001
M/S G S UDYOG
G-11, Site-III, Panki UPSIDC Industrial Area,
Kanpur-22 (Tele: 9598052239)
- (Sample of Item as per Scales of
Testing given in IS:1038 shall be
subjected to Testing at reputed
Lab/Govt. Test House as approved
by GE at Contractor's Cost and after
getting satisfactory Test Result
Payment shall be released)

1	2	3
	11. PRE-COATED FACTORY MADE STEEL WINDOWS/ VENTILATORS (IS 1038-1980) & (Sample of Item as per Scales of Testing given in IS:1038 shall be subjected to Testing at reputed Lab/Govt. Test House as approved by GE at Contractor's Cost and after getting satisfactory Test Result Payment shall be released)	– (i) TATA Steel, Mumbai, (ii) Ashwani & Sons, 4-66, RajNagar, Ghaziabad(UP), (iii) JINDAL, 2-32, Gurgaon, Haryana-122001, (iv) Ashish Industries, 1337, Manapur Industrail Area, Meerut Road(UP), Pine- 201003,Ph-9891542779 (v) NCL Alltek & Seccolor Ltd, Reg. & Admin Office : 1, Ganga Enclave, Petbasheerabad, Hyderabad – 500 067
	12. ROLLING SHUTTER	– ANY MAKE BEARING IS CERTIFICATION MARK
	13. PRE-ENGINEERING /GALVALUME SHEET as per IS 15965	– (i) DURASHINE/LYSAGHT BY M/S TATA BLUE SCOPE (ii) ALUCOLOR/GALVACOLOR BY BHUSHAN POWER & STEEL (iii) COLOURON PLUS BY JSW
	14. CGI/PGI STEEL SHEET	– JINDAL/ SAIL / TATA
	15. Wire mesh for wire crate	– ISI Marked with valid CML NO of BIS
	16. Poly carbonate sheet	– TUFLITE/ FLEXITUFF/ STARPLAST/ PRIME ROOFING
	17. Fiber glass / Mineral wool for thermal insulation of ceilings(Under deck insulation)	– TWIGA INSULATION, UP TWIGA FIBER GLASS LTD, LLOYD INSULATION.
	18. Prelaminated plywood/ Plywood Grade BWR type BB /decorative plywood	– GREEN PLY /KIT PLY / CENTURY PLY./ ARCHID PLY / SHIRDI INDUSTRIAL LTD (ASIS)/ NEPAL BOARD / M/S JAIN WOOD INDUSTRIES (BRAND : JAYANA)
	19. Plastic Laminated Sheet	– GREEN LAM / ARCHID LAM / CENTURY LAM/ KIT LAM
	20. Veneered Particle Boards	– ECOBOARD/ NOVAPAN/ BHUTAN BOARD / CENTURY PLY / ARCHID PLY / GREEN PLY/ SHIRDI INDUSTRIAL LTD (ASIS)/ NEPAL BOARD
	21. Prelaminated Particle Board/ Prelaminated MDF	– GREEN LAM / ARCHID LAM/CENTURY LAM / KIT LAM// SHIRDI INDUSTRIAL LTD (ASIS)/ NEPAL BOARD
	22. Adhesive	– FEVICAL / DR FIXIT / DENDRITE
	23. APP MODIFIED WATER PROOFING MEMBRANES	– MOPLY-FP (M/S TEXSA INDIA LTD.) / SUPER THERMOLAY (M / S STP LIMITED) / TORCHSHIELD AP BY PIDILITE INDUSTRIED
	24. BITUMEN PRIMER, BITUMEN, ETC FOR ROOF TREATMENT ONLY	– STP OR MAKE BEAR IS CERTIFICATION MARK
	25. High Pressure Steam Cured Non Asbestos Fibre Cement Board as per IS 14862	– ARMSTRONG / SAINT GOBAIN (GYPROC) / EVEREST
	26. GYPSUM BOARDS	– ARMSTRONG / SAINT GOBAIN (GYPROC) / USG BORAL
	27. TERRAZZO TILES (IS-1237:1980)	– ISI MARKED

1	2	3
28.	CHEQUERED TILES (IS-13801)	- CONFORMING TO IS (TILES SHALL NOT BE MADE AT SITE. ITEMS SHALL BE GOT TESTED AT NTH AT CONTRACTOR'S COST. PAYMENT SHALL BE RELEASED ONLY AFTER GETTING SATISFACTORY TEST RESULTS)
29.	Ceramic Tiles(Antiskid/Non skid/ Glazed tiles), Outdoor Vitrified Paving Tiles	- FIRST QUALITY OF JOHNSON TILES, SOMANY, NITCO, CERA, KAJARIA
30.	Acid resistance Ceramic Tiles(Industrial type) as conform to IS 4457 with chemical resistant mortar	- JHONSON (ENDURA, HEAVY DUTY) COATED SERIES or equivalent quality SOMANY, REGENCY, EURO TILES, ASIAN, KAJARIA, NITCO as approved by GE
31.	VITRIFIED TILES	- FIRST QUALITY OF JOHNSON TILES, SOMANY, NITCO, KAJARIA
32.	PRECAST INTERLOCKING PAVER BLOCK	- (I) ANJALI TILES (II) ULTRA TILES PVT LTD (III) TERRA FIRMA (IV) BANSAL (V) WONDER CRETE (VI) A-ONE TILES (VII) MEHTAB
33.	SHEET GLASS	- MODIGUARD FLOAT GLASS / SAINT GOBAIN GLASS(SSG)
34.	CEMENT BASE PAINT	- Shalimar(Maha Cemkote)/ Snowcem Plus/ Durocem/Robbiacem(J&N) / Acrocem Ultra/ Ecocem(TATA Plgments)
35.	Acrylic based polymer modified cementitious water proofing	- ACROCRETE & ACROCOTE, CICO, FOSROC, MYK LATICRETE, HI TECH, PIDILITE, SIKA, BASF INDIA LTD, BLUE SEAL
36.	Dry Distemper / Oil bound Distemper / Acrylic Distemper	- ASIAN PAINTS (TRACTOR UNO), BERGER (JADOO), / DULUX WEATHERSHIELD (Signature or power flex) OF ICI
37.	Acrylic emulsion	- ASIAN PAINTS (ROYAL), BERGER (LUXOL SILK SPLENDER), ICI(DULUX VELVET TOUCH)
38.	Acrylic Exterior Weather Resistant Paint (Weather Proof Paint)	- ASIAN PAINTS (APEX) OR EQUIVALENT OF BERGER / ICI
39.	Plastic Emulsion Paint	- ACROCEM/ DUROCEM/ SUPER SNOWCEM/ BERGER (XTRCE M-76 SUPERIOR CEMENT PAINT)/ ASIAN PAINT (GUTUCAM)
40.	WHITE CEMENT/WALL PUTTY	- BERGER / J&N / BIRLA LAVAL PLAST / SHALIMAR PAINTS / ASIAN PAINTS
41.	SYNTHETIC PAINT (FIRST QUALITY)	- ASIAN PAINTS (APPCOLITE), BERGER (LUXOL), ICI(DULUX SUPERGLOSS)
42.	PVC CISTERN (ISI MARKED) & PLASTIC SEAT COVER (SOILD HEAVEY DUTY)	- CERA/ COMMANDER/ HINDWARE/ JOHNSON PEDDAR/ PARRYWARE/ SPEED FLO (BLUE STAR POLYMERS)
43.	STAINLESS STEEL SINK/ PLATE RACK	- ANJALI/ BLUE STAR/ DIAMOND/ LOTUS/ NIRALI/PRAYAG
44.	MIRROR	- ATUL/GOLDFISH/KOHINOOR/MODI/SAINT GOBAIN/SWASTIK//PRAYAG
45.	CHROMIUM PLATED BATH ROOM FITTING of CAST COPPER ALLOY FANCY BIB TAPS, STOP VALVES & PILLAR	- JAQUAR(CONTINENTAL)/MARC/ PARRYWARE/ HINDWARE / M/S ACCURATE ENTERPRISE (BRAND : WJ DECOR)

1	2	3
	TAPS (IS:8931-1993) IS-8934-1978)	
46.	PVC OVER HEAD TANK (MULTI LAYERED CONSTRUCTION AS PER IS-12701:1996)	– ROTAX/ SINTEX/ POLYCON/ DIPLAST/ NILKAMAL
	<u>WATER SUPPLY ITEMS</u>	
47.	GI PIPE (ANY GRADE)	– BANSAL/ BST/ JINDAL/ NEZONE (NTL)/ PRAKASH/ TATA/ SWASTIK/ ZENITH
48.	GI FITTINGS	– AA OR MAKE BEARING IS CERTIFICATION MARK
49.	PP-R PIPES & FITTINGS	– PRINCE/ RELIANCE/ SAVOIR-FAIRE MANUFACTURING CO. PVT LTD. (SFMC)/ VECTUS/ WET FLOW/ FUSION/ M/S KANHA PLASTICS PVT LTD
50.	CAST COPPER BIB COCK/STOP VALVE	– LEADER/GEM/JAQUAR
51.	GUN METAL GATE VALVE	– KIRLOSKAR/ L&T/ LEADER
52.	CAST IRON PIPE (CENTRIFUGALLY CAST)	– ELECTRO STEEL/ KALINGA/ KESORAM/ TISCO
53.	CAST IRON PIPE (VERTICALLY CAST)	– JINDAL/ KEJRAWAL
54.	CI/DI Centrifugally Cast (Spun) Pipes & Fittings (Soil/Waste/Vent Pipe)	Neco Centri / BIC / Electro Steel Casting Ltd / AIC / PIC / Jai Balaji Industries / Srikalahasti Pipes Ltd
36A	Vitreous China, WC/HWB/ Urinal/Soap Dish/ Urinal Partition Wall/ Laboratory sink with ISI Marked	– HINDUSTAN SANITARY WARE (Hindware) (Regular) / PARRYWARE (SUPERFINE) / CERA (Regular) / JAQUAR
55.	DUCTILE IRON PIPE	– ELECTROTHERM INDIA /ELECTROSTEEL CASTINGS LIMITED / JINDAL SAW LIMITED / TATA METALIKS KUBATA PIPES/ JAI BALAJI INDUSTRIES LTD
56.	CI /DUCTILE IRON SPECIALS	– ELECTROSTEEL/ELECTRO-THERM/JINDAL/ KESORAM/ LANCO
57.	MILD STEEL PIPE	– BANSAL/ BST/ HINDUSTAN/ JINDAL/ NEZONE (NTL)/ PRAKASH/ SWASTIK/ TATA/ ZENITH
58.	HDPE /PVC PIPES & FITTINGS	– JAIN IRRIGATION / ANANT/ OM SREE PRODUCTS/ TUSKER/ORI-PLAST/ SUPREME/ PRINCE/ RELIANCE
59.	UPVC / RWP/CPVC	– JAIN IRRIGATION / ANANT EXTRUSIONS LTD. (KAMAL)/ KISAN/ PARAS/ PRIME/ SUPREME/ PRINCE/ RELIANCE/ASHIVAD
60.	SLUICE VALVE/ REFLUX VALVE	– KIRLOSKAR(KBL)/ L&T/ LEADER
61.	AIR RELEASE VALVE/ FOOT VALVE/ NON-RETURN VALVE	– KIRLOSKAR(KBL)/ L&T/ LEADER
62.	BLEACHING DOZER	– AQUAPURA/ AVON/ ION EXCHANGE/

1	2	3
		MAIC-INDIA
63.	GRANULAR CHLORINATION	– BRIOZING/ DECLIBAC (ALTOCH “GP”)/ POWER & WATTS
64.	LIQUID CHLORINE	– DECLIBAC/ HYDRIOL/ RMCO
65.	CHLORONOME PLANT /CHLORINATOR	– AQUA/ CANDY FILTERS/ MAIC/ NATIONAL TIMBERS LTD./ PATTERSON/ PEARL FILTERS
66.	LIQUID CHLORINE DOZING	– DECLIBAC/ MILTON ROY/ RMCO/ TECHNOMAC
67.	WATER METER	– CAPSTON / DASHMESH / KIRLOSKAR
68.	CENTRIFUGAL PUMP / NON CLOGGING PUMP	– CROMPTON GREAVES/ JOHNSON/ KIRLOSKAR/ KSB/ MATHER & PLATT
69.	SUBMERSIBLE PUMP	– KIRLOSKAR / KSB/ CROMPTON GREAVES
70.	AIR BLOWER	– EVEREST / VETA / AKASH / KAY
71.	PRESSURE FILTER	– DECLIBAC/ MILTON ROY/ RMCO/ TECHNOMAC
72.	SOLAR WATER HEATER	– SUN TECHNICS ENERGY SYSTEMS PVT LTD / M/S NUETECH SOLAR SYSTEM PVT LTD / M/S RASHMI SOLAR ENERGY PVT LTD / M/S SOLARCHROME PVT LTD
73.	VERTICAL TURBINE	– JOHNSTON/ KIRLOSKAR/ KSB/ WORTHINGSTON
	<u>ELECTRICAL ITEMS</u>	
74.	POINT WIRING CABLES	– FINOLEX/HAVELLS/RR KABLE/RPG/ KEI
75.	PIANO SWITCHES, SOCKETS etc	– ISI MARKED PRODUCTS OF ANCHOR / KINJAL/HAVELLS/LEGRAND
76.	PVC CASING CAPPING	– FINOLEX / MODI / PRESTO PLAST/ PLAZA/KALINGA
77.	PVC CONDUITS	– FINOLEX / MODI / PRESTO PLAST/ PLAZA/KALINGA
78.	STEEL CONDUITS	– TATA/JINDAL/AKG/SWASTIK/PRAKASH
79.	MODULAR SWITCHES/ FIXTURES	– CRABTREE/ LEGRAND/ SCHNEIDER/L&T/ SIEMENS/ ABB/ MK/ PHILIPS/ANCHOR / M/S NOVATEUR ELECTRICAL & DIGITAL SYSTEMS PVT LTD (INDOASIAN)
80.	MCBs & DBs & ISOLATOR	– LEGRAND/ SCHNEIDER (MERLIN GERIN)/ SIEMENS/ABB / M/S NOVATEUR ELECTRICAL & DIGITAL SYSTEMS PVT LTD(INDOASIAN)
81.	ELCB/ RCCB/RCBO	– LEGRAND/ SCHNEIDER (MERLIN GERIN)/ SIEMENS/ABB / M/S NOVATEUR ELECTRICAL & DIGITAL SYSTEMS PVT LTD(INDOASIAN)
82.	MCCBs	– ABB/ LEGRAND/ SCHNEIDER/ SIEMENS / M/S NOVATEUR ELECTRICAL & DIGITAL SYSTEMS PVT LTD(INDOASIAN)
83.	SWITCH FUSE	– L&T/ SCHNEIDER (MERLIN GERIN)/ SIEMENS/ABB / M/S NOVATEUR ELECTRICAL & DIGITAL SYSTEMS PVT LTD(INDOASIAN)
84.	ALL TYPE FLUORESCENT FITTING/ HPMV / HPSV / CFL/etc	– BAJAJ/ CROMPTON GREAVES/ HAVELL’S/ PHILIPS/ WIPRO

1	2	3
85.	ALL TYPE LED LIGHT FITTING	– BAJAJ/ PHILIPS/ WIPRO/ SYSKA LED/HAVELLS/ JAQUAR
86.	HIGH MAST GI POLE	– BAJAJ/ CROMPTON GREAVES/ NEZONE (NTL)/ UTKARASH
87.	FLAME PROOF FITTINGS	– BALIGA / FLEXPPO / SUDHIR / FCG/ CROMPTON GREAVES/ BAJAJ
88.	SOLAR STREET LIGHT FITTING	– TATA POWER SOLAR /BAJAJ/PHILIPS/ CROMPTON GREAVES
89.	EXHAUST FANS/CEILING FAN	– CROMPTON GREAVES , KHAITAN, BAJAJ, HAVELL'S, ORIENT
90.	HEATER WATER STORAGE TYPE ELECTRIC GEYSER	– Bajaj / HAVELLS / CROMPTON GREAVES/ VENUS
91.	STREET LIGHT TIME SWITCHES	– GE CONTROLS / L&T/ LEGRAND / SR COMMUNICATIONS
92.	STEEL POLES (ISI MARKED)	– BANSAL POLES / CALCUTTA POLES / JINDAL POLES / KWALITY STEEL-KOLKATA / NATIONAL TUBING COMPANY/NEOZNE
93.	HT INSULATORS	– BHLE/ JAYSHREE/ MYSORE/ RASTRIYA
94.	GOD WITH ISOLATOR	– PACTIL/ JAIPURIA/BHEL
95.	LIGHTNING ARRESTOR	– ALPRO / AREVA/ OBLUM/ RASHTRIYA/ RAYCHEM?BHAL/ABB
96.	CHANGE OVER SWITCHES	– L&T / SCHNEIDER / SIEMENS/ABB/ M/S NOVATEUR ELECTRICAL & DIGITAL SYSTEMS PVT LTD(INDOASIAN)
97.	STARTERS	– BCH (BHARAT CUTTLER HAMMER)/ CROMPTON GREAVES/ L&T/ SIEMENS
98.	LT XLPE/ PVC CABLES (UG) (ARMOURED & UNARMOURED)	– KEC (RPG)/ GLOSTER/ FINOLEX/ HAVELLS
99.	HT XLPE/ PVC CABLES (UG) (ARMOURED & UNARMOURED)	– KEC (RPG)/ CCI/ NICCO/GLOSTER/HAVELLS
100.	HT XPLE CABLE JOINTS	– DENSON/ M-SEAL/ RAYCHEM/3M
101.	LT ACB	– ABB/ L&T/ SCHNEIDER (MERLIN GREEN)/ SIEMENS
102.	HT OCB/VCB, 33KV & 11KV	– ABB/ BHEL/ CROMPTON GREAVES/ / SCHNEIDER (MERLIN GREEN)/ SIEMENS /ANDREW YULE (MAKE OF ACCESSORIES LIKE CT's, PT's, ETC. SHALL BE AS APPROVED BY MANUFACTURER OF OCB/VCB PANEL)
103.	33 KV CTs / PTs	– AE / AREVA/ CROMPTON GREAVES/ KAPPA
104.	CURRENT TRANSFORMER & POTENTIAL TRANSFORMER 11 KV RANGE	– AREVA/ ELECTRICAL CONTRL & SYSTEM/ KAPPA/ PRAGATI
105.	RELAY (ELECTRO MECHANICAL	– ABB / AREVA / GE CONTROLS / L&T
106.	RELAY NUMERICAL	– ABB / AREVA / GE CONTROLS / L&T
107.	ELECTRONIC MULTI-FUNCTION ENERGY METER/KWH METER	– HPL SOCOMEC / L&T / NEPTUNE / SECURE METERS/AE

1	2	3
108.	THERMO-PLASTICS ENCLOSURES FOR METERS / DBS	- HENSEL / SECURE METERS/L&T
109.	INDICATOR LAMP	- GE CONTROLS / HAVELL'S / L&T / SIEMENS
110.	SELECTOR SWITCH	- GE CONTROLS/ HAVELL'S/ HPL LTD/ KAYCEE/ L&T/ SIEMENS
111.	AMMETER, VOLTMETER, ETC.	- AE/ HAVELL'S/ L&T/ LEGRAND/ MECO/ RISHAB
112.	CONTACTORS	- BCH/ CROMPTON GREAVES/ GE CONTROLS/ HAVELLS/ L&T / SIEMENS
113.	PANEL BOARD	- ANY MAKE HAVING CPRI APPROVED
114.	CAPACITOR BANK/ APFC PANEL	- CROMPTON GREAVES/ L&T/ NEPTUNE/ SIEMENS/ABB/ BCH (BHARAT CUTTLER HAMMER)
115.	TRANSFORMER 11KV/0.433KV BELOW 315KVA BELOW	- NGEF/ VOLTAMP / PME/ ANDREW YULE/ ITF GURGAON, UNIVERSAL
116.	TRANSFORMER 11KV/0.433KV ABOVE 315KVA & ABOVE	- ABB/ ANDREW YULE/ BHEL/ CROMPTON GREAVES/ VOLTAMP (BARODA)
117.	TRANSFORMER 33KV/11KV	- ABB/ BHLE/ CROMPTON GREAVES/ SIEMENS/ VOLTAMP (BARODA)
118.	BATTERY CHARGERS	- AMARA RAJA / MASSTECH / STATCON
119.	BATTERY MAINTENANCE FREE	- AMARA RAJA/ AMCO/ EXIDE/ OKAYA/ PRESTOLITE
120.	VOLTAGE STABILIZER	- AE / BRENTFORD / ITE-GURGAON / VINETEC
121.	ELECTRIC MOTORS	- ABB/ AREVA/ CROMPTON GREAVES/ KIRLOSKAR/ SIEMENS
122.	PACKAGE/UNIFIED SUB STATION	- ABB / BHLE / SCHNEIDER / SIEMENS
123.	ENGINE FOR DG SET (ANY RANGE)	- ASHOK LEYLAND/ CUMMINS INDIA LTD./ GREAVES COTTON/ KIRLOSKAR OIL ENGINES LTD.
124.	ALTERNATOR FOR DG SET	- CROMPTON GREAVES/ KIRLOSKAR ELECTRIC/ STAMFORD/BHEL
125.	ENERGY AUDIT SERVICES	- CPRI / DATAGEN / DESCON LIMITED/ DSCL / ESCO
126.	SOLAR PRODUCTS (SOLAR CELLS, PV MODULES ETC.)	- BHEL / BEL / PEC / WAAREE / VIKRAMSOLAR / SUKAM OR ANY OTHER MAKE APPROVED BY MNRE / NISE / SECT
127.	SOLAR INVERTER	- M/S JACKSON ENGINEERS LIMITED/ M/S THERMAX LIMITED/ M/S SU-KAM POWER SYSTEM LTD./ M/S POWER-ONE MICRO SYSTEM (P) LTD/ ABB / SCHNIDER ELECTRIC OR ANY OTHER MAKE APPROVED BY MNRE / NISE / SECT
128.	MODULE MOUNTING STRUCTURE	- TATA (STRUCTURA) / JINDAL STAR / JSW
129.	SCADA	- DRAKER/ POWER ONE MICROSYSTEM
130.	REFRIGERATOR/ WATER COOLER/ DEEP FREEZER/SPLIT & WINDOW& CASSETTE TYPE	- LG /SAMSUNG/ VEDIOCON / GODREJ/ VOLTAS/ WHIRLPOOL/ BLUE STAR

1	2	3
	AC UNIT	
131.	VOLTAGE STABILIZER AUTOMATIC OPERATION SINGLE PHASE	– SINETRAC, BRENTFORT, VINITEC, AE, MICROTECH, APLAB, VOLINA ,LG, SAMSUNG
132.	BUS BAR TRUNKING	– L&T, CONTROL & SWITCH GEAR, SCHNEIDER, SIEMEN, GE INDIA
	<u>MISCELLANEOUS</u>	
133.	Punched Tape Concertina Coil	– Global Technocrats Pvt Ltd / Shiva Engineering Company
134.	GEOTEXTILE	– Maccaferri Environmental Solutions Pvt Ltd/Gabion Technologies India Pvt. Ltd/Khator Technical Textiles Pvt Ltd/SVM Non Wovens Pvt Ltd.
135.	SEALING COMPOUND & JOINT FILLER	– STP LIMITED/ SHALIMAR(TAR)/ M. K. PETRO PRODUCTS (INDIA) PVT. LTD/CICO/BASF/DR FIXED/ FOSROC/ BASF INDIA LTD
136.	WATER PROOF COMPOUND	– WATER SEAL, MYK LATICRETE, STP NO 1, PEDILITE (DR FIXIT), ACCO PROOF, FOSROC, CICO. BENGAL BITUMEN, SIKA, BASF INDIA LTD, BLUE SEAL
137.	ROAD SAFETY ANY TYPE FITTING or ROAD FURNITURE	– TATA BP/ ABS ENGINEERING / DARK EYE/3M
138.	LLDPE SEPTIC TANK	– (i) Sintex Industries Limited (Plastic Division) Kalol, North Gujarat-382 721, India, Tele : 91-2764-253 5000/Fax : +91-2764-253 800 Email: plastic@sintex.co.in (ii) The Suprime Industries Ltd (Plastic Piping Division) 1161/1162, Solitair Corporate Park, Building No. 11,167, Andheri Ghatpar Link Road, Andheri (East) Mumbai-400 093, India, Tele : 91-22-6771 0000/4043 0099/Fax : +91-22-6771 0099/4043 0099 Email: pvc-pipes@suprime.co.in (iii) United Sanitation Devices Amala Nagar, PO – Thrissur, Kerla, India-680 555 Tele : 91-487-2307791/2308792 Email: enquiry@unitedseptictanks.com (iv) M/s Reliance Polymers 22, Ceramic Street, 3rd Floor, Block D, Kolkata – 700 016 Tele : 91-33-4001 3400

Note:-

- The makes have been given tradewise only for the purpose of easily locating the items and otherwise makes given are applicable to the entire contract.
- Wherever word “equivalent make” has been specified the option of equivalent make will only be considered after taking approval from Accepting Officer and only where products of brand/ manufacturer specified are not available in market.

Signature of the Contractor

Date :

Jt / Dy Dir (Contracts)

For Accepting Officer

MATERIALS OF LOCAL ORIGINAPPENDIX 'C'

S/No	Station	Brick size & strength	Fine sand	Coarse sand	Stone aggregate
1. <u>CWE Shillong Area</u>					
(a)	Shillong	Not Applicable	Umtangar/ Mowpat/ Happy Valley/Laitkore peak	Umtangar/ Mowpat/ Happy Valley/Laitkore peak	Mylliem
(b)	Umroi	Not Applicable	-do-	-do-	-do-
(c)	Narangi & Guwahait	Old size bricks (23x11.5x7.5cm of strength 75 Kg/Sqcm	Sonapur	Sonapur	Chandrapur / Rani Killing
2. <u>CWE Tezpur Area</u>					
(a)	Tezpur/Chardaur/ Missa/Missamari	Locally available of size 23x11.5x7.5cm of strength 75 Kg/Sqcm	Mara Bharali	Mara Bharali	Bhalukpong/ Shijusa
(b)	Bomdila/Rupa/ Tenga	-	Locally available from river bed	Locally available from river bed	Shingle from river bed
3. <u>CWE Dinjan Area</u>					
(a)	Dinjan	Old size brick of size 23x11.5x7.5 cm of strength 75 Kg/Sqcm	Guinjan	Guinjan	Namrup
(b)	Lekhapani	-do-	Jagun/Margharita	Jagun/Marghrita	Jagun/Marghrita
(c)	Jorhat/Mariani/ Bhalukmara	Old size brick of size 22x11x7.5 cm of strength 75 kg/sqcm	Bhogdoi river/ Kanighat	Bhogdoi river/ Kanighat	Bhihu-bari
4. <u>HO 137 WE Area</u>					
(a)	Dimapur/ Rangapahar	Locally available of size 22x11x7.5 cm of strength 75 kg/sqcm	Dhansiri river	Deopnai	Diphu river
(b)	Zakhama	Old size of brick of size 23x11.5x7.5 cm of strength 75 kg/sqcm			
(c)	Leimakhong	Old size of brick of size 25x 10x7.0 cm of strength 75 kg/sqcm	Imphal	Imphal	Imphal
(d)	Agartala/Tripura	Locally available of size 25x12.5x7.5 cm and of strength 75 kg/sqcm	Locally available	Locally available	Silchar
(e)	Masimpur/Silchar	Old size bricks of size 23x11.5x7.5 cm of strength 75 kg/sqcm.	Madhura/Jatinga	Madhura/Jatinga	Madhura/Jatinga

Note – 1. The above sources are given for guidance only. This does not absolve the contractor from his responsibility of incorporating various materials in the work as per specifications mention in contract. Contractor has to ascertain the availability of material at the source given above. In case of non availability/scarcity of material mentioned at the source above the contractor has to arrange the materials from other sources without any extra cost to the Government. No claim whatsoever shall be entertained by the department on this account at later stage.

**SIGNATURE OF CONTRACTOR
DATED**

**Jt/Dy DIRECTOR (CONTRACTS)
FOR ACCEPTING OFFICER**

CEMENT SUPPLY & ACCEPTANCE REGISTER

APPENDIX 'D'

1. CA NO & Name of work :
2. Control No* :
3. Name of Manufacturer/Brand/Gde of Cement (A) Manufacturer _____ (B) Brand _____ (C) Grade :
4. Qty of cement & Lot No/Week No (in bags) : (A) (Qty _____) (B) Lot No/Week No _____
5. Manufacturer's test certificates no _____
6. Random Test details (a) Physical test report from _____ vide their letter No _____ (Name of approved Lab/Engg College)
- (b) Chemical test report from _____ vide their letter No _____ (Name of approved Lab/Engg College)
7. Details of Physical & Chemical properties :

	Specific Surface Area (m ² per Kg)	Soundness by Le Chatellar	Soundness by Auto Clave	Initial Setting Time (Minutes)	Final Setting Time (Minutes)	Compressive strengths			Temp during testing °C	Standard consistency (%)	Lime Saturation (Ratio)	Aclumina Iron Ratio	Insoluble ratio (%)	Magnesium (%)	Sulphuric Anhydride (%)	Loss on ignition (%)	Alkalies (%)	Chlorides (%)
						03 days	07 days	28 days										
As per relevant IS																		
As per manufacturer's test certificate																		
As per random test certificate																		

Remarks with Signature :

Accepted/Rejected

Contractor

Junior Engineer

Engineer-in-Charge

Garrison Engineer

Remarks of BOO/Inspecting Officer/CWE

* To be allotted Serially by GE consignment wise

MATERIAL AND THEIR TESTS
RECOVERY RATES OF TESTING CHARGES

APPENDIX 'E'

Sl No	Material	Test	Method of testing	Frequency of Tests	Level of test	Rate per test Rs. Ps	Remarks
1	2	3	4	5	6	7	8
1.	Bricks	(i) Compressive strength	IS-3495 (Part-II)	As per IS-5454 as given under:- Lot size Sample Permissible No of defective bricks	'A'	330/-	Checks for visual and dimensional characteristics shall also be carried out as per IS-5454.
		(ii) Water absorption	-do-	-do-	'A'	330/-	-do-
		(iii) Efflorescence	-do- (Part-I)	1001 5 0 to 10000 10001 10 0 to 35000 35001 15 1 to 50000	'A'	330/-	
2.	Coarse aggregate	(i) Sieve analysis	IS-2386 (Part-I)	One test for every 15CUM of aggregates for part thereof brought to site.	'A'	660/-	
		(ii) Flakiness Index	-do-	-do-	'A'	250/-	
		(iii) Estimation of deleterious material	IS-2386 (Part-I)	One test for every 100CUM of aggregate or part thereof	'A'	600/-	
		(iv) Organic impurities	-do-	One test per source of supply	'B'	275/-	
		(v) Moisture content	-do- (Part-II)	Regularly as required.	'A'	330/-	
		(vi) Specific gravity	-do-	One test for each source of supply	'B'	330/-	
3.	Fine aggregate	(i) Sieve analysis	IS-2386 (Part-I)	One test for every 15CUM of FA or part when brought to site.	'A'	660/-	
		(ii) Test for clay, silt and impurities	-do- (Part-I)	-do-	'A'	500/-	
		(iii) Specific gravity	-do- (Part-II)	One for each source of supply	'B'	330/-	
		(iv) Moisture content	-do- (Part-II)	Regularly as required subject to 2 test/day when being used.	'A'	330/-	
		(v) Test for organic impurities	-do- (Part-II)	One test for each source of supply.	'B'	275/-	

Legend
A-site lab.
B- Zonal Laboratory/ Command Test Laboratory
C- National Test House, SEMT Wing CME, Regional Research labs, IITs, National Institutes of Technology, ,
any Govt Engineering College or NABL Labs approved any Govt laboratories, Command Test Laboratory (if such facilities exists)

1	2	3	4	5	6	7	8	
4.	RCC/PCC concrete (nominal Mix & Design Mix)	(i) Slump test or compacting factor test or vee-bee time.	IS-119	The minimum frequency of sampling of concrete of each grade shall be as under:- Qty of concrete in the work (cubic metre)		'A'	300/-	Random sampling shall be carried out to cover all mixing units.
				1-5	1			
				6-15	2			
				16-30	3			
				31-50	4			
		(i) Compressive Strength		51 and above	4+ 1 addl for each 50Cum or part thereof.	'A'	900/-	
5.	(a) PCC block for walling (Hollow block)	(i) Compressive strength	IS-2156-1984	08 block out of 14		'A'	900/-	Sample:- 14 blocks from consignment of every 5000 blocks or part thereof.
		(ii) Water absorption	-do-	03 blocks out of 14		'B'	330/-	
		(iii) Density	-do-	03 block out of 14		'B'	330/-	
	(b) PCC solid block for walling	(i) Dimensions and inspected for visual defects	IS-2185 Part-II	All 20 block		'A'		20 blocks shall be taken from every lot/ consignment of 5000 blocks or part thereof from the same grade, size and same batch of manufacture.
		(ii) Block density	-do-	03 blocks out of 20 block		'B'	330/-	
		(iii) Compressive strength	-do-	08 blocks out of 20 block		'A'	900/-	
		(iv) Water Absorption	-do-	03 blocks out of 20 block		'B'	330/-	
		(v) Drying shrinkage	-do-	03 blocks out of 20 block		'B'	120/-	
		(vi) Moisture movement	-do-	03 blocks out of 20 block		'A'	60/-	
		(vii) Reserve for future test	-do-	03 blocks out of 20 block				
6.	Cement flooring tiles/terrazzo tiles	(i) Water absorption	IS-1237	06 tiles out of 18		'B'	330/-	

1	2	3	4	5	6	7	8	
		(ii) Wet transverse strength	-do-		-do-	'B'	660/-	
		(iii) Resistance to wear	-do-		-do-	'C'	1000/-	
7.	Burnt clay roofing tiles (hand made) As per IS-2690 (Part-II) Length 150mm to 200mm Width 100mm to 200mm Thickness 35 mm to 50mm	(i) Water absorption	IS-3495 (Part-II)	6 tiles out of 12		'B'	216/-	Samples:- 12 tiles from each source of supply selected at Random.
		(ii) Compressive Strength	-do- (Part-II)		-do-	'A'	180/-	
8.	Mangalore pattern roofing tiles	(i) water absorption	IS-654 (6 tiles out of 32		'B'	180/-	Samples:- 32 tile from each consignment of 3000 tiles or part thereof. These tiles shall be checked for dimension.
		(ii) Breaking load	-do-		-do-	'B'	120/-	
9.	Timber	(i) Specific gravity and weight	IS-1708-1960	Minimum 3 samples from a lot of 4 Cum or 250 pieces of seasoned timber.		'B'	120/-	
		(ii) Moisture content	-do-			'A'	120/-	
10.	Water for construction purposes	(i) Test for acidity	IS-4564 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-			'B'	500/-	
		(iii) Test for Total Dissolved Solid (TDS) content.	-do-			'B'	500/-	

1	2	3	4	5	6	7	8	
11.	Welding of steel work	Visual test.	inspection	IS-822-1970	100% by visual inspection clause 7.1	Work site	360/-	Specialised tests their method and frequency to be decided on consideration of their importance by the Accepting Officer.
12.	Timber paneled and glazed door/window & shutters (including Factory mad shutters)	(a) Dimensions, sizes, workmanship and finish		IS-1003-1977 (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 and above 80			
		b) Strength test						
		(i) Slamming		IS-1303-1990	(i) Samples size shall be as per latest IS provision. (ii) From each lot 5% of the factory made shutters shall be manufacturer tested for strength test	C	-	-
		(ii) Impact indentation	-do-	-do-	-do-	C		
		(iii) Shock resistance	-do-	-do-	-do-	C		
		(iv) Edge loading	-do-	-do-	-do-	C		
13.	Plywood (IS-303-1989)	(a) Moisture content		IS-1734-1989 (Part-I)		'B'	120/-	
		(b) Water resistance test	-do-	(Part-I)	Six test pieces cut from each of the boards selected as per table shall be subjected to testes.		240/-	Sampling shall be as per IS-7835-1975 tables.

1	2	3	4	5	6	7	8
14.	Veneered wood particle board (medium density)	(a) Density	IS-635	Three test specimens from each (Part-I) sample size 150mm x 75mm)	'C'	60/-	Sampling shall be as per IS-3487-83 with moisture metre.
		(b) Moisture content	-do-	-do-	'A' & 'B'	60/-	
		(c) Water absorption	-do- (Part-16)	-do-(size 300 mm x 300mm)	'A'	60/-	
		(d) Swelling due to surface absorption	-do- (Part-17)	-do- (size 125 mm x 100 mm)	'A'	60/-	
		(e) Swelling in water	-do-	-do- (size 200mm x 100 mm)	'A'	60/-	
		(f) Modulus of rupture	-do- (Part-4)	Three test specimens as per IS -2380-77	'B'	90/-	
		(g) Screw withdrawal strength	-do- (Part-4)	-do- as per IS 2385.	'C'	120/-	
15.	Cement	(a) Setting time	IS:4031-63 RE-AFFIRMET - 1986	Once for each consignment or as and when required.	'B'	500/-	
		(b) Soundness	-do-	-do-	'B'	550/-	
		(c) Compressive Strength	-do-	-do-	'B'	550/-	
		(d) Fineness	-do-	-do-	'B'	275/-	
16.	Solid door PVC	(a) Dimensions and squareness	IS-4020	Frequency & Sample sizes shall be as per IS provisions	A	180/-	
		(b) General Flatness test	-do-	-do-	A	180/-	
		(c) Local planeness test	-do-	-do-	A	180/-	
		(d) Impact identification test (Steel ball impact test)	-do-	-do-	C	-	
		(e) Edge loading test	-do-	-do-	C	-	
		(f) Shock resistance test	-do-	-do-	C	-	
		(g) Buckling test	-do-	-do-	C	-	
		(h) Slamming test	-do-	-do-	C	-	
		(j) Misuse test	-do-	-do-	C	-	
		(k) Screw withdrawal resistance test	-do-	-do-	C	-	
17.	Bitumen use for road pavement work	(a) Penetration value	IS 73	1 test per batch of bitumen supplied in bulk or drums	B & C		

1	2	3	4	5	6	7	8
		(b) Softening points	IS 73	-do-		B & C	
		(c) Elongation	IS 73	-do-		B & C	
		(d) Wax Content	IS 1209	-do-		B & C	
		(e) Flash point/ fire point	IS 1209	-do-		B & C	
		(f) Ductility	IS 1209	-do-		B & C	
18.	All type Glazed tiles	(i) Water absorption	IS-777	06 tiles out of 18		'B'	180/-
		(ii) Wet transverse strength	-do-	-do-		'B'	144/-
		(iii) Resistance to wear	-do-	-do-		'C'	540/-
19.	Reinforcement Steel	(i) Physical tests upto 16 mm dia (Normal mass, tensile elongation, bend and rebend)	As per relevant IS		As Specified in Particular Specification	'B'	2500/-
		(ii) Physical tests more than 16 mm dia (Normal mass, tensile elongation, bend and rebend)	-do-		-do-	'B'	2750/-

SIGNATURE OF CONTRACTOR
DATED:**Jt/Dy Dir/AD (CONTRACT)****FOR ACCEPTING OFFICER**

STEEL SUPPLY & ACCEPTANCE REGISTER

1. CA NO & Name of Work
2. Contract No
3. Name of Manufacturer's T.C No
4. Manufacturer
5. Random Test details (a) Physical test report from _____ vide their letter No _____
(Name of NABL approved Lab/ Govt Engg College)
(b) Chemical test report from _____ vide letter No _____
(Name of NABL approved Lab/ Govt Engg College)
6. Types of steel, Dia & Qty
 - (a) Type : TMT/CRS
 - (b) Dia _____ mm
 - (c) Actual Wt _____ MT
 - (d) Conversion Wt _____ MT

	Chemical test							Mechanical test						
	Carbon %	Sulphur %	Phosphorous %	Sulphur % + Phosphorous %	Manganese %	Silicon %	Corrosion Resistant element	Wt per metre	Stress (N/mm ²) 0.2% proof stress	Tensile strength (N/mm ²)	Elongation%	Bend Test	Rebend Test	Remarks
As per IS 1786-2008														
As per Manufacturer's test certificate														
As per independent test														

Remarks with Signature

Accepted/Rejected

Contractor

Junior Engineer

Engineer-in-Charge

Garrison Engineer

Remarks of BOO/Inspecting Officer/CWE