

MILITARY ENGINEER SERVICES

NAME OF WORK : PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POs AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)

C O N T E N T S

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Drawings : _____ Sheets

Signature of Contractor

AAD (Contracts)
for Accepting Officer

APPENDIX- 'A' TO NOTICE INVITING TENDER (NIT) (contd...)**MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)
(in lieu of IAFW-2162 (Revised 1960))**

1. A tender is invited for the work as mentioned in Appendix-'A' to this NOTICE INVITING TENDER (NIT).
2. The work is estimated to cost as indicated in aforesaid Appendix 'A'. This estimate, however, is not a guarantee and is merely given as a rough guide and if the work costs more or less, a tenderer / bidder will have no claim on that account.
3. The work is to be completed within the period as indicated in the aforesaid Appendix 'A' in accordance with the phasing, if any, indicated in the tender from the date of handing over site, which will be on or about two weeks after the date of Acceptance of tender.
4. Contractors whose names are on the MES approved list and within whose financial category the estimated amount would fall and unenlisted contractors may submit tender/bid subject to other criteria mentioned in Appendix A. However, in case of term contracts, enlisted contractors of Class SS to E may submit tender. Not more than one tender shall be submitted/uploaded by one contractor/ firm. Under no circumstances will a father and his son(s) or other close relations who have business dealing with one another be allowed to tender/bid for the same contract as separate competitors. Two firms shall be deemed to have business dealing if any of the partners/proprietor/director is common among both of them. A breach of this condition will render the tenders/bids of both the parties liable for rejection.
5. The office of the **Chief Engineer (Navy) Mumbai** will be the Accepting Officer here-in-after referred to as such for the purpose of the contract.
6. Not more than one tender/bid shall be submitted/uploaded by one bidder firm. Under no circumstances will a father and his son(s) or other close relations who have business dealing with one another be allowed to tender/bid for the same tender as separate competitors. A breach of this condition will render the tenders/bids of both the parties liable for rejection.
7. The Technical Bid and Financial Bid (Cover-1 and Cover-2) shall be uploaded by the contractor on or before the date & time mentioned in **NIT**. A scanned copy of DD with enlistment details and other documents as specified in Appendix A shall be uploaded as Cover-1 (Technical bid) of the tender on e-tendering portal. DD is refundable in case the contractor is not considered eligible in technical evaluation of Cover 1 resulting in nonopening of Cover1. The applicant contractor shall bear the cost of bank charges for procuring and encashing the DD including revalidation of DDs and shall not have any claim from Government whatsoever on this account.
8. Tender form and conditions of contract and other necessary documents shall be available on website <https://defproc.gov.in> for download and shall form part of contract agreement in case the tender/bid is accepted.
9. In case of MES enlisted contractor who has not executed the Standing Security Bond and unenlisted contractor, the Cover-I shall be accompanied by Earnest Money for the amount mentioned in Appendix 'A' in the form of deposit at call receipt in favour of concerned CCE/GE/GE (I)/AGE (I) (see Appendix 'A') by a Scheduled Bank or in received treasury Challan the amount being credited to the revenue deposit of the concerned CCE/GE/GE(I)/AGE(I) (see Appendix 'A'). The CCE/GE/GE (I)/AGE (I) will return the Earnest Money, wherever applicable, to all unsuccessful tenderers/bidders by endorsing an authority on the deposit at call receipt for its refund, on receipt of intimation from the Accepting Officer to do that.
10. In case of successful contractor i.e., the lowest contractor having submitted EMD, he shall have the option of converting the EMD instrument into part of the Performance Security to be deposited by him within 28 days from the receipt of intimation of acceptance of tender from Accepting Officer.
11. Sample of materials and stores to be supplied by the contractor will also be available for inspection by the bidder at the office of concerned GE/GE (I)/AGE (I)/Project Manager during working hours. The bidder is advised to visit the site of work by making prior appointment with GE/GE (I)/AGE (I)/CCE/Project Manager, who is the Executing Agency of the work (see Appendix 'A'). The bidder shall be deemed to have full knowledge of all relevant documents, samples, site etc. whether he has inspected them or not.
12. Any bid which proposes any alteration to any of the conditions laid down or proposes any other new condition whatsoever, is liable to be rejected.

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

NOTICE INVITING TENDER (NIT) (contd...)

13. The uploading of bid by a bidder implies that bidder has read this notice and the conditions of contract and has made himself aware of the scope and specification of work to be done and of the conditions and rates at which stores (as applicable) etc. will be issued to him and local conditions and other factors having bearing on the execution of the work.
14. The bidder must be in possession of a copy of the MES Schedule (SSR) (Part-I & Part-II of latest edition) including amendments and errata thereto.
15. Accepting Officer does not bind himself to accept the lowest or any tender/bid or to give any reason for not doing so.
16. The Accepting Officer reserves the right to accept a tender submitted by a Public Undertaking/Small & Medium Enterprises (SMEs), giving a price preference/purchase preference over other tender(s)/bids which may be lower, as are admissible under the Government Policy. No claim for any compensation or otherwise shall be admissible for such tenderer/bidder whose tender/bid is rejected.
17. The **Notice Inviting Tender (NIT)** including Appendix 'A' and Annexures thereto, if any, shall form part of the contract agreement.

Signature of Contractor

**AAD (Contracts)
For Accepting Officer**

APPENDIX- ‘A’ TO NOTICE INVITING TENDER (NIT) (contd...)

1.	Name of work	:	PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POs AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)																	
2.	Estimated Cost	:	₹2,147.25 Lakh (at par market) (Approximate) (i) ₹2094.11 Lakh (at par market) (Approximate) for main project. (ii) ₹53.14 Lakh (Comprehensive maintenance of LIFTS for three years after completeion of defect liability period, Manning and Operation of internal and external services, installations for 05 years after completion of main project) Total cost: ₹2147.25 Lakh (at par market) (Approximate)																	
3.	Period of Completion	:	24 (Twenty Four) months																	
4.	Cost of tender documents	:	₹3,000/- in the shape of DD/Banker's cheque from any Scheduled Bank in favour of the Garrison Engineer (Navy) Porbandar and payable at Porbandar																	
5.	Website/portal address	:	https://defproc.gov.in																	
6.	Type of contract	:	The tender shall be based on drawings and specifications (IAFW-2159) (Revised 1947) and GCC (IAFW-2249) withSchedule- 'A' (list of items of work) pre-priced by MES. The tenderers are required to quote their lump sum amounts for pre-priced parts of Schedule- 'A' and quote rates against items of other parts of Schedule- 'A'/BOQ.																	
7.	<u>Timeline details</u>																			
	(a) Bid submission startdate (b) Bid submission enddate (c) Date of bidopening	}	Refer critical dates on the website.																	
8.	<u>Eligibility Criteria</u>																			
	(A)ForMESenlisted Contractors	:	Contractor shall satisfy the following: - (i) Enlistment in Class SS & Category a(i) as per MES enlistmentrules (ii) Shall not carry adverse remarks in Work Load Return or any similar report circulated by the competent engineerauthority.																	
	(B) For Contractors not enlisted with MES	:	(i) Contractor shall meet the enlistment criteria of SS Class & category a(i) contractor with regard to satisfactorily completion of requisite value works with Central/StateGovernment/Central/StatePSUs/AWHO/AFNHB /CGEWHO/ DGMAP, annual turnover, bank solvency, working capital and other requirements given in Para 1.4 & 1.5 of Section 1 of MES Manual of Contracts 2020 as available in all MES formations as well asMES website (www.mes.gov.in). (ii) Not carrying adverse remarks in Work Load Report (WLR) or any other similar report circulated by any competent authority, if already working inMES. (iii) Not suspended debarred/blacklisted (either permanently or temporarily) from participating in any bid or for business dealings by any Central/State Government Department or any Central/State Government PSU or any Autonomous Body under Central/State Government or any Local Body as on the bid submission enddate (iv) Details of works completed and under progress in MES be submitted in the following format: - <table><tr><td>Srl No</td><td>CA No & Name of Work</td><td>Value of CA</td><td>Date of Commencement</td><td>Date of Completion</td><td>Extended Date of Completion</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>						Srl No	CA No & Name of Work	Value of CA	Date of Commencement	Date of Completion	Extended Date of Completion						
Srl No	CA No & Name of Work	Value of CA	Date of Commencement	Date of Completion	Extended Date of Completion															

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

			(v) Un-enlisted Contractor who have secured two works in MES should get themselves registered in the appropriate designated Class with any Registering Authority, else the firm will not be eligible for participation in the tender unless until the firm is enlisted with the MES.
9.	Tender issuing and Accepting Officer	:	Chief Engineer (Navy) Mumbai Shahid Bhagat Singh Road, Colaba, Mumbai – 400 005 Concerned Officer: - Shri Rajesh Kumar, AAD (Contracts) Phone No. 022-22150513 Email address: sswcezn2-mes@nic.in
10.	Executing agency	:	Garrison Engineer (Navy) Porbandar
11.	Earnest Money	:	₹13,98,625/- in favour of the Garrison Engineer (Navy) Porbandar in the form of Deposit at call receipt. FDR not acceptable.

NOTES:

1. In case after opening of Cover 1, the number of MES enlisted contractors of eligible class as well as eligible un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT is less than 7 (Seven), applications in respect of MES contractors of upto two class below the eligible class shall also be considered subject to fulfilment of other eligibility criteria given in the NIT. Therefore, MES contractors upto two class below may also bid for this tender. Such contractors (contractors of one or two class below the eligible class) shall not be considered in case their present residual work in hand is more than FIVE TIMES their present tendering limit. However, in case such contractors fulfil the criteria of upgradation to the stipulated eligible class based on past experience of completed works (individual work experience and/or average annual turnover, as applicable) and financial soundness (solvency/financial soundness and working capital), the ceiling of present residual work will not apply and they will be considered for issue of tender. Such bidders shall upload in their Cover-1 bid details related to residual work in hand like details of works in hand showing names of work, names of Accepting Officers, Contract amounts, dates of commencement and completion (stipulated) and progress as on bid submission date. Such contractors, if claim to fulfil the criteria of upgradation shall also upload the requisite information/documents in support of upgradation. These details shall be verified by the Tender Issuing Authority from concerned formations in case bids of such contractors are considered for evaluation.
2. In case after opening of Cover 1, the number of MES enlisted contractors of eligible class as well as un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT, are 7 (Seven) or more, applications of only those one class below the eligible class bidders shall be considered, who have previously completed similar works satisfactorily and are meeting the criteria of up gradation in respect of past experience of completed works (individual work experience and or average annual turnover as applicable) and financial soundness (solvency/financial soundness and working capital) as per details given in Manual on Contracts Therefore such contractors shall upload the requisite information/documents in the Cover-1.
3. Unenlisted contractor shall be considered provided he meets the criteria. However, foreign firms shall not be eligible for this tender. However Indian Firms having foreign nationals/ Indian nationals staying abroad/ Indian national having taken foreign citizenship, as director(s) shall be considered subject to security clearance from the concerned authorities.
4. Contractors enlisted with MES will upload following documents in Cover 1 for checking eligibility-
 - (a) Application for tender on Firm's letterhead.
 - (b) Enlistment letter issued by the Registering Authority duly renewed for the cycle period in vogue.
 - (c) Scanned copy of DD /Bankers Cheque toward cost of tender and EMD instrument in case SSD bond is not signed at the time of registration.
 - (d) Self-attested copies of GST registration, EPFO registration and ESIC registration certificates.
 - (e) Any other document required as described in this Appendix.
5. Contractors not enlisted with MES will be required to upload following documents in Cover 1 for checking eligibility-
 - (a) Application for tender on Firm's letter head.
 - (b) Scanned copy of DD/ Bankers cheque toward cost of tender and Earnest Money Deposit (EMD) instrument.
 - (c) Copy of Police Verification Report/ Police Clearance Certificate/ Character Certificate from the Police Authority of the area where the registered office of the firm is located/notarized

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

- copy of valid passport of Proprietor/ each Partner/ each Director.
- (d) Documents required for enlistment in MES for SS class as per Para 1.5 of Section 1 MES Manual on Contracts 2020.
 - (e) Details of works being executed in MES, if any
 - (f) Self-attested copies of GST registration, EPFO registration and ESIC registration certificates.
 - (g) Any other document required as described in this Appendix
6. Tenders not accompanied by scanned copies of requisite DD/Bankers Cheque towards cost of tender and earnest money (as applicable) in Cover I shall not be considered for validation of T bid and their Financial bids will not be opened.
7. Contractors should ensure that their original physical DDs and Earnest Money Deposit (EMD) instruments (as applicable) reach the office of Accepting Officer within **07 days** of bid submission end date failing which following action shall be taken:
- a) In case of tenders from an enlisted contractor of MES, where scanned requisite DD/Bankers Cheque towards cost of tender have been uploaded in Cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover2) will be opened. However non-submission of physical copies of cost of tender shall be considered as wilful negligence of the tenderer with ulterior motives and such tenderer shall be banned from bidding for a period of six months commencing from the date of opening of Financial Bid (Cover2).
 - b) In case of tenders from unenlisted contractor, where scanned copies of requisite DD/Bankers Cheque towards cost of tender have been uploaded in Cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will not be opened. Name of such contractors along with complete address shall be circulated for not opening of their bids for a period of six months commencing from date of opening of Financial bid (Cover2).
 - c) In case of tenders from enlisted and unenlisted contractors, where scanned copies of instruments for Earnest Money Deposit (as applicable) have been uploaded in Cover 1 but the same are not received in physical form within stipulated period, such tenders shall not qualify for opening of financial bid (Cover2).
8. Contractor will not be allowed to execute the work by subletting or through power of attorney to a third party/ another firm on his behalf. However, a contractor can execute the work through power of attorney to sons/daughters/ spouse of Proprietor/ Partner Director and firm's own employees, director, project manager provided they are not having a separate enlisted firm in MES in their name as Proprietor/ Partner/Director.
9. After opening of Cover 1 and during its technical evaluation, in case any deficiency is noticed in the documents required to be uploaded by the tenderers as per NIT, a communication in the form of e-mail /SMS /Speed Post etc. shall be sent to the contractor to rectify the deficiency within a period of seven days from date of communication failing which their financial bid (Cover 2) shall not be opened and contractor shall not have any claim on the same.
10. Invitation for e-tender does not constitute any guarantee for validation of Technical bid and subsequent opening of financial bid of any applicant/bidder merely by virtue of enclosing DD. Accepting Officer reserves the right to reject the Technical bid and not to open the financial bid of any applicant/bidder. Technical bid validation shall be decided by the Accepting Officer based on eligibility of the firm as per criteria given in this Appendix. Tenderer/ bidder will be informed regarding non-validation of his Technical bid assigning reasons therefore through tender evaluation report which shall be uploaded on the website. Such tenderer, if desires, may appeal to the next higher Engineer Authority (NHEA) viz **HQ Chief Engineer Southern Command, Pune** on email id 'dydrcontceengrpl-mes@gov.in' with copy to the Accepting Officer on email before the scheduled date of opening of Cover 2. NHEA shall decide the matter within a period of seven working days from the date of receipt of appeal. The decision of the NHEA shall be final and binding. The tenderer/bidder shall not be entitled for any compensation whatsoever for rejection of his bid.
11. In case the BOQ is revised through the corrigendum and the bidder has failed to quote on revised BOQ (i.e. he has quoted on pre revised BOQ), such bid shall be treated as wilful negligence by the bidder and his quotation shall be considered non-bonafide. In such cases the lowest tender shall be determined from amongst the valid/ bonafide bids only. Accepting Officer may decide whether to re-tender or consider the lowest bonafide tender for acceptance.
12. Revoking the offer or revising the rates upward or offering voluntary reduction by the lowest tenderer after opening of Cover 2 shall be considered as a wilful default. For this default a penalty of an amount equal to Earnest Money shall be levied. In case of an unenlisted tenderer, Earnest Money deposited by him shall be forfeited. In case of MES enlisted tenderer having deposited the

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

Standing Security Bond, an amount equal to the earnest money stipulated in the NIT, shall be notified to the tenderer for depositing through MRO and consideration of such tenderer in tender evaluation for future works shall remain suspended till the aforementioned amount is deposited in the Government Treasury. No other disciplinary administrative action shall be taken against such tenderers. In such a situation, the next lowest offer shall not be considered for acceptance. Instead, retendering shall be resorted to in a transparent and fair manner and the defaulting tenderer and his related firm if any, shall not be eligible for this tender in second call or subsequent calls.

13. Tender to related firms shall not be issued simultaneously. Firms shall be termed as related if Proprietor/ one or more Partners/Directors are common. Decision of Accepting Officer on issue/deny the tender to any one of the related firms shall be final and binding.
- 13A. Irrespective of whatever is mentioned in condition 19.3 of IAFW 2249 with regard to suspension of tenders on account of non-submission of Performance Security, issue of tenders to such tenderers shall remain suspended for a period of six months from the date of cancellation of contract under condition 19.3 of IAFW 2249 in case of unenlisted contractors. In case of MES enlisted contractor, issue of tenders shall remain suspended till deposit of EMD or six months from date of cancellation whichever is later.
14. **INTEGRITY PACT:**
Integrity pact is an integral part of tender/bid documents. Scanned copy of Integrity pact duly signed on each page by the bidder shall be uploaded as a part of technical bid (Cover -1) and original IP duly on all pages shall be forwarded by post along with demand draft to Accepting Officer. Bidders who do not upload scanned copy of IP duly signed will be informed through option of 'Short Fall Documents' (in e-tendering portal). Any bidder who fails to forward the copy of IP duly signed even after this communication shall be disqualified in the Technical Bid (Cover-1) evaluation and his financial bid will not be opened. Refer tender documents.

Signature of Contractor**AAD (Contracts)
for Accepting Officer**

File No: 87979/E8

Military Engineer Services
Chief Engineer (Navy) Mumbai,
Shahid Bhagat Singh Road,
Colaba, Mumbai – 400 005

Concerned Officer:-
Shri Rajesh Kumar, AAD (Contracts)
Phone No. 022-22150513
Email address: sswcezn2-mes@nic.in

INTEGRITY PACT**1. General**

Whereas the President of India, represented by Chief Engineer (Navy) Mumbai hereinafter to as Principal / Owner and the first part, has floated the tender (NIT No **87979/E8**) and intends to award, under laiddown organizational Procedure, Contract for **PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)**. Herein after referred to as works / Services and M/s _____ represented by, _____ (Which term unless expressly indicated by the contract, shall be deemed to include its successors and its assignees), hereinafter referred to as the Bidder/Contractor and the second part is willing to carry out the works /services.

2. Whereas the Bidder is a Proprietorship Concern / Partnership Firm / Limited Liability Firm / Private Limited Company / Limited company constituted in accordance with the relevant law in the matter and the Principal / Owner is Chief Engineer (Navy) Mumbai performing its functions on behalf of the President of India.

3. Objectives

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

- 3.1 Enabling the Principal / Owner to get the desired works / services at a competitive price in conformity with the defined specifications of the services by avoiding high cost and the distortionary impact of corruption on public procurement.
- 3.2 Enabling Bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices and the Principal / Owner will commit to prevent corruption, in any form, by their officials by following transparent procedures.

4. Commitments of the Principal /Owner

The Principal / Owner commits itself to the following: -

- 4.1 The Principal / Owner undertakes that, no official of the Principal / Owner, connected directly or indirectly with the contract will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift , reward, favour or any material or immaterial benefit or any other advantage from the Bidder, either for themselves or for any person, organization or third party related to the contract; in exchange for an advantage; in the bidding process, bid evaluation, contracting or implementation process related to the contract.
- 4.2 The Principal / Owner will, during the pre-contract stage, treat all Bidders alike and will provide to all Bidders the same information and will not provide any such information to any particular Bidder which could afford an advantage to that particular Bidder in comparison to other Bidders.
- 4.3 All the officials of the Principal / Owner will report to the appropriate Government office any attempted or completed branch(s) of the above commitments as well as any substantial suspicion of such breach.
5. In case of any such preceding misconduct on the part of such official(s) is reported by the Bidder to the Principal / Owner wilful and verifiable facts and the same is prima facie found to be correct by the Principal/ Owner, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the Principal / Owner and such a person shall be debarred from further dealing related to the tender / contract process. In such a case while an inquiry is being conducted by the Principal / Owner the tender process / proceedings under the contract would not be stalled.

6. Commitments of Bidder

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

- 6.1 Bidder will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour any material or non-material benefit or other advantage, commission, fee, brokerage or inducement to any official of the Principal / Owner, connected directly or indirectly with the bidding process, or to any Person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the Contract.
- 6.2 The Bidder further undertakes that he has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour any material or non-material benefits or other advantage, commission, fees, breakage, or inducement to any official of the Principal / Owner or otherwise is procuring the contract or forbearing to do or having done any act in relation to the obtaining or execution of the Contract or any other Contract with the Government for

INTEGRITY PACT (Contd.../-)

showing or forbearing to show favour or disfavour to any person in relation to the Contract or any other Contract with the Government.

- 6.3 The Bidder will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.
- 6.4 The Bidder will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.
- 6.5 The Bidder would not enter into conditional contract with any Agent(s), broker(s) or any other intermediaries wherein payment is made or penalty is levied, directly or indirectly, on success or failure of the award of the contract.
- 6.6 The Bidder commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts. Complaint will be processed as per **Guidelines for Handling of complaints** in vogue. In case the complaint is found to be vexatious, frivolous or malicious in nature, it would be construed as a violation of Integrity Pact.

7. Previous Transgression.

- 7.1 The Bidder declares that no previous transgressions occurred in the last three years immediately before signing of this Integrity Pact with any other company in respect of any corrupt practices envisaged hereunder or with any public sector Enterprise in India or any Government Department in India.
- 7.2 If the Bidder makes incorrect statement on this subject, Bidder can be disqualified from tender process or the contract and if already awarded, same can be terminated for such reason.

8. Company Code of Conduct

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

9. Sanction for Violation

- 9.1 Any breach of the aforesaid provisions by the Bidder or any one employed by him or acting on his behalf (whether with or without the knowledge of the Bidder) or the commission of any offence by the Bidder or any one employed by him or acting on his behalf, as defined in Chapter IX of the Indian Penal Code, 1860 or the Prevention of Corruption Act 1988 or any other act enacted for the prevention of corruption shall entitle the Principal /Owner to take all or any one of the following actions, wherever required :-
 - (i) Technical bid of the Bidder will not be opened. Bidder will not be entitled to or given any compensation. However, the proceedings with other Bidder(s) would continue.
 - (ii) Financial bid of the Bidder will not be opened. Bidder will not be entitled to or given any compensation. However, the proceedings with the other Bidder(s) would continue.
 - (iii) The earnest money Deposit shall stand forfeited either fully or partially, as decided by the Principal / Owner, in case contract not awarded to the Bidder and the Principal / Owner shall not be required to assign any reason therefor. For enlisted contractors an amount less than or equal to Earnest Money Deposit as decided by the Principal / Owner shall be deducted from any amount held with the Department / any payment due.
 - (iv) To immediately cancel the contract, if already concluded / awarded without any compensation to the Bidder.
 - (v) To encase the Performance Security furnished by the Bidder.
 - (vi) To cancel all or any other Contract(s) with the Bidder.
 - (vii) To temporarily suspend or temporarily debar / permanently debar the bidder as per the extant policy.
 - (viii) If adequate amount is not available in the present tender / contract, the deficient amount can be recovered from any outstanding payment due to the Bidder from the Principal Owner in connection with any other contract for any other works / services.
 - (ix) If the Bidder or any employee of the Bidder or any person acting on behalf of the Bidder, either directly or indirectly, is closely related to any of the officers of the Principal/Owner, or alternatively if any close relative of an officer of the Principal / Owner has financial interest/stake in Bidder's firm, the same shall be disclosed by the Bidder at the time of submission of tender. Any failure to disclose the interest involved shall entitle the Principal/Owner to debar the Bidder from the bid process or rescind the Contract without payment of any compensation to the Bidder. The term 'close relative' for this purpose would mean spouse whether residing with the Government servant or not, but does not include a spouse separated from the Government servant by a decree or order of a competent Court; son or daughter or step son or step daughter and wholly dependent

INTEGRITY PACT (Contd.../-)

upon Government servant, but does not include a child or step child who is no longer in any way dependent upon the government servant or of whose custody the government servant has been deprived of by or under any law; any other person related, whether by blood or marriage, to the Government servant or the government servant's wife or husband and wholly dependent upon Government.

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

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

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

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

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

10.2 Details of Nodal officer nominated by E-in-C's Branch are as follows:-
Name : Shri P K S Sengar, Director (Contracts), Room No. 158, Dte of Contract Management, E-in-C's Branch, Kashmir House, Rajaji Marg, New Delhi – 110011
Tel No. (Office) : 011-23019154
(Mobile) : 9131948501
E-mail id : dircont1einc-mes@nic.in

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

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

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

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

11. **Examination of Book of Accounts**

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

12. **Law and Place of Jurisdiction**

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

13. **Other Legal Actions**

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

INTEGRITY PACT (Contd.../-)**14. Signing of Integrity Pact on behalf of Bidder**

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

15. Validity

- 15.1 The validity of this Integrity Pact shall be from date of its signing. It expires for the Contractor after that final payment under the contract has been made or till the continuation of Defect liability period, whichever is later and for all other bidders, till the Contract has been awarded.
- 15.2 Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intention.

INTEGRITY PACT

To

Chief Engineer (Navy) Mumbai

Sub: - Tender ID No. _____ submission of Tender for the work of **PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)**

Dear Sir,

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

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the Integrity Pact, which is an integral part of tender documents, falling 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 condition of the NIT.

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

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

Yours Faithfully

(Duly authorised signatory of the Bidder)

INTEGRITY PACT (Contd.../-)

To

Sub:- Tender ID No. _____ for the Work PROVISION OF DEFICIENT MARRIED
ACCOMMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48
DUs)

Dear Sir,

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

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

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

Yours faithfully

Chief Engineer (Navy) Mumbai

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER**1. EARNEST MONEY DEPOSIT (EMD)**

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

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

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

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

2. PERFORMANCE SECURITY

2.1 Within 28 days of receipt of the letter of acceptance, the successful contractor shall deliver to the Accepting Officer a performance security in any of the forms given below for an amount equivalent to **5%** of the contract sum. Condition 19 of IAFW-2249 (GCC) deemed to be amended accordingly.

- (a) A bank guarantee in the prescribed form.
- (b) Government Securities, FDR, Insurance Surety Bond or any other government instruments stipulated by the Accepting Officer.

2.2 The Performance Security shall be in favour of Accepting Officer and shall be in any of the forms mentioned below

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

It is advisable that Performance security is deposited in the form of deposit call receipt from an approved Schedule Bank for easy refund. In case the tenderer/bidder wants to lodge 'PERFORMANCE SECURITY DEPOSIT' in any other form allowed by MES, a confirmation about its acceptability will be obtained from the Accepting Officer well in advance. Performance security Deposit shall be submitted in the name of concerned GE.

Work Order No 1 shall be placed only after submission of Performance Security deposit of adequate value by the Contractor. In case a fixed deposit receipt of any bank is furnished by the contractor to the Government as part of the Performance Guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.

2.3 If the Performance Security is provided by the successful contractor in the form of Bank Guarantee, it shall be issued by the Nationalized/Scheduled Indian Bank but its confirmation shall be done only from the Head office of the Bank.

2.4 Form of the Bank Guarantee Bond against Performance Security Deposit shall be same as Appx2.1 of MES Manual on Contracts 2020.

2.5 The Period of validity of the Bank Guarantee Bond against Performance Security shall be initially valid up to the stipulated date of expiry of Defects Liability Period plus minimum 60 days beyond that. In case final bill is not paid during this period, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time required for payment of final bill.

2.6 Failure of the successful Contractor to comply with the requirements of clause **2.1** shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Earnest Money. In case of MES enlisted Contractor, amount equal to the Earnest Money stipulated in the Notice Inviting Tender, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury.

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER (contd...)

- 2.7 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. 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.
3. **GENERAL INSTRUCTIONS FOR COMPLIANCE**
- 3.1 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.
- 3.2 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.
- 3.3 Drawings, if issued in physical form, must be returned duly initialled by the tenderer/bidder in separate envelope indicating his name and address.
- 3.4 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.
- 3.5 In the technical bid, a scanned copy of Power of Attorney in favour of the person uploading the bid using his/her DSC shall be uploaded. In case, the digital signatory himself, is the sole proprietor, scanned copy of an affidavit on stamp paper of appropriate value to this effect stating that he has authority to bind the firm in all matters pertaining to contract including the Arbitration Clause, shall be attached in 'pdf' format. 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.
- 3.6 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 & Articles 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 and 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 National 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.
- 3.12 The tenderer/bidder shall quote his rate on the BOQ file only. No alteration to the format will be accepted, else the bid will be disqualified and summarily rejected.
- 3.13 In case the tenderer/bidder has to revise/modify the rates quoted in the BOQ (excel sheet) he can do so only in the BOQ, through https://defproc.gov.in site only before the bid closing time and date.

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER (contd...)

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

In the event of tenderer/bidder revoking his offer or revising his rate 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.

5. CPM (Critical Path Method)

- 5.1** The project planning for work covered in the scope of tender is based on CPM.
- 5.2** The tenderer/bidder is expected to be fully conversant with the CPM technique and employ technical staff who can use the technique in sufficient details. Sufficient books and other literature on the subject are widely available in the market which the tenderer/bidder may make use of.
- 5.3** The 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.** 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.
- 7.** In case the BOQ is revised by the Department and the bidder has failed to quote in revised BOQ (i.e. he has quoted in previous BOQ), such bid shall be treated as wilful negligence by the bidder and his quotation shall be considered non-bonafide. In such cases the lowest tender shall be determined by the lowest amount amongst the valid/bonafide bids only. Accepting Officer may decide whether to retender or otherwise. The remark of 'non-bonafide finance bid' against such bidder and copy of this CST shall be uploaded along with Finance Bid Opening Summary.
- 8.** These instructions shall form part of the contract documents.

Signature of Contractor

**AAD (Contracts)
for Accepting Officer**

In lieu of IAFW-2159 (Revised 1947)

[To be used in conjunction with General Conditions
of Contracts IAFW-2249) (1989 Print)]

MILITARY ENGINEER SERVICES

Tel : 022-22150513

Headquarters
Chief Engineer (Navy) Mumbai,
Shahid Bhagat Singh Road,
Colaba, Mumbai - 400 005

87979 / / E8

Jun 2026

**LUMP SUM TENDER AND CONTRACT FOR WORKS REQUIRED IN THE EXECUTION OF
PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POS AND BELOW) AT
NAVAL BASE PORBANDAR (48 DUs)**

Shri/S`Shri_____ of _____ is / are hereby
authorised to tender for the above work. The quoted e-Tender shall be uploaded at the MES website
<https://defproc.gov.in> upto **1800** hours on _____ **2026** and shall be opened on or after _____ **2026** at
1100 hours. All correspondence concerning this tender should be addressed as indicated at the top of
the sheet quoting reference as given.

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

**AAD (Contracts)
for Accepting Officer**

BOQ / SCHEDULE-`A' NOTES (contd...)

NAME OF WORK: PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)

NOTES:

1. SCOPE AND PARTS OF BOQ/SCHEDULE`A'

1.1 This BOQ/Schedule-`A' has been divided into **15 (Fifteen)** different parts described as here under:

(a)	Building And Structures Works	:	Schedule-`A' Part – I
(b)	Site Clearance, Excavation & Earthwork	:	Schedule-`A' Part – II
(c)	Internal Water Supply	:	Schedule-`A' Part – III
(d)	Internal Electrification	:	Schedule-`A' Part – IV
(e)	Telephone and TV Conduit	:	Schedule-`A' Part – V
(f)	Fire Fighting System	:	Schedule-`A' Part – VI
(g)	Lightening Protection & Aviation Light	:	Schedule-`A' Part – VII
(h)	External Water Supply	:	Schedule-`A' Part – VIII
(j)	External Electrification	:	Schedule-`A' Part – IX
(k)	Road, Culverts, Footpath and Hardstanding	:	Schedule-`A' Part – X
(l)	Sewage Disposal	:	Schedule-`A' Part – XI
(m)	Area Drainage	:	Schedule-`A' Part – XII
(n)	EV Charging point	:	Schedule-`A' Part – XIII
(o)	Aviation Light	:	Schedule-`A' Part – XIV
(p)	Arboriculture	:	Schedule-`A' Part – XV
(p)	BOQ including Miscellaneous Items	:	Schedule-`A' Part – XVI

1.2 The descriptions of building works and services given in the various parts of BOQ/Schedule- `A' are in brief and includes for complete materials and labourers unless otherwise mentioned. These shall be amplified and read in conjunction with Special Conditions, Particular Specifications, Drawings forming part of the contract including notes thereon, Specification for materials and workmanship and conditions in relevant sections of MES Standard Schedule of Rates 2009 (Part-I) and MES Schedule Part-II (2020) including preambles thereto. Words 'all as specified and/or shown on drawings' shall be deemed to be included in all items of BOQ/Schedule-`A' whether specifically mentioned or not.

1.3 The typical drawings (TD drawings) attached with the tender shall be supplemented to the main drawings and only relevant details shall be followed. In case of any discrepancy between details in main drawings and TD drawings, the details in main drawings shall take precedence over the typical drawings unless specifically indicated.

1.3.1 Finishes mentioned in Schedule of Finishes drawings shall supersede the finishes mentioned in Particular Specifications, in case of any discrepancy.

1.4 The content / description under column 3, 7 and 8 of **Schedule-`A' Part-I to Part-XVI** shall be read as under:

a)	Column 3 (Drawing No)	:	Refer 'List of Drawings'
b)	Column 7 (Period of completion of individual Items from the date of handing over of site)	:	Refer note No. 2 and 3 of Schedule-`A' / BOQ notes
c)	Column 8 (Remarks)	:	Refer Schedule-`A' /BOQ notes

2. PERIOD OF COMPLETION:

2.1 The entire work under this contract including connected services as mentioned in BOQ (**Schedule `A' Part-I to Part-XVI**) shall be completed in **24 (Twenty Four) months** in all respects from the date of handing over of site as mentioned in Work Order.

2.2 Work Order for the work will be issued by **Garrison Engineer (Navy) Porbandar**.

2.3 Final bill for the work shall be paid to the contractor after satisfactory completion of work.

3. BLANK

BOQ / SCHEDULE-`A' NOTES (contd...)**4. UNIT RATES**

- 4.1** The rates per unit inserted in Column 5 of **Schedule-`A' Part- I to XV** are deemed to be at par with rates contained in MES Schedule of Rates 2020 or rates analogous thereto. The Contractor is required to quote his lump sum price in column 6 of BOQ against **Schedule-`A' Parts- I to XV** and the percentage representing his lump sum price against relevant parts of this BOQ/Schedule-`A' on or off the total cost inserted by MES will be automatically indicated in column 9 of BOQ of tender documents. The percentages and the amounts tendered by the Contractor shall be deemed to have been calculated in the manner set out in condition 6A(B) of General Conditions of Contracts IAFW-2249.
- 4.2** The Contractor is required to quote his rates per unit against each item of work given under **BOQ (Schedule `A') Part-XVI**. The rates quoted shall include supply of material and labour and fixing etc. complete.
- 4.3** Unless otherwise specified in the description of items 'Rate/Unit' (inserted by MES) of each item of works includes supply of all materials and labour and fixing, fabricating, erecting, laying, testing, commissioning, etc. as required for complete execution and completion of the work.
- 4.4** Works in respect of Schedules, which are Pre-Priced by the MES are carried over to BOQ. The tenderer shall work out total amount against each of these sections of Sch 'A' based on his own calculations and insert the percentage at appropriate places on or off the total cost inserted by MES in BOQ of each section of Sch 'A' from the amount quoted by him. In the event of discrepancy between the lump sum quoted by the tenderer and percentages inserted by him, the amount shall be treated as firm and the percentage shall be amended accordingly. In this connection, tenderer attention is particularly invited to condition 6A sub Para 'B' (Lump sum contracts based on pre-priced Sch 'A') of IAFW-2249 forming part of the tender documents. The contractor shall have no claim what-so-ever on account of any errors in the unit rates/prices inserted by MES. Tenderer shall insert his percentage at appropriate place above or below the total cost inserted by MES for Provisional Sum.
- 4.5** Works in respect of Schedules, which are not Pre-Priced by the MES, tenderers are required to work out and quote their rates for each item of works as catered in these schedules in the manner set out in condition 6A of IAFW-2249 and quote their rates as per unit under column 6 in "figures" and extend the amount under 'Col. 7' based on the description of items, drawings, specifications, special conditions, general conditions and other conditions of the contract for each item separately and sum of the total amount so arrived is carried forward to the general summary at appropriate place provided for.
- 4.6** M&L or S&F wherever occurring, shall be read as 'Material and Labour' or 'Supply and Fix' respectively.
- 5.** All quantities given under column 5 of **Schedule-`A' Parts-II to XV** and quantities given under column 3 of **Schedule-`A' Part-XVI** (BOQ) are provisional. Probable layouts of various items are indicated in drawings. The layout shown therein is intended for guidance only and may be varied where necessary at the discretion of the Engineer-in-charge. The Contractor shall not be entitled for any claim on account of such varied alignments.
- 5.1** All works for lift shall be carried out in accordance with the provisions contained in the particular specifications, special conditions and general conditions forming part of this tenderer & Bombay Lift Act & Bye Laws 1939 and Bombay lift Rules 1958 respectively from time to time.
- 5.2** The unit rates quoted by the tenderer against BOQ (Lift work and OWC work) shall also include for comprehensive maintenance for 24 months from date of taking over by the department including replacement of any item as directed by GE during maintenance period.
- 6. SCHEDULE- `A' PART-I**
- 6.1** Unit rate quoted by the tenderer against items of Schedule-`A' Part-I shall be deemed to include for entire completion of the work and all relevant items of works as shown on drawings including notes thereon except works covered in **Schedule-`A' Parts-II to XV**.
- 6.2** The cost of following items shall also be deemed to be included in the unit rates quoted by the tenderer against items of Schedule-`A' Part-I.

(i) (a) Foundation for walls, columns footing, superstructure including plinth and complete filling under floors and sides of walls/foundations wherever required, hard core, sub base to floor, flooring, DPC, window cills, granite, board and items not covered under internal water supply and internal electrification for connecting and commissioning unless mentioned otherwise in the particular schedule.

(b) After excavation for foundation, actual strata encountered will be inspected by GE. In case the strata differ from the original soil report, SBC shall be re-verified by GE and the same shall be brought to the notice of Accepting Officer if SBC is on lower side for re-design of foundation. Cost of re-verification of SBC shall be borne by the Contractor and deemed included in the quoted sum.

(ii) Cutting chases, leaving / forming holes in walls, floors and concrete etc. as required for embedding concealed pipe/conduits/strips and making good to match with the adjoining surfaces in connection with the works included in other parts of Schedule- `A' except specifically mentioned

BOQ / SCHEDULE- 'A' NOTES (contd...)

otherwise under particular items of other Schedules. No price adjustment shall be made for any increase/ decrease in works of cutting / chase / forming holes etc. consequent to variation in quantities of items included in other parts of Sch- 'A'.

(iii) Water proofing treatment to RCC roof slabs, chajjas, parapets and over top of RCC canopies as specified.

(iv) All sanitary apparatus, appliances, accessories, toilet fittings, kitchen fittings, mirrors, etc., SGSW Gully traps including PCC encasing, CI floor traps/ Nahani traps with CP grating whether shown on drawings or not, plumbing work, UPVC Soil/waste/vent pipes, 1st manhole and SGSW pipe from Gully traps to 1st manhole. All soil/waste pipes shall be taken vertically below GL to a depth as required and shall be provided with a heel rest bends at the lower end and soil pipes shall be connected up to 1st manhole with required slope. Irrespective of what is shown on drawings, the first manhole shall be constructed at a distance of 3.0m from the respective external face of the wall except in cases where 1st manhole is shown in shafts. In case of any variation in distance of manhole, the same shall be regularized through DO.

(v) Fan hook with MS boxes, pelmet boxes and / or decorative curtain rods as shown on drawings, peg set fittings and fixtures, niches and boxes to house switch box and the like.

(vi) Pre-constructional anti-termite treatment shall be provided to all buildings (Item Sr No 01) of Schedule 'A' Part-I.

(viii) CI/ pressed steel fan boxes with hooks treated with 2coats of synthetic enamel paint over a coat of red oxide primer on exposed surfaces and tarred on surfaces in contact with concrete

(ix) Numbering to blocks

(x) Strengthening measures for buildings for required seismic zone

(xi) RCC over Head water tank, steps, ramps, plinth protection, platforms, RCC shelves etc. as shown on drawings

(xii) Coping over 1.2m high RCC parapet walls, drapery rods, rain water pipe, rain water spouts and splash stones

(xiii) Built in furniture items such as cupboards, stainless steel sink with drainage board, kitchen cabinet, Book shelves, letter box and any other items as shown on drawings.

(xiv) Parking area and route of parking to be painted with road marking paint.

(xv) Vent pipe, upto the height of 0.30m above RCC parapet.

(xvi) Preparatory works, surface dressing, etc.

(xvii) Grills, RCC shelves, opening for exhaust fans, arrangements for drying clothes

(xviii) Stainless Steel Railings (Grade 304).

(xix) RCC overhead tanks of capacity as shown on drawings including CP brass float valve of required size, 20 mm bore GI medium grade overflow pipe, 40 mm bore GI flush pipe with plug, 15 mm bore GI vent pipe as shown on drawings. The length of overflow pipe shall be brought up to nearest sump/ outlet of rain water spouts / holes and anti- mosquito rose be provided with overflow & vent pipe.

(xx) The readymade steel walk board shall be provided by the Contractor for movement of labours and materials on each slab while concreting. No pedestrian/ machinery movement shall be allowed on base reinforcement. The cost of this provision shall deem to be included in lump sum quoted rates against Schedule- 'A' Part-I.

(xxi) The work is required to be carried out up to (Ground + 6 stories) building, motorised lift for concrete/ materials shall be used. Cover blocks for slabs, beams and columns shall be of factory made as approved by the GE. The cover blocks shall be made of fibre reinforced concrete of strength not less than 50MPa or shall be of polypropylene. For columns and vertical members such as walls, PVC ring type / Polypropylene blocks shall be used. The cost of this provision shall deem to be included in lump sum quoted rates against relevant items of Schedule- 'A' Part-I

(xxii) Detailed drawings (if not mentioned / provided in this tender documents) and necessary for any of the items of work shall be obtained from the GE / CWE / CE office and work shall be executed accordingly without any extra cost.

7. SCHEDULE- 'A' PART-II to PART-XV

7.1 All quantities given under column 5 of **Schedule- 'A' Part-II to Part-XV** and quantities given under column 3 of **Schedule- 'A' Part-XV (BOQ)** are provisional.

BOQ / SCHEDULE-`A' NOTES (contd...)

7.2 All excavation and earthwork required for **Schedule- ‘A’ Part-II to Part- XV** shall be measured and paid under respective items of Schedule- ‘A’ Part-II except where the description of **Schedule ‘A’ Part-II to Part-XV** items specifically include work of excavation and earthwork.

8. **VALUATION OF DEVIATION**

The percentage addition / deduction of MES Schedule of Rates for the purpose of pricing deviation vide sub-clause C (c) or C (d) of Condition 62 of IAFW-2249 shall be as follows :-

a)	For works covered under BOQ/Schedule-‘A’ Part- II to XV	Percentage above / below as derived by the tenderer comparing with the lump sum worked out by him to the amount inserted by MES as stipulated in Condition 62 of IAFW 2249
b)	For works covered under BOQ/ Schedule-‘A’ Part- XVI	As per Condition 62 of IAFW 2249 (General Conditions of Contracts)

9. **APPROVAL OF SPECIAL (STAR) RATE**

a) In case of any deviation, mode of pricing shall be decided by Accepting Officer in terms of Condition 62 of IAFW-2249.

b) In the event of a deviation order involving fixation of Special (Star) Rate, Draft Rate Shall be prepared by GE (within a maximum period of 30 days) while initiating the proposal for deviation seeking approval of Accepting Officer and shall be notified to contractor. While notifying the Draft Rate, it will be clearly stipulated that the same is merely an estimated rate and firm rate shall be fixed based on actual and receipt of supporting documents from contractor such as vouchers/literature of product/test certificates etc. (as applicable) on completion of the work involving Star Rate. Any objection to the method of fixing Star Rate will be dealt as per Condition 7 of IAFW-2249.

c) The Draft Star Rate shall be made based on market enquiry through telephonic enquiry/ quotations/ email/ rate lists/ internet based source, material & labour constants available in various civil engg. books and record available in respect of Star Rates approved in the past for similar items of works etc. Contractor may also assist GE office in preparation of draft Star Rate.

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

e) After completion of the item of work involving Star Rate, contractor shall submit the vouchers/literature of product/test certificate (as applicable, decision of GE being final in case of any disagreement) for finalisation of Star Rate. The Star Rate shall be technically checked by DCWE (C)/ Director (C) depending upon the financial effect & approved by Competent Authority within a period of one month from submission of the relevant documents by contractor as mentioned above.

f) The Star Rate as approved by Competent Authority, after technical check by DCWE (C)/ Director (C) depending upon the financial effect, shall be referred as “the rate decided by GE” under Condition 62 (G) of IAFW-2249.

10. **MINOR DETAILS**

10.1 Lump sum quoted or the rate quoted for a particular item by the tenderer shall be deemed to include for all minor details / items of work and / or constructions which are obviously and fairly intended and which may not have been included in these documents but which are essential for the execution and entire completion of work and services in workman like manner and sound construction.

10.2 In case of difference of opinion between the Contractor and the Garrison Engineer as to whether or not certain item of work constitutes `Minor Constructional Details' which is deemed to have been included in the Contractor's quoted lump sum, the decision of the Accepting Officer shall be final, conclusive and binding.

10.3 However, some of the minor details / items which shall be deemed to be essential for execution and entire completion of work are described as under for guidance

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

(ii) Dwarf wall in situations like veranda, passage etc. not indicated in drawing.

(iii) Lintel over doors, windows and or opening not shown in drawing.

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

10.4 In all the above and similar cases, the details indicated elsewhere in the drawings which are similar or near similar to missed out items or works shall be followed. In the absence of any other similar or near similar details, minimum essential requirement for completion of the work from structural, architectural and utility point of view shall be deemed to be included in the lump sum

BOQ / SCHEDULE-`A' NOTES (contd...)

quoted. In the event of any dispute, decision of the Accepting Officer shall be final, conclusive and binding.

11. (a) For structural details, structural drawings shall only be referred. If there is any discrepancy between architectural and structural drawings with regard to structural details, details shown on structural drawings shall prevail. Similarly, if there is discrepancy between architectural and structural drawings with regards to architectural details, details shown on architectural drawings shall prevail. The decision of the Accepting Officer as to what constitutes structural or architectural details shall be final, conclusive and binding.
- (b) For missing reinforcement details, if any, of RCC work, minimum reinforcement as required as per IS shall be adopted.
- (c) In case where type and size of beam, slab and column etc. are not indicated these shall be provided as decided by the Accepting Officer.
- (d) If there is any discrepancy regarding general notes on RCC works in TD (typical details) drawings and structural drawings, structural drawings shall be followed. Similarly, details in main drawings shall be followed in case of discrepancy in main drawing and TD drawings.
- (e) Nothing extra shall be admissible on account of work executed as stated above and the Contractor shall be deemed to have taken into consideration the above provisions before quoting his lump sum cost and submitting the tender.

12. The lump sum quoted by the tenderer in BOQ (Schedule 'A') Part-I for each block shall also include for making of block number (at two places in a particular block) as well as making number for all blocks with numbered ceramic tiles of size 8" X 8" for each alphabet / number separately for numbering of each block and of size 6" X 6" for each alphabet / number separately for numbering of each over 15 mm thick cement plaster in CM (1:4) as directed by the GE / Engineer-in-Charge. The number of tiles required for numbering of each block shall be different as the same will depend on quantum of alphabet / numbers required for numbering of any particular block. However, no adjustment shall be made for such variations and the unit rate / lump sum quoted in BOQ (Schedule 'A') Part-I shall be deemed to include for such variations and nothing extra shall be admissible on this account. Similarly, the lump sum quoted by the tenderer in BOQ (Schedule 'A') Part- I shall also include for marking of block / building numbers as mentioned here-in-before.

13. **GRANITE STONE PLATE FOR GUARANTEE**

The contractor, within four weeks from the certified date of completion, shall provide a black granite stone plate of size 90 cm x 60 cm x 1.5 cm at a **prominent place/location of each building as directed by the GE/AGE(I)** having engraved the following information/details on the plate :-

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

- 13.1 Granite stone plate shall be fixed over 15 mm thick cement screed in CM (1:3)
- 13.2 All figures/words engraved shall be painted with golden paint of approvedmake.
- 13.3 The cost of above is deemed to be included in the lump sum amount quoted by the contractor against Schedule 'A' Part-I.
14. The Contractor shall prepare a sample board of approved samples of internal finishes and external finishes as instructed by the GE/Engineer-in-charge during the execution of the project without any extra cost to Govt. and that sample board shall be displayed in the GE/Engineer-in-charge office.
15. In view of coming into force of 'Goods and Services Tax Act' by Govt. of India Notification wef 01 Jul 2017, the rates quoted by the tenderer shall be deemed to include the provisions of Goods and Services Tax. Nothing extra whatsoever shall be admissible on this account. The relevant clauses in the tender shall be deemed to be amended accordingly. Taxes levies as applicable as per Govt. rules/Acts other than GST if any also shall deemed to be included in the rates quoted by the tenderers. The Rate quoted by the Contractor shall be deemed to be inclusive of all Labour Welfare Cess / Tax etc.), duties, Royalties & other levies payable under the respective Statues.
16. The Rate quoted by the Contractor shall be deemed to be inclusive of all taxes (including Goods and Services Tax including Swatch Bharat Abhiyan Tax & Krishi Kalyan Cess, Turnover Tax, Labour Welfare Cess / Tax etc.) and other levies payable under the respective States as applicable.

BOQ / SCHEDULE-`A' NOTES (contd...)**17. LAYOUT**

- 17.1 Layout of buildings indicated on the site plan is tentative. No adjustment in price shall be done on account of minor changes/ modifications in the final approved layout within the site plan area.
- 17.2 Probable distributions of various items of internal / external services are indicated on drawings. These are tentative and likely to be varied where necessary at the discretion of the Engineer- in-Charge. The tenderer shall not be entitled for any claim whatsoever on account of such varied alignment of services.

18. PERFORMANCE EVALUATION AND MONITORING OF WORKS**18.1 Performance Evaluation**

Performance evaluation of the work as executed by the Contractor shall be carried out as specified, distinct and laid down stages of the work. The Contractor shall give on site presentation in these evaluations to the Accepting Officer in presence of CWE, GE, AGE, staff officers of CE's Office [E8, E2 (Design), E6, E2 (Plg) and E4]. These shall also be attended by the representatives of CFA, PMG, users, audit and references quoted in the minutes of meeting (MoM), which shall be issued by the CE. All evaluations will be carried out on site.

(a) First Evaluation

- (i) First evaluation shall be carried out at end of mobilisation but not later than two months from date of commencement of work indicated in the Work Order No. 1. The Contractor and GE shall finalise the Works Programme (CPM or PERT or any other method) which shall be discussed threadbare, during the meeting.
- (ii) The minutes of the evaluation shall be recorded and signed by the Accepting Officer, CWE and GE as well as the Contractor attending the meeting. This shall become the action plan agreed to by all parties and will be contractually binding.

(b) Second/ Intermediate Evaluation

Contractors having period of completion more than twelve months shall have these meeting at intervals of every six months from the date of commencement indicated in Work Order No. 1. These shall be held at the work site on a date fixed well in advance to ensure presence of all concerned. The present progress of work and reasons for any delay shall be analysed and time bound action plan to remove any encumbrances/ bottlenecks shall be discussed in detail.

(c) Evaluation one month Prior to Original/ Extended Date of Completion

Like six monthly meeting mentioned above, this meeting will evaluate progress achieved one month prior to original date of completion vis-à-vis extended date of completion. In case progress is not satisfactory on account of the Contractor's deficiencies, he will be informed of decision of compensation levy able from original or extended date of completion.

19. ENGINEERS AND T&P

Employment of sufficient Engineering staff and deployment of T&P, machinery & transport as stipulated in the contract is a mandatory requirement and as detailed hereinbefore. Inadequate engagement of Engineers and deployment of T&P, machinery and transport as per contract conditions shall be considered as a serious lapse attracting ban / removal / downgrading / debarment of the firm / company in addition to penalty.

- 19A. Irrespective of whatever specified anywhere in the contract specifications and drawings, the Concrete for RCC work shall consist of OPC 43/53 grade and fly ash conforming to grade 1 of IS 3812 meeting all chemical and physical properties as per relevant IS codes. The mixing of fly ash in concrete should be in strict conformity to relevant provision of IS 10262:2019.
20. Wherever mentioned in tender documents defect liability period & guarantee period shall be amended to read as **24 calendar months** from the date of handing over of the project to MES in lieu of existing.
21. Permission for the usage of any of the existing facilities such as approaches, if available may be granted by the GE on written request from the contractor and in the event of damage to such facilities caused due to usage of the same shall be made good by the contractor at no extra cost to the Govt. If the contractor fails to make good the damages caused as above in spite of direction from GE, these damages shall be made good and brought back to the original standard by the department at the risk and cost of the contractor. GE's decision in this regard shall be final, conclusive and binding.

BOQ / SCHEDULE-`A' NOTES (contd...)

- 22. RECORD DRAWING AND PSMB:** Contractor shall submit completion drawings (record drgs) architectural, PSMB (format to be obtained from GE) and structural duly incorporating changes, if any and provision of respective TD drgs. The drawings so prepared on computer based AUTOCAD software, shall be submitted in print copy duly signed in laminated form and also in digital form in CD with total 2 sets each. These shall be signed by Engineer in Charge and GE in token of their check. The cost of the same shall be deemed to be included I the unit rates quoted by the tender of respective bldgs.
- 22.1** If the contractor fails to submit record drawing and PSMB the sum of Rs. 5,00,000.00 shall be recovered from contractor.
- 23** The contractor shall submit all documentation (Dated Photographs, Test Reports, Challans or Bills and Material Vendor Certificates etc.) as and when required / instructed by Engineer InCharge. Cost of the following arrangements is deemed to be included in the quoted lump sum.

CHECKLIST FOR CONTRACTOR TO FOLLOW ON SITE

- a. Complied with the safety procedures, norms and guidelines as outlined in NBC 2005 (BIS 2005c), Part 7.
- b. Personnel Protective Equipment provided like safety helmets, harness & safety nets etc.
- c. First-Aid box provided
- d. All parts of dangerous machinery shall be guarded.
- e. Precautions for working on machinery
- f. Hoists and lifts, lifting machines, chains, ropes, and other lifting tackles in good condition
- g. Walking surfaces or boards at height are of sound construction and are provided with safety rails or belts.
- h. Adequate height and length of barricading shall be made at site as per TD drawing and amount for the same shall be deemed to be included in the quoted lump sum.
- i. Providing measures to prevent fires.
- j. Fire extinguishers and buckets of sand to be provided in a fire-prone area and elsewhere
- k. Providing sufficient and suitable light for working during thenight
- l. Safety policies of the construction firm/division/company
- m. Labour camp (if applicable)
- n. Canteen for Workers (if applicable)
- o. Crèche
- p. Latrines
- q. Drinkingwater
- r. All workers shall be insured by the contractor for any accident at site and insurance policy to be produced before commencement of the work.

24 CHECKLIST FOR WASTE SEGREGATION & DISPOSAL DURING CONSTRUCTION :

The civil contractor shall have adequate measures to reuse & recycle following possible construction waste. Recycling includes donation or reuse at some other location with dated photographs and receipts. Cost of the following arrangements is deemed to be included in the quoted lump sum.

- a. Asbestos products – insulation, tiles, and soon.
- b. Fuels and heating oil and other volatile/ flammable liquids, such as coolants and grease.
- c. Tar and tar products (such as bitumen, felt, and water proofing compounds)
- d. Centring oil and formwork oil
- e. Wood dust
- f. Lead
- g. Plastics, acrylics, silica, and PVC
- h. Hazardous gases released on burning of waste
- j. Chemical admixtures, sealants, adhesives solvents, among others (should never be burnt)
- k. Paints, pigments, dyes, and primers
- l. Carbon black
- m. Pesticides
- n. Tarpaulin
- o. Explosives and related products and equipment used in excavations
- p. Product packaging (such as cement bags, cartons, containers, and plastic covers)
- q. Compressed gases/cylinders
- r. H₂S emission
- s. Mercury containing lamps and tubes – fluorescent lamps intact and crushed, halogen lamps, arc lamps, UV lamps, high-pressure sodium lamps, mercury vapour lamps, neon lamps, and incandescent lamps.
- t. Mercury containing devices – mercury switches, relays, regulators, thermostats, thermometers, manometers and debris containing mercury

BOQ / SCHEDULE-`A' NOTES (contd...)

- u. All types of batteries.
- v. Electronic ballasts, PCBs, transformers, capacitors, switchgear, lead cable, and oil-filled/ gel-filled cables.
- w. Electronic waste – computer products, circuit boards, CRTs, electronic parts, solder dross, and weld waste.

25. **DIGITAL PHOTOGRAPHS**

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

26. **PROJECT MANAGEMENT**

In amplification of Condition 25 of IAFW-2249, at least one engineer minimum a Graduate in Civil Engineering with requisite experience shall be employed by the contractor who will be well conversant and qualified to the satisfaction of GE on utilization of Project Management tools and techniques using MS Project Software. Engineers so employed shall be approved by the GE and shall not be changed during the currency of the project without prior permission of the GE. The contractor's site office will have necessary software, hardware and qualified operator to monitor the project on day to day basis using above MS Project tools. The total project duration considered from start to completion will also include likely time delays specific to the areas of execution of the work and shall be within the accepted time of completion mentioned in the contract.

27. Works Diary, Stage Passing Register, Sample Approval Register, Testing Register, Material Passing Register, Site Order Book, engineering staff deployed by contractor register has to be maintained by the contractor duly signed by all concerned.

Signature of Contractor

**AAD (Contracts)
for Accepting Officer**

SCHEDULE-'A' PART-I
(List of works & prices)
BUILDINGS & STRUCTURES WORKS

- Notes :-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise

Sl. No.	Description of items of work	Drg. No.	Unit Rate (Rs.)	No of units reqd.	Amount (Rs.)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8

1	Construction of deficient (POs and below) Married Accommodation (Stilt+6 Storey) comprising one block of 48 quarters, stilt plus six-storey structure (i.e. up to 7th floor) complete all as specified and as shown on drawings.		15,16,00,000.00 Lump Sum	1.00	15,16,00,000.00		
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Total of Schedule-'A' Part-I C/o to BOQ

₹ 15,16,00,000.00

Signature of Contractor
Dated :-

AAD (Contracts)
For Accepting Officer

SCHEDULE-'A' PART-II
(List of works & prices)
SITE CLEARANCE, EXCAVATION & EARTHWORK

Notes :-

- 1
- All quantities under col 5 are provisional
- 2
- For probable distribution details, refer drawings
- 3
- Rates under col 4 are for both materials and labour complete unless mentioned otherwise
- 4
- All excavation and earthwork required for items of works covered under Schedule-'A' Part-II to XVI shall be measured & paid under relevant items of this Schedule, unless otherwise specifically mentioned in the description of the items.

Sl. No.	Description of items of work	Drg. No.	Unit Rate (Rs.)	No of units reqd.	Amount (Rs.)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Surface excavation not exceeding 30cm deep and averaging 15cm deep and getting out in hard/dense soil.		93.20 Sqm	3519.89	3,28,053.75		
2	Excavation in trenches in hard/dense soil and not exc 1.5 m wide and n.exc 1.5 m in depth for laying of cable / fixing poles, stays etc and getting out complete all as specified and directed by Engineer-in-Charge.		675.00 Per Cum	289.20	1,95,210.00		
3	Returning, filling in including spreading leveling, watering and well ramming in layers not exceeding 25 cm thick with excavated soil complete all as specified and directed by Engineer-in-Charge.		139.10 Per Cum	295.09	41,047.02		
4	Returning, filling including spreading, levelling, watering and well ramming in layers not exc 25 cm in soft/disintegrated rock complete all as specified and as directed.		185.00 Cum	105.75	19,563.75		
5	Earth work in excavation by mechanical means (Hydraulic excavator)/ in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out in hard/dense soil and disposal of surplus excavated soil as directed, within a lead of 50m complete all as specified and as directed.		228.55 Cum	125.81	28,753.88		
6	Earth work in excavation by mechanical means (Hydraulic excavator)/ in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out in soft/disintegrated rock and disposal of surplus excavated soft rock as directed, within a lead of 50m complete all as specified and as directed.		401.63 Cum	411.73	1,65,363.12		
7	Removing excavated soil exc. 250m and n.exc 500m and depositing where directed by Engineer in charge		211.00 Cum	582.60	1,22,928.60		
8	Removing excavated material as rocks exc. 250m and n.exc 500m and depositing where directed by Engineer in charge		50.50 Cum	745.80	37,662.90		
Total of Schedule-'A' Part-II C/o to BOQ					₹ 9,38,583.02		

Signature of Contractor
Dated :-

AAD (Contracts)
For Accepting Officer

SCHEDULE-`A' PART-III
(List of works & prices)
INTERNAL WATER SUPPLY

Notes:-

- 1
- All quantities under col 5 are provisional
- 2
- For probable distribution details, refer drawings
- 3
- Rates under col 4 are for both materials and labour complete unless mentioned otherwise
- 4
- All excavation and earthwork required for items of works covered under this Schedule-`A' shall be measured & paid under relevant items of Schedule-`A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Supplying and laying of CPVC pipes SDR 11 & plain CPVC SDR 11 fittings in any length including all fittings on walls/ ceiling or laying in floors complete all as specified and directed.						
(a)	50mm outer dia		1049.70 RM	60.00	62,982.00		
(b)	40mm outer dia		660.30 RM	48.00	31,694.40		
(c)	32mm outer dia		496.80 RM	48.00	23,846.40		
(d)	25mm outer dia		353.40 RM	48.00	16,963.20		
(e)	20mm outer dia		244.60 RM	76.80	18,785.28		
(f)	16mm outer dia		175.90 RM	144.00	25,329.60		
2	Supplying and laying of CPVC pipes SDR 13.5 & plain CPVC schedule 80 pipes & plain CPVC schedule 80 fittings in any length including all fittings on walls/ ceiling or laying in floors complete all as specified and directed.						
(a)	150mm outer dia		6399.10 RM	42.70	2,73,241.57		
(b)	100mm outer dia		4812.80 RM	47.52	2,28,704.26		
(c)	75mm outer dia		3271.10 RM	35.64	1,16,582.00		
(d)	62.5mm outer dia		2444.70 RM	30.89	75,516.78		
3	S&F 15mm stop valves, chromium plated with long shank and cup (concealed type) cast copper alloy, screwed down, high pressure, with crutch or butterfly handle, screwed both ends for iron pipe ot for unions and fixed complete all as specified and directed.		720.14 Each	96.00	69,133.44		
4	S&F brass chromium plated shower rose 125mm size with or without swivel joints, any size, including fixing to steel size, including fixing to steel pipe or union complete all as specified and as directed.		112.98 Each	96.00	10,846.08		
5	S&F 15mm dia bib taps, fancy type, chromium plated complete all as specified and as directed.		607.57 Each	144.00	87,490.08		
6	S&F PVC connections 15mm size with PTMT nuts of length 600mm all as specified and as directed.		200.00 Each	96.00	19,200.00		
7	S&F CPVC ball valve all as specifed and as directed.		676.44 Each	48.00	32,469.12		
8	S&F looking 600mmx450mm bevelled edge mirror of selected quality glass, mounted on 6mm thick AC building board or commercial plywood and fixed to wooden plugs		554.60 Each	48.00	26,620.80		
9	Brass chromium plated bottle traps for wash basins with inlet and outlet screwed for pipe or connections including necessary packing, union and cap and fixed as in repair complete all as specified and as directed by Engineer-in -charge.		710.00 Each	48.00	34,080.00		
Total of Schedule-'A' Part-III C/o to BOQ					11,53,485.01		

Signature of Contractor
Dated :-

AAD (Contracts)
for Accepting Officer

SCHEDULE-`A' PART-IV
(List of works & prices)
INTERNAL ELECTRIFICATION

- Notes:-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-`A' shall be measured & paid under relevant items of Schedule-`A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of incl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Material and labour point wiring with 1.5 sqmm (nominal cross section area) single core PVC insulated unsheathed cable of 1100 Volts grade (FRLS) multistrand with copper conductor drawn through and including non metallic, rigid PVC conduit of adequate size with all fittings and conduit accessories surface/concealed in wall/ceiling/floor/roof etc. including provision of 1.5 sqmm green in colour PVC insulated copper conductor single core multistrand (FRLS) for earth continuity conductor and connected to common earth duly all as specified for the following:-						
	(a) One light point control by one switch		992.75 Per Point	1276.00	12,66,749.00		
	(b) One ceiling fan/exhaust fan control by one switch		992.75 Per Point	288.00	2,85,912.00		
	(c) One light point controlled by two 2 way switches		1,397.96 Per Point	15.00	20,969.40		
	(d) for switch socket same board outlet 3 pin 5 amps with 1.5 sq mm cable as earth continuity conductor		284.10 Per Point	240.00	68,184.00		
	(e) for the switch board of independent 5 Amps socket		1,070.40 Per Point	384.00	4,11,033.60		
	(f) bell point wiring 1.5 sqmm controlled by one switch		992.75 Per Point	48.00	47,652.00		
2	ditto as per item no. 1 above but wire 2.5 sq mm cable for switch socket outlet 3 pin 15 Amps with 2.5 sqmm and provision of 2.5 sqmm green in colour PVC insulated copper conductor single core multistrand (FRLS) for earth continuity conductor and connected to common earth daly all as specified and as directed.		1,131.39 Per Point	148.00	1,67,445.72		
3	S&F modular switch 1 way 6A, 1 module including cover plate all as specified and directed by Engineer-in-Charge.		260.50 Each	2,188.00	5,69,974.00		
4	S&F modular switch 2 way 6A, 1 module including cover plate all as specified and directed by Engineer-in-Charge.		307.30 Each	30.00	9,219.00		
5	S&F modular socket, 6A- 2/3 pin combined 2 module including cover plate all as specified and directed by Engineer-in-Charge.		340.54 Each	624.00	2,12,496.96		
6	S&F modular switch 1 way 16A 1 module, including cover plate all as specified and directed by Engineer-in-Charge.		343.70 Each	148.00	50,867.60		
7	S&F modular Socket 6A/16A- 2/3 pin combined 2 module, including cover plate all as specified and directed by Engineer-in-Charge.		528.40 Each	148.00	78,203.20		
8	Supply and fix exhaust fan made of sturdy engineering plastic complete with louvers shutter, voltage 230V, 50 Hz, RPM 1200, Copper winding of sweep 200 mm complete all as specified and as directed.		1,606.52 Each	96.00	1,54,225.92		
9	Supply and fix exhaust fan made of sturdy Engineering metallic body complete with louvers shutter, voltage 230V, 50 Hz, RPM 1200, Copper winding of sweep 230 mm including blades frame and louvers complete all as specified and as directed		3,548.59 Each	48.00	1,70,332.32		
10	S&F Bell electric AC 230V single pole ding dong ISI Mark complete all as specified and as directed.		430.40 Each	48.00	20,659.20		
11	S&F modular type bell push 6 Amp 1 module ISI mark complete all as specified and as directed.		307.30 Each	48.00	14,750.40		
12	S&F Lamp holder PVC/ Poly carbonate type with back plate suitable for batten fitting complete all as all as specified and as directed.		166.50 Each	192.00	31,968.00		
13	Supply and fixing integrated LED batten 20 Watt, 4 feet long full white in engineering plastic batten with white acrylic cover with built in electronic driver pre wired and connecting up wit twisted twin core flexible copper wire 0.5 sqmm for ceiling rose to connector to fitting complete all as specified.		1,305.40 Each	604.00	7,88,461.60		
14	Supply and fixing integrated LED batten 10 Watt, 2 feet long full white in engineering plastic batten with white acrylic cover with built in electronic driver pre wired and connecting up wit twisted twin core flexible copper wire 0.5 sqmm for ceiling rose to connector to fitting complete all as specified.		1,354.81 Each	288.00	3,90,185.28		
15	S&F ceiling fan complete with blades, down rod, electronic regulator and all accessories, 230V, 1200mm sweep, min air delivery 210 CFM with service value 6.00 BEE. Five star rated with brushless direct current motor (BLDC) all a specified and directed.		2,649.47 Each	96.00	2,54,349.12		
16	S&F ceiling fan complete with blades, down rod, electronic regulator and all accessories, 230V, 1400mm sweep, min air delivery 245 CFM with service value 6.00 BEE. Five star rated with brush less direct current motor (BLDC) all a specified and directed.		2,649.47 Each	48.00	1,27,174.56		
17	S&F MCB TPN DB made of sheet steel, powder painted with neutral bus bar 200 A, neutral link, earth bar and Din rail ,430 Volts TPN with 4 way Double door, IP-43-IK09 protection Note :- DBs to be flushed in wall/ surface		2,642.70 Each	1.00	2,642.70		

SCHEDULE-`A' PART-IV (contd...)

1	2	3	4	5	6	7	8
18	S&F MCB DB made of sheet steel , powder painted with neutral bus bar 200 A, neutral link, earth bar and Din rail, 240Volts SPN with 12 way Double door , IP-43-IK09 protection Note :- DBs to be flushed in wall/ surface	2,264.90 Each	50.00	1,13,245.00			
19	S&F MCB DB made of sheet steel , powder painted with neutral bus bar 200 A, neutral link, earth bar and Din rail, 240Volts SPN with 4 way Double door , IP-43-IK09 protection Note :- DBs to be flushed in wall/ surface	1,544.40 Each	10.00	15,444.00			
20	S&F MCB SP 240 Volts 'C' series, breaking capacity 10 KA of rating 6-32 Amps	294.00 Each	540.00	1,58,760.00			
21	S&F MCB DP 240 Volts 'C' series, breaking capacity 10 KA of rating 40 Amps	851.20 Each	60.00	51,072.00			
22	S&F 415V AC box Triple pole and earth encolsure 63 Amp with a three pin and earth plug with socket complete with one triple pole MCB 63 Amps.	6,832.00 Each	48.00	3,27,936.00			
23	S&F MCB TPN 415Volts 'C' series, breaking capacity 10KA of Rating 63 Amps	2,360.74 Each	1.00	2,360.74			
24	M & L for sub main wiring with proper colour coding 2 single core FRLS 1100 volts grade cable with standard copper conductor of size 6 sqmm in and all including PVC conduit of suitable size not less than 25mm, ISI marked including 1 x single cable with standard sheathed copper conductor of size 6 sqmm (green in colour) for earthing (from meter panel to SPN DB 12 way) Note:-(I) 2 run of 6 sqmm cable of 1 mtr each, 01 mtr of PVC conduit and 01 M of 6 sqmm cable as earth wire shall be measure as 01 RM	259.20 RM	1,800.00	4,66,560.00			
25	M & L for sub main wiring with proper colour coding 2 single core FRLS 1100 volts grade cable with standard copper conductor of size 4 sqmm in and all including PVC concealed conduit of suitable size not less than 25mm, ISI marked including 1 x single cable with standard sheathed copper conductor of size 4sqmm (green I in colour) for earthing (for AC and Geyser points) Note :-(I) 2 run of 4 sqmm cable of 1 mtr each, 01 mtr of PVC conduit and 01 M of 4 sqmm cable as earth wire shall be measure as 01 RM	215.00 RM	900.00	1,93,500.00			
26	M & L for sub main wiring with proper colour coding 2 single core FRLS 1100 volts grade cable with standard copper conductor of size 2.5 sqmm in and all including PVC concealed conduit of suitable size not less than 25mm, ISI marked including 1 x single cable with standard sheathed copper conductor of size 4sqmm (green in colour) for earthing (for AC and Geyser points) Note :- (I) 2 run of 2.5 sqmm cable of 1 mtr each, 01 mtr of PVC conduit and 01 M of 2.5 sqmm cable as earth wire shall be measure as 01 RM	185.21 RM	100.00	18,521.00			
27	S&F electric water heater storage type steel body with copper inner tank and heating element upto 2KW capacity 25 Ltr BEE 5 Star rated AC 220V 50Hz with all accessories such as safety valve, thermostat, NRV, connection pipe etc complete all as specified as directed.	10029.54 Each	48	4,81,417.92			
28	S&F modular white cover plate with frame, 1 module ISI marked complete all as specified and directed.	192.70 Each	48.00	9,249.60			
29	S&F modular white cover plate with frame, 3 module ISI marked complete all as specified and directed.	217.70 Each	672.00	1,46,294.40			
30	S&F modular white cover plate with frame, 6 module ISI marked complete all as specified and directed	309.60 Each	50.00	15,480.00			
31	S&F modular white cover plate with frame, 12 module ISI marked complete all as specified and directed.	335.00 Each	58.00	19,430.00			
32	S&F modular metal flush box 01 or 02 module ISI marked and flushed in wall and making good surface complete all as specified and directed.	179.10 Each	48.00	8,596.80			
33	S&F modular metal flush box 03 module ISI marked and flushed in wall and making good surface complete all as specified and directed.	179.80 Each	672.00	1,20,825.60			
34	S&F modular metal flush box 06 module ISI marked and flushed in wall and making good surface complete all as specified and directed.	284.10 Each	50.00	14,205.00			
Total of Schedule-'A' Part-IV C/o to BOQ					73,06,353.64		

Signature of Contractor
Dated :-

AAD (Contracts)
for Accepting Officer

SCHEDULE-'A' PART-V
(List of works & prices)
TELEPHONE AND TV CONDUIT

- Notes:-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-'A' shall be measured & paid under relevant items of Schedule-'A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	M&L for non metallic conduit exclusive of boxes (junction boxes/terminal) but inclusive of all Tees, bends, elbows, bell mouth tube ends and fixing accessories such as couplers, lock nuts, saddles, pipe hook etc. for 25mm external dia complete all as specified and directed.		84.30 RM	600.00	50,580.00		
	Total of Schedule-'A' Part-V C/o to BOQ				50,580.00		

Signature of Contractor
Dated :-

AAD (Contracts)
for Accepting Officer

SCHEDULE-`A' PART-VI
(List of works & prices)
FIRE FIGHTING SYSTEM

- Notes:-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-`A' shall be measured & paid under relevant items of Schedule-`A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Supply, fixing & jointing MS ERW pipes 100 mm dia 'heavy duty' ISI marked in any lengths complete with all fittings like couplings, bends, elbows, tees, long/short pieces etc. including cutting to size welding and jointing together and laid in trenches/ducts, above ground, floor, roof, on wall etc including necessary pipe supports made with mild steel sections duly painted with two coat of synthetic enamel paint fire red colour over a coat of synthetic enamel red oxide primer and testing complete all as specified and directed by engineer - in- charge.		903.00 RM	165.00	1,48,995.00		
2	Supply, fixing & jointing MS ERW pipes 80 mm dia 'heavy duty' ISI marked in any lengths complete with all fittings like couplings, bends, elbows, tees, long/short pieces etc. including cutting to size welding and jointing together and laid in trenches/ducts, above ground, floor, roof, on wall etc including necessary pipe supports made with mild steel sections duly painted with two coat of synthetic enamel paint fire red colour over a coat of synthetic enamel red oxide primer and testing complete all as specified and directed by engineer - in- charge.		662.00 RM	10.00	6,620.00		
3	Supply, fixing & jointing MS ERW pipes 63 mm dia 'heavy duty' ISI marked in any lengths complete with all fittings like couplings, bends, elbows, tees, long/short pieces etc. including cutting to size welding and jointing together and laid in trenches/ducts, above ground, floor, roof, on wall etc including necessary pipe supports made with mild steel sections duly painted with two coat of synthetic enamel paint fire red colour over a coat of synthetic enamel red oxide primer and testing complete all as specified and directed by engineer - in- charge.		560.00 RM	30.00	16,800.00		
4	Supply , fix and jointing Branch pipe gun metal 63mm instantaneous inlet, made threaded outlet, 15mm bore nozzle short		3,048.00 Each	36.00	1,09,728.00		
5	Supply and fix fire hydrant landing valve 63 mm dia, gun metal conforming to IS-5290 type 'A', instantaneous type, single headed outlet with brass spindle, cast iron wheel, coupling, cap with chain etc. and complete with all accessories suitable for connecting hose pipe and all as specified and directed by engineer - in- charge.		6,227.00 Each	18.00	1,12,086.00		
6	Supply and fix Valve, Non return valve butterfly type of 80 mm dia.		8,610.00 Each	1.00	8,610.00		
7	Supply and fix butterfly valve of size 100 mm bore, ISI marked including all joints with rubber or fiber board, bolts and nuts, washers etc complete all as specified.		8,012.00 Each	1.00	8,012.00		
8	Supply and fix butterfly valve of size 63 mm bore, ISI marked including all joints with rubber or fiber board, bolts and nuts, washers etc complete all as specified.		3,700.00 Each	14.00	51,800.00		
9	S & F Pressure gauge 4"dial 0-14 kgs rating complete all as specifies and directed.		1,264.00 Each	2.00	2,528.00		
10	S&F gate valve 25 mm dia for Hose reel pipe including all connected items complete all as specified and directed.		1,556.00 Each	14.00	21,784.00		
11	Supply, install, testing and commissioning of Electronic Hooter, horizontal single stage continuous, normal operation for atleast 50 min with sound level 65 Db to 120 Db measured at 1.5m with sound output variation of +5 Db for 500 m range.		2,659.00 Each	14.00	37,226.00		
12	S & F smoke detectors complying with all type certified to EN-45 addressable type, photo electric/optical with base with self built intelligence as per IS-11360 complete all as specified and directed by EIC.		2,060.00 Each	2.00	4,120.00		
Total of Schedule-'A' Part-VI C/o to BOQ					5,28,309.00		

Signature of Contractor
Dated :-

AAD (Contracts)
for Accepting Officer

SCHEDULE-`A' PART-VII
(List of works & prices)
LIGHTENING PROTECTION

- Notes :-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-`A' shall be measured & paid under relevant items of Schedule-`A' Part-II, unless otherwise specifically mentioned in the description of the items

Sl. No.	Description of items of work	Drg. No.	Unit Rate (Rs.)	No of units reqd.	Amount (Rs.)	Period of completion of incl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Supply and fix single pointed air termination aluminium rod 12mm dia 300mm long all as specified.		<div>278.90</div> Each	12.00	3,346.80		
2	Supply and fix aluminum strips 25 mm X 3 mm complete with saddles and fixing screws using epoxy terminal roof conductor/ down conductors complete all as specified and directed.		<div>125.10</div> Rm	230.00	28,773.00		
3	M&L for Test point terminal block made of gun metal or phosphorus bronze size 75 x 75 x 25mm drilled and screwed including 03 Nos of 8mm dia 25mm long hexagonal head screw.		<div>689.70</div> Each	5.00	3,448.50		
Total of Schedule-'A' Part-VII C/o to BOQ					<div>₹ 35,568.30</div>		

Signature of Contractor
Dated :-

AAD (Contracts)
For Accepting Officer

SCHEDULE-`A' PART-VIII
(List of works & prices)
EXTERNAL WATER SUPPLY

- Notes:-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-`A' shall be measured & paid under relevant items of Schedule-`A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Supply and lay water tubing, medium grade, galvanized, with all fitting; laid in trenches complete 63mm dia including fittings all as specified and directed.		568.23 RM	70.00	39,776.10		
2	Supply and fix Valve, Sluice, flanged of class 1.6 PN of 100 mm dia.		11400.00 Each	2.00	22,800.00		
3	Supply and fix Valve, Sluice, flanged of class 1.6 PN of 63 mm dia.		8200.00 Each	2.00	16,400.00		
Total of Schedule-'A' Part-VIII C/o to BOQ					₹ 78,976.10		

Signature of Contractor
Dated :

AAD (Contracts)
for Accepting Officer

SCHEDULE-`A' PART-IX
(List of works & prices)
EXTERNAL ELECTRIFICATION

Notes:-

- 1
- All quantities under col 5 are provisional
- 2
- For probable distribution details, refer drawings
- 3
- Rates under col 4 are for both materials and labour complete unless mentioned otherwise
- 4
- All excavation and earthwork required for items of works covered under this Schedule-`A` shall be measured & paid under relevant items of Schedule-`A` Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8

- 1
- Supply, laying, test and commisioning LT cable XLPE insulated, galvanized steel strip armoured, 1100 volts grade , with stranded aluminium conductors conforming to IS-7098 Part-I connecting with suitable size aluminium lugs by crimping and laid in trenches,ducts,floors,passing through pipes etc. of following sizes all as specified and directed by Engineer-in-Charge:-

(a)	10 sqmm 4 core (for street light)	174.68	300.00	52,404.00
		RM		
(b)	35 sqmm 3.5 core (Main panel to Water pump)	269.75	50.00	13,487.50
		RM		
(c)	50 sqmm 3.5 core (Utility Panel to Lifts 1,2)	337.52	120.00	40,502.40
		RM		
(d)	240 sqmm 3.5 core (Existing Main LT panel to building meter panel, Utility panel - 3 Runs)	1168.69	540.00	6,31,092.60
		RM		

Note: Excavation, earth work, sand cushioning, cable covers and cable protection pipes shall be measured and paid separately.

2	S&F Galvanised steel tubing with all fittings light grade 80 mm bore, fixed on walls/ pole/ in floor/ laid in trenches, etc, fixed with & including duly painted MS clamps & necessary nuts, bolts, washers, complete all as specified and directed by Engineer-in-Charge.	705.00	80.00	56,400.00
		RM		
3	S&F Galvanised steel tubing with all fittings light grade 40 mm bore, fixed on walls/ pole/ in floor, etc, fixed with & including duly painted MS clamps & necessary nuts, bolts, washers, complete all as specified and directed by Engineer-in-Charge.	380.20	40.00	15,208.00
		RM		
4	M&L for danger notice plate of 1.6mm thick mild steel sheet, vitreous enamelled white, with letters, figures and conventional skull and bones in signal red colour and fixed with M.S. clamps, bolts and nuts of approved size, for LT, 20x15cm size	131.60	105.00	13,818.00
		Each		

Total of Schedule-'A' Part-IX C/o to BOQ

₹8,22,912.50

Signature of Contractor
Dated :

AAD (Contracts)
for Accepting Officer

SCHEDULE-`A' PART-X
(List of works & prices)
ROAD, CULVERTS, FOOTPATH AND HARDSTANDING

- Notes:-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-`A' shall be measured & paid under relevant items of Schedule-`A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	M&L for soling (or sub base) 150mm thick (spread thickness) in one layer with borken boulders or quarried stone of gauge 63 to 75 mm, interstics filled, surface formed and rolled with power roller 8 to 12 tonne to form a true surfaces and consolidated to required gradient and camber.		<u>2633.70</u> X Sqm	107.50	2,83,122.75		
2	M&L for 150mm thick (compacted thickness) WMM in two layers (7.5cm each layer) with granite, trap or basalt coarse aggregate of grading 2 (63 mm to 40 mm), spread rolled and compacted with power roller 8 to 12 tonne to form required gradient and camber (Note: two layers will be measured as one unit) .		<u>4,782.20</u> X Sqm	82.50	3,94,531.50		
3	Material and labour for preparing unsurfaced water bound macadam by brushing with wire brushes for removing caked mud etc. sweeping with brooms and finally fanning the cleaned surface with gunny bags and mechanical compressor to remove all loose dirt's etc complete all as specified.		<u>360.60</u> X Sqm	82.50	29,749.50		
4	M&L for applying evenly a tack coat with bituminous primer at 10Kg per 10 Sqm with paving bitumen complete all as specified and directed by Engr-in-Charge. Paving bitumen VG - 30 grade complete all as specified.		<u>512.50</u> X Sqm	82.50	42,281.25		
5	M&L PCC 1:5:10 (40mm graded aggregate) for mass concrete thick compacted surface over hardcore (soiling) complete all as specified		<u>5,237.90</u> Cum	25.00	1,30,947.50		
6	M&L cement concrete work in pavement/hard standing of flexural strenght 40 kg/Sqcm in field using 400 Kg of cement per cubic metre,thickness of concrete 20 cm.		<u>7,107.10</u> Cum	50.00	3,55,355.00		
7	M & L Forming 20mm thick expansion joints filled with preformed bitumenous filler and top 30mm primed and sealed with sealing compound, grade 'B', 200 mm thickness complete all as specified and directed.		<u>1,186.40</u> X Rm	5.00	5,932.00		
8	M&L Forming contraction (Dummy) joint for 65mm deep x 10mm wide, filled with sealing compound, Grade-'B', complete all as specified and directed.		<u>608.70</u> X Rm	20.00	12,174.00		
9	M&L Finishing surfaces of concrete roads, pavements, by brooming. Complete all as specified and directed.		<u>203.00</u> X Sqm	25.00	5,075.00		
10	M & L for PCC type D2 (1:4:8) using 40 mm graded stone aggragate as in foundation filling and mass concrete complete all as specified and directed		<u>5,483.10</u> Cum	27.41	1,50,291.77		
11	M&L for RCC pipes class NP2 of bore pipe dia 450mm laid and jointed in CM (1:1) with collars complete all as specified and directed		<u>900.00</u> Rm	24.75	22,275.00		
12	M & L Squared rubble walling with Porbandar stone masonry, uncoursed, well bounded, bedded, solidly hearted built in cement mortar 1:6 brought up to courses concrete complete all as specified and directed.		<u>5,693.64</u> Cum	39.24	2,23,418.43		
13	M & L for rendering in CM 1:4, 15 mm thick on stone masonry surfaces finished even smooth without using extra cement complete all as specified and directed		<u>344.99</u> Sqm	121.51	41,919.73		
14	Material and labour for bituminous premix asphaltic semi dense concrete 40mm consolidated thickness with 5.5% binder (as per design mix) content by weight of total mix laid by mechanical paver, rolled and compacted to required camber and gradient complete and rolling to uniform smooth surface with 8 to 10 ton power road roller complete all as specified and directed by the Engineer-in-charge.		<u>4,112.90</u> X Sqm	82.50	3,39,314.25		
15	M & L PCC 1:2:4 type B1 using 20 mm graded stone aggregate as in copings etc. including weathering slightly rounded or chamfered angles and throating etc. including necessary form work complete all as specified and directed.		<u>9,259.40</u> Cum	6.28	58,149.03		
16	M & L for applying two coats of colour washing over one coat of white washing including preparation of new plastered surfaces complete.		<u>27.40</u> Sqm	329.01	9,014.87		
17	M & L for Hardcore of Broken stone or boulders of gauge n. exc 63mm, deposited spread and leveled in layers n exc 15 cm thick watered and rammed to a true surface complete all as specified.		<u>2,070.80</u> Cum	37.50	77,655.00		
18	M&L for sand filling(50mm) under floors or in foundations including watering and consolidation		<u>1,974.30</u> Cum	12.50	24,678.75		
19	M&L machine pressed precast concrete interlocking paver block (coloured) any shape and size conforming to IS 15658-2006 of 80mm thick M-40 grade etc complete (with grey cement and pigment) over sand cushioning.complete all as spd and directed by Engineer in Charge .		<u>955.00</u> Sqm	250.00	2,38,750.00		
20	M&L 15mm thick rendering in cm 1:6 on stone masonary surfaces or surfaces other than fair faces of brick work or on one side of lathing to be finished even and smooth (without using extra cement) complete all as specified and directed by Engr-in-Charge		<u>322.37</u> Sqm	207.50	66,891.78		
Total of Schedule-'A' Part-X C/o to BOQ					<u>25,11,527.11</u>		

Signature of Contractor
Dated :-

AAD (Contracts)
for Accepting Officer

SCHEDULE-`A' PART-XI
(List of works & prices)
SEWAGE DISPOSAL

- Notes:-**
- 1

All quantities under col 5 are provisional
- 2

For probable distribution details, refer drawings
- 3

Rates under col 4 are for both materials and labour complete unless mentioned otherwise
- 4

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

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of incl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	M & L for cement concrete 1:3:6 Type C2 (using 40mm graded stone aggregate), as in foundations, filling and mass concrete complete all as specified and directed.		5862.00 Cum	4.17	24,444.54		
2	M & L Walling with Porbandar stone masonry well bounded, bedded, solidly hearted built in cement mortar 1:6 brought up to courses complete.		5693.64 Cum	12.52	71,284.37		
3	M & L for PCC (1:2:4) type B1 (using 20mm graded stone aggregate) as in copings, benching in manholes etc including form work complete.		9259.40 Cum	1.04	9,629.78		
4	M & L for rendering 15mm thick, in cement mortar 1:4 on fair faces of stone masonry work or concrete surfaces and finished even and smooth with out using extra cement but with using water proofing compound. Note Water proofing compound to bemeasured and paid separately.		344.99 Sqm	85.65	29,548.39		
5	M & L Concrete bed 1:4:8, Type D2 to drain 150mm bore of pipes including packing under,and haunching against the sides of pipes after they are laid and tested.		455.02 RM	285.00	1,29,680.70		
6	M & L for 150mm dia reinforced concrete pipes, class NP3, laid and jointed complete with collars laid in trenches and jointed as specified.		400.00 Rm	300.00	1,20,000.00		
7	M & L for Mild steel CRS TMT bars 10mm dia and over, cut to length, bent to shape required, including cranking, bending, hooking ends and binding with and including MS wire (annealed) not less than 0.9mm dia.		82.60 Kg	225.96	18,664.30		
8	M & L for precast RCC cover slab for manholes in 1:2:4,Type B1 (20mm graded aggregate) set in cement mortar 1:6 including necessary form work and set in CM 1:6.		11053.80 Cum	1.83	20,228.45		
9	Supply only Integral water proofing compound.		46.10 Sqm	28.07	1,294.03		
Total of Schedule-`A' Part-XI C/o to BOQ					4,24,774.56		

Signature of Contractor

Dated :-

AAD (Contracts)

for Accepting Officer

SCHEDULE-`A' PART-XII
(List of works & prices)
AREA DRAINAGE

- Notes:-**
- 1

All quantities under col 5 are provisional
- 2

For probable distribution details, refer drawings
- 3

Rates under col 4 are for both materials and labour complete unless mentioned otherwise
- 4

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

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	M & L for PCC type D2 (1:4:8) using 40 mm graded stone aggragate as in foundation filling and mass concrete complete all as specified and directed.		5483.10 Cum	40.95	2,24,532.95		
2	M & L Squared rubble walling with Porbandar stone masonry, uncoursed, well bounded, bedded, solidly hearted built in cement mortar 1:6 brought up to courses concrete complete all as specified and directed.		5693.64 Cum	165.60	9,42,866.78		
3	M & L PCC 1:2:4 type B1 using 20 mm graded stone aggregate as in copings etc. including weathering slightly rounded or chamfered angles and throating etc. including necessary form work.		9259.40 Cum	6.90	63,889.86		
4	M & L for rendering in CM 1:4, 15 mm thick on stone masonry surfaces finished even smooth without using extra cement complete all as specified and directed.		344.99 Sqm	1098.00	3,78,799.02		
5	Extra for forming fair finished drain or channel 45 cm inner girth in cement concrete, using extra cement, including forms, moulds, mi-tred/stopped ends etc.		43.35 Rm	300.00	13,005.00		
6	M & L for applying two coats of colour washing over one coat of white washing including preparation of new plastered surfaces complete.		27.40 Sqm	1098.00	30,085.20		
7	M & L for precast RCC cover slab for manholes in 1:2:4,Type B1 (20mm graded aggregate) including necessary form work etc. complete and set in cement mortar 1:4		11053.80 Rm	20.48	2,26,381.82		
8	Supply and Fix Mild steel CRS TMT bars 10 mm dia and over, cut to length, bent to shape, required, including cranking bending spirally for hooping for columns, hooking ends and binding with and including mild steel wire (annealed) not less than 0.9 mm dia or securing with clips quality conforming to Fe-410-W (Gde E-250) quality A or Fe 500 complete all as specified and as directed.		82.60 Kg	5358.00	4,42,570.80		
Total of Schedule-'A' Part-XII C/o to BOQ					23,22,131.43		

Signature of Contractor

AAD (Contracts)
for Accepting Officer

SCHEDULE-'A' PART-XIII
(List of works & prices)
EV CHARGING POINTS

- Notes:-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-'A' shall be measured & paid under relevant items of Schedule-'A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	S&F MCB TPN DB made of sheet steel, powder coated with neutral bus bar 200 A, neutral link, IP-43-IK09 protection grade, 415 Volts TPN with 4 way double door complete all as specified and directed by Engineer-in-Charge		2,642.70 Each	1.00	2,642.70		
2	S&F MCB TPN 415 Volts, "C" series, breaking capacity 10 KA of rating 40 to 63 Amps complete all as specified and directed by Engr in Charge.		2360.74 Each	1.00	2,360.74		
3	S&F MCB TPN 415 Volts, "C" series, breaking capacity 10 KA of rating 16 to 32 Amps complete all as specified and directed by Engr in Charge.		1,721.04 Each	2.00	3,442.08		
Total of Schedule-'A' Part-XIII C/o to BOQ					8,445.52		

Signature of Contractor
Dated :-

AAD (Contracts)
for Accepting Officer

SCHEDULE-`A' PART-XIV
(List of works & prices)
AVIATION LIGHT

- Notes:-**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-`A' shall be measured & paid under relevant items of Schedule-`A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of Indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	M&L for wiring for LED obstruction light with PVC insulated unsheathed copper conductor 2x2.5 sqmm and 1x2.5 sqmm as earth wire drawn in and including PVC conduit from DB to aviation light including necessary connection and connecting earth dolly all as specified and directed by Engineer-in-Charge.		185.21 RM	70.00	12,964.70		
Total of Schedule-'A' Part-XIV C/o to BOQ					12,964.70		

Signature of Contractor
Dated :-

AAD (Contracts)
for Accepting Officer

SCHEDULE-'A' PART-XV
(List of works & prices)
ARBORICULTURE

- Notes:**
- 1 All quantities under col 5 are provisional
 - 2 For probable distribution details, refer drawings
 - 3 Rates under col 4 are for both materials and labour complete unless mentioned otherwise
 - 4 All excavation and earthwork required for items of works covered under this Schedule-'A' shall be measured & paid under relevant items of Schedule-'A' Part-II, unless otherwise specifically mentioned in the description of the items

SI No	Description of items of work	Drg No	Unit Rate (₹)	No of units reqd	Amount (₹)	Period of completion of indl items from date of handing over of site	Remarks
1	2	3	4	5	6	7	8
1	Supply and lay sweet earth (Black soil) brought from outside MD Land to a uniform thickness of 15cm including watering, spreading and levelling complete all as directed.		<div>300.00 Cum</div>	1,240.00	3,72,000.00		
2	Supply, mix and lay farm yard manure for proper plantation complete all as specified and directed.		<div>76.00 Cum</div>	1500.00	1,14,000.00		
3	M&L for growing of hedges in the perimeter in size 300mm width and 300mm height with DURANTA or any other approved sampling by GE which gives a thick and dense appearance including cutting and shaping complete all as directed.		<div>276.00 RM</div>	620.00	1,71,120.00		
4	M&L for development of lawn area and planning of carpet grass or any other approved grass as approved by the GE including watering, shaping etc. complete.		<div>800.00 Sqm</div>	1240.00	9,92,000.00		
5	M&L for planting of trees ornamental, exotic plants and other approved plants as approved by the GE including watering, shaping including excavation in pits etc. complete all as directed by GE.		<div>1250.00 Each</div>	54.00	67,500.00		
6	S&F water sprinklers of brass rotating type standard quality suitable for 15mm dia GI pipe complete all as specified and directed by Engineer in charge.		<div>1500.00 Each</div>	42.00	63,000.00		
7	S&F 15mm bore medium grade galvanised iron tube, with all type fittings and accessories laid in trenches complete all as specified and directed by Engineer in charge.		<div>130.00 RM</div>	320.00	41,600.00		
8	All as per item No 14 above but 25mm bore.		<div>184.60 RM</div>	171.00	31,566.60		
9	S&F glove or gate valve 15mm bore gun metal, with iron wheel head, screwed both ends for iron pipe complete all as specified and directed by Engineer in charge.		<div>505.45 Each</div>	16.00	8,087.20		
10	All as per item No 16 above but 25mm bore.		<div>587.24 Each</div>	8.00	4,697.92		
11	Supply only 15mm bore low density polythylene (LDPE) pipes of pressure rating 6kgf/sq.cm complete all as specified and directed by Engineer in charge.		<div>90.57 RM</div>	200.00	18,114.00		
Total of Schedule-'A' Part-XV C/o to BOQ					<div>18,83,685.72</div>		

Signature of Contractor
Dated :-

AAD (Contracts)
for Accepting Officer

NAME OF WORK : PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)

SCHEDULE - ‘B’

**(ISSUE OF MATERIALS TO CONTRACTOR)
(See condition 10 of IAFW-2249)**

SI No	Particulars	Unit	Rate at which material shall be issued to the Contractor	Place of issue of material	Remarks
1	2	3	4	5	6
-----NIL-----					

SCHEDULE - ‘C’

**List of Tools and plant (other than transport) which will be hired to the Contractor
(See conditions 15, 34 and 35 of IAFW 2249)**

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

SCHEDULE - ‘D’

**(TRANSPORT TO BE HIRED TO THE CONTRACTOR)
(See conditions 16 and 35 of IAFW 2249)**

SI No	Quantity	Particulars	Rate per unit per working day	Place of issue (by name)	Remarks
1	2	3	4	7	8
-----NIL-----					

Signature of Contractor

AAD (Contracts)
for Accepting Officer

GENERAL SUMMARY

1. Total amount brought forward from BOQ (Schedule ‘A’) ₹ _____

2. Total amount of Schedule of Credit brought forward (-) ₹ **Nil**

Net Contract Sum ₹ _____

(Rupees _____

_____ Only)

Signature of Contractor

**AAD (Contracts)
for Accepting Officer**

T E N D E R

NAME OF WORK : PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)

T E N D E R

To,
The President of India

Having examined and perused the following documents:

1. Specifications signed by the AD/Director (Contracts) for the Chief Engineer (Navy) Mumbai, Mumbai - 400 005
2. Drawings detailed in the specifications.
3. Schedule 'A', 'B', 'C', and 'D' attached hereto.
4. MES Standard Schedule of Rates Part-I 2009 Specifications (including amendment Nos. 01 to 03) and MES Standard Schedule of Rates 2020 Part-II Rates (including amendment Nos. 1 to 122) {hereinafter and in IAFW-2249 referred to as the MES Schedule}.
5. General Conditions of Contracts IAFW-2249 [1989 Print] together with errata 01 to 20 and amendments 01 to 49 and the Schedule of Minimum Wages.
6. Water Condition 31 of IAFW-2249 [General Conditions of Contracts].
WATER WILL NOT BE SUPPLIED BY MES.
7. Should this tender be accepted, * I/WE AGREE

***(a) "That the sum of ₹ 13,98,625/- (Rupees Thirteen Lakh Ninety Eight Thousand Six Hundred Twenty Five Only) forwarded as Earnest Money which shall either be retained as a part of Security Deposit or be refunded by the Government on receipt of an appropriate amount of the Security Deposit, within the time specified as per condition 22 of IAFW-2249.**

(b) To execute all the works referred to in the said documents upon the terms and conditions contained or referred to therein and as detailed in the Summary and to carry out such deviations as may be ordered vide condition 7 of IAFW-2249 up to a maximum of (±)10% (Ten Percent) and further agree to refer all disputes as required by Condition 70 to Arbitral Tribunal of a Sole Arbitrator having degree in Engineering or equivalent or having passed Final/Direct Final Examination of Sub Division II of Institution of Surveyors (India) or similar other Institutes recognized by the Government of India. The Arbitrator shall be appointed by the Engineer-in-Chief, or in his absence the Officer officiating as the Engineer-in-Chief, or the Director General of Works if specially delegated in writing by the Engineer-in-Chief, Army HQ, New Delhi within a period of thirty days of having received the notice from any of the parties to Contract, out of MoD Panel of Arbitrators, whose decision shall be final, conclusive and binding.

**Delete whichever not applicable.*

In lieu of IAFW-2159 (Revised 1947)

Total brought forward from BOQ for the Lump Sum of
₹ _____ /- (Rupees _____

_____ only)

Signature _____ in the capacity of _____ duly
authorized to sign the tender for and on behalf of Messer’s _____
(BLOCK CAPITALS)

Name of the Signatory : _____
(IN BLOCK CAPITALS)

Date : _____

Postal Address : _____

Telegraphic Address : _____

Witness : _____

Address : _____

Telephone : _____

NAME OF WORK : PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)

A C C E P T A N C E

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

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

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

_____ only)

on dated _____ day of _____ 2026

Signature dated _____ day of _____ 2026

(FOR AND ON BEHALF OF THE PRESIDENT OF INDIA)
The Chief Engineer (Navy) Mumbai
Mumbai - 400005
Accepting Officer

NAME OF WORK : PROVISION OF DEFICIENT MARRIED ACCOMMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)

GENERAL CONDITIONS OF CONTRACTS - IAFW 2249 (1989 PRINT) FOR LUMP SUM CONTRACTS – IAFW 2159 (REVISED 1947)

A copy of the GENERAL CONDITIONS OF CONTRACTS - IAFW 2249 (1989 Print) with errata 1 to 20 and amendment Nos. 1 to 49 has been supplied to me/us, has been perused by 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 shall abide by the terms and conditions thereof, as modified if any, elsewhere in these tender documents.

It is hereby further agreed and declared by me/us, that the GENERAL CONDITIONS OF CONTRACTS, IAFW-2249 (1989 Print) including condition 70 thereof pertaining to settlement of disputes by arbitration, containing 33 pages (Serial page Nos 67 to 99) with errata 1 to 20 and amendment Nos. 1 to 49 (serial page Nos. 100 to 109) form part of these tender documents.

Note: In case of difference in interpretation due to wordings of English and Hindi versions of the General Conditions of Contracts (IAFW-2249) (1989 Print), the English version will prevail.

Signature of Contractor

**AAD (Contracts)
for Accepting Officer**

NAME OF WORK : PROVISION OF DEFICIENT MARRIED ACCOMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)

SCHEDULE OF MINIMUM FAIR WAGES

It is hereby agreed that the `Schedule of Minimum Fair Wages' as published vide Government of India / State Govt. / Union Territory Latest Notification forms part of these tender documents. My/Our signature hereunder amounts to my/our having read and understood the provisions contained therein and I/we agree that I/we shall abide by the same and that aforesaid documents form part of this tender.

Signature of Contractor

**AAD (Contracts)
for Accepting Officer**

SPECIAL CONDITIONS**1. GENERAL**

- 1.1 The following conditions shall be read in conjunction with General Conditions of Contracts IAFW-2249 (1989 Print) and IAFW-2159 (Revised 1947) including errata and amendments thereto. If any provision in these special conditions is at variance with the provisions of the above mentioned documents, provisions in these special conditions shall be deemed to take precedence there over.

2. VISIT TOSITE

- 2.1 The tenderer is advised to inspect the site, by prior appointment with the Garrison Engineer, to ascertain the nature of site, access thereto, local facilities for procurement of materials, working hours and labour rates prevalent in the area and all other matters affecting his price in the tender for execution and the completion of the work. The tenderer shall be deemed to have full knowledge of the site (s) whether or not he actually visits it/these. For the purpose of collection of materials and execution of the works, the site will be considered as lying in area as mentioned in clauses hereinafter.

3. SECURITY AND PASSES

- 3.1 Tenderers attention is invited to condition 25 of IAFW-2249. He shall employ only Indian Nationals after verifying their antecedents and loyalty. He shall ensure that no person of doubtful antecedents and nationality is, in any way, associated with work. If for reasons of technical collaboration or other consideration, the employment of any foreign national is unavoidable, the Contractor shall furnish full particulars to this effect to the Accepting Officer at the time of submission of his tender. The Contractor shall on demand by the Engineer-in-charge, submit a list of his agents, employees and work people concerned and shall satisfy the Engineer-in-Charge as to the bonafide of such people.
- 3.2 The Engineer-in-Charge shall, at his discretion has the right to issue passes, as per rules and regulations of the installation/area in force, to control the admission of the Contractor, his agents, and employees and work people to the site of the work or any part thereof. Passes shall be returned on any time on demand by the Engineer-in-charge or the authorities concerned and in any case on completion of work.
- 3.3 The Contractor and his agents, employees and work people shall observe all the rules promulgated by the authority controlling the installation/area in which the work is to be carried out e.g. prohibition of smoking and lighting, fire precautions, search of persons at entry and exit, keeping to specific routes, observing specified timings etc. Nothing extra shall be admissible for any man hours, etc. lost on this account.

4. MATERIALS ANDSAMPLES

- 4.1 Refer condition 10 of IAFW-2249 and clause 1.6 & 1.7 of MES Schedule.
- 4.2 Materials provided by the Contractor for incorporation in the works shall, unless otherwise specified in the particular specifications be ISI marked. IS means Indian Standards as issued by the Bureau of Indian Standards. Wherever in the specifications 'IS' is referred to, it means the edition with all amendments, current on the due date of receipt of the tender documents.
- 4.3 The tenderer is advised to inspect other materials, which are displayed in the office of the GE, before submitting his tender. The tenderer shall be deemed to have inspected the samples and satisfied himself as to the nature and quality of materials, he is required to incorporate in the work irrespective of whether he has actually inspected them or not. The materials to be incorporated in the work by the Contractor shall be ISI marked or shall be equal or superior in quality to sample displayed and shall comply with the specifications given hereinafter.
- 4.4 The Contractor shall produce samples of all materials, articles, fittings, accessories etc. that he proposes to use and get these approved in writing by the Garrison Engineer within reasonable time from the date of commencement of work as per work order. The materials, articles, etc. as approved, shall be labelled as such and shall be signed by the GE and the Contractor's representative. These samples shall be kept in the custody of the Garrison Engineer/Engineer- in-Charge.
- 4.5 The Contractor shall not procure materials unless the samples are first got approved by the Garrison Engineer. All items/materials for which approval is obtained from the GE shall be recorded in MBs as 'Not to be abstracted'.
- 4.6 The brand of all materials, articles, fittings, etc. approved together with the names of the manufacturers and firms from which supplies have been arranged shall be recorded.
- 4.7 (a) A list of items/articles, which are having ISI certification mark and are readily available, is given in Appendix- 'A'. It is mandatory that ISI certified marked items/articles as listed in Appendix-'A' shall be incorporated in the work.

SPECIAL CONDITIONS (CONTD/-)

(b) The Govt. reserves the right to get the items/articles listed in Appendix- 'A' tested in approved laboratories. The cost of sample for testing shall be borne by the Contractor and the remaining expenses such as cost of transportation of sample to laboratory and testing fee shall be borne by the Govt., if the test result is found to be satisfactory. However, in the event of the test result being found unsatisfactory, the entire cost of testing including cost of sample shall be borne by the Contractor. Government may get more than one sample of the same materials tested and the cost of such testing shall be borne by the Government.

5. PROPRIETARY/ BRANDED MATERIAL

- 5.1 Proprietary/branded materials such as paints, chemicals for anti-termite treatment, bitumen, waterproofing compound, etc. quantity of which cannot be checked after incorporation in the work, shall when collected at site, be recorded in measurement book and signed both by the Engineer-in-charge and the Contractor as a check to ensure that the required quantity has been brought at site for incorporation in the work.
- 5.2 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.
- 5.3 The Contractor shall obtain proprietary/branded materials from manufacturers or from manufacturer's authorised stockists where such authorised stockist has been appointed. The Contractor shall, on demand, produce original receipted vouchers/ invoices of suppliers to the Garrison Engineer, to ensure that the Contractor has actually brought the required quantity of the materials from the authorised dealers/manufacturers and also to be find out the rates thereof. The original vouchers/ invoices shall be defaced and stamped by the Engineer-in- Charge, indicating contract number, name of work, under his dated signature. The Contractor shall ensure that the materials are brought to site, in original sealed containers/ packing bearing manufacturer's marking except in the case of the requirement of material(s) being less than the smallest packing.

6. BLANK**7. TIME AND PROGRESS (CPM CHART)**

- 7.1 The CPM Chart to be prepared as per Condition 11 of IAFW-2249 (General Conditions of Contracts) shall consist of detailed network analysis and a time Schedule. The critical path network will be drawn jointly by the Garrison Engineer and the Contractor soon after acceptance of the tender. The Contractor so as to finish the work within the stipulated time will do the time scheduling of the activities. On completion of the time schedule, firm calendar date Schedule will be prepared and submitted by the Contractor to the Garrison Engineer who will approve it after due scrutiny. The Schedule will be submitted in four copies within two weeks from the date of handing over the site.
- 7.2 During the currency of the contract, the Contractor is expected to adhere to the time schedule and this adherence will be a part of the Contractor's performance under this contract. During the execution of work, the Contractor is expected to participate in the reviews and updating of the network undertaken by the GE. These reviews may be undertaken at the discretion of the Garrison Engineer either as a periodic appraisal measure or when the quantum of work ordered on the Contractor is substantially changed through deviation orders or amendments.

Any revision of the time schedule as a result of the review will be submitted by the Contractor to the Garrison Engineer within a week for his approval after due scrutiny. The Contractor will adhere to the revised schedule thereafter. In case of the Contractor disagreeing with the revised schedule the same will be referred to the Accepting Officer, whose decision will be final, conclusive and binding. The Garrison Engineer'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.

- 7.3 Extension of time shall be considered and decided by the appropriate authority mentioned in condition 11 of IAFW-2249 and separately regulated.
- 7.4 The Contractor shall mobilise and employ sufficient resources to achieve the detailed schedule within the broad frame work of the accepted methods of working and safety.
- 7.5 No additional payment will be made to the Contractor for any multiple shift work or other intensive methods contemplated by him in his work schedule, even though the department approves the time schedule.

8. SECURITY OF CLASSIFIED DOCUMENTS

- 8.1 The Contractor's special attention is drawn to condition 2-A and 3 of General Conditions of Contracts (IAFW-2249). The Contractor shall not communicate any classified information

SPECIAL CONDITIONS (CONTD/-)

regarding the works either to sub-Contractors or others without prior approval of the Engineer- in-Charge. The Contractor shall also not make copies of the design/drawings and other documents furnished to him in respect of the works and he should return all documents furnished to him in respect of the works on completion of the work or earlier termination of the contract. The Contractor shall along with the final bill, attach a receipt from the Engineer-in- charge in respect of his having returned the classified documents as per condition 3 of General Conditions of Contracts (IAFW-2249).

9. FAIR WAGES

- 9.1 The Contractor shall have no claims, whatsoever if on account of any rules and regulation or otherwise he is required to pay wages in excess of the fair wages shown in the schedule of wages under condition 58 of General Conditions of Contracts IAFW-2249.

10. PERIOD FOR KEEPING TENDER OPEN

- 10.1 The tender shall remain open for acceptance for a period of **90 (Ninety) days** from the next date subsequent to last date of bid submission.

11. RECORD OF CONSUMPTION OF CEMENT

- 11.1 For purpose of keeping record of cement brought by the Contractor and consumed in works, the Contractor shall maintain a pucca bound register, with serially numbered pages with all pages initialled by the Engineer-in-Charge against numbering, in the form approved by the Engineer-in-Charge showing daily receipts of cement brought by the Contractor, quantity used in works and balance in hand. The register shall be signed daily by representative of MES and the Contractor in token of their verification of its correctness and will be checked by the Engineer-in-Charge, at least once a week and on the days, cement is brought by the Contractor.
- 11.2 The aforesaid provision will not however, absolve the Contractor of his responsibility to justify the consumption of cement at the time of finalisation of his accounts.
- 11.3 The register shall be kept at site in the safe custody of the Contractor during progress of the work and he shall on demand produce the same for verification by inspecting officers. On completion of the works cement register shall be handed over to the Engineer-in-charge for record with MES.

12. **ROYALTIES** Delete the existing condition 14 of IAFW-2249 and insert the word 'BLANK' in lieu.

13. LAND AND LABOUR ACCOMMODATION, AND STORES AND WORKSHOP ETC.

- 13.1 Delete lines 5 to 9 of Para 1 of Condition 24 of General Conditions of Contracts IAFW-2249 i.e. from 'In the event of area of land' to 'land allotted to him' and insert as under: 'The Contractor shall be allotted, the area as marked on the layout plan for the purpose of erection of temporary workshop, stores for which he shall pay the nominal rent of Rs.1/- per year or part of a year.'
- 13.2 The Contractor will not be allowed to quarry/ win earth from MD land.

14. CO-OPERATION WITH OTHER AGENCIES

- 14.1 The Contractor shall permit free access and generally afford reasonable facilities to other agencies or departmental workmen engaged by Government to carry out their part of the work, if any, under separate arrangements.
- 14.2 The Contractor's prices shall be deemed to cater for all the above contingencies and nothing extra shall be admissible on this account.

15. LABOUR (REGULATION & ABOLITION) ACT

- 15.1 Contract labour (Regulation & Abolition) Act 1970 is applicable to MES Contractors. Rates quoted by the tenderer shall be deemed to take into account the cost, etc. required to comply with the provisions contained in the said act and the rules framed under the said act.
- 15.2 Refer Condition 58 of IAFW-2249. The 'Schedule of Minimum Wages' as published vide Government of India Notifications, as available on date of receipt of tender forms part of these tender documents. However, 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.
- 15.3 The fair wages referred to in condition 58 of IAFW-2249 will be deemed to be the same as the minimum wages payable as referred to above.
- 15.4 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.

SPECIAL CONDITIONS (CONTD/-)**16. WATER SUPPLY**

- 16.1** Refer condition 31 of General Conditions of Contracts (IAFW-2249) and clause 1.13 of MES Schedule.
- 16.2** **Water will NOT be supplied by the MES** & the Contractor shall make his own arrangements for water for the entire work. However, the Contractor if he so desires, will be permitted to drill bore well(s) in the area at his own cost. The well(s) dug/drilled by the Contractor shall become the property of the Govt. without any extra cost. The Contractor shall at his own cost, get the water tested from recognised Govt. Laboratory about the portability of water and produce the certificate to the GE.
- 16.3** Water used for mixing and curing shall be generally potable water, clean and free from impurities viz. oils, acids, alkaline salts, sugar, organic materials or other substance that may be deleterious to concrete or steel and also conform to IS-456.

17. ELECTRIC SUPPLY

- 17.1** In the case the Contractor desires to buy electricity from the MES and if the same is available for supply with the department he shall be charged for the electric energy consumed at the following rates:
- (a) At Rs. 18.06 per unit for lighting and
 - (b) At Rs. 18.06 per unit for power
- 17.2** The 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 the GE.

18. RELEASE OF PERFORMANCE GUARANTEE

- 18.1** Amount towards performance guarantee shall be released on satisfactory completion of defect liability period of two (02) years from the date of completion.

19. MINOR CONSTRUCTIONAL DETAILS

- 19.1** Lump sum quoted by the Contractor shall be deemed to allow for all minor constructional details which are not specifically shown on drawings or given in the Particular Specifications but are essential for the execution of work and services in workman like manner and sound construction. In case of as to whether or not certain item of work constitutes 'Minor Constructional Details' which is deemed to have been included in the Contractor's quoted lump sum, the decision of the Accepting Officer shall be final, conclusive and binding.

20. STACK MEASUREMENTS

- 20.1** Refer Special Conditions 20A.1.2 of MES Schedule Part-II.
- 20.2** Soling, Stone chipping for premixed carpet, etc. shall be stacked at suitable level places and their measurements recorded in measurement book and signed and dated by the MES representative and the Contractor as a check to ensure that the required quantities have been brought at site for incorporation in the work. No deductions shall be made in the stack measurement for unevenness of ground.
- 20.3** This provision, however, shall not absolve the Contractor from providing more materials required to complete the work to the required specification and to repair potholes, cracks, etc. that may occur during rolling.

21. OUTPUT OF ROAD ROLLER

- 21.1** Reference Condition 15 of General Conditions of Contracts IAFW-2249 (1989 Print) where road rollers are hired by the department to the Contractor, 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 procures 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.
- 21.2** 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 affected from the Contractor for the number of days falling short of the days assessed on the basis of output stipulated. The recovery shall be affected as under:
- (a) Where road roller is hired out only by the Department to the Contractor, at rates given in

SPECIAL CONDITIONS (CONTD/-)

Schedule-`C'.

- (b) Where road roller is hired by the Contractor only from sources other than the Department, at ` 1000/- net per working day (8hours).
- (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 sub-para (b) above.

21.3 OUTPUT OF ROAD ROLLER (8 to 10 tonne) :

			<u>Output per day of 8 hours work</u>
(a)	Consolidation of formation surfaces/sub grade	-	1850sqm
(b)	(i) Consolidation of soling (bottoming) of crushed or broken stone, spread thickness 150mm	-	800sqm
	(ii) -do- but spread thickness 230mm	-	518sqm
(c)	(i) Consolidation of water bound macadam (stone metal) 11cm. Spread thickness including spreading and consolidation with bindingmaterials.	-	248sqm
	(ii) Consolidation of water bound macadam (stone metal) 7.5cms. Spread thickness including spreading and consolidation with binding materials	-	372sqm
(d)	(i)Consolidation of 20mm thick pre-mixed carpet including sealcoat.	-	744sqm
	(ii) Consolidation of 25mm thick pre-mixed carpet including sealcoat.	-	600sqm
(e)	50mm thick consolidated pre-mix macadam	-	465sqm
(f)	40 mm thick consolidated SDAC	-	400 sqm
(g)	Consolidation of single coat surface dressing	-	744 Sqm
(h)	Consolidation of two coat surface dressing	-	558 Sqm
(j)	Consolidation of bituminous mixture 2 parts of broken stone metal and one part of sand and bitumen, consolidated thickness 40mm	-	372 Sqm

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

22. SALES TAX CONSEQUENT UPON THE CONSTITUTION (FORTY SIXTH AMENDMENT ACT 82)

- (a) Tendered rates shall be inclusive of all taxes and levies payable under the respective statute including Sales Tax/ service tax on works contract / VAT, labour welfare cess @ 1% works contract imposed on transfer of the right to use any goods for any purpose, the Act of Maharashtra State Government promulgated consequent to the 46th amendment to the constitution.
- (b) Tenderer shall note that no separate amount is to be indicated for the above-mentioned Sales Tax/ service tax on works contract /VAT labour welfare cess @ 1% works contract payable to the Maharashtra Government, in his tender. The element of this Sales Tax / service tax shall be included by the tenderer in his contract sum/unit price quoted.
- (c) Any tender which proposes any alteration to the above condition and/or which proposes the element of Sales Tax/ service tax on works contract / VAT labour welfare cess @ 1% works contract separately over and above the quoted contract sum/unit price will be treated as conditional tender and is liable for rejection.

23. 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 (including Sales Tax/VAT on materials, Sales Tax/VAT on Works Contracts, Turnover Tax, Service Tax, Labour Welfare Cess/tax, etc.), duties, Royalties, Octroi and other levies payable under the respective statutes. No reimbursement/refund for variation in rates of taxes, duties, Royalties, Octroi and other levies, and/or imposition/abolition of any new/existing taxes, duties, Royalties, Octroi and other levies shall be made except as provided in sub-para (b) herein below.
- (b)(i)The taxes which are levied by Govt. at certain percentage rates of Contract Sum/Amount shall be termed as “taxes directly related to Contract value” such as Sales Tax/VAT on Works Contracts, Turnover Tax, Service Tax, Labour Welfare Cess/tax and the like but excluding Income

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Tax. The tendered rates shall be deemed to be inclusive of all 'taxes directly related to Contract value' with existing percentage rates as prevailing on last due date for receipt of tenders. Any increase in percentage rates of 'taxes directly related to Contract value' with reference to prevailing rates on last due date for receipt of tenders shall be reimbursed to the Contractor and any decrease in percentage rates of 'taxes directly related to Contract value' with reference to prevailing rates on last due date for receipt of tenders shall be refunded by the Contractor to the Govt./deducted by the Govt. from any payments due to the Contractor. Similarly, imposition of any new 'taxes directly related to Contract value' after the last due date for receipt of tenders shall be reimbursed to the Contractor and abolition of any 'taxes directly related to Contract value' prevailing on last due date for receipt of tenders shall be refunded by the Contractor to the Govt./deducted by the Govt. from the payments due to the Contractor.

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

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

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

24. ADVANCES ON ACCOUNT OF MATERIALS WHICH DO NOT LOOSE IDENTITY

The Contractor may be paid advance on account to the full value of the under mentioned materials only, brought on the site, on his furnishing guarantee bond(s) from a scheduled bank for the amount of the retention money, should otherwise be recoverable from him under the contract:

- (a) Factory made panelled shutters
- (b) Factory made Aluminium windows/ventilators
- (c) Sanitary fittings
- (d) Builders hardware fittings (ironmongery)
- (e) Electrical cables/ wires/ fittings/fixtures
- (f) Water supply pipes, fittings/fixtures
- (g) All other non-perishable materials as decided by the GE.

The Bank Guarantee Bonds shall be executed for a period 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 of similar value. It will be noted that advance on account to the full value to materials brought on the site is permissible only in respect of fittings and fixtures and other manufactured items which do not lose their identity. Materials like bricks, aggregate, precast concrete and similar items shall not be taken in the list.

25. CLEANING DOWN (Refer Condition 49 of IAFW-2249)

The Contractor shall clean all floors, walls, remove cement, lime, paint marks/drops, etc. clean the joinery, glass panes, etc. touch up all painters work and carry out all other necessary items of work in connection therewith and leave the whole premises clean and tidy before handing over the building. No extra payment shall be claimed by the Contractor for this operation.

26. LABEL OF ARTICLES

The Contractor shall provide aluminium LABEL of not less than 75mmx25mm and of adequate gauge with brass screws on articles like transformer, panel board, generating set, etc. indicating there on the names of the firm, the contract No. and year as directed by the GE. Also the Contractor shall provide aluminium LABEL of same size and specification for quarter numbering. The cost of such aluminium labels shall be deemed to be included in the quoted rates against respective item of Schedule-'A'.

27. DAMAGE TO STRUCTURE

Any damage done to the structure built or being built by other agency during execution of work shall be made good by the Contractor at his own cost and the site of work left clean and tidy on completion. Rectification, reinstatement, making good, etc. shall conform to the standard of materials originally used in the work and finished work shall match with existing work in all respect

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to the entire satisfaction of the GE. In case of any dispute on this account the matter shall be referred to the CWE whose decision in writing shall be final, conclusive and binding.

28. CONDITIONS OF WORKING**28.1 CONDITIONS OF WORKING IN RESTRICTED AREA**

The entire work under this contract lies in 'RESTRICTED AREA'. The conditions of working in restricted area are stipulated as under:

(a) **Definition** Restricted area(s) for the purpose of this contract means the area(s) declared as such by the units as shown in site plan/described in Special Condition.

(b) **Verification of antecedents** Verification of antecedents of Contractor's representatives / labours 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 antecedent by Police Authority / Security Agency shall be borne by the Contractor.

(c) **Visit to site within the Restricted Area** Permission to enter the restricted area(s) at time of submission of tenders can be obtained, through the Garrison Engineer. Tenderers are advised to send prior intimation to the Garrison Engineer about the particulars of the agents, representative, etc., if any, the date and the time of their proposed visits so that necessary arrangement may be made by the GE, to secure admission. Whether tenderers visit the site or not they shall be deemed to have full knowledge of the restrictions on entering in, exit from and working within the restricted area.

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

(e) **Identity Cards or Passes**

(i) The Contractor, his agents and representatives are required individually to be in possession of an identity card or pass duly verified by the GE. The identity card or pass will be examined by the security staff at the time of entry into or exit from the restricted area, and also any time or number of times inside restricted area.

(ii) **Identity of Workmen** Every workman shall be in possession of an Identity Card. The identity cards shall be issued after a thorough investigation of the antecedents of the labourers, by the Contractor and attested by the officer-in-charge of the units concerned in accordance with the standing rules and regulations of the unit.

(iii) The Contractor shall be responsible for conduct of his workmen, agents or Representatives.

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

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

(h) **Working Hours.** The units controlling restricted area, usually work during six days in a week and remain closed on the 7th day. The working hours available to the Contractor's labour/staff are however accordingly get reduced because of the time taken in security checks observed at the time of entry and exit and during working hours. The exact working hours, working days and non-working days observed for these restricted area(s), where works are to be carried out shall be deemed to have been ascertained by the Contractor before submitting his tender. The tenderers' attention is invited to the fact that total number of working hours for a unit, are prescribed in regulations and that they cannot be increased by the Garrison Engineer.

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The definition of "Working Day" as given under condition 1(t) of IAFW-2249 does not apply in case where the works are carried out in restricted area.

(j) **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 expressly authorised in writing to do so by the Garrison Engineer. The GE may at his sole discretion declare any day as holiday or non- working day without assigning any reason for such declaration.

(k) **Access to restricted area after completion**After the works are completed and surplus stores etc. removed, the Contractor, his agents, representatives or workmen etc., will not be allowed any access to the restricted area except for attending to any rectification of defects pointed out to him by the GE.

(l) **Fire precautions**

(i) The Contractor, his agents, representatives, workmen etc., shall strictly observe the orders pertaining to fire precautions prevailing within the restricted area.

(ii) Motor transport vehicle, if allowed by the authorities to enter the restricted area must be fitted with serviceable fire extinguishers.

29. Arbitration: The existing description of Condition 70 of IAFW-2249 shall be substituted as under: -

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

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

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

(b) Arbitration Where Applicability of Section 12 (5) of Arbitration & Conciliation Act Has Not Been Waived Off.

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

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

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Arbitrators so appointed shall select one Arbitrator from the MoD Panel of Arbitrators who will be the 'Presiding Arbitrator'.

(c) Common for all Arbitration:

Unless both parties agree in writing, such reference shall not take place until after the completion or alleged completion of the works or termination or determination of the contract under Condition Nos 55, 56 and 57 of IAFW 2249 hereof.

Provided that in the event of abandonment of the works or cancellation of the Contract under Condition No 52, 53 or 54 of IAFW 2249 hereof, such reference shall not take place until alternative arrangements have been finalised by the Government to get the works completed by or through any other Contractor or Contractors or Agency or Agencies.

Provided always that commencement or continuance of any arbitration proceeding hereunder or otherwise shall not in any manner militate against the Government's right of recovery from the Contractor as provided in Condition 67 of IAFW 2249 hereof.

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

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

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

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

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

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

30. METHOD STATEMENT

- 30.1** The Contractor shall plan for execution and completion of work with foresight to ensure timely execution with the quality of work desired.
- 30.2** Period of completion shall be divided into months/ fortnights/ weeks and plan for each months/fortnights/weeks by preparing schedule for every months/ fortnights/weeks with following details, even before commencement of work.
 - (a)** Items of work to be executed with quantity.
 - (b)** Labour to be deployed trade wise,
 - (c)** T & P to be deployed.
 - (d)** Material to be brought to site for works to be executed next week.
 - (e)** Type and number of engineers to be employed.
- 30.3** Any special item of work to be executed along with description of method as to how the Contractor intends to execute. It must be submitted in advance.
- 30.4** Contractor shall also plan in advance and make available all the requisite safety equipment for his labour. A list of the same shall be given.
- 30.5** Contractor shall produce test certificate of T&P being deployed at site. The test certificates shall indicate the present capacity of the T&P and shall not be more than 06 months old.
- 30.6** The above details shall be furnished by the Contractor within 10 days of commencement of the

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work. Work will be not allowed to be executed without these details. However, date of commencement of work will be within one month of acceptance as per contract.

30.7 Delay on account of non-submission of these details and or test certificates will be attributable to the Contractor and no extension of time will be granted on this account.

30.8

****MONTH/FORTNIGHT/WEEK NO.**

From _____ To _____

EXECUTION

SI No	Item of work	Quantity	SI No	No of Engineers to be employed	
					Nos
1			1	Civil (a) Graduates (b) Diploma Holders	
2			2	Electrical (a) (b)	
3			3	Mechanical (a) (b)	

SI No	Labour required to be employed		SI No	T&P to be deployed	
	Trade	Nos		Type	Nos
1	Mazdoor		1		
2	Manson		2		
3	Electrician		3		
4			4		
5					
6					

MATERIALS TO BE BROUGHT AT SITE FOR EXECUTION MONTH/FORT NIGHT/ WEEK WISE DETAILS

SI no	Description of material	Quantity	Source
1.			
2.			
3.			
4.			

31. OFFICIAL SECRETS ACT

The Contractor shall be bound by the Official Secrets Act, 1923.

32. SAMPLE QUARTER

32.1 To determine the acceptable standard of materials and workmanship/ final finishes and layout of fittings etc. the contractor shall execute stages of work viz. excavation, foundation concrete, walling upto plinth/ lintel/ roof levels, roofing, flooring, joinery, built-in items, finishes, all fittings & fixtures and the like and services i.e. Internal Electrification, Water Supply, Plumbing, Sanitary Fittings as described in Schedule 'A', specified in Particular Specifications & as shown on drawings under the close supervision of Engineer-in-Charge and shall got it approved from the GE. The quarter shall be labelled as 'SAMPLE QUARTER'. The workmanship of various trades and finishes of sample quarter shall serve as guiding samples for the work in remaining quarters.

32.2 Approval of the stages and workmanship of sample quarter shall be separately entered and approved in stage passing register giving reference to block and quarter number for easy identification even at a later date.

33. PLANT SITE

33.1 Batching plants and site office shall be erected in restricted area at the location shown on the site plan attached. No crushing plant will be permitted to be installed inside the MOD land. The Contractor shall take necessary precaution to reduce the noise level, vibration, dust and emissions from the plants as directed by the GE. The access to the plant site shall be from

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restricted area only. To make access, the contractor will have to provide temporary gate of required width in the existing security wall. Security personnel deployed by the authorities at the entrance/gate shall be at the Contractor's own cost. On completion of work the temporary gate will have to be removed and broken wall is to be made good. No extra amount shall be payable for provision of temporary gate and making good the wall.

- 33.2 All existing roads to be used by the vehicle of the contractor or any of his sub-contractors or suppliers of materials or plant shall be kept clean and clear of all dust and other extraneous materials dropped by the said vehicles or their tyres every day.
- 33.3 Any structural damage caused to the existing roads by the Contractor's construction equipment shall be made good without any extra cost within seven days, failing which an amount of `10,000/- damages per week shall be charged till the road is repaired by the Contractor.

34. DISPUTE RESOLUTION BOARD (DRB) (CONDITION 71 OF IAFW – 2249 GENERAL CONDITIONS OF CONTRACT REFERS) (APPLICABLE TO ALL CONTRACT OF VALUE MORE THAN ₹10.00 CRORE)

- 34.1 During execution of the works or after completion or after determination/cancellation/termination of the contract all disputes between the parties to contract arising out of the contract (except those for which decision of Accepting Officer or any other Officer (CWE and/or GE) is expressed to be final and binding), including any disagreement by either party with any action, inaction, opinion, instruction, certificate or valuation by the Accepting Officer or his nominee, the matter in dispute shall, in the first place be referred to the Dispute Resolution Board (DRB). In case of disagreement with decision of such DRB, any party may invoke arbitration clause.
- 34.2 The Constitution of the DRB shall be three-member body as under:
 - (i) Chairman: Joint DG (Contracts) of the concerned Command Chief Engineer. Where Jt.DG(C) is not posted in the Command, any other Chief Engineer / Brig Level Officer posted in CE Command shall be nominated by Command Chief Engineer at his sole discretion.
 - (ii) Member 1
 - (iii) Member 2

} Col/Director rank Officers of Command CE or of any other Zonal CE be nominated by the Command CE
- 34.3 The name of Chairman and Members shall be notified by the Accepting Officer within one month of the date of Acceptance of contract.
- 34.4 Once the DRB is constituted, the members and Chairman shall disclose in writing their neutrality and impartiality about any personal interest in the work.
- 34.5 The disputes 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.
- 34.6 The DRB shall decide the disputes in accordance with the terms of the contract, principle of natural justice, equity and fair play.
- 34.7 The DRB may fix oral hearings at a place, date and time as decided by the Chairman.
- 34.8 The requisite administrative support to the DRB shall be provided by the Accepting Officer.
- 34.9 All the contract documents pertaining to the case shall be provided by the Accepting Officer for reference by the DRB.
- 34.10 DRB shall give its decision on the disputes within three months of notice from any party invoking the DRB clause. This period can be extended by one month with the consent of the parties.
- 34.11 All the decision given by the DRB shall be by majority and such decision shall be communicated in writing by Chairman to the parties.
- 34.12 If the decision of the DRB is not to the satisfaction of either party or if the DRB fails to give decision within the laid down time, either party shall indicate their reservations on the decision to the Accepting Officer within 30 days of such decision and to refer that dispute for Arbitration within the provisions of Condition 70 of IAFW 2249 General Conditions of Contract.
- 34.13 It shall be mandatory for the party invoking arbitration on any particular dispute to have first exhausted the remedy provided under the DRB clause for that particular dispute.
- 34.14 The mandate of the DRB shall terminate on completion of one year from the date of completion / determination / cancellation / termination of the contract.
- 34.15 If any member or Chairman of the DRB is unable to function due to any reason whatsoever, or he resigns his appointment, Chief Engineer Command, shall fill the vacancy so caused within 15 days of happening of such vacancy.
- 34.16 Any dispute referred to the DRB and having been decided by the DRB and not objected to by either party within 30 days shall attain finality and shall not be referable to Arbitration.

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- 34.17** Accepting Officer shall ensure implementation of the decisions of the DRB which attain finality, i.e. except those which are objected by him or by contractor within 30 days as per Para 12 above.
- 34.18** Findings and decision of DRB shall be admissible as evidence, to the extent permissible as per law, in the subsequent Arbitration and / or litigation.
- 34.19** DRB Chairman/Members shall not, in any case, be liable to be called as witness or to produce any evidence in any Arbitration or departmental proceedings of any kind.
- 34.20** During execution of work the disputes may be referred to the DRB as per the requirement of each party after having exhausted the decision-making process provided in the contracts. In case of completion of work or after determination / cancellation / termination of the contract all the disputes including payment / non-payment / delay in final bill shall be simultaneously referred to the DRB within six months of completion / determination / cancellation / termination of the contract.
- 34.21** The department case before the DRB shall be presented by Accepting Officer himself and / or Dir (Contract) of CE Zone assisted by CWE and his DCWE (Contract), GE and his AGE (Contracts) and any other Officer and legal counsel nominated by Accepting Officer. The contractor may present his case by himself and / or by his nominated reps & authorized legal / technical counsel.

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

In compliance with the Condition 26 of IAFW-2249 (General Conditions of Contracts), the contractor shall employ skilled/semi-skilled tradesmen who are qualified and possessing certificate in particular trade from Industrial Training Institute (ITI)/ National Institute of Construction Management and Research (NICMAR)/ Similar reputed and recognised Institutes by State/Central Government, to execute the works of their respective trade. The number of such qualified tradesmen shall not be less than 25% of total skilled/semi-skilled tradesmen required in each trade. The Contractor shall submit the list of such tradesmen along with requisite certificates to the Garrison Engineer for verification and approval. Notwithstanding the approval of such tradesmen by the GE, if the tradesmen are found to have inadequate skill to execute the work of their trades, leading to un-satisfactory workmanship, the Contractor shall remove such tradesmen within a week after written notice to this effect by the GE and shall engage other qualified tradesmen after prior approval of the GE. The GE's decision whether a particular tradesman possesses requisite qualification, skill and expertise commensurate with nature of work, shall be final and binding. No compensation whatsoever on this account shall be admissible.

36. PERFORMANCE SECURITY

- 36.1** Within 28 days of receipt of the letter of acceptance, the successful contractor shall deliver to the Accepting Officer a performance security in any of the forms given below for an amount equivalent to 5% of the contract sum.
- (a)** A bank guarantee in the prescribed form.
- (b)** Government Securities, FDR or any other government instruments stipulated by the Accepting Officer.
- 36.2** Failure of the successful contractor to comply with the requirements of sub clause 1.17.1 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.
- 36.3** 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. 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.
- 36.4** 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.
- 36.5** Condition 19.1 of IAFW-2249 and condition 14A.1 of IAFW-1815Z provides for submission of Performance Security by the successful contractor in the form of Bank Guarantee Bonds or Govt

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Securities, FDR or any other form of deposit stipulated by the Accepting Officer.

- 36.6** The Performance Security shall be in favour of Accepting Officer and shall be in any of the forms mentioned above. Work Order No. 1 shall be placed only after Submission of Performance Security of adequate value by the contractor. In case a Fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the Performance Guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.
- 36.7** 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.
- 36.8** The period of validity of the Bank Guarantee Bond against Performance Security shall be initially valid up to the stipulated date of expiry of Defects Liability Period plus minimum 60 days beyond that. In case final bill is not paid during this period, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time required for payment of final bill, failing which BGB shall been cashed.
- 36.9** Bank Guarantee Bond in lieu of Performance Security is due for discharge on expiry of Defect Liability period provided always that the contractor has been paid the final bill and contractor has rendered the No Demand Certificate (IAFW-451).
- 36.10** In case final bill has been paid, contractor shall submit the No Demand Certificate (IAFW-451), if not already submitted by him. After submission of No Demand Certificate (IAFW-451), GE will intimate this fact to the Accepting Officer within a week to release the Bond duly discharged to the contractor.
- 36.11** If any recovery is outstanding against the contractor, release of Bank Guarantee will be subject to Compliance of the procedure for effecting the recovery/withholding the due amount as stipulated in Condition 67 (as amended) of GCC (IAFW-2249) or Condition 34 (as amended) of GCC (1AFW-1815Z), as applicable.
- 37. BLANK**
- 38. YARDSTICK Details:** - Advance payment on account of work done at site for items of Sch-A Part-I shall be made to the contractor as per the yardstick details given as under. No claim on the account of any ambiguity in between percentage of work done at site and as given under will be payable.

YARDSTICK		
Name of Work: <u>PROVISION OF DEFICIENT MARRIED ACCOMODATION FOR SAILORS (POs AND BELOW) AT NAVAL BASE PORBANDAR</u>		
SCHEDULE A – PART- I, ITEM NO.1		
SR No.	STAGE OF WORK	PERCENTAGE OF COST OF BUILDING
1	Stage - 1 : Upto Plinth Level	
	Surface dressing, excavation, RCC footings including steel reinforcement, form work, RCC M-35, PCC (1:2:4) & (1:2:4) as in Foundation, Lift Well Shear Wall, Plinth Beam, Reinforcement, Form work & RCC M-35 upto Plinth level, return filling in foundation, & filling under floor complete upto plinth level including ATT.	18.08
2	Stage - 2 : Plinth Top To G. Floor Lintel Level	
	RCC M-35 in Shear Wall including Reinforcement , Form Work From Plinth Top To G. Floor Lintel Level, AAC Block Masonry, Lintel Band including reinforcement, form work, complete.	2.36
3	Stage - 3 : G. Floor Lintel Top To G. Floor Slab Level	
	RCC M-35 in Shear Wall, including Reinforcement, Form Work from G. Floor Lintel Top To G. Floor Slab Level, AAC Block Masonry, RCC M-35 in Beams, RCC Slab & Staircase including Reinforcement, form Work, Complete.	3.94
4	Stage - 4 : Typical Floor Slab Top To Typical Floor Lintel Level (1st Floor To 3rd Floor)	
	RCC M-35 in Shear Wall Including Reinforcement , Form Work from Typical Floor Slab To Typical Floor Lintel Level, AAC Block Masonry, RCC Parapet Wall, Lintel Band & Chajja Including Reinforcement, Form work, Complete.	8.59

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5	Stage - 5 : Typical Floor Lintel Top To Typical. Floor Slab Level (1st Floor To 3rd Floor)	
	RCC M-35 in Column & RCC Wall, including Reinforcement, Form Work from Typical Floor Lintel Top To Typical Floor Slab Level, AAC Block Masonry, RCC M-35 in Beams, RCC Slab & Staircase including Reinforcement, form Work, Complete.	11.82
6	Stage - 6 : Typical Floor Slab Top To Typical Floor Lintel Level (4th Floor & 5th Floor)	
	RCC M-35 in Shear Wall Including Reinforcement, Form Work from Typical Floor Slab To Typical Floor Lintel Level, AAC Block Masonry, RCC Parapet Wall, Lintel Band & Chajja Including Reinforcement, Form work, Complete.	6.01
7	Stage - 7 : Typical Floor Lintel Top To Typical. Floor Slab Level (4th Floor & 5th Floor)	
	RCC M-35 in Column & RCC Wall, including Reinforcement, Form Work from Typical Floor Lintel Top To Typical Floor Slab Level, AAC Block Masonry, RCC M-35 in Beams, RCC Slab & Staircase including Reinforcement, form Work, Complete.	7.60
8	Stage - 8 : 6th. Floor Slab Top To 6th. Floor Lintel Level	
	RCC M-35 in Column & RCC Wall Including Reinforcement , Form Work from Typical Floor Slab To Typical Floor Lintel Level, AAC Block Masonry, RCC Parapet Wall, Lintel Band & Chajja Including Reinforcement, Form work, Complete.	2.98
9	Stage - 9 : 6th. Floor Lintel Top To Roof Slab Level	
	RCC M-35 in Column & RCC Wall, including Reinforcement, Form Work from Typical Floor Lintel Top To Typical Floor Slab Level, AAC Block Masonry, RCC M-35 in Beams, RCC Slab & Staircase including Reinforcement, form Work, Complete.	5.03
10	Stage - 10 : Roof. Floor Slab To Mumty Slab Level	
	RCC M-35 in Column & RCC Wall Including Reinforcemen, Form Work from Roof Slab To Mumty Slab Level, AAC Block Masonry, RCC Parapet Wall, Lintel Band & Chajja Including Reinforcement, Form work, Complete.	2.06
11	Stage - 11 : Plaster Work (G.Floor)	
	Polymer modified ready mix Plaster to Internal Surface of Wall, Ceiling and External Surface of Wall, etc.	1.18
12	Stage - 12 : Plaster Work Typical Floor (1st Floor To 3rd Floor))	
	Polymer modified ready mix Plaster to Internal Surface of Wall, Ceiling and External Surface of Wall, etc.	4.20
13	Stage - 13 : Plaster Work Typical Floor (4th To 5th Floor)	
	Polymer modified ready mix Plaster to Internal Surface of Wall, Ceiling and External Surface of Wall, etc.	1.67
14	Stage - 14 : Plaster Work (6th. Floor)	
	Polymer modified ready mix Plaster to Internal Surface of Wall, Ceiling and External Surface of Wall, etc.	1.63
15	Stage - 15 : Plaster Work (Mumty Floor)	
	Polymer modified ready mix Plaster to Internal Surface of Wall, Ceiling and External Surface of Wall, etc.	0.68
16	Stage - 16 : Joinery (All Floors)	
	Pressed Steel Door Frame, Panelled Door Shutter, Wire Netting of Stainless Steel, Aluminium Window, steel window & ventilator & Shutter, PVC Door Frame & Shutter, Fixed Glazing, Sheet Glass, Figured Glass for Ventilator, Iron Mongery, etc.	8.72
17	Stage - 17 : Surface Finishes (G.Floor)	
	Painting Work for Internal, External, Ceiling Newly Plastered Surfaces	0.26
18	Stage - 18 : Surface Finishes Typical Floor (1st. Floor To 3rd Floor)	
	Painting Work for Internal, External, Ceiling Newly Plastered Surfaces	0.86
19	Stage - 19 : Surface Finishes Typical Floor (4th & 5th Floor)	
	Painting Work for Internal, External, Ceiling Newly Plastered Surfaces	0.60
20	Stage - 20 : Surface Finishes (6th. Floor)	
	Painting Work for Internal, External, Ceiling Newly Plastered Surfaces	0.34
21	Stage - 21 : Surface Finishes (Mumty Floor)	

SPECIAL CONDITIONS (CONTD/-)

	Painting Work for Internal, External, Ceiling Newly Plastered Surfaces	0.13
22	Stage - 22: Flooring (G. Floor)	
	PCC Flooring Sub Base to Floors, Hardcore, Machine Cut Polished Kota Stone Flooring including Skirting, Heavy duty parking tile, Interlocking paver block with sand filling, etc. complete	1.06
23	Stage - 23 : Flooring Typical Floor (1st. to 3rd. Floor)	
	PCC Flooring Sub Base to Floors, Machine Cut Polished Kota Stone Flooring including Skirting, Vitrified Ceramic Tiles & Non - Skid Ceramic Tile for Flooring, Glazed Ceramic Tiles for Dado, etc. complete	3.35
24	Stage - 24 : Flooring Typical Floor (4th. & 6th. Floor)	
	PCC Flooring Sub Base to Floors, Machine Cut Polished Kota Stone Flooring including Skirting, Vitrified Ceramic Tiles & Non - Skid Ceramic Tile for Flooring, Glazed Ceramic Tiles for Dado, etc. complete	3.52
25	Stage - 25 : Flooring (Mumty Floor)	
	PCC Flooring Sub Base to Floors, Machine Cut Polished Kota Stone Flooring including Skirting, etc. complete	0.06
26	Stage - 26 : Plinth Protection to Building	
	PCC (1:3:6) Type C-2, Plinth Protection with Drain, Hard Core, etc. complete	0.04
27	Stage - 27 : Water Proofing Treatment	
	Water Proofing Treatment complete	0.44
28	Stage - 28 :- Sanitary Fixtures (G.Floor to 3rd Floor Typical)	
	Sanitary Items & Fixtures complete	0.64
29	Stage - 29 :- Sanitary Fixtures (4th to 6th Floor Typical)	
	Sanitary Items & Fixtures complete	0.75
30	Stage - 30. :- Misc Items (G.Floor to 3rd Floor Typical)	
	SS Work, MS Work, Pcc Curb Wall	0.68
31	Stage - 31 :- Misc Items (4th to 6th Floor Typical)	
	Misc Items, etc. complete	0.70
32	Stage - 32 :- Misc Items (Mumty Floor)	
	Misc Items, etc. complete	0.01
33	Stage - 33 :- Site Clearance	
	Site Clearance	0.01
	TOTAL	100.00

39. SAFETY MEASURES FOR WORKMEN

- 39.1** In addition to the safety precaution to be taken by the contractor as described in special conditions herein and in IAFW-2249, the contractor shall take following additional safety precaution of his workmen without any extra cost to the Government:
- (a) Safety adjustable waist belt with proper arrangement
 - (b) Safety helmets with strap. The above shall be provided to his workmen as and when required and directed by the Engineer-in-Charge.
 - (c) The contractor shall employ safety inspector qualified in construction of building works.
 - (d) Insurance of workmen as per Labour Act
- 39.2** The contractor shall submit list of persons to be deployed on work and ensure insurance of the persons against any type of miss-happening during execution of work, well before the commencement of the work.

40. INDEMNITY BOND FOR PAYMENT OF LABOUR, WORKMEN EMPLOYED ON THE WORKS

The contractor shall execute indemnity bond with the GE for enforcement of various enactment like Wages Act-1936, Minimum Wages Act-1948, Employees Liability Act-1938, Workmen's Compensation Act-1923 and any other act or enactment related directly or indirectly to labour employment and rules framed thereunder from time to time for the time being enforce. In case of non-compliance of any of the enactment by the contractor, the GE shall be empowered to exercise the powers vested in him as the principal employer and the amount so not paid to the labourer/workmen to be deducted from the sum become due to the contractor under this contract or from other contracts in terms of condition 67 of IAFW-2249 (General Condition of the Contract).

SPECIAL CONDITIONS (CONTD/-)**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. LOCATION OF BUILDINGS AND WORKS

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

43. COORDINATION WITH OTHER AGENCIES

The contractor shall permit free access and afford normal facilities and usual convenience to other agencies or Departmental workmen to carry out connected works or services under separate arrangements. The contractor will not be allowed any extra payment on this account and no compensation shall be admissible to the contractor on this account.

44. RECORD OF MATERIALS AND PURCHASE VOUCHERS

(a) The quantity of materials such as cement, steel, paints, water proofing compound, chemicals for anti-termite treatment and the like, as directed by the Engineer-in-Charge (the quantity of which cannot be checked after incorporation in 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.

(b) 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.

(c) Materials to be Procured by Contractors: -

(i) Vouchers in respect of cement, steel, major E/M equipment like transformers, DG Sets, pumps, motors, AC and lift equipment will be submitted invariably. For all original works, keeping in view specific provisions and circumstances for each contract, it may be necessary that certain additional items require verification of vouchers. GE shall list out all such items after issue of tender and submit the same in his comments on the tender documents. The list of such items shall be put up by E8 section (through E4 if required) to the Accepting Officer for his approval. The list should be work specific and not general in nature.

(ii) Original purchase vouchers shall be defaced by the Engineer-in Charge and photocopies shall be kept in record. Genuineness of purchase voucher shall be verified by the Engineer in Charge before considering the same for making payment. Initially JE may verify the vouchers after taking confirmation on phone or through e mail. The contractor shall ensure that the materials are brought to site in original sealed containers/ packing, bearing manufacturer's marking except in the cases of the requirement of materials being less than smallest packing.

(iii) These instructions shall also be applicable in case of contracts based on IAFW - 1815Z.

(d) Bitumen shall be purchased directly from main manufacturers only. In case of small quantity, the Accepting Officer may allow procurement of Bitumen from authorised dealers of main manufacturers. Purchase vouchers for the same shall be defaced by the Engineer-in-Charge, indicating reference to the Contract number under his dated signature and photocopies thereof shall be kept on record so as to avoid their being used again.

(e) The vouchers will clearly indicate the Contract number and the IS No and specific alternative to which the material conforms in case of various alternatives in IS. In case the contractor procures the Bitumen mix from Hot Mix Plant, the copy of voucher of Bitumen provided by the main manufacturer to the Hot Mix Plant shall be submitted by the contractor.

45. WATCH/LIGHTING

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

46. HANDING OVER OF SITE

Site for execution of work will be available as soon as the work is awarded. In case it is not possible to make the entire site available on the award of work, the contractor will have to arrange his working programme accordingly. No claim whatsoever, for not giving the entire site on award of work and for giving site gradually, will be tenable. However, Work Order No 1 shall specifically indicate phased handing over of site as proposed in consultation with users

Signature of Contractor

AAD (Contracts)
for Accepting Officer

SPECIAL CONDITIONS (CONTD/-)

T&P FOR EXECUTION OF WORK

(a) The Contractors shall also meet requirement of minimum T&P/ Machinery and Transport as under:

SI No.	Special T&P/ machinery/ transport	Minimum requirement in numbers	Remarks
1.	Working lifts	01	For lifting of construction materials and labours (2 Tons)
2.	Rope netting / safety net		As per BMC bylaws and as per site requirement (All around bldg perimeter for 3m width)
3.	Suitable netting / green cloth		To protect surrounding accommodations from dust and hazards as promulgated bymunicipal bylaws and criteria and as per site requirements
4.	Suitable Barricading with MS Sheet or equivalent	-	To protect surrounding accommodations from dust and hazards as promulgated bymunicipal bylaws and criteria and as per site requirements
6.	Tower crane	01	5 tonne capacity min.
7.	02 sets shuttering (minimum 1500sqm) of PU coated plywoodwith steel props and spans	-	
8.	Steel walk board	10	
9.	RMC batching plant with RMC pump	01	Capacity 30 cum/hour of RMC plant. Pump should be able to lift concrete to a height of approx. 50m
10.	Suspended working platform of 1 T Cap	01	
11.	Rock Breaker Machine	01	
12.	Needle type vibrator	05	60/40mm needles
13.	Excavator, JCB, trucks and tippers	01 each	
14.	Transit mixers	02	If RMC plant location is finalised far away from the site of construction
15.	Total Station	01	
16.	Rebound hammer	01	For NDT
17.	Computer and printer	01	For necessary planning and documentations and printer for RMC
18.	Digital camera	01	To take photographs of every stage and VIP visits and as directedby the GE
19.	CCTV camera	10	As per requirement to cover the entire work site for security reasons (No Chinese origin and no wifi connectivity)
20.	Display boards with stands, flex charts	05	

(b) The Contractors shall also meet requirement of minimum Engineer strength as under :

SI No.	Supervisory staff for execution	Minimum requirement in numbers	Remarks
1.	Resident Engineer / Project Manager	01	BE with minimum 20 years of working experience in high rise buildings.
2.	Site Engineer (Civil)	02	01 Nos BE with minimum 10-15 years of working experience in high rise buildings And 01 No Diploma in Engineering with minimum 15-20 years of working experience

SPECIAL CONDITIONS (CONTD/-)

3.	Site Engineer (Electrical)	01	BE with minimum 10-15 years of working experience in high rise buildings
		Or	or
		02	Diploma in Engineering with minimum 15-20 years of working experience and having requisite knowledge and expertise in firefighting systems of high-rise buildings

Notes:

- (i) The above list is for minimum requirement and not exhaustive. In addition, any T&P if required at site and or as directed by the GE shall be brought at site by the Contractor. No claim whatsoever shall be admissible on this account. All the above T&P shall be brought at site during the relevant stage as per CPM and can only be taken out / removed from site on written permission of the GE.
- (ii) The above list is for minimum required staff engagement and not exhaustive. In addition, additional staff strength if required at site and or as directed by the GE shall be deployed at site by the Contractor. No claim whatsoever shall be admissible on this account. All the above T&P shall be brought at site during the relevant stage as per CPM and can only be taken out / removed from site on written permission of the GE.
- (iii) The requirement of Aluminium shuttering/Form work shall meet the following :-
 - (a) The criteria of stripping time as laid down in table No 11.3.1 of IS 456:2000 and Amit to the clause of IS 456:2000 vide Amdt No 05 Jul 2019
 - (b) The stipulated timings for completion of structure work as per CPM Chart.

**AAD (Contracts)
for Accepting Officer**

PARTICULAR SPECIFICATIONS (Contd.../-)**1. GENERAL**

- 1.1 Works under this Contract shall be carried out as detailed in BOQ and in accordance with Particular Specifications, Special Conditions, provisions given in General Summary and General rules and Specifications / Provisions given in MES SSR Part-I 2009 as well as General rules, Special conditions and preambles to various rates given in MES SSR Part-II 2020 (MES SSR Part-I and II hereinafter called as MES Schedule).
- 1.2 The term 'General Specifications' referred to in these documents as well as referred to in IAFW-2249 (General Conditions of Contracts) shall mean the specifications contained in the MES Schedule Part-I.
- 1.3 General Rules, Specifications, Special conditions, method of measurements and all preambles in the MES Schedule shall be deemed to be applicable to the work under this contract, unless specifically stated otherwise in these documents. In case of variance between provisions in these documents and those given in MES Schedule, the provisions in these documents shall take precedence over the aforesaid provisions in the MES Schedule.
- 1.4 The term 'as specified' wherever appears in tender documents and drawings, relates to relevant particular specifications and in its absence General specifications.
- 1.5 Particular specifications in this section given hereinafter shall be generally applicable to all works covered under BOQ. The particular specifications are in brief and are only to particularise, amend and emphasize the specifications given in MES Schedule, which are not repeated.
- 1.6 Where specifications for any item of work are not given in these particular specifications or in MES Schedule, specifications as given in relevant Indian Standard or Code of Practice shall be followed.
- 1.7 Reference to any drawings which is mentioned in these particular specifications shall be deemed to be forming part of the tender. The tenderer shall refer such drawings/ details in the office of the Accepting Officer before quoting his tender.
- 1.8 The tenderer shall not take cognizance of note (s) appearing on drawing regarding the bearing capacity of the soil taken into consideration while designing the foundation, as it is for departmental purpose only.

2. SCOPE OF WORK

- 2.1 The scope of work consists of **PROVISION OF DEFICIENT MARRIED ACCOMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)** all as given in the BOQ, all as described and as specified in these Particular Specifications. The scope also includes internal/ external and other services as enumerated in Schedule-'A' Parts-II to XIV complete all as shown on drawings and as specified in these particular specifications hereinafter.
- 2.2 Any damage to or so to the existing structures, article, equipment, etc. as ascertained by the Engineer-in-charge shall be made good repaired or renovated or rebuilt by the Contractor without any cost to the Department to the entire satisfaction of the GE.
- 2.3 All considerations under the government's Green Rating of Integrated Habitat Assessment – GRIHA – to be mandatorily followed by the contractor while executing all aspects of the work.

3. DIMENSION

- 3.1 In laying out the centre line dimensions mentioned in the drawings or deduced there from and or as directed by the Engineer-in-charge, shall be strictly followed.
- 3.2 The tenderer shall fully apprise himself of the prevailing conditions at the proposed site. Climatic conditions including monsoon patterns, local conditions and site specific parameters and shall include for all such conditions and contingent measures in the rates, including those which may not have been specifically brought out in the specifications.

4. MATERIALS

- 4.1 All materials to be supplied by the Contractor for incorporation in work shall conform to relevant specifications / IS.
- 4.2 In case specifications of materials needed for incorporation is not contained anywhere in the contract documents, the specifications of such materials proposed to be incorporated in work shall be got approved in writing from the GE before incorporation in the work. The Contractor is advised to check availability, lead, time of procurement from these suppliers before quoting.
- 4.3 As far as practicable all manufactured articles other than those manufactured in the Contractor's workshop at site shall bear ISI certification mark and which are readily available in the market and are as given in Special Conditions. It is mandatory for the Contractor that ISI certified marked items/articles as listed therein shall only be incorporated in the work.
- 4.4 Local materials such as stone aggregate, sand, lime, etc. shall generally conform to the sample kept in the GE's office in addition to their conformity with relevant specifications given in the tender documents. The samples of such materials shall be got approved from GE in writing before the materials are brought at site in bulk. The Contractor shall submit samples of materials to the

PARTICULAR SPECIFICATIONS (Contd.../-)

GE through Engineer-in-charge for approval.

- 4.5 Letters conveying approval of samples / materials by the GE will initially mention source of supply / name of manufacturer, trade name/brand (if applicable) and reference to clause of the tender documents containing specification of particular materials.
- 4.6 The Contractor and executives will ensure that the materials incorporated in the work are identical with the approved samples.

5. TESTING OF MATERIALS

- 5.1 All the materials to be incorporated in the work shall be subject to quality control tests as per the testing procedure and frequency as laid down in relevant IS and or as specified in the tender.
- 5.2 Irrespective of whatever is indicated elsewhere in the tender documents the modalities of testing arrangements shall be as given here in after,
- 5.3 The Contractor shall set-up a site laboratory fully equipped to the satisfaction of GE to carry out the 'A' type tests as given in Appendix- 'D' to these specifications. The laboratory shall be set up in all respects before any activity requiring tests as indicated above is physically commenced. Contractor shall employ a competent person technically qualified as approved by the GE to carry out the testing activities. All the tests shall be carried out in the presence of Engineer-in- charge and records shall be jointly signed with the Contractor.
- 5.4 Entire cost of laboratory and its functioning including cost of samples will be borne by the Contractor in all respects and no separate recovery for testing charges shall be effected for tests/retest carried out at site laboratory. If in the opinion of the GE (whose decision in this regard shall be final and binding)
- 5.5 Any of the tests as given in Appendix-D to these specifications cannot be satisfactorily carried out in the site laboratory at any stage due to any reason, the same shall be got done in Zonal lab / Govt. approved lab/Engineering college as approved by GE in respect of which all expenditure there of shall be borne by the Contractor.
- 5.6 Any tests marked as type 'A', 'B' or 'C' in Appendix-'D', if got done at Zonal lab / SEMT wing Pune, testing charges as indicated against them will be recovered from the Contractor. In addition to this the Contractor shall arrange for samples and its handing/transportation to the concerned labs at his own cost.
- 5.7 The tests marked as type 'B' and 'C' will not be carried out in the site laboratory. These tests shall be carried out only in zonal lab / SEMT wing / Govt. approved lab/National test House / Engineering College as approved by the GE. Incase type 'B' and 'C' testing is done in zonal lab / SEMT wing the testing charges recoveries shall be as indicated in the Appendix- 'D' to these PS against each test. However, if testing is done in other places as given above the actual cost will be directly borne by the Contractor.
- 5.8 The list of tests given in Appendix- 'D' to these PS contains only a few common tests. However, all other tests required in the work but not covered in the appendix shall also be got done in Govt. approved lab/Engineering College/National Test House as approved by the GE and entire cost of sample, handling, transportation and actual testing charges will be borne by the Contractor directly.

6. EXCAVATION AND EARTHWORK**6.1 PREPARATORY WORK/ SITE CLEARANCE**

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

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

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

PARTICULAR SPECIFICATIONS (Contd.../-)

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

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

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

(g) Finalisation and approval of building levels shall be completed as phase-I of the work within a period of 02(Two) months as per phasing given under Sch 'A' Notes. Accordingly the level sheets as mentioned here-in-before shall be submitted to Accepting Officer for approval within 03 Weeks prior to the completion period of 02 (Two) months for Phase-I, leaving adequate time for scrutiny and approval.

6.2 EXCAVATION -GENERAL

6.3.1 Unit rates for buildings in Schedule 'A' Part-I shall include for **mechanical excavation** and earthwork in Hard/Dense soil upto 0.3m depth, Soft/disintegrated rock exceeding 0.3m and upto 1m depth, hard rock/fractured rock beyond 1m depth. Any change in strata during excavation than mentioned hereinbefore shall be regularized through a deviation order. In case of deviation, rate of excavation as per relevant items of SSR Part II shall be considered in OMIT part of deviation order adjusted by percentage quoted by the tenderer for Schedule 'A' Part-I.

6.3.2 Mechanical Excavation shall be done to the depth as shown on drawings/as required at site and as directed by Engineer-in-Charge.

6.3.3 Decision of the Garrison Engineer shall be final, conclusive and binding as regards classification of soils and rocks met during excavation.

6.3.4 Before execution of work please ensure the SBC as given drawings as per requirement to the desired depth as given in drawings. The cost of the same shall be included in the sum quoted by tenderer.

6.3 Quoted cost of all items of Schedule-'A' Part-I as well as subsequent parts shall also be deemed to include for bailing, pumping, dewatering from foundation trenches if water is met with or accumulated from any source or cause or working in water or liquid mud. No additional payment as stipulated in Clause 3.11 of MES Schedule Part-II will be admissible. In the event of deviations, no adjustment shall be made for cost of bailing, pumping and dewatering, specified hereinbefore. The Contractor shall be deemed to have acquainted himself with the sub-soil water table at site before submitting his tender.

6.4 (a) Stone obtained from excavation in hard rock (met with during excavation) (other than by chiselling) shall become property of the Contractor. The Contractor shall pay Rs. 750.00 per cum of measured quantity of stone obtained in excavation and shall remove it off the site with prior permission of GE/ Engineer-in-charge. No lead shall be payable for the removal of stone from site. The Contractor may use the stone obtained from excavation in filling under floors or road work if permitted by the GE. In cases the excavation in hard rock is carried out by chiselling then the excavated material shall be used in filling as specified hereinafter in floors or road work. The recovery of Rs. 750.00 per cum of stack measurement (without any deduction for voids) of hard rock shall be effected from the Contractor to the extent of material used in filling. Surplus excavated material shall be disposed of outside MD land.

(b) Blasting of rock is prohibited. Excavation in hard rock (if met with during excavation) shall be done by chiselling or by any other agreed method.

6.5 In case timbering to excavation is required and specifically ordered by the GE in writing, it shall be provided by Contractor at his own cost.

6.6 TRENCHES FOR FOUNDATION AND PIPES

(a) The excavation shall be restricted to dimensions shown on the drawings and as specified in MES Schedule. Excavation made, if any, in excess of required depth/width shall be made good by the Contractor with cement concrete 1:7:12 type F2 without extra cost to the Government

(b) The beds of the trenches shall be watered and well rammed and any depressions thus formed shall be filled with approved earth as required to the level and slopes as directed by Engineer-in-Charge.

6.7 FILLING IN TRENCHES/UNDER FLOORS

(a) The approved soil/soft rock obtained from excavation (except earth/ spoil obtained from surface dressing) shall be used for returning, filling in trenches, under floors or any other situation after removing big stones, grass, roots and vegetables and other organic matter. Earth mixed with small stones/pebbles (if approved by GE) is permitted for use in filling around pipes after the pipes

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are laid and tested. Any additional earth required for the purpose of filling shall be arranged by the Contractor at no extra cost to the Department from outside the Defence Land.

(b) Filling under floors / sides of trenches shall be in layers not exceeding 250mm and each layer shall be watered, compacted and rammed as approved by the Engineer-in-Charge.

(c) Surplus soil/ spoil shall be removed outside MD land. For the purpose of omit part of deviation order, it shall be considered as 30km.

(d) The Contractor shall provide levelling instrument 'Auto level' with operator for taking the existing and final levels by Board of Officers and for entire duration of pile foundation without any extra cost to Government.

6.8 METHOD OF MEASUREMENTS FOR EXCAVATION AND EARTHWORK

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

(b) COMPUTATION OF VOLUMES (PRISMOIDAL FORMULA)

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

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

Where: A - Area of the cross section insqm
 d - Common distance between successive ordinates in metres
 h₁ - Height of the first ordinate in metres.
 h_n - Height of the last ordinate in metres
 (h₃ + h₅ + ...) - Sum of the heights of odd ordinates in metres in between h₁ and h_n
 (h₂ + h₄ + ...) - Sum of the heights of even ordinates in metres in between h₁ and h_n

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

$$A_x = d/2 [(h_x + (h_x + 1))]$$

Where: A_x - Area to be computed between any two ordinates insqm
 h_x, (h_x+1) - are heights of two ordinates respectively.

(d) COMPUTATION OF VOLUMES (SIMPSON'S RULE)

Simpson's rule given below shall apply for the computation of volumes where the total number of ordinates is odd and the ordinates are spaced at equal interval.

$$V = d/3[(A_1 + A_n) + 2(A_3 + A_5 + \dots) + 4(A_2 + A_4 + \dots)]$$

Where: V - Volume of the cross section incum
 d - Common distance between successive ordinates in metres
 A₁ - Area of the first ordinate insqm
 A_n - Area of the last ordinate insqm
 (A₃ + A₅ + ...) - Sum of the areas of odd ordinates in sqm
 (A₂ + A₄ + ...) - Sum of the areas of even ordinates in sqm

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

$$V_x = d/2 [(A_{2n} + A_{2n+1})]$$

Where: V_x - Volume to be computed between any two ordinates in cum
 A_{2n}, A_{2n+1} - are areas of two ordinates respectively

6.9 DRESSING AROUND BUILDINGS

After constructions and before handing over any building the area around as defined in Clause 6.1 above shall be dressed without extra cost to the Govt. spoil obtained from surface dressing shall be removed outside Defence land. Rubbish shall be removed from site time to time as directed by Engineer-in-charge. Nothing extra shall be admissible on account of any extra lead, if required, due to inadequate space for keeping excavated soil at sides of trenches.

6.10 FOUNDATION AND PLINTH

PARTICULAR SPECIFICATIONS (Contd.../-)

- (a) The lump sum cost for works under Schedule-`A' Part-I shall be for the construction of buildings as per the contract drawings and specifications.
- (b) For the purpose of reckoning the depth of the foundation the average level of the ground after surface excavation shall be considered.
- (c) Site plan shows location of buildings, should it be found necessary to vary the sitting of these buildings, no claim for additional expenses, if any, will be entertained on this account by the Department.
- (d) Quoted cost of all items of Schedule-`A' Part-I as well as subsequent parts shall also be deemed to include for removal of roots of the trees if met during excavation.

6.11 HARD CORE

Hard core shall be hand crushed or broken trap / basalt / granite stones of gauge not exceeding 63mm well graded to provide dense and compact sub grade all as specified in Para 3.27.1 and 3.27.6 of MES Schedule Part-I. The finished consolidated thickness of hard core shall be as shown in drawings or 150mm unless otherwise specified. Thickness shown on drawings / Schedule of finishes shall be treated as consolidated thickness. The crushed or broken stones shall be brought from the source(s) approved by the GE.

7. PRECONSTRUCTION ANTI TERMITE TREATMENT

- 7.1 Preconstruction anti-termite chemical treatment shall be carried out for buildings, covered in items of **Schedule-`A' Part-I (Item Nos. 01)** all as described in clause 3.26 of MES Schedule Part-I to bottom and sides of foundation trenches/pits, filling in trenches/pits, and below floors, junctions of walls and floors, external perimeter of building(s) and surroundings of conduits/pipes and below plinth protection.
- 7.2 In the event of deviations, the rates given in the MES Schedule Part-II for the treatment with emulsion using chlorpyrifos shall be applicable.
- 7.3 The above pre-construction anti-termite treatment work shall be executed through an approved agency which should be member of Indian Pest Control Association holding valid license as per Column 13 of Insecticide Act 1968 and persons employed to do the anti-termite treatment shall be qualified as per rules framed under Insecticide Rules, 1971. Specialist firm shall be approved by the GE and the work shall be done to the entire satisfaction of the GE. The defects liability period of anti-termite treatment shall be 10 years and the Contractor shall be responsible to keep the entire buildings free from termite infection for a period of 10 years after the certified date of completion. The main Contractor shall produce paid vouchers along with necessary certificates from the Pest Control specialist firm giving 10 years (Ten years) guarantee (from certified date of completion of contract) to keep the building fully free from termite infestation during guarantee period. This guarantee does not however absolve the main Contractor from his responsibility in respect of this specialist work as per contract conditions. The main Contractor shall be responsible to ensure that the buildings are kept free from termite infestations during guarantee period.
- 7.4 An amount as calculated below shall be retained out of the final bill amount as security deposit for anti-termite treatment work. This amount shall be calculated as per the scales laid down by MES for calculating individual security deposit on the final work done amount of preconstruction anti-termite treatment at contract rate. The amount shall be released to the Contractor after satisfactory expiry of ten years guarantee period. The GE may accept Bank Guarantee Bond from Scheduled Bank or a fixed deposit receipt (pledged in GE's favour) from an approved Bank for the said sum for a period of ten years, in which event no further amount will be recovered from the final bill on this account. Defects liability period under Condition 46 of General conditions of Contracts (IAFW-2249) shall be deemed to be amended to the extent mentioned above for anti-termite treatment works.
- 7.5 If at any time during the guarantee period it is found by the GE that the buildings or any parts thereof are affected by termites, the Contractor shall at his own cost provide post-construction anti-termite treatment to such affected portions to the entire satisfaction of the Garrison Engineer. The decision of the GE as to the extent to which such post construction treatment is to be provided shall be final, conclusive and binding.
- 7.6 The chemical for use in anti-termite treatment shall be emulsion of chlorpyrifos 20% EC chemical directly purchased from the original manufacturer or his authorized agent as specified in Appendix-`B' attached. Chemical should be brought in sealed container(s).
- 7.7 If necessary, GE shall carry out frequent checks after at least one mandatory test with regard to composition of chemical in an approved laboratory and a record shall be kept incorporating the laboratory results. The cost of the laboratory tests will be borne by the Contractor if the same is got done by the Department despite production of test certificates by the Contractor to satisfy that spurious materials are not being used. A copy of ISI 6313 (Part-II) should be made available at site by the Contractor.
- 7.8 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.

7.9 The Contractor shall provide a plate of adequate dimensions, 20mm thick in cement and sand mortar (1:4) indicating the CA No., name of the specialist firm and the date of expiry of the anti-termite treatment guarantee rendered to the respective blocks of accommodation at place directed by the Engineer-in-charge. Height of letters shall not be less than 10cm and shall be engraved in plaster. The plaster plate shall be painted with three coats of synthetic enamel paint (including the priming coat) of tint as decided by the GE. The unit rates inserted in Schedule-`A' for the respective buildings is deemed to be inclusive of the cost of anti-termite treatment and guarantee plate specified above.

8. **STEEL AND IRON WORK**

8.1 All steel required for the work under the Contract shall be procured, supplied and fixed in the work by the Contractor under his own arrangement. Whatsoever shown on drawings grade of steel shall be CRS Fe-550D.

8.2 **GRADES & QUALITY**

Steel supplied by the Contractor shall conform to the following grades and quality :

- (a) Steel for concrete reinforcement at locations as shown on drawings:
- (i) TMT steel bars CRS (Corrosion Resistant Steel) Fe-550D grade manufactured by manufacturers listed herein below conforming to IS-1786 shall be incorporated if bars of above grades are not available due to manufacturing status next higher grade may be used without revising the design and without any price adjustment.
 - (ii) Where indicated as HIGH YIELD STRENGTH DEFORMED BARS, it shall be high strength deformed steel bars conforming to IS-1786-1985 (Reaffirmed 1990) and grade Fe-550D
- (b) Structural steel
- (i) Structural steel standard quality shall be of grade E-250 (Fe 410W quality) conforming to IS 2062-2006. This type of steel shall be provided in the locations mentioned in clause 10.4.1 of MES Schedule Part-I.
 - (ii) Structural steel ordinary quality shall be of grade E-165 (Fe 290 quality) conforming to IS 2062-2006. This type of steel shall be used for structure not subjected to dynamic loading. This type of steel will not be used where welding is used in fabrication and in the areas falling in the earth quack zone where severe damage is expected and design of structure is based on plastic theory. This type of steel shall be provided in the locations specified in clause 10.4.2 of MES Schedule Part-I.
- (c) Hard drawn steel wire fabric for concrete reinforcement : Fabric reinforcement shall conform to IS-1566, 1982.

Note: Any items of steel specified in clause 8.2 (a) to (c) above not conforming in grade and quality shall be rejected and the rejected steel items under the particular consignment shall be removed from the site by the Contractor at his own cost within 7 (seven) days. The Contractor will have no claim whatsoever on this account.

8.3 **SOURCES OF PROCUREMENT**

(a) Structural Steel

The Contractor shall procure structural steel from the main producer viz.:

SI No	Firm Name, Brand & Address	Size / Dia and Type
(i)	Rashtriya Ispat Nigam Limited, Brand: RINL, Visakhapatnam Steel Plant, Visakhapatnam – 530 031, India, Tel: (91 891) 518226, 518376, Fax: (91 891) 518316, e-mail: cmdvsp@itpvis.ap.nic.in	Angle, beam, column, channel, plates
(ii)	Tata Iron & Steel Company, Brand: 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, 287 840, Email: corpcomm@jsr.tatasteel.com (Br office for North : Jeevan Tara Bldg, Patel Chowk , New Delhi)	-do-
(iii)	Steel Authority of India Limited, Brand: SAIL Central Marketing Organization, Northern Region, 17 th Floor, Scope Minar, Laxmi Nagar Distt. Centre Delhi – 110 092	-do-
(iv)	M/s Jindal Steel & Power Ltd, Brand: Jindal Jindal Centre, Plot No. 2, Sector-32, Gurgaon-122001, Haryana Tel: 0124-6612000 Fax: 0124-6612125 website: www.jindalsteelpower.com	-do-

(b) TMT CRS Bars

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Steel required for the work shall be procured by the Contractor from the primary manufacturers as listed hereinafter (or) any other manufacturer approved by E-in-C's Branch, New Delhi even after issue/ submission of bid and the approved manufacturer's validity shall not be expired at the time of procurement.

SI No	Firm Name, Brand & Address	Size / Dia and Type
(i)	Rashtriya Ispat Nigam Limited, Brand: RINL , Visakhapatnam Steel Plant, Visakhapatnam – 530 031, India, Tel: (91 891) 518226, 518376, Fax: (91 891) 518316, e-mail: cmdvsp@itpvis.ap.nic.in	For all types & dia of TMT CRS bars
(ii)	Tata Iron & Steel Company (TISCO or Tata Steel), Brand: TATA , Bombay House, 2, 4 Homi Modi Street, Mumbai – 400 001, India Tel : (91 22) 204 9131, Fax : (91 22) 204 9522, 287 840, Email: corpcomm@jsr.tatasteel.com (Br office for North : Jeevan Tara Bldg, Patel Chowk , New Delhi)	For all types & dia of TMT CRS bars
(iii)	Steel Authority of India Limited, Brand: SAIL Central Marketing Organization, Northern Region, 17 th Floor, Scope Minar, Laxmi Nagar Distt. Centre Delhi – 110 092	For all types & dia of TMT CRS bars
(iv)	M/s Shyam Metalics & Energy Ltd. Brand: SEL TIGER Viswakarma, 1 st floor, 86 C Topsia Road, Kolkata-700 072 Tel- +9133 4011 1000 Fax- +9133-2285 2212 Website- www.shyamgroup.com	TMT Bars of Gde Fe 500D, (Size 8-32mm) Gde Fe 550D, (Size 8-32mm except 20mm) (Approval upto 18 Sep 2026)
(v)	M/s SUGNA METALS LIMITED, Brand: SUGNA TMT Plot No 76, Vemireddy Enclave Road No 12, Banjara Hills, Hyderabad- 500 034 (Telangana) Tele-040 27664502/27663527 Email - Info@sugnatmt.com	TMT Bars of Gde Fe 550D (Size 8~32mm) (Approval upto 12 Sep 2026)
(vi)	M/s TULSYAN NEC LIMITED, Brand: TULSYAN TMT APEX Plaza, 1 st Floor Old No. 3, New No. 77 Nungambakkam High Road Chennai – 600 034 (TN) Website- www.tulsyannec.in Tele- 044-61991060/61991045 Mob- 9840354010, 9677088334	TMT Bars of Grade Fe500, Fe 500D & Fe 550 (Size 8~32mm) (Approval upto 06 Mar 2030)
(vii)	M/s SPS Steel Rolling Mills Ltd., BRAND: ELEGANT TMT “Diamond Heritage” 16, Strand Road, Room No H523 A, 5 th Floor, Kolkata – 700001	TMT Bars of Grade Fe 500D (Size 08-32mm)
(viii)	M/s Jindal Steel and Power Ltd, BRAND: JINDAL PANTHAR OP Jindal Road Hiddar, Haryana – 125005 Tel : +91-1662-222471/84 Fax : +91-1662-222476 Website – www.jindalsteelpower.com	TMT Bars of Grade Fe 500, Fe 500D, Fe 550, Fe 550D & CRS with (Sizes 08-40mm)
(ix)	M/s Electrotherm (India) Ltd. BRAND: ET TMT Survey No. 72, Palodia Via- Thatlej, Ahmedabad, Gujarat – 382 115 Tel : +91-2717-234553/660550 Mob : +91-9687-234866 Website : www.electrotherm.com	TMT Bars of Grade Fe 500, Fe 500D & CRS with (Sizes 08-32mm)

The steel shall confirm to the requirements as stated in clause 8.2 above. The documents in support of the purchase of steel shall be verified by the site staff and the GE. The particulars of the manufacturer/supplier of steel shall be obtained from the Contractor for every lot of steel separately. Form given at Appendix-'F', shall be used for this purpose.

PARTICULAR SPECIFICATIONS (Contd.../-)

(c) However, non-structural steel as for hold fast, railing and the structural steel where total requirement under the contract is less than 5tonne may be procured locally after obtaining permission of the Acceptance Officer in writing.

(d) The Contractor shall submit original vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be incorporated in the work. All consignments received at the work site shall be inspected by the GE along with the relevant documents before acceptance. The original test certificates and vouchers shall be defaced by the Engineer-in-charge and kept on the record in the office of the GE duly authenticated and with cross reference to the control number recorded in the Steel Acceptance Register. The Steel Acceptance Register, as given at Appendix- 'F' will be signed by the JE, the Engineer-in-charge, the GE and the Contractor. The Accepting Officer may order a Board of Officers for random check of steel and verification of connected document. 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 Engineer-in-charge and the Contractor.

8.4 MINIMUM FREQUENCY OF TESTING FOR EACH SOURCE & EACH CONSIGNMENT

8.4.1 Steel for concrete reinforcement

(i)	Bar size less than 10mm	One sample (3 specimens) for each test for every 25 Tonnes or part thereof
(ii)	Bar size 10mm to 16mm (inclusive)	One sample (3 specimens) for each test for every 35 Tonnes or part thereof
(iii)	Bar size over 16mm	One sample (3 specimens) for each test for every 45 Tonnes or part thereof

8.4.2 Structural Steel

(i)	Tensile Test	One Test for every 25 tonne of steel or part thereof
(ii)	Bend Test	One Test for every 10 tonne of steel or part thereof

(a) For high strength deformed bars tensile, bend test and re-bend test shall be done as per I 1975. For MS bars tensile & bend test shall be carried out as per IS-432 of 1982.

(b) Testing by the GE as per above frequency is mandatory before payment is released to the Contractor or steel is incorporated in the work. However, tests will not be insisted upon for the steel required for guard bars, holdfasts, grills and such other allied items. Any items of steel, not meeting the requirements, shall be rejected and the particular consignment removed from the site by the Contractor at his own cost. The Contractor will have no claim on this account. The cost of tests and test samples as per above frequency

(c) Cost of transportation of samples to the approved laboratory/test house and all testing charges shall be borne by the Contractor.

8.5 Storage Steel supplied by the Contractor shall be stored in accordance with the requirement of BIS. Each grade and quality of steel shall be stored separately and have identification tags indicating the source, quality and grade.

8.6 Preservation and Maintenance of Steel The steel brought by the Contractor shall be preserved to ensure that no rusting takes place till it is incorporated in the works.

8.7 Schedule of Supply The Contractor shall procure the steel sections, timely as required in accordance with CPM chart, agreed between GE and the Contractor. The Contractor will have no right to demand extension of time if the supply of steel got delayed due to his failure in placing order in time to the manufacturers/suppliers.

8.8 Payment Receiving payment of steel shall be governed by in accordance with condition 64 of IAFW- 2249. Payment shall be allowed after production of test certificate & original paid/purchase vouchers by the Contractor.

8.9 Measurement The entire quantity of steel brought to the site shall be recorded in measurement book 'Not to Be Abstracted' indicating the reference to manufacturer, source of supply, voucher No. and test certificate before incorporation in the work and shall be signed both by the Engineer-in-charge and the Contractor. Proper documentation/record shall be maintained as per the instructions on the subject.

8.10 Weight Conversion Weight of steel supplied by the Contractor shall be calculated at unit weights given in Appendix-'A' of MES Schedule 2020 Part-II. For section not listed in MES Schedule, the ISI conversion table shall be followed or manufacturers certificate if the weights are not available in MES Schedule/ISI tables.

PARTICULAR SPECIFICATIONS (Contd.../-)

- 8.11 Normal waste and off cuts shall be stacked neatly which shall be the property of the Contractor. Contractor shall be allowed to remove such cut pieces after inspection and certification by the Engineer-in-charge.
- 8.12 Advance on account payment made towards these cut pieces shall be recovered from advance on account of payment immediately falling due & before removal of such cut pieces from site.
- 8.13 Bending and fixing of bars for concrete reinforcement including mild steel wire for binding shall be carried out all as specified in MES Schedule.
- 8.14 Hooks shall be provided only for mild steel bars. In case of cold twisted / deformed /TMT steel bars ends shall be bent instead of hooks as directed by the Engineer-in-charge.
- 8.15 Binding wire for reinforcement shall be mild steel wire (annealed) of size not less than 0.9mm.
- 8.16 **FIELD TEST ON RING FORMATION USING NITRIC ACID AND METHANOL FOR DIFFERENTIATING TMT FROM TOR STEEL**
- (a) A field test of ring formation using Nitric acid and Methanol shall be carried out to differentiate TMT from TOR steel. The test shall be conducted in the presence of Engineer-in-charge/ MES rep and the Contractor / his authorized representative and the test results shall be recorded and duly signed by the Engineer-in-charge and the Contractor and countersigned by GE.
- (b) The test shall be carried out as mentioned below:
- i) Solution of Nitric acid and Methanol is prepared by using 2% of Nitric acid and 98% of Methanol
 - ii) Steel rod to be checked is cut into small pieces of 200mm length and cross section is smoothened by sand paper.
 - iii) Rod is kept in contact with above solution for 24hours.
 - vi) Annular ring is visible on cross section in case of TMT. If the ring is not visible, then steel is not TMT steel.
- 8.17 **STEEL SUPPLY/ACCEPTANCE FORM**For each consignment of steel supply/acceptance form (Refer Appendix- 'F') will be filled in and jointly signed by the Department representative (AGE / JE (Civil)) and the Contractor and accepted/rejected by the GE before incorporation in the works. (Note: Steel supply/acceptance form will be issued by the GE)
- 8.18 **STEEL REINFORCEMENT**
- Reinforcement shall be fabricated, placed in position all as per Schedule- 'A' and specified in clause 10.17 to 10.22 of MES Schedule (Part-I) without application of heat.
- 8.19 **STRUCTURAL STEELWORK**
- (a) All structural steel work in trusses, purlins, braces, etc. shall be carried out all as shown on Schedule 'A' and specified in clause 10.4 to 10.16 of MES SSR Part- I. Structural steel work shall be conforming of 410-S as per IS-226 and 2062 and shall have yield stress more than 250N/sqmm.
- (b) Bolts, nuts and washers except purpose made bolts shall be all as specified in clause 10.7 of MES SSR Part-I and conforming to IS: 2016 and IS: 6610. Spring washers shall conform to IS-3063.
- (c) All structural steel members shall be treated with one shop coat of red oxide primer after fabrication but before assembly and erection and one under coat and one finishing coat of synthetic enamelled paint after erection all as directed by Engineer-in-charge.
- (d) Sizes of gusset plates for the trusses and bracing shall be as directed by Engineer-in-charge. and shall be within parameters of IS-800. All gusset plates and steel members shall confirm to high strength bolts as per IS clause 4000 of 1992. 10.18.5 All anchor plates shall conform to high strength bolts as per IS clause 4000 of 1992.
- 8.20 **WELDING**
- (a) Welding to iron and steel work shall be done in approved manner with electric welding unless specifically indicated otherwise in Schedule-'A'.
- (b) Electric welding shall be metal arc welding using consumable electrodes. All fillet welds shall be normal fillet welds. Welding shall be done as specified in IS-816 and IS-823
- (c) Welding electrodes shall be of quality suitable for welding of structural steel and shall comply with the requirement of IS-814 for covered electrodes for metal arc welding of mild steel.
- (d) The Contractor's particular attention is drawn to IS-818 code of practice for safety health requirements in welding and cutting operations. All welds shall be cleaned of slag and other deposits after completion. Unless otherwise specified/directed, all welds shall be 5mm fillet welds.
- (e) All steel/MS work in grills/railing, etc. shall have joints welded around. Spot welding shall not be permitted.

PARTICULAR SPECIFICATIONS (Contd.../-)**8.21 COUPLERS & PREPARATION OF REINFORCING BARS**

(a) Reinforcement couplers shall be of class 'L' threaded coupler conforming to grade Fe-600 of IS-1786 and shall satisfy the performance criteria and all tests as stipulated in IS: 1617-2014. These shall be free from burrs, cracks and other manufacturing defects.

(b) The threads shall be clearly formed and shall be free from imperfections.

(c) The reinforcing bars to be coupled shall be swan square cut at ends, the swan cut end of the reinforcing bar shall be enlarged by cold forging process. When the core diameter of bar thus is increased to a pre-determined diameter, the rib of the forged head shall then be removed afterwards by turning process for even surface to receive the thread cut mechanically onto the enlarged end of the bar.

(d) The entire reinforcement network including placing of couplers, etc. shall be got approved from the GE and necessary stage passing register shall be maintained for the same.

8.22 Pricing deviations involving CRS TMT bars of grade Fe-550D/Fe-550D shall be as per rates contained in MES Standard Schedule of Rates, Part-II for TMT bars enhanced by percentage quoted by the tenderer for Schedule 'A' Part-I. No claim on this account shall be admissible.

9.0 CONCRETE WORK**9.1 CEMENT**

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

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

9.2 FINE AGGREGATE

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

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

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

9.3 COARSE AGGREGATE

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

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

9.4 GRADING OF COARSE AGGREGATE Graded Aggregate of nominal sizes given hereunder shall be used, unless specified otherwise, in the specifications hereinafter:

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

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

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

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

- (i) Under 30mm thickness : 12.5mm
- (ii) 30mm to 80mm thickness : 20mm
- (iii) Exceeding 80mm thickness : 40mm

9.5 WATER Water shall conform to the requirement stipulated in IS-456 and as per Clause 4.9 of MES Schedule.

9.6 MIX OF CONCRETE

9.6.1 Unless otherwise specified in drawings, mix of concrete shall be as below in various situations shall be as under unless otherwise stated in Schedule- 'A' or here in after in these Particular Specifications.

Situation	Types of Concrete
(a) Foundation concrete for all buildings, under brick/stone walling and lean concrete under plinth/grid/toe beam and steps, in gaps between plinth/column under footing	M10 nominal mix
(b) Foundation concrete under column footing if not shown in drawings	M10 nominal mix
(c) PCC in sub floors (base concrete) for PCC / tiles floor	M7.5 nominal mix
(d) PCC in plinth protection, drain and channel, PCC Cills and PCC block for holder-bats, and plugging for scaffolding holes	M10 nominal mix
(e) All RCC work	RMC grade M-30 to M-40 Design Mix M-30 to M-40 as shown in drawings
(f) PCC in bed plate, benching, splash stones, coping, DPC and pre-cast articles	M15 nominal mix
(g) Cement concrete in any other situation not mentioned above	M15 nominal mix

- 9.6.2

Small projects having total volume of concreting not exceeding 30cum will be dealt asunder:

(a) A normal weigh-batching plant shall be utilized for these types of projects. The specifications of the plant shall be as under:

 - (i) The plant shall be a three-hopper plant. Three hoppers shall be used for cement, fine aggregate and coarse aggregate.
 - (ii) The plant shall be motorized
 - (iii) Arrangements shall be made for addition of water by weight/volume.

(b) The mix design shall be arrived at as per IS: 10262-2009 after three trial mixes and shall be approved by the GE before the start of the work.

(c) Sampling of concrete shall be as per IS:456-2000.
- 9.6.3

Medium and large projects shall be dealt with as under:

 - (i) Projects having concreting work of more than 30cum shall be considered as medium and large projects.
 - (ii) Concreting in these projects shall be carried out by any of the following ways at the option of Contractor. However, no financial adjustment will be done if the Contractor uses any of the two methods:
 - (a) By procurement from an approved RMC plant.
 - (b) From an automatic computerized weigh batching plant installed at site by the Contractor (As per details given below).
- 9.7

READY MIX CONCRETE (RMC)
- 9.7.1

RMC as specified shall confirm to IS:4926-2003.
- 9.7.2

The Contractor shall procure concrete from RMC manufacture as listed hereinafter RMC plant if specifically set up from one of the listed manufacturers shall conform to IS-4926:2003.
- 9.7.3

Mix of the two types i.e. RMC and concrete in situ shall not be permitted for the same element of structure.
- 9.7.4

The Contractor shall obtain a written approval from the GE for the specific manufacturer from whom he is intends to procure the RMC. The GE shall verify the suitability of the plants for the particular project after considering all provisions given in IS:4926-2003. Following are of some aspects may be verified by the GE:

 - (i) Output capacity of plant Minimum output capacity for RMC plant shall be 30cum / hour as specified in CA.
 - (ii) Pollution under check Certificate The relevant and valid PUC certificate from the Government agency shall be available for the plant.
 - (iii) Calibration Certificate Relevant and valid calibration certificate shall be checked for the plant as well as for the testing machine
 - (iv) Transit Mixers The number and the condition of the transit mixers shall be satisfactory.
 - (v) Vicinity of the plant with respect to the site The distance between the plant and the site shall be such as it may satisfy the transportation time as allowed in the IS code.

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9.7.5 For projects at locations where movement of transit vehicles are restricted during day time Contractor shall carry out the concreting work during night or late hours after obtaining necessary approval from the GE as well as users.

9.7.6 The Contractor shall forward an information note as shown in Appendix-'D' of IS: 4926-2003, duly countersigned by the GE to the RMC supplier. A copy of the same shall be kept at site for verification.

9.7.7 **MIX DESIGN**

(i) The mix proportions intended to be used for the demanded mix shall be obtained from the manufacturer in writing and shall be verified by the GE to ensure that these are complying with the provisions of IS: 456-2000 and IS:10262.

(ii) The Contractor shall also produce copies of the test certificate for the materials being used by the RMC manufacturer for the verification by the GE. The GE shall give a provisional approval for the mix proportion based on this and work can commence accordingly. However, final approval will be given only after verifying the 28th day cube strength of the first batch brought at site, as stated herein after at clause 9.7.9(ii).

(iii) The use of admixture shall be as per the provisions of clause 5.5 of IS: 456 and the amount shall be based on the provisions of IS: 10262. The details of the admixture shall be clearly spelt out at serial Nos. (c) and (d) of Part-'B' of the delivery ticket. In no case amount of extra admixture shall be added at site to regain lost workability.

(iv) Admixtures shall be charged to the mixer at the same time in the mixing sequence for every batch. Liquid admixtures shall be charged with the water. Powdered admixture shall be sprinkled into the mixer with other dry ingredients. When more than one admixture is used, they shall be batched separately and they shall not be premixed before entering the mixer.

(v) The department executive shall have right to visit the RMC plant and collect raw materials being used for testing the same. Such test shall be conducted at least once in three months or after every 200 cum of concrete whichever is earlier.

(vi) The agreement between the RMC manufacturer and the Contractor should ensure deployment of a qualified supervisor at plant site and random check by the MES supervisor / executives.

9.7.8 **TRANSPORTATION OF CONCRETE**

(i) The concrete shall be transported only in agitating type truck mixer. The concrete shall be discharged from the truck mixer within two hours after the concrete at the plant. The time of adding water to the cement at the batching plant shall be taken as the time of mixing the concrete. Further the concrete thus discharged shall be placed in position and compacted within 30 minutes, after delivery at site.

(ii) Each truck arriving at site shall be accompanied with delivery ticket as specified in IS: 4926 Annexure-'G' clause 9.4. The following shall be recorded at site:

- (a) The locations where the particular batch is used.
- (b) The workability of the concrete as measured at site.
- (c) The designation / Marking of the cubes prepared for testing from the batch.

9.7.9 **SAMPLING**

(i) The sampling criteria for testing of concrete received from the RMC plant shall be as per clause 6 of IS: 4926. One sample containing 9 cubes shall be prepared from each truck mix or 50 cum whichever is less. Out of this one specimen of 3 cubes shall be tested for 7-day strength. The min strength at 7 days shall be at least 2/3 of the specified strength as per clause 16 of IS: 456, acceptance criteria for concrete. The second set of 3 cubes shall be tested for 28 days strength.

The third set of three cubes shall be kept for records and any further testing as required. It may be noted that the sampling criteria for concrete based on volume of concrete as specified in clause 15.2.2 of IS: 456 is not applicable for concrete procured from RMC plants.

(ii) However, the first batch of concrete of a particular grade received from a particular manufacturer shall be sampled by taking at least 12 cubes. These cubes shall be tested in the presence of the GE for confirmation before the final approval of the RMC manufacturer. These cubes shall be tested as follows:

(iii) Specimen of 3 cubes – for 7 days strength. In case these test report does not satisfy the requirement of 2/3rd of the acceptance criteria for 28th day strength, further supply and use of concrete from the particular manufacturer shall be suspended till the 28-day strength are available.

(iv) Specimen of 6 cubes shall be tested for 28th day strength. The manufacturer shall be approved for supply if these values are acceptable as per clause 16 of IS: 456 (even if the cubes have failed during 7th day testing). If the reports are not satisfactory the supply from the manufacturer shall be suspended forth with. All the members already cast with these mixes shall be subjected to suitable NDT tests as specified and further corrective measures or demolition of

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such members shall be taken. The rates quoted by the Contractor shall be deemed to be inclusive of the above and nothing extra shall be payable.

9.7.10 The concrete procured from Ready Mix concrete Plants should meet the requirements specified at the time of placing. Cost of admixture required for retardation of setting time and plasticizers for increasing workability and cost of transportation etc. shall be deemed to be included in the lump sum cost quoted by the Contractor. In case of his own plant established at site Contractor has to submit mix design (for approval) from approved Labs such as IIT / NIT / SEMT Pune / Any NABL approved lab, which will be approved by the CWE. In all other cases when RMC is procured from the manufacturer listed or approved as hereinafter, mix design shall be approved as specified in clause 9.7.7 hereinbefore. However, Contractor owes responsibility to get the required results after testing and will not have any claim whatsoever if the concrete from these listed makes are procured.

9.7.11 List of Approved RMC manufacturer's is given below:

- (i) Lafarge India Pvt. Ltd.
- (ii) ACC Ready Mix Concrete
- (iii) RMC, Ready Mix (India) Pvt. Ltd.
- (iv) Ashoka Buildcon Ltd.
- (v) Ultratech Cement Ltd.
- (vi) Godrej Readymix Concrete Ltd.
- (vii) Prism RMC
- (viii) Ramco
- (ix) Any other plant as approved by the Accepting Officer

9.7.12 If so desires, the Contractor can set up his own RMC plant conforming to all stipulations of IS 4926:2003 without any price adjustment. Defence land shall be made available to install the RMC Plant at site only.

9.7.13 The minimum cement (43/53 grade OPC) content for RMC M-30 to M-70 (Design Mix) concrete (25% replacement of cement by fly ash / use of PPC instead of OPC with min. 25% fly ash content) shall be as per IS:456-2000.

9.7.14 In the event of deviation involving price adjustment, though the Contractor have used RMC in lieu of design mix, the rate applicable for RMC M-70 to M-25 shall be as per SSR rate for RCC M-50 / M-40 / M-35 / M-30 design mix concrete adjusted with Contractor's quoted percentage.

9.7.15 When required, the RMC plant selected by the Contractor shall provide information about the ingredient in the making RMC including admixture, used for RMC to GE. Admixtures for improving workability of concrete and extension of setting time shall be conforming to IS 6925 and IS 9103.

9.7.16 The Contractor is responsible for the quality of ready-mix concrete manufactured at plant site with respect to the strength, cement content and use of constituent materials as per approved design mix.

9.7.17 Placing and compaction of concrete shall conform to IS:4926-2003

9.8 **BLANK**

9.9 **IMPORTANT REQUIREMENTS OF REINFORCED CEMENT CONCRETE/PLAIN CEMENT CONCRETE**

(a) The proportioning of design mix concrete and nominal mix concrete where provided will be carried out by using 'Weigh Batching Machine', all as per Clause 4.11.3 except sub clause 4.11.3.1 on Serial Page Nos. 4 to 8 of SSR Part-I of 2009. Proportioning by volume batching will not be permitted under any circumstances.

(b) All the materials, workmanship, inspection and testing for the cement concrete of M-15 (nominal mix), and design mix concrete of M-30 and above shall be as per the requirements of MES Schedule and IS.

(c) For checking the quality of concrete and materials, compressive test shall be carried out at frequency in accordance with IS-516. Compressive test of cubes shall be conducted as per IS-416 of 2000. In case the test results show less strength Non-Destructive Testing (NDT) shall be carried out. The decision of the Garrison Engineer shall be final and binding in this regard. The Contractor at his own cost shall carry out non-destructive tests. Cost of supplying concrete for cubes, casting and curing cubes and transporting the cubes to the Laboratory as mentioned above, will be borne by the Contractor. Testing will be done in the presence of the Contractor or his representative

(d) Minimum average slump for reinforced cement concrete (25% replacement of cement by fly ash / use of PPC instead of OPC with min. 25% fly ash content) and maximum water cement ratio for RCC M-30 (design mix) and above grades shall be as specified in IS-456-2000. Design mix of RCC for various grades shall be carried out all as per provisions catered for in IS-456-2000 duly considering the above requirements and minimum cement content shall be as per relevant clauses in IS 456-2000. The exposure condition for 'Porbandar, Gujarat' shall be considered as 'SEVERE'. Accordingly, the tenderers are advised to verify the quality of various ingredients

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available for incorporation in the subject work and quote accordingly.

(e) The tenderers are advised to note that if the cement contents work out to be less than the above specified minimum cement contents as mentioned hereinbefore, then the above specified minimum cement contents have to be incorporated and in case cement contents works out to be more than the above specified minimum cement contents then the cement as per design mix shall be provided without any extra cost to the department. The Contractor shall have no claim in this regard due to misunderstanding of above provisions and decision of GE in this regard shall be final and binding.

9.10 NON-DESTRUCTIVE TESTING OF HARDENED CONCRETE

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

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

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

The Hammer shall be calibrated at regular interval as specified hereinafter.

9.11 CALIBRATION OF HAMMER

9.11.1 Specified mix shall be prepared by the site Engineers before undertaking any concrete work. Following procedure shall be followed:

- (a) Minimum of 18 standard cubes shall be prepared and shall be counted as one specimen.
- (b) Out of the 18 cubes cast, 3 cubes shall be tested at 28days strength. If the test results at 28days is found satisfactory, then the remaining 15 cubes shall form the standard sample for calibration otherwise the samples shall be rejected and new samples shall be prepared.
- (c) All results shall be recorded in a separate register.
- (d) No concreting shall progress unless standard specimen cubes have been obtained. The criteria for acceptance and calibration of hammer shall remain to be 28 days' strength. Concrete work shall be rejected if 28 days strength falls short as per acceptance criteria.

9.11.2 Three cubes shall be tested on 28days to obtain a correlation between compressive strength of concrete and Rebound Number as per procedure described in para 5.2 of IS 13311(Part II):1992. The average values of the rebound number obtained in respect of same three cubes passing on 28 days' work test shall form the datum reference for remaining cubes for the strength of cubes. Re-calibration of hammer shall be carried out after every 2000 tests.

9.11.3 Following procedure shall be followed for the Rebound HammerTest:

- (a) The concrete cubes are held in Compressive Testing Machine under fixed load of 7N/mm² when impact energy of the hammer is 2.2Nm. Measurements of the rebound hammer are taken and the compressive strength is determined as per IS 516:1959.
- (b) Wet cured specimen shall be removed from wet storage and kept in lab atmosphere for 24hrs before testing.
- (c) Only vertical faces of the cubes as cast shall be tested.
- (d) At least nine readings shall be taken on each of the three vertical accessible faces of the cube in the compressive strength testing machine.
- (e) The points of impact shall not be nearer than 20mm from the edge and shall not be less than 20mm from each other. The same point shall not be impacted more than once.
- (f) The rebound Number of the hammer shall be determined for each of the 18 or 12 (18-3-3) cubes.
- (g) While recording the results, it will be necessary to distinguish between readings of the trowelled face and those on the moulded face.

9.11.4 INTERPRETATION OF RESULT

The results shall be interpreted as follows:

- (a) Whenever individual cube rebound number varies $\pm 25\%$ from the datum reading, then that

- cube shall be excluded and shall not be considered for standard specimen of cubes for calibration.
- (b) It must be ensured that at least 8 out of 12 (66.67%) of the cubes are within permissible range of variation of rebound number.
- (c) If the above points (a) and (b) are not satisfied, then the whole procedure shall be repeated.
- (d) 8 cubes shall form one standard sample before the commencement of the work and shall be made available for the inspecting Officer during the currency of the project.
- (e) This calibration shall be done by the executives with their hammer and then a chart of calibration giving the details of the average readings, date and the months of casting, mix of concrete, etc. shall be prepared and signed by the Engineer-in-charge and will be duly preserved for future reference as and when required.
- (f) The report shall be maintained as follows:

SI No	Strength	%	Criteria
1.	Very Good	>125	
2.	Good	100-125	Values are at par or 125% of calibrated values
3.	Satisfactory	75-100	
4.	Fail	50-75	Payments shall not be released in such cases

9.12 **LABORATORY MIX DESIGN AND TESTS**

- As soon as possible, after receiving the order to commence work, the Contractor shall procure sufficient quantities of required type of aggregates, cement and water and find their characteristics to suitability of the specifications in the laboratory approved. Based on the result of such verification, he shall carry out number of trials to determine the optimum mix to produce the specified slump and 28 days’ target mean strength.
- Each of these cubes shall also be tested simultaneously for 7 days’ result as guidance for job user. If the Contractor so desire, he may commence the works based on test results of 7 days’ strength to be commensurate with the corresponding 28 days’ strength at his own responsibility. The trials shall be jointly carried out in the Zonal laboratory established by the CE (Navy) Mumbai or in the laboratory established by the Contractor at site or any other established laboratory approved by the GE. Cost of materials, labour and other incidental including transportation charges for all tests including the routine work tests specified hereinafter shall be borne by the Contractor. However, the departmental laboratory facilities where available will be extended with the charges. Following data and results thereof shall be submitted to the GE by the Contractor for approval of mix design prior to commencement of the actual works:
- (a) Grading and density of coarse and fine aggregates proposed to be used.
- (b) 7 to 28 days’ compressive strength of the cement concrete.
- (c) Trial mix proportion of aggregates, cement, any admixture and water for consistency (slumps)tests & their results along with workability and strength achieved in each case.
- (d) The strength characteristics obtained both for 7 and 28 days’ compressive strengthforthe selected trial mixes, using a minimum of 3 water cement ratios.
- (e) Results of additional trials till the desired slump value are reached and the target mean strength is obtained to achieve the specifications.

9.13 The Contractor shall get the design mix, from approved Institution IIT / NIT / SEMT Pune / Any NABL approved lab, and shall produce the design for approval of the CWE. The mix design be carried out on the basis of laboratory trial mixes using approved materials and methods as per IS: 10262 (Recommended guide lines for Mix design) or on the basis of any other method in consultation with Garrison Engineer. The aggregate cement ratio and water ratio once decided based on Trial mix design shall not be changed without reference to the GE. Any change in sources of coarse and fine aggregate and cement shall be informed to the GE and accordingly a fresh mix design is to be submitted for approval. Calculation Details in support of mix design shall also be provided.

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

9.13.2 Adequate number of tests at regular intervals shall be carried out to ascertain the properties of materials. In case of variation in grading of aggregate noticed at any point of time the same shall be made good by suitably blending of different sizes of aggregates wherever possible. If this is not feasible the mix design shall be changed immediately before carrying out further work. In case of change in source or quality of cement, fine aggregates or coarse aggregates, the design mix shall be revised as specified hereinabove.

9.14 **RECORD OF ACTUAL CONSUMPTION OF CEMENT**

The Engineer-in-charge shall maintain a record of actual consumption of cement in proper

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register (other than the cement register mentioned in special conditions) and initial the entry for every change in quantity of materials. The register maintained is solely for the purpose to cross check that the quantity consumed in the work and does not mean any proof for additional quantity of cement, if any, incorporated in the work due to site requirement or for any other reason and no claim of whatsoever nature will be entertained on this account.

9.15 MIXING

All cement concrete, both plain and reinforced except RMC shall be mixed in mechanical mixer of Hopper type as approved by the GE. However, in case of small quantity (i.e. the quantity of concrete required being less than one batch of mix), the Contractor may, after obtaining written permission of the Engineer-in-charge, be allowed hand mixing, where hand mixing is permitted it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency.

9.16 TRANSPORTING, DEPOSITING AND COMPACTING

- (a) Transporting depositing and compacting generally shall be carried out as specified in clause 4.11.9, 4.11.10 and 4.11.11 of SSR Part-I 2009.
- (b) All concrete for RCC work except RMC shall be consolidated / compacted by mechanical vibrators approved type. Precast / cast-in-situ, plain cement concrete shall however, be rammed and consolidated by tamping and rodding as specified in MES Schedule.

9.17 FORMWORK

- (a) Formwork shall comply with requirements of clause 4.11.6 and clause 7.15 of MES Schedule.
- (b) Props shall be of steel screw type height adjustable with steel base. All connection shall be with forged steel couplers. The props shall be properly tied together at 3m interval of height of adequate length and strength. Formwork using steel props depending upon the provisions in the contract shall be designed by the Contractor's site engineer and approved by the GE keeping in view the following guidelines:

- (i) Deadweight of concrete and steel.
- (ii) Load carrying capacity of the props.
- (iii) Sequence and schedule of concrete pours.
- (iv) Number of vibrators to be put in service.
- (v) Any other criteria as considered necessary by the GE

- (c) Formwork for beam and slabs soffits & RCC wall sides shall be of PU coated plywood. Shuttering shall be supported on adjustable steel spans of adequate strength. For all columns prefabricated steel box type formwork shall be used. Deformed steel sheet shall not be used as formwork.

- (d) Props should be straight and placed in true vertical position. Vertical props should be provided with braces in both directions. Number of vertical intervals at which braces to be provided shall be decided and approved by the GE, depending upon height of the structure and horizontal loading. Bracings and supports may be of steel at the option of the Contractor and shall be properly and adequately tied to form firm joint.

- (e) Moving loads in the form of workers on the top of the formwork should be minimized by pumping the concrete and restricting the number of workers. The impact and horizontal loads due to movement of workers should be minimized by keeping them stationery and just moving concrete containers from one person to other up to the place of pouring. It should be ensured that sub base of the floor is completed and cured after consolidating the earth underneath so that it gives firm base to the props. Vertical props should be provided with braces in both directions.

Numbers of vertical intervals at which braces are to be provided will depend upon the height of the structure and horizontal loading.

- (f) Safety of the workmen and structure shall be ensured by through checks that scaffolds are safe, the spacing of verticals, horizontals and braces are carefully designed, making safe access arrangement, taking adequate measures against fire, use of safety helmets and safety belts, providing sufficient illumination of work area if work is in progress at night, special attention of female workforce for loose garments, etc. The decision of the GE in this regard shall be final and binding.

- (g) Readymade steel walk board shall be used for movement of labour and material on slabs while concreting. No pedestrian / material / machinery movement shall be allowed on bare reinforcement.

- (h) For buildings more than two storey, motorised concrete / material lift shall be used.

- (j) Cover blocks for slabs, beams and columns shall be factory made fibre reinforced concrete blocks of strength not less than 50Mpa, or readymade polypropylene blocks and PVC ring type cover blocks for columns.

- (k) In case of any deviation involving formwork the pricing shall done at the rates of timber formwork for fair finished surface.

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(l) The stripping time for formwork shall be as per IS for using PPC/OPC with 25% fly ash.

9.18 LEAVE/FORM HOLES AND CHASES

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

9.19 PRECAST CONCRETE ARTICLES

Cement concrete (25% replacement of cement by fly ash / use of PPC instead of OPC with min. 25% fly ash content) lintels with or without integrally cast chajjas up to 1.5m clear span, shelves, bed blocks/plates, cover slabs, fencing posts, fins and jalli and the like may either be precast or cast in situ at the Contractor's option, unless otherwise shown on drawings. If precast the articles shall be set in cement mortar (1:3). In case of deviation involving these items, pricing shall be done on the basis of cast-in-situ work.

9.20 RCC CHAJJAS WITH FINS

(a) RCC chajjas with fins shall be provided as per details shown on drawings. Thickness of the finished fin after application of rendering in CM (1:3) on both sides shall be 80mm unless otherwise shown on drawings.

(b) RCC chajjas (whether cast integral with the lintel or Precast embedded in the wall) shall be provided with a coved fillet of radius 80mm in PCC (1:2:4) type B-0, mixed with integral water proofing compound, preferably casted on green concrete.

(c) The top surface of chajjas / fins and the coved fillet shall be finished with 10mm thick cement plaster in CM 1:3 with mixture of approved water proofing compound as per manufacturer's instructions while the concrete is yet green viz. just after the initial setting has taken place.

9.21 THROATING/WEATHERING Throating to projections or RCC/PCC beyond external faces of the walls where shown on drawings, and where RCC chajjas are not provided with downward fascia shall be formed in the concrete while casting, by planting fillets/bar of 12mm diameter in the formwork and finished smooth.**9.22 BEARINGS OF RCC STRUCTURAL MEMBERS**

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

(b) All RCC beams / lintels/ bressummers resting on masonry work shall be provided with PCC bed blocks cast in PCC (1:2:4) type B-1. Bed blocks shall be twice the width of beams in length covering the entire thickness of wall and of depth 150mm, unless otherwise shown on drawings.

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

(d) No treatment shall be provided under bearing of RCC bands.

9.23 PLINTH PROTECTION Plinth protection in all situations as shown on drawings shall be provided with 50mm thick PCC (1:3:6) type C-1 over 75mm thick consolidated bed of hard core (stone aggregate) grouted with fine sand over well consolidated sub grade. The width of the plinth protection shall be as shown on drawing. In the absence of width on drawing the same shall be considered as 750mm. PCC shall be laid in alternate bays (not exceeding 2sqm) and finished fair on top without using extra cement. 10mm wide joints shall be provided throughout the thickness of plinth protection in concrete bays at corners and turning points and also in between walling and plinth protection. All joints in bay, as well as between walling and the concrete in plinth protection shall be filled-in with mastic filling comprising 1 part of heated bitumen 85/25 or 90/10 grade and 3 parts of sand (all by weight).**9.24 CONCRETE PADDING** Where the required height of walls, openings, is not obtained with adequate size of bricks the same shall be obtained by providing PCC 1:3:6 type C-1.**9.25 RCC BANDS** Irrespective of whether shown in drawings or not RCC bands shall be provided at every 4th course of wall and this RCC band will be of 10cm thick of entire length of all 11.5cm thick (i.e. half brick thick) brick walls or 10cm thick pre-cast solid masonry wall (including over door openings) with full bearing at end walls/columns and the same shall be constructed with 4Nos 8mm dia CRS bars with 8mm dia stirrups @150mm c/c. Bearing plaster and water proof building paper shall not be provided below RCC band.

Continuous RCC band 230x150mm shall be provided at lintel level of entire length of all 230mm thick wall or 200x150mm for 200mm thick precast solid masonry wall and reinforcement shall be CRS bars 4Nos. 10mm dia main bars and 8mm dia stirrups at 150mm c/c.

9.26 PCC COVING PCC coving with PCC (1:2:4), type B-0, mixed with integral water proofing compound shall be provided at junction of RCC chajjas with wall/lintel/beam to the radius of 50mm.

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- (a) Unless otherwise shown on drawings cills shall be of 20mm thick greenmarble.
- (b) Cills shall be provided with a minimum bearing of 5cm not on continuous ends. However, bearing of cills shall not be provided at ends, where cills are abutting columns or other RCC structures. Green marble slab shall be of one piece with machine cut & polished finish on top and edges. The cills of green marble shall be in two steps in the external windows and ventilators to avoid ingress of rain water.

9.29 RCC LINTELS

- (a) The bearing of lintels shall be 15cm or effective depth (whichever is more) unless otherwise shown in drawings.
- (b) Lintels (without chajjas) for openings not exceeding 1.50m clear span may be pre-cast at the Contractor's option. However, these shall be priced as cast-in-situ lintels in the event of deviation if any. All other lintels and band shall be cast-in-situ

9.30 DRIP MOULDING

Irrespective of whether shown on drawing or not, drip moulding in cement mortar (1:4) of size 50mm wide x 15mm deep shall be provided on all projection of chajjas, RCC roof slabs etc.

9.31 BLANK**10. AAC BLOCK MASONRY****10.1 GENERAL**

AAC (Autoclaved Aerated Concrete) blocks, Make: Siporex/ Ecolite/ Ultratech/ equivalent) are the light weight concrete blocks made by introducing air or other gas into the cement or lime slurry resulting it lighter than the cement concrete block. All external wall & internal wall shall be provided with AAC Blocks. Blocks shall be semi-automatic machine made. These shall have compressive strength not less than 4.0N/sqmm, conforming to provisions of IS-2185 (Part-III) 1984.

10.2 DIMENSION

Nominal dimension of full size AAC Block
For 200mm thick wall: 600mm x 200mm x 200mm
For 100mm thick wall: 600mm x 100mm x 200mm

10.3 PHYSICAL REQUIREMENTS OF AAC BLOCKS

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

- (a) **Block density:** The block density of AAC block should be as per IS-2185 (Part-III): 1984. The minimum density should be 550-650kg/cum
- (b) **Compressive strength:** The minimum Compressive strength, being the average of twelve units when determined as described in IS-6441(Part-V): 1972 should not be less than 4N/sqmm.
- (c) **Thermal conductivity:** The thermal conductivity of AAC should not be more than the values as specified in Table 1 of IS 2185 (Part-III):1984.

The AAC blocks must have thermal conductivity not more than 0.18 W/ MK

- (d) **Drying Shrinkage:** The drying shrinkage of AAC block when conducted shall not be more than 0.05% for grade 1 block. Grade 1 blocks are to be provided.
- (e) **Tolerance:** Size tolerance is allowed up to ± 5 mm in length and ± 3 mm in width and height.

10.4 MATERIALS

- (a) **Cement:** Cement should conform IS 269:1976 (OPC) with 40% fly ash by volume or IS-1489-1976 (PPC) with min.40% fly ash by volume.
- (b) **Lime:** Lime to be used should conform to IS-712:1984
- (c) **Fly ash:** FA shall conform to IS-3812:1981 (min. 40% volume)
- (d) **Calcined Clay Pozzolana:** It is used as per IS-1344:1981
- (e) In case of RCC, reinforcement requirements should be as per the provision in IS-6041:1985
- (f) **Water:** Water to be used should conform to IS456:1978.
- (g) Manufacturing of blocks is carried out as per the provision in the IS-2185(Part-3):1984.

10.5 DESIGN CONSIDERATIONS

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

- (a) **Wall thickness:** The wall thickness shall be designed in accordance with the provisions of IS: 1905–1980 to meet the strength and stability. The minimum thickness of non-load bearing wall shall be 100mm and 200mm for internal and external walls respectively. For loadbearing wall, it should not be less than 150mm and 200mm for internal and external walls. The thickness of wall shall not be lesser than as shown in drawings.

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- (b) The maximum horizontal and vertical dimension of walls should be in accordance to IS 1905: 1980. It is not recommended to have long span AAC block wall without RC/stiffeners.
- (c) **Crack prevention**: Various measures for the crack prevention as under will be provided as per clause 4.6.2- 4.6.6 of IS-6041:1985
- (i) Nominal Bond beams to be provided of wall thickness, with two 8mm Fe 500 CRS bars spaced every 1200mm along the height will be provided in the IS-604: 1985 (ref drawing attached)
 - (ii) Ensure the levelling bed of 15mm is used to ensure perfect level across all the blocks in the first course and thereon.
 - (iii) Structural Bond beams to be provided as structural members at floor level, at the top of the door openings (serves as lintel) and below the sill of the opening. The grade for the bond beam in this case should not be lower than M-30 and the reinforcement should be two 12mm as described in clause 4.7.2 of IS 6041: 1985 unless specified otherwise in the drawings.
 - (iv) RC bond beams as shown in the drawing attached to be provided at sill level window frames
 - (v) AAC Blocks shall be stored in such a way so as to avoid any contact with moisture on site. (refer clause 5.1 of IS 6041:1985).
 - (vi) Blocks will not be wetted before or during the laying in the walls; in case the climatic condition so required, the top and the sides of the blocks may be slightly moistened (Refer IS 6041-1985 Cl. 6.6.1).
 - (vii) Vertical reinforcement 12mm Fe500 CRS bar @450 mm C/c will be provided when gap between two columns exceeds 3 meters.
- (d) **Avoidance of heavy loads**: Heavy loads due to heavy fittings like huge commode to 100mm AAC wall shall not be provided.
- (e) **Laying**
- (i) The construction should be made by the trained mason only. AAC blocks should be laid carefully to avoid damage and cracks in the wall.
 - (ii) The foundation /beam needs to be chipped off with uneven cement deposits and dust cleaned with water.
 - (iii) Each block needs to be made wet with a sponge on all sides of mortar contact surface and place them one by one and press it firmly to have proper bond without any level difference and fill joints between the blocks by same mortar (blocks should not be soaked).
 - (iv) Mortar thickness shall be 10mm in cement sand mortar (25% replacement of cement by fly ash / use of PPC instead of OPC with min. 25% fly ash content) (CM 1:6) (Refer IS 6041-1985 clause 7.1). The first course of masonry should be laid carefully. Checking should be done after laying 3 to 4 blocks in the masonry.
 - (v) The proper construction workmanship should be followed as described in clause 7.2.1- 7.2.4 of IS 6041: 1985.
 - (vi) True masonry bond should be provided between the intersecting walls as stated in clause 10.1 of IS 6041: 1985.
 - (vii) When full depth of block course is not available, the gap shall be filled with PCC M-10 (nominal mix) using 20mm graded aggregate.
 - (viii) Manufacturing of blocks is carried out as per the provision in the IS-2185(Part-3): 1984. AAC Block shall be set and jointed in cement mortar 1:6 for both 100mm & 200mm thick Wall. As per the exposure conditions, external plastering is applied with different thicknesses (refer clause 12.1.3- 12.1.6 of IS-6041:1985).
 - (ix) **Filling of holes** Any hole left in the AAC block masonry work for the purpose of centering/scaffolding shall be filled up with cement concrete M-10 (using 20mm graded aggregate) and mixed with WPC as per Manufacturer's instructions.
- (f) **Provision for door and window**
- (i) Door and window frames are attached to the masonry by flooring nails of size 200mm which are spaced not more than 400mm and the first nail should not be farther than 200mm from a corner. Vertical reinforced concrete studs are provided to attach the frame to the masonry (ref drawing attached (refer clause 8 of IS-6041:1985).
 - (ii) Lintel bond beam as per the drawing attached shall also be provided on top of the door openings in the internal as well as external wall where lintel beam has not been provided in the drawings.
- (g) **Roofing** The roof finish should be done with thin layer of 1:3 cement mortar (refer clause 9 of IS 6041:1985)
- (h) **Maintenance** The exposed walls shall be inspected every year before monsoon and cracks.
- (j) **Tests** The tests, bulk density, compressive strength, moisture content and thermal

PARTICULAR SPECIFICATIONS (Contd.../-)

conductivity should be conducted with same specimen. Tests to be carried out as per policy to determine various physical properties of AAC are listed below.

(i) **Block Density**: Unit weight or density of the AAC block should be determined as per described in the IS 6441(part I) - 1972. A specimen of size 100x200x50 mm is prepared for the test.

(ii) **Compressive strength**: Compressive strength test should be carried out as per the provision in IS-6441(Part-V): 1972. 15cm edged cubes shall be tested under compression testing machine.

(iii) **Thermal conductivity**: Thermal conductivity test of AAC blocks should be conducted in accordance with IS 3346:1980. The result should confirm the values as in Table 1 of IS- 2185 (Part-III):1978

The AAC blocks must have thermal conductivity not more than 0.18 W/ MK

(iv) **Drying shrinkage**: Drying shrinkage test on AAC block is performed as per the provision in the code IS 6441(PART II): 1972. Prism of size 40x40x150mm without reinforcement shall be used for this test.

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

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

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

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

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

(p) **Codes to be followed**:

(a) IS-2185 (Part-3): 1984- Specification for concrete masonry units (Autoclaved Aerated Concrete)

(b) IS 6441 Part-I to Part-IX – methods of test for AAC products

(c) IS 6041- Best practice for construction of AAC block masonry

(d) IS 1661- Best practice for application of cement and cement-lime plaster

(e) IS 1905: 1987- Code of practice for structural use of unreinforced masonry

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

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

(b) AAC Block shall be set and jointed in ready mixed mortar as per manufacturer's instructions for both 100mm & 200mm thick wall

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

(d) AAC blocks shall be embedded with a mortar, the strength of which is relatively lower than that of the mix used for making blocks in order to avoid the formation of cracks. 1:6 cement-sand mortars may be used. (refer IS 6041-1985 Para 3,3.9.2). Blocks need not be wetted before or during the laying in the walls; in case the climatic condition so required, the top and the sides of the blocks may be slightly moistened (refer IS 6041-1985 Para 6, 6.1).

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

(f) Mortar thickness must be limited to 10mm to 12mm in cement sand mortar (refer IS 6041-1985 Para 7, 7.1) & 3 to 4mm in ready mix mortar.

(g) Plaster thickness required for AAC blocks in case of Internal walls must be 10mm to 12mm and in case of external walls must be 15 to 17mm (refer IS 6041-1985 Para12).

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

(i) Filling of holes- Any hole left in the AAC Block Masonry Work for the purpose of Centering/Scaffolding shall be filled up with Cement Concrete M-10 (20mm graded aggregate) and mixed with WPC as per Manufacturer’s instructions.

10.7 TESTING OF MATERIALS

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

The Contractor shall employ a competent technical representative as approved by the Engineer-in-charge for the purpose of testing and all such tests shall be carried out in the presence of the Engineer-in-Charge. The successful tests result thereof shall be recorded and signed jointly by the contractor and the Engineer-in-Charge. The charges for these tests i.e. ‘A’ level tests carried out in site laboratory of the contractor shall not be recovered. In case, the Contractor has not set up the site laboratory and the test are carried out in Zonal or any other laboratory setup / approved by the Accepting Officer, the recovery shall be made at rates applicable i.e. as given hereinafter.

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

(c) The recoveries on account of testing charges wherever applicable shall be effected from the running account payments due to the contractor payable after completion of the respective tests or whenever the test is due whichever is earlier.

(d) Testing criteria:

Sl No	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate (Rs)	Remarks
1.	AAC Blocks	(i) Bulk density and Moisture Content	IS6441 (Part-I)	3 blocks out of 24	‘B’	330	Sample: 24 blocks from consignment of every 10000 blocks or part thereof These blocks to be checked for dimension and weight
		(ii) Drying Shrinkage	-do- (Part-II)	3 blocks out of 24	‘B’	330	
		(iii) Compressive StrengthTest (iv) Determination of thermal conductivity (v) Corrosion protection of steel reinforcement in autoclaved cellular (aerated) concrete.	-do- (Part-III) -do- (Part-IV) -do- (Part-V)	12 Blocks out of 24	‘A’	900	
		(vi) Strength, deformation and cracking of flexuralmember’s subject to bending-short duration loading test (vii) Strength, deformation and cracking of flexuralmember’s subject to bending-sustained loading test	-do- (Part-VI) -do- (Part-VII)				

		(viii) Loading tests for flexural members in diagonal tension (ix) Jointing of autoclaved cellular concrete elements	-do- (Part-VIII) -do- (Part-IX)				
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10.8 AAC BLOCK WALLING

- (a) Mortar for walling -20cm thick AAC block wall shall be in ready mixed mortar as per manufacturer’s instructions and 10cm thick
- (b) Laying -The blocks shall be slightly wetted before and/or during laying in the wall. The blocks shall be laid with joints completely filled without any void left in the masonry. The thickness of the horizontal and vertical joints shall not exceed 1cm. The 1/2, 1/3 and 2/3 block shall be used for breaking the joints. The face joints shall be raked to a depth of 1cm by raking tool during the progress of the work when the mortar is still green, so as to provide proper key for plaster or to facilitate pointing to be done later. Where plaster or pointing is not required, the joints shall be struck flush and finished side by side.
- (c) Curing of walling -Masonry work shall be kept constantly moist on all the faces for a minimum period of 7 days.
- (d) Scaffolding for walling -Only double scaffolding shall be used. The scaffolding shall be strong and sound. No holes in the masonry for supporting scaffolding shall be allowed.
- (e) Unless otherwise specified or shown on drawings, all 10cm thick partition walls on ground floor shall rest on sub base of the floor and on first floor shall rest on RCC slab. 10cm thick partition walls/columns shall be properly bonded at ends into adjoining walls/columns irrespective of whether shown in drawings or not, 10cm thick partition walls shall be provided with the following:
- (i) 02 Nos. 8mm dia MS bars at every fourthcourse.
 - (ii) RCC band at lintel level for the entire length (including over openings) unless otherwise shown on drawings, the RCC band shall be 100x100mm size reinforced with 4 No 8mm dia TMT bars as longitudinal bars and 8mm dia TMT bar stirrups at 150mmc/c.

11. WOOD WORK AND JOINERY

11.1 TIMBER

- (a) Timber for all joinery and wood work shall conform to specifications given in clause 7.3 of the MES Schedule and shall be within the permissible limits of defects defined in clauses 7.4 and 7.5 of the MES Schedule Part-I.
- (b) Timber shall be well seasoned, whether air or kiln dried at the discretion of the Contractor but without any price adjustments. The moisture content of timber shall not exceed the limits laid down vide clause 7.7 of the MES Schedule. Adequate number of tests shall be carried out by the Engineer-in-charge to determine the moisture content in the timber to be used in the work and the Contractor shall provide necessary facilities for test as required by the Engineer-in-charge without any extra cost to Government. Testing charges shall also be deemed to be included in lump sum quoted by the Contractor for Schedule- ‘A’ Part-I

11.2 PRESERVATION OF TIMBER

- (a) Preservative anti-termite treatment shall be carried out to all wood work and joinery fabricated by the Contractor at site. Factory made ply/boards are deemed to be provided with anti-termite treatment.
- (b) Chemical used for anti-termite treatment to wood work and joinery shall be copper NAPTHANATE, ASCU or any other chemical specified in IS-401, applied in any one of the manners specified in ibid IS.
- (c) The species of timber for joinery/furniture items fabricated at site and prefabricatedwood products i.e. particle board, etc. shall be as specified hereunder:

(i)Fully panelled or partly panelled/ glazed/wire gauzed shutters	Factory made shutters with styles/rails of IInd class hard wood as per IS-1003 (Part-I) of speciesLAUREL/BIJASAL/BENTEAKE/VENTEAK/ SAL, to be obtained from list of approved manufacturers given in ‘Appendix-B’ (FSC/PFSC CertifiedChain of custody Certified products. Make: Greenply/ Archidply/ equivalent)
(ii) Frames of built-in cupboards / cabinets and furniture items, if indicated of timber	2 nd class Hard wood (Sal) (FSC/PFSC Certified Chain of custody Certified products. Make: Greenply/ Archidply/ equivalent)

(iii) Wooden pelmets	Pelmets of particle boards shall be provided as specified hereinafter.
(iv) Edging/beading for particle/ block/ medium density fibre board exposed to view in shutters, shelves and tops of built-infurniture, cupboards and cabinets	Teak/Shishamwood. (FSC/PFSC Certified Chain of custody Certified products. Make: Greenply/ Archidply/ equivalent)
(v) Gutties plugs cleats / stoppers, beading and fillets for shutters and frames	2nd class hardwood (Sal/Kalasiris/Chaplash/Hollock)
(vi) All other woodwork and joinery not otherwise specified	Second class hardwood (Sal/ Kalasiris/ Chaplash/ Hollock).
(vii) Door frames	2 nd class hardwood (Sal)

10.2 A **WOODEN CHOWKATS/FRAMES FOR DOORS AND WINDOWS**

Wooden chowkats/frames for doors and windows shall generally confirm to clause 8.18 & 8.19 of MES Schedule Part I and shall be provided at locations and as per the details shown on drawings.

11.3 **FACTORY MADE PANELLED DOOR SHUTTERS**

- (a) Panelled door shutters and glazed / gauged shutters shall be factory made shutters conforming to IS-1003 (Part-I). Styles and rails shall be kiln seasoned and chemically treated by pressure process as per para 5.5 of IS-401 (under vacuum pressure). The dimensions and overall sizes shall however be as shown on drawings.
- (b) The thickness of door shutters shall be as shown on drawings and if not shown on drawings, the same shall be 35mm.
- (c) Panelled shutter shall be provided with suitable size wooden beading all round the panel insert on both the sides of the shutter.
- (d) In all doors, magnetic door catchers shall be provided in lieu of door stoppers.
- (e) For all external doors: Irrespective of what is shown on drawings, magic eye shall beprovided in the main entrance door of each quarter.

11.4 **FACTORY MADE SKELETON SHUTTER FOR MOSQUITO PROOF DOORS**

- (a) Mosquito proof shutters where indicated on drawings shall be of factory-made skeleton shutters conforming to IS-1003 (Part-I) with second class hard wood styles and rails of species specified here-in-before and wire gauze as shown on drawings. The dimension and overall size shall however be as shown on drawings.
- (b) Timber shall be of kiln seasoned and chemically treated by pressure process as specified in para 5.5 of IS-401 (under vacuum pressure).
- (c) Other treatments to timber surfaces such as tarring, painting etc. shall be carried out in addition.

11.5 Factory made panelled / skeleton shutters shall be obtained from any one of the manufacturer’s inspection and approval. Sample shutters shall be got approved from the GE before placing bulk order.

11.6 Factory made panelled / skeleton shutters may be obtained from any other manufacturer, provided the same fulfil the following requirements:

- (a) Shall conform to the specification given above.
- (b) Standard and quality are equal or superior to that of the products mentioned above.
- (c)Is approved by the GE in writing before incorporation in the work.

11.7 Factory made shutters shall be brought to site before applying the primer and the shutters shall be got passed by the Engineer-in-charge before application of the primer.

11.8 **PLYWOOD:** All plywood where indicated on drawings shall be 19mm thick marine ply with 1.2mm thick laminate (as approved) on both side

11.9 **WORKMANSHIP**

- (a) Joinery shall be wrought all over. Timber surface exposed to view shall be wrought and for surface not exposed to view shall be clean sawn. The workmanship and fixing of joinery shall be as per Clauses 8.11 to 8.24 of MES Schedule.
- (b) The dimensions of the various components of joinery (other than block board shutters) shown on drawings, wherever at variance, shall supersede the standard dimensions mentioned in the MES Schedule. However, for pricing deviations involving any joinery work, the rates in the MES Schedule for the corresponding joinery shall be applicable.
- (c) Unless otherwise specified, all work both carpenter's and joineries shall have full dimension shown on drawings except that an allowance of 1.5mm shall be allowed for each wrought face.

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Wooden beads and fillets shall however, hold the full dimensions as shown on drawings. The Contractor shall also maintain the overall sizes of the doors and windows, etc. as shown on drawings.

- (d) Timber member's upto 3m length shall be in one piece.
- (e) Plugging to walls shall be done with wooden plugs as per clause 7.29 of the MES Schedule and specified hereinbefore.
- (f) 2mm thick PVC sheet to a height 200mm shall be provided to both sides and also at bottom edge of all door shutters of kitchen, unless other material is indicated on drawings.
- (g) Vertical members of wooden doorframes shall be embedded 40mm deep below FFL. All door shutters shall have 2 to 3mm clearances above FFL.

11.10 FLUSH DOOR SHUTTER

Flush door shutter shall be 30mm thick, fire rated wooden door with both side laminated, solid core, factory made shutter made as per IS: 2202 (Part-I-1999) and shall be ISI marked. Styles and rails shall be without any joint and be made of non-coniferous timber hard wood (Hollock / Mirantee / Bonsum/ Ben Teak) with moisture contents not more than 12% and dimension as given in IS code. The face panel comprising of plywood or cross band and face veneers shall be glued by hot pressed process. Over all finished thickness of face panel shall not be less than 3mm while the thickness of face veneer shall not be less than 0.6mm. Block board core shall fully confirm to the requirement specified in the IS code. 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 & manufactures test certificate for test specified in IS: 2202 (Part I) shall be rendered.

The Contractor shall submit machine numbered paid vouchers from the authorized dealer/ manufacturer for the total quantity of the flush door shutters supplied under each consignment. At the time of delivery of flush doors at site, delivery challan along with invoices shall be submitted by the Contractor to the GE. Each consignment received at the site shall be inspected by the GE. The original invoice shall be defaced by the GE and kept on record at the site office. Colour shall be as approved by GE.

The Excise duty paid gate pass shall be submitted by the Contractor to the GE for each consignment of flush door shutter dispatched by the factory holding valid BIS certification and brought at site for incorporation in the work.

On receipt of the shutters at site, the samples of door shutters shall be tested in any approved laboratory as instructed by the GE. From each lot of approximately 700 shutters, one shutter shall be selected at random by the GE. The cost of the door shutters selected as samples, their transportation to the laboratory and the cost of testing by the laboratory shall be borne by the Contractor and shall be deemed to be included in the lump sum rates quoted in Schedule-'A' Section-I. Flush doors to be provided with teakwood beading as per drawings and painted to match the door shutter. Bottom of the flush door be painted with two coats of synthetic enamelled paint before fixing. Flush door shutters to be provided as per drawings, shall be with teak wood beading 6mm thick all round.

11.11 SOLID CORE PRE-MOULDED PVC FLUSH DOOR

PVC Flush door shall be made of solid core single leaf Flush door of 30mm thickness, lipped with 15mm (5mmX3) X 30mm width on one stile and top rails & 10mm(5mmX2) X 30mm width on the other side & bottom rail. The inner panel shall be laminated with 2mm th PVC sheet of density 600 Kg/Cbm manufactured by a ISO 9001:2015 certified company. It shall be Termite proof, water proof and fire resistant. Moulded PVC sheet with 2,4,6 raised panel design in different plain and/or prelam color shall be fixed on one side after routing the moulded design on flush door & 2mm plain or prelam PVC sheet shall be fixed on other side using rubber based adhesive on flush door and solvent cement adhesive on the PVC lipping etc.

Adhesive shall be phenol formaldehyde synthetic resin BWP type specified in IS: 848- 2006. All dimensions shall be finished dimension & manufactures test certificate for test specified in IS: 2202 (Part I) shall be rendered.

The Contractor shall submit machine numbered paid vouchers from the authorized dealer/ manufacturer for the total quantity of the PVC flush door shutters supplied under each consignment. At the time of delivery of flush doors at site, delivery challan along with invoices shall be submitted by the Contractor to the GE. Each consignment received at the site shall be inspected by the GE. The original invoice shall be defaced by the GE and kept on record at the site office. Colour shall be as approved by GE.

On receipt of the shutters at site, the samples of door shutters shall be tested in any approved laboratory as instructed by the GE. From each lot of approximately 700 shutters, one shutter shall be selected at random by the GE. The cost of the door shutters selected as samples, their transportation to the laboratory and the cost of testing by the laboratory shall be borne by the Contractor and shall be deemed to be included in the lump sum rates quoted in Schedule-'A'

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Section-I.

11.12 FRP DOORS

- (a) All door shutters and frames of WCs, wash and toilets shall be of FRP as shown on drawings
- (b) FRP doors shall be of make DELUX POLYFAB or Advance Marketing or Sai Swarna Fibre Plast, Pune or Omega Fibres, Goa.
- (c) The thickness of FRP shutters & thickness of FRP shall be as shown on drawings. Shutters shall be in depressed panel and of design and colour as approved by the GE and shall be consisting of extra reinforcement on edges. The core of shutter in styles and rails area shall be of polyurethane foam. The panel area shall have ply-FRP sandwich construction having 4mm thick ply to have embedded wooden blocks for taking fixtures. Shutter shall have recesses to take hinge to fix wooden frame. The whole shutter shall be resistant to mild acid /alkali. Aluminium ironmongery to FRP shutter shall be fixed as per manufacturer's instructions. Any usage of FRP shutter of more thickness of FRP shall be void of any extra payment whatsoever the case may be.

11.13 ALUMINIUM WINDOWS / DOORS AND VENTILATORS/PARTITION

- (a) Aluminium doors / windows / ventilators including grills shall be factory made generally conform to clause 10.37 of MES Schedule Part I and shall be provided at locations and as per the details shown on drawings. Aluminium doors/Windows/Ventilators shall be powder coated.
- (b) Aluminium Billets to be purchased from following three companies:
 - (i) Nalco
 - (ii) Vedanta
 - (iii) Hindalco
- (c) Section of Aluminium Joinery shall be extruded from following three Extruders:
 - (i) Boruka
 - (ii) Jindal
 - (iii) Galco
- (d) Manufacturers of Aluminium windows:
 - (i) Brand - Aluk
Company Name: Aluk Building System Pvt. Ltd.
Address: 2nd Floor, Bagmane Laurel, Bagmane Tech Park, C V Raman Nagar, Bengaluru- 560093.
Contact Person: Debashis Roy- 987002233.
 - (ii) Brand - YKK
Company Name: Boruka Extrusions Pvt. Ltd.
Address: 1, K.R.S. Main Road, Metagalli Post, Metagalli Industrial Estate, Mysuru, Karnataka- 570016.
Contact Person: Sudipta Raj Roy- 7738012404.
 - (iii) Brand - Gutmann
Company Name: Amp Agencies Pvt. Ltd.
Address: Mittal Court, 43 - 'A' Wing, 4th Floor, Nariman Point, Mumbai-400021.
Contact Person: Gunjan Shah- 9833188932.
- (e) Glazing of aluminium doors / windows / ventilators shall be with Toughened glass of quality conforming to IS 2553 (PART 1): 2018 and thickness of toughened glass as mentioned in drawings. Glazing for WC/ toilet shall be Frosted Toughened glass conforming to relevant IS code and thickness as mentioned in drawings. Glazing for all the Aluminium Sliding doors and windows Toughened glass as shown in drawings. Fixed glazing shall be as per the details given in respective drawings.
- (f) All fittings to aluminium doors / windows / ventilators shall be as per the manufacturer's instructions.
- (g) Where shown in the drawings, Aluminium windows and ventilators shall be provided with Aluminium grills all as shown on drawings.
- (h) Where shown on the drawings, aluminium windows and ventilators shall be provided with fly proofing shutters (Wiremesh) of stainless steel XPM jalli 24 gauge thickness and average 1.40mm width of aperture to be provided all as specified/shown in drawing. Wooden door shall be provided with fly proofing shutters and grills of specification have been shown in drawings.
- (j) Where shown in the drawings, Aluminium windows and ventilators shall be provided with Aluminium Deco grills –L 75 (10mm) powder coated of make Deco grill or equivalent.
- (k) SS Grill (SS-304) shall be provided at locations shown on drawings.
- (l) All other specifications for these aluminium doors/ windows/ ventilators shall be as per the relevant drawings mentioned in the list of drawings.

PARTICULAR SPECIFICATIONS (Contd.../-)

(m) Holes of 5mm dia is to be provided at 20 CM c/c in external rails of outer windows for draining out the rain water. In all windows and ventilator minor gaps between frames and wall surface to be filled with epoxy to avoid ingress of rain water.

12 BUILDERS HARDWARE

- 12.1 All articles of iron mongery (Builder's Hardware) shall generally conform to the specifications given in section 9 of MES Schedule Part-I. The Contractor shall produce the samples of each article of builder's hardware which he proposes to use and get the same approved in writing by the Garrison Engineer. Articles of builder's hardware shall bear ISI mark, wherever available.
- 12.2 The type of builder's hardware shall be as follows :
- (a) Butt hinges shall be of stainless steel (with stainless steel pin) and shall be of bright finish with smooth surface.
 - (b) Double / single action spring hinges and catches shall be of mild steel.
 - (c) Coat hooks/pegs shall be of brass chromium plated.
 - (d) Irrespective of what is shown on drawings all other articles / fittings of builder's hardware shall be of stainless steel of grade 304/316.
 - (e) All hardware shall be fixed with steel cadmium plated screws.
 - (f) All exposed S.S. monger shall be of grade 316.
- 12.3 The type pattern and size of aluminium anodised fittings shall be as follows:
- (a) Aldrop bolts (sliding door bolt) shall be provided to doors where indicated on these shall be with hasp and staples (bolt type) and fixing clips etc. complete and shall conform to IS. Aldrop bolts shall be fixed with nuts and bolts only.
 - (b) Hasp and staples shall be of safety pattern plate type.
 - (c) Hooks and eyes shall be plate type and the hooks shall be out of extruded section.
 - (d) Door handles shall be of plain pattern with back plate. The dia of the bars shall be 10mm.
 - (e) Barrel bolt/tower bolts shall be provided with 10mm dia shoot upto 150mm and 12mm dia shoot above 150mm.
 - (f) Sliding latch shall be 200mm long of 15.5 x 9mm flat slide.
 - (g) Where shown on drawing, magic eye shall be provided in the main entrance door of each quarter as approved by the GE.
 - (h) Screws for all fittings shall match the respective fittings, both in materials and finish except that screws for anodised aluminium fittings shall be of steel cadmium plated.
 - (j) Piano type hinges shall be continuous type and shall be of stainless steel, bright finish

13 FALSE CEILING**(E- BOARD)**

- a) Supply, fabrication and installation of Everest Fibre cement boards or E Boards 6mm thick connected to aluminium snap grid as per drawing.
- b) E Board must consist of Cement and cellulose fibres as the principal components in the mixture.
- c) These E Boards must be cured through high pressure steam curing (HPSC), also called autoclaving process.
- d) They must be totally non-asbestos and should not contain any asbestos fibres.
- e) These must be Water Resistance, Fire Proof, Easy to work, Termite proof and Moisture resistant.

Fixing details of False Ceiling

- a) 40x3 FI suspender/hanger made to shape along with the main 'T' @1200 c/c embedded in beam/slab with split end.
- b) Special adjuster to be connected to Aluminium Main T having standard Aluminium snap grid.
- c) 6mm thick E- bard Classic to be placed over it or as specified in drawings.

(GYPSUM BOARD)

Providing, fabrication and fixing in position of false ceiling at a height as mentioned in drawing by fixing 12 mm Th. Gypsum Board sheets on frame work of GI sheet section. The main runners of 22-gauge GI sheet and cross runners of 24-gauge GI sheet shall be framed to form a mesh of 2'0"x2'0" c/c. The Gypsum Board shall be fixed to the GI frame and joint to be properly filled in with POP paste and paper tape to get a levelled smooth ceiling. Recessing of the Gypsum Board for light fixtures shall be done along with extra frame work of GI sheet section to hold the concealed light fixtures etc. including cost of two or more coats to give an even shade of plastic paint on ceiling with putty work complete with designer ceiling as required and directed.

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False ceiling work shall be carried out in accordance with the actual site conditions at different / split-levels. Any sagging, unlevelled stretch of work shall be redone / replaced and made good, at no extra charge, to the satisfaction of Engineer in charge. No compensation shall be paid on account of provision / coverage of openings for lighting fixtures, air – conditioning ducts and the likes as detailed in drawings and / or directed.

14 UPVC LOUVERS

Exterior grade UPVC Louvers required for fenestration in buildings. These are pipes/blades of size 40mmx40mmx2mm, rectangular in shape having powder coated polished surface.

Louver assembly

A louver assembly is made up of a frame and a separate louver section. The frame is mounted in the opening in the wall, and then the louver section is mounted within the frame. The frame defines a central channel which extends from an interior opening to an exterior opening. The frame includes a frame flange extending from an exterior edge of the central channel so that, when the frame is in a desired position within the hole in the wall, the frame flange extends around the entire perimeter of the hole to seal the perimeter of the hole. The louver section is selectively mountable within the central channel so that it is prevented from passing through the exterior opening.

15 BLANK**16 TOWER BOLTS**

16.1 Aluminium anodized tower bolts shall comply with IS: 204 (Part-II) specifications for tower bolts, Part-II non-ferrous metals. The shape and size of tower bolt shall be as indicated. The type and size of tower bolt shall be as specified in respective item.

16.2 Barrel and tower bolts, wherever possible shall have the knob integral with bolts. In case it is not possible to provide a single piece construction of bolt, the knob may preferably be fitted to the bolts with a pin or alternatively screwed and riveted to the bolts, and its shape may be round as directed. Where diameter of bolt of particular size of tower bolt is not stated in the IS, the bolt shall be of 10mm dia upto size 125mm and 12mm dia for sizes 150mm and above.

17 **SLIDING DOOR BOLTS** Where shown on drawings shall be of aluminium anodised all as per IS-2681 of 1979 and 9.5.2 of MES Schedule 2009 Part-I (Specifications). The dia of bolt unless otherwise shown on drawings shall be 16mm.

18 **HANDLES** Handles for doors shall be aluminium anodized fabricated type as specified in clause No.9.11 of MES Schedule Part-I, and sizes of handles shall be provided as indicated in BOQ.

19 **HYDRAULIC DOOR CLOSER** Aluminium doors shall be provided with aluminium die cast body door closer, hydraulically regulated designation No 2, universal type conforming to IS 3564 and shall be as specified in Clause No 9.16 and 9.16.1 of MES Schedule 2009 Part-I (Specifications).

20 **GLAZING** Sheet glass or figured glass for glazing shall be of thickness as indicated in BOQ/Schedule- 'A' items / drawings and shall conform to IS 2835-1977 Specification for transparent sheet glass. Sheet glass shall be flat transparent and clear as judged with the naked eye. It shall be free from any cracks and any defects. Preparation and fixing shall be all as specified in clause 16.7 of SSR Part-I 2009.

STRUCTURAL GLAZING

- (a) Supply, fabrication and installation of structural glazing system in fixed panels, having main frame work of mullions and transoms made out of specially designed extruded aluminium sections, to withstand wind pressure of 150 kg per sq. m and fixing the same at all levels and heights. The extruded sections will be finished with electrolytically deposited color anodic coating of approved color and minimum 20-micron thickness. The extruded sections will be 6063-t5 or t6 alloy conforming to astm b 221 or equivalent. Fixing of the main frame onto masonry walls/ rc concrete surface with ms hot dip galvanized brackets, fasteners with nuts, bolts, rivets, anchors and other fastening materials of stainless steel make.
- (b) The sub frame shall be glazed with the glass using both side adhesive vhb sgt 2.3 mm x 12mm tape & structural silicone sealant. The system shall be fixed with 6mm thick heat strengthened tinted mirror glass. (approval should be taken from senior architect).
- (c) The system is compatible for spandrel area insulation with 48 kg density rock wool and black veil-

PARTICULAR SPECIFICATIONS (Contd.../-)

40 gsm and smoke seal at floor slab levels, & the rate thus called for, shall include wherever necessary, fire dampers in gi sheet formed sections to required profile, aluminium flashings, trims, etc., with weather proof sealant in locations as per site requirement.

- (d) The aluminium framework will be masked with a special self- sticking film to avoid scratches during installation. The same will be removed before handing over. Also the glass will be cleaned at outer surfaces at the final stage of completion of work. The complete system shall be finished as per specification and directions of the engineer in charge.

ALUMINIUM COMPOSITE PANEL

It shall consist of a polyethylene core and 2 Aluminium skins each of 0.5mm thick. Panel thickness is to be 4mm. The thermoplastic core in Aluminium composite panel shall be of low density polyethylene (LDPE), & belong to carbon hydrogen plastic and it should be non-toxic in nature. It shall be fire resistant. Exterior face of coil to be coated with PVDF.

ACP sheets shall be installed with a Wet Sealant Joint. The system shall have tray-style panels and joint seals. The ACP sheet will first be secured to the substructure beneath this system. The joints will then be sealed with an appropriate sealing substance, which guarantees that the panels will be water tight

- 21 **PVC (SWR) PIPES & FITTINGS** PVC (SWR) pipes shall conform to IS: 13592-192 fittings shall conform to IS-5382. PVC (SWR) fitting shall be used as per recommendations of the manufacturer of the pipes. PVC (SWR) pipes and fittings shall be strong dimensionally stable and shall be free from defects.
- 22 **CAST IRON PRESSURE PIPES AND FITTINGS** All pipes and fittings shall be as specified in clause 18.2 of SSR Part-I of 2009.
- 23 **CONCRETE PIPES** Reinforced concrete pipes for drain shall be non-pressure type clause NP- 3 as indicated and conform to IS: 450-1971 all as specified in clause No.18.29 of SSR Part-I.
- 24 **CPVC PIPES** CPVC pipes shall conform to IS 15778. CPVC pipes shall be manufactured in two different standard dimensional ratios SDR 11 & SDR 13.5. CPVC fittings upto 50mm bore shall be SDR 11. CPVC pipes above 50mm shall be as per ASTM F441 in Schedule 80 & Schedule 40. CPVC fittings above 50mm bore shall be Schedule 80 only. All pipes and fitting of CPVC shall be UV stable, leak proof, tough, rigid and suitable for internal and external water supply. Jointing shall be with One step CPVC yellow solvent cement for pipe & fittings up to 50mm and 2nd step CPVC Solvent cement comprising of 1st step CPVC Primer and 2nd step CPVC solvent cement for pipes & fittings above 50mm. Laying of CPVC pipes shall be in accordance with clause 18.51 of MES Schedule 2009 Part-I (Specifications). The Contractor shall use proper bends, elbows, tees, etc. at turning corners. The Contractor shall provide screwed plugs to all open ends of pipe on completion of day's work. CPVC pipes and fittings shall be of make as approved by the GE.
- 25 **PVC CONNECTIONS** Cold water supply connection shall be of PVC connection pipes 600mm & 300mm long suitable for 15mm nominal bore GI pipe complete with brass chromium plated unions and rubber washers. The weight of brass coupling nuts shall not be less than 40gm. The weight of PVC pipe shall not be less than 47gm.
- 26 **GI WATER TUBING**
- 26.1 Water tubing as per BOQ shall be galvanised medium grade conforming to IS: 1239 and fittings shall comply with the requirement of relevant IS. Laying of GI pipes shall be in accordance with Clause 18.51 of MES Schedule.
- 26.2 Where GI pipes crosses the wall, GI sleeve piece of suitable dia / length shall be provided to accommodate the pipe and cost of same shall be deemed to be included in the quoted rate. The Contractor shall use proper bends, elbows, tees, etc. at turning corners. The Contractor shall provide screwed plugs to all open ends of pipe on completion of a day's work.
- 27 **BIB TAPS, STOP VALVES** Bib taps and stop valves shall be of cast copper alloy nickel chromium plated conforming to IS-781-1984 all as specified in clause 18.14 of MES Schedule 2009 Part-I (Specifications). Minimum finished mass of bib tap and stop valves shall be all as specified in clause 18.14.1 of MES Schedule 2009 Part-I (Specifications). Bib taps and stop valves shall be as mentioned in Schedule- 'A' and specified in clause 18.14 and 18.15 of MES Schedule.
- 28 **PILLAR TAPS** These shall be as stipulated in Schedule- 'A' and as specified in clause No. 18.16 of MES Schedule.
- 29 **GATE / GLOBE VALVEST** These shall be of gun metal fitted with wheel head (iron or gun metal),

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screwed/flanged both ends for iron pipe opening full way and of the size as specified. These shall conform to IS: 778. The weight of valves, fixing process shall be as stipulated in SSR Clause No.18. 102

30 LOW DENSITY POLYTHENE (LDPE) PIPES & FITTINGS

30.1 Low Density Polyethylene (LDPE) pipes and fittings shall conform to IS: 3076-1985. Specification for low density polyethylene pipes for potable water supply. Pipes shall be smooth clean and reasonably free from grooving and other defects.

30.2 LDPE pipes and fittings shall be of pressure ratings (working pressure) 6kg/cm² as indicated and these shall be designated by the outside diameters of the pipes. These shall be as specified and laid as stipulated in clause No. 18.5 of MES Schedule.

31 **WATER CLOSET ORISSA PATTERN** Squatting pan Orissa pattern size 680x470mm with integral foot rest, white colour, vitreous china front or back inlet with 'P' or 'S' trap with long outlet so that joints fall out of building. The trap shall be of cast iron.

32 **WATER CLOSET (PEDESTAL PATTERN)** Pedestal pattern wash down apparatus shall be of pattern 2 of IS-2556 Part-II (1981) and shall comprise of the following without any extra cost to government:

(a) Wash down water closet pan complete with integral 'P' or 'S' trap, the closet screwed to and including wooden plug embedded into the floor and made good ground.

(b) Closet seat and cover shall be moulded from high grade thermoplastic complete with chromium plated brass hinges.

(c) Low level flushing cistern Jaguar dual flush 1085DFP/equivalent flow rate of dual flush 4/2 ltr capacity body moulded from virgin quality high impact polystyrenes of make as stipulated hereinafter with clock valve based on buoyancy principle and controlled by a water clock including brass chromium plated bend, brass float valve 15mm bore with polythene ball and polythene connection complete.

(d) 40mm bore PVC flush pipe with necessary brass fittings. 15mm bore PVC connection 450mm long with brass union at both ends

33 **SHOWER ROSE OVER HEAD** The shower rose shall be of chromium plated brass of specified diameter. It shall have uniform perforation. The inlet size shall be 15mm or 20mm as required. The body of the shower rose shall be sound and free from laps, blow holes and pittings. External and internal surface shall be clean, smooth and free from sand burning, plugging, stopping or patching of casting shall not be permissible. The body and swivel joint shall be machined true to shape so that when assembled the parts are axial parallel and cylindrical with surfaces, smoothly finished and are correct in adjustment. The thickness of plating shall not be less than that for the grade specified in the relevant IS specifications. The plating shall be capable of taking high polish and shall not easily tarnish or scale. Shower rose shall be provided in each bathroom whether shown in drawings or not.

34 **FLUSHING CISTERNS** These shall be as specified in clause No. 18.34 of MES Schedule. Jaguar dual flush 1085DFP/equivalent flow rate of dual flush 4/2 ltrs.

34A. **EWC Wall Hanging**- Wall Mounted W.C with concealed cistern flush plate with accessories 6/3 liters' low level for European water closet with C.P. bolts, nuts, C.I. chair (painted with two coats of enamel paint over a coat of primer) or other hanging arrangements, bakelite / poly propylene seat & cover with C.P. hinges & rubber buffers, C.P. brass screw, washer with all accessories. Including cutting & making good the walls, floors, slab wherever required.) (Low flow fixtures conforming to GRIHA.)

34B URINALS AND URINAL PARTITION:

Provide white glazed fire clay stall urinal and its screens (factory made ceramic divisional plate). Stall urinal shall be 1140 mm high and 460 mm wide with 400 mm over all depth at the base and shall conform to IS 771 (Part- 3 Sec 2) and all as specified in clause 18.32.7.4 of MES Schedule Part I. Screens shall be 1000 mm high and 15 mm thick (overall) and projecting 500 mm. The screen shall be embedded in to the wall firmly as directed by the Engineer-in-Charge. The inside surface of the stall shall be regular and smooth throughout to ensure efficient flushing. 20mm bore medium grade galvanized iron flush pipe, 32mm bore medium grade galvanized iron waste pipe up to outlet drain, Chromium plated brass coupling to connect urinal pan with waste pipe and chromium plated adopter to connect pan with flush pipe. The pan shall be fixed with brass screws on sheesham wooden plugs embedded in the wall in CM (1:2). PCC platform shall be provided with Non-skid ceramic tiles flooring to match with adjoining flooring to the slope all as shown in drawing and as directed.

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- 35 **TOWEL RAIL** Towel rails shall be 19mm dia (nominal) anodised aluminium tube towel rail shall be of 19mm dia brass chromium plated or otherwise stipulated in BOQ. Towel rail shall be screwed with brass chromium plated bracket and aluminium anodised towel rail shall be screwed with steel chromium plated brackets fixed with PVC sleeve of appropriate size with brass chromium plated screws. The length of towel rail shall be 900mm unless otherwise stipulated. Towel Rail shall be provided in each bathroom whether shown in drawings or not.
- 36 **LOOKING MIRROR** Mirrors shall be 5.5 to 6mm thick polished sheet glass flawless firmly mounted on 6mm thick plywood backing in PVC frame of approved quality shape moulded and shade or aluminium anodised frame as specified in respective drawings. The edge of plywood shall be finished smooth by sand paper. Looking mirror shall be provided in each WHB area whether shown in drawings or not.
- 37 **DRAPERY ROD** Drapery Rod shall be provided in all the places shown on floor plan and shall be of high strength aluminium rod powder coated thickness 40-60micron outer dia 19/20mm and inner dia 16mm with plastic rings made of ABS plastics for all quarters. The brackets shall be of galvanized steel 1.6mm thick. The drapery rod shall be of make MAC- sleek line type – I / Vista levolarSoffio-I. Drapery rod shall be provided in all doors / windows except toilet, bathroom & kitchen door/window whether shown in drawings or not.
- 37A **PEG SET**
These shall be of aluminium anodised fixed with steel chromium plated screws to 12mm thick teak wood planks. The supporting planks shall either be fixed to door shutter or walls as shown on drawings. The exposed surfaces of planks shall be enamel painted as specified herein before. If number of pegs is not shown on drawing. Pet set of three shall be provided.
- 38 **A) WASH HAND BASIN**
Wash hand basin shall be vitreous China glazed ware, size and pattern shall be as shown on drawing. Size of flat back wash hand basin and oval type wash hand basin if not specified in drawing shall be 550x400mm (normal size) and 480x375mm (normal size) respectively.
Wash basin shall have the following without any extra cost to the government:
(i) Single trap hole with brass grating & coupling and comprising of CP brass with check nut with internal over flow.
(ii) Waste pipe with chromium plated brass coupling with check nut fixed to wash hand basin. One pair of stout, painted cast iron brackets screwed to and including wooden plugs.
(iii) Bottle trap with connected fittings fixtures and items.
(iv) 15mm bore PVC pipe connection, white 450mm long with 2Nos. brass coupling for each pillar tap. Pillar tap shall be fancy type conforming to IS: 8934 and clause 18.16.1 of MES SSR Part-I (ISI marked) chromium plated.
- B) TROUGH TYPE WASH BASIN**
It shall be manufactured from granite stone 18-20mm fixed over rcc trough casted in desired shape having dimension of as per detail shown in drawing or as approved by GE with necessary brackets, connecting union, waste pipe.
It shall Six or Four station type trough as shown in drawing.
- 39 **STAINLESS STEEL SINK & DRAINING BOARD**
It shall be manufactured from stainless steel grade A1 SI 305. Thickness of sheet shall be 1mm. Overall size of stainless-steel sink with drainage board shall be 915x460mm bowl size 410x330x160mm and type of stainless-steel sink and draining board shall be as approved by GE with necessary brackets, connecting union, Bottle trap. The surface of the sink shall be plastic coated to make it safe & scratch free installation.
- 40 **KITCHEN CABINET ABOVE & BELOW COOKING PLATFORM :-**
The specifications for Kitchen Cabinet shall be as under if not given in drawings :-
(a) **Kitchen Cabinet**
(i) Top, bottom sheet & shelves: 19mm thick marine plywood conforming to IS-710
(ii) Shutter: 18mm thick marine plywood (as per IS-710) with 1.5mm thick lamination (shade and colour as approved by GE)
(iii) Internal surfaces of plywood finished with 0.8mm thick white colour lamination inside the cabinet
(iv) 100mm stainless steel handles 8mm thick for every shutter
- 41 **CUP BOARD (BUILT IN) / WARDROBE**
The specifications for wardrobe shall be as under if not given in drawings: -
(i) Partitions: 18mm thick BWR grade type AA (FSC/PFSC Chain of custody Certified products. Make: Greenply/ Archidply/ equivalent) plywood conforming to IS-303.
(ii) Shutter: 25mm thick block board flush shutter (FSC/PFSC Chain of custody Certified products. Make: Greenply/ Archidply/ equivalent) conforming to IS-1659 with 1.5mm thick

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lamination (shade and colour as approved by GE).

(iii) Internal surface finished with French polish.

(iv) 200mm stainless steel handle 8mm thick one on every shutter.

42 SYNTHETIC ENAMEL PAINTING WORKS

(a) All synthetic enamel paint, emulsion paint shall be having low VOC Content and be of 1st quality manufactured by the standard firms of make as stipulated

(b) The Contractor shall inform the GE, within three weeks of the acceptance of the tender, the brand/names of the manufacturers of paint proposed to be used in the works and submit samples thereof and obtain prior written approval of the GE before their use in works.

(c) The Contractor shall when so have required by the GE, produce certificate from the manufacturer or their representative to establish that the brands of paints purchased by the Contractor from them, satisfy the requirements of the relevant Indian Standards.

(d) Paints for priming coat, under coat and finishing coat shall be of the same manufacturer.

(e) Tint of paint, if shall be as stipulated and as approved by the GE.

(f) Steel and iron work shall be painted in the manner as specified in clause 17.8 of MES Schedule Part-I.

43 WHITE WASHING

43.1 Three coats of White (lime) wash shall be provided as indicated, all as specified in clause No. 15.2, 15.12, 15.12.3 and 15.12.5 of MES Schedule. For white washing on ceiling adequate quantity of zinc oxide shall be added to lime wash for achieving egg white shade.

43.2 Lime used for white washing shall be freshly burnt fat lime (class 'C') or magnesium lime (class 'D' or 'F') white in colour, conforming to IS-712 of 1984.

43.3 Blue vitriol shall comprise of fresh crystals of hydrous copper sulphate (blue vitriol) conforming to IS-261 – 1982 and shall be ground to fine powder.

44 ACRYLIC OIL EMULSION DISTEMPER

Acrylic oil emulsion distemper conforming to IS 428- 1969 shall be provided as indicated, all as specified in clause No 15.14 and its sub-clauses therein of MES Schedule.

45 WEATHER PROOF EXTERIOR EMULSION PAINT, ACRYLIC OIL EMULSION DISTEMPER, ACRYLIC EMULSION PAINT (INTERIOR), CEMENT PAINTING**45.1 PROTECTION & PREPARATION**

45.1.1 Before commencement of painting work all doors / windows / ventilators, Balcony railings etc. shall be covered properly for protecting from the drips of paint / primer while painting, to the entire satisfaction of Engineer-in-Charge. Covering shall be done with tarpaulin or ply wood. After completion, the surrounding area, glass panes, flooring shall be cleaned and all the paint marks on it shall be removed.

45.1.2 Contractor's quoted rates shall be deemed to include for the above said provision and nothing extra shall be admissible on this account.

45.1.3 Preparation of plastered or un-plastered surface or removal of existing treatment by scrapping of walls, ceiling, chajjas, fins, fascia's, parapets etc. shall be done by using mechanical sander with internal dust extraction system for clean environment certified by the manufacturer. After preparation of surface, approval shall be obtained from Engineer-in-Charge before applying primer and further treatment / coat. Building wise stage passing register shall be maintained. In case of Porbandar, the above can be achieved manually by employing skilled labourers.

45.1.4 The surface shall be thoroughly cleaned of loose particles, dust, dirt, efflorescence, chalking, grease, mortar drops and other foreign matter. The surface shall be sand papered with grade I abrasive paper and dusted off to achieve an even and smooth surface free from all dust particles. The contractor will use electric blowers for this purpose. If surface so obtained is uneven, it shall be brought to a perfectly even surface by applying putty and allowing it to dry completely and then it shall be rubbed with the abrasive paper and dusted off and finally area cleaned by use of electric blower.

45.2 GENERAL Surface imperfections such as holes, dents, cracks are to be filled only by using mixture of white cement and fine sand (in the ratio 1:3).

45.3 MATERIALS

45.3.1 Paint shall be water based premium acrylic smooth exterior emulsion and acrylic water based exterior grade primer, cement based paint, exterior oil emulsion distemper, acrylic water based

PARTICULAR SPECIFICATIONS (Contd.../-)

interior grade primer, interior acrylic emulsion etc. as applicable and as indicated in Schedule of finishes. Paint and primer shall be any of the make mentioned in list of makes.

45.3.2 Shade of the paint shall be as approved by GE.

45.3.3 Primer shall be water based acrylic suitable for exteriors as per manufacturer's instructions. Primer shall be of same make as of paint.

45.3.4 The paint and primer shall be brought in manufacturer's sealed containers only by the contractor duly marked with batch number from the manufacturer.

45.3.5 The contractor shall produce purchase voucher in original for the paint and primer brought to site before claiming payment for the same. Purchase voucher of paint and primer shall contain the complete description of material, batch No., net weight, test certification No., quantity in each package, No. of packages etc., The quantity of material brought at site indicating No. of packages, quantity in each package, batch No., purchase voucher number, test certification number, date of manufacturing, date of expiry etc., shall be entered in MB as "Not to be Abstracted" and shall be signed by the JE, Engineer-in-Charge, GE and contractor.

45.3.6 Each container of paint and primer shall bear the following particulars: -

- (a) Manufacturer's trade mark.
- (b) Reference to Indian Standard to which they comply.
- (c) Name of product.
- (d) Net weight.
- (e) Date of manufacturing.
- (f) Batch No.
- (g) Storage requirement.
- (h) Storage life.
- (j) Date of expiry.

45.3.7 Each lot of paint and primer shall be checked by Engineer-in-Charge and approved by him after verifying from invoices, package and batch No. Materials shall be incorporated in the work only after written approval from Engineer-in-Charge.

45.4 **WORKMANSHIP**

45.4.1 All brushes, tools, pots, kettles etc., used in carrying out the work shall be free from foreign matter and shall be thoroughly cleaned with hot water and solutions at the end of a day's work or before use for a different type of material. No finish shall be executed until a sample of the finish to the required colour and shade has been approved by the GE.

45.4.2 The colour shall be even shade over the whole surface. If it is patchy or otherwise bad, the work shall be redone by the contractor at his own expense.

45.4.3 The application of paint shall be done either mechanical equipment / manually, coupled with a team of skilled workers to ensure desired quality of finishing work.

45.4.4 In order to improve quality of finishes which include uniformity of finished surfaces, controlled dust pollution, health, safety of workers, better speed of execution, enhanced durability of finishes, user satisfaction, etc., contractors are required to utilise services of paint manufacturers / authorised applicators and mechanical appliances (or manually in case of works at Porbandar) for activities like descaling, scraping, cleaning, smoothening, spraying, painting, finishing etc.

45.5 **PRIMING COAT**

45.5.1 After preparing the surface as approved by GE, one coat of acrylic water based exterior grade primer as approved by manufacturer, thinned with water in 1:1 ratio shall be applied with brush as per manufacturer's instructions and as directed by Engineer-in-Charge.

45.5.2 **Application of Finishes through Paint Manufacturers/ AuthorisedApplicators**

The work shall be got executed through paint manufacturer/ authorized applicator of manufacturer's only subject to following provisions : -

- (a) For carrying out the application of paint, the tenderers are deemed to have entered into necessary MoU with the said manufacturers of paints and their authorised applicator before quoting their bids.

PARTICULAR SPECIFICATIONS (Contd.../-)

- (b) Authorised Applicator of paint manufacturers shall have valid authorization letter from the manufacturer (minimum regional HQs) issued not earlier than 30 days from start date of the said finishing work. Also, the authorisation letter needs to be valid for the complete period of execution.
- (c) Contractors shall ensure to obtain application, testing and certification of finishes by paint manufacturing firms / their authorised applicators, after the completion of the said painting work.
- (d) Cement Paint shall be applied using airless spray technology and capable of operating single spray gun with a suitable hose length. The spray machine should be reputed manufacturer with pro-guard technology and capability of tracking pressure as well as paint & primer usage.
- (e) This equipment's shall be certified by approved manufacturer.
- (f) The accessories for applying the finishes shall be able to spray in hard to reach areas and penetration of finish on the surface so as to achieve uniform application and quality surface finish.
- (g) No strainer or colorants shall be used. The paint shall be stirred well before use. The primer coat shall not be left without application of top coats for a long period time.
- (h) Two coats of weatherproof exterior emulsion paint thinned with 400 ml water per litre of paint shall be applied. The drying period between two coats shall be minimum 4 hours or as per Manufacturer's instructions. The shade shall be as approved by GE. The finish of exterior emulsion weather paint shall be matt finish.
- (i) The paint shall be as per Manufacturer's original colour as available or shade card. No mix of tint shall be made into original shade.

45.6 GUARANTEE

45.6.1 The work of applying primer and paint shall be got carried out by the authorized team of the manufacturer. A certificate from their representative shall be obtained by the contractor to the effect that work of painting and primer has been carried out under their strict supervision and as per manufacturer's instructions. The same shall be submitted by the contractor to GE. The contractor shall also obtain a written guarantee for effectiveness of paint against fading out, peeling off, cracking, dust / algae accumulation etc. for 5 (FIVE) years from the certified date of completion of entire work from the manufacturer and submit the same to GE before completion of work.

45.6.2 Should the GE at any time during construction or reconstruction or prior to the expiry of the Guarantee period, finds defective performance of the paint, the contractor shall, on demand in writing from the GE specifying the locations complained of, notwithstanding that the same may have been inadvertently passed / certified and paid for, under take to carry out such treatment as may be necessary forthwith to rectify the defects to the full satisfaction of GE. In the event of his failure to do so, within the specified period to be specified by the GE in his demand aforesaid, the GE may undertake such defective work at the risk and expense of the contractor. The liability of the contractor under this condition shall not extend beyond the period of FIVE years from the certified date of completion, unless the GE had previously given notice to the contractor to rectify the defects.

45.6.3 The amount of security deposit for weather proof exterior emulsion paint shall be 2.5% at the contract rates quoted for respective items of BOQ, shall be retained from the final bill amount and will be released after satisfactory expiry of 07 (Seven) years Guarantee period. If contractor fails to rectify the defects noticed in the treatment or found in the material the aforesaid amount so retained shall be utilized for rectification of defects and contractor shall have no claim whatsoever on this account. The contractor may submit Bank guarantee Bond or Fixed Deposit Receipt from any Nationalised Bank pledged in favour of Garrison Engineer for the said sum valid for the period of 05 (Five) years from the date of completion of work in which event no further amount will be recovered from the final bill on this account. Defect liability period under condition 46 under General Conditions of Contracts IAFW-2249 shall be deemed to be amended to the extent mentioned above for Acrylic emulsion paint.

45.7 SCAFFOLDING

45.7.1 The exterior painting work shall be carried out by using scaffolding. No zoola is permitted for the work under any circumstances. Suitable scaffolds shall be provided for workmen.

45.7.2 Scaffolding or staging more than 3.5 metre above the ground or floor, swung or suspended from any overhead support or erected with stationary support shall have a guard rail properly attached, braced and otherwise secured at least 1 Metre high above the floor or platform of such scaffolding or

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staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

45.7.3 Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1 Metre.

45.7.4 Safe means of access shall be provided to all working platforms and other working places.

45.7.5 The rates quoted are deemed to include for the above provision of scaffolding and nothing extra will be payable to contractor on this account. The scaffoldings shall be removed only after obtaining clearance of AGE after considering the quality of the work undertaken on completion of the painting.

45.8 SAFETY PRECAUTIONS

45.8.1 Contractor shall provide all safety precautions for the labour engaged for this work. All the labours shall be provided with safety belts, helmets, Nose screens etc. and the contractor shall adhere to all safety precautions as per Labour Welfare Act.

45.8.2 It is also advised, contractor to have insurance cover for his workmen working at heights against any eventuality from any reputed insurance agencies. Department will not be responsible for any untoward incident happening due to lack of safety precautions taken by contractor.

45.9. STAGE PASSING

45.9.1 The work shall be executed in a workman like manner and to the entire satisfaction of the GE. Contractor shall obtain the approval of GE stage wise as indicated below. The contractor shall give due notice in writing with sufficient time in advance to the Engineer-in-Charge and the GE, when each stage is about to be completed. The contractor shall start the work of subsequent stage only after obtaining written approval of the GE for previous stage. In default of such notice being received from the contractor, if he commences the work of subsequent stage without approval of the GE, then the GE shall have all the rights reserved to reject the work and ask the contractor to demolish the said portion executed. The contractor shall have no claim on this account or otherwise. The decision of the GE in this regard shall be final and binding.

45.9.2 STAGES

- (i) Extent of area to be painted.
- (i) Sample of painting work (Area to be decided by AGE)
- (ii) After preparation of surface and before applying priming coat.
- (iii) After applying priming coat.
- (iv) After applying first coat of Acrylic emulsion paint.
- (vi) After applying second coat of Acrylic emulsion paint.

46 BLANK**47 BLANK****48 PLASTERING****48.1 GENERAL**

- (a) Where plaster on concrete surfaces is shown to match the adjacent masonry surfaces, the mix of plaster shall be as for the masonry surfaces.
- (b) All plastered surfaces shall be trowelled to a fair and even surface without using extracement.
- (c) Thickness of cement plaster mentioned hereinafter shall be finished thickness exclusive of dubbing. Dubbing may however be done in one operation with plaster.
- (d) All corners, angles, junctions and edges shall be truly vertical or horizontal as the case may be and shall be carefully finished. Corners around jambs of openings and junctions of walls shall be rounded to minimum radius of 5mm.
- (e) To avoid cracks at junction of RCC and brick / block masonry wall, 150mm wide GI chicken wire mesh of 0.9mm dia, 12mm mesh shall be nailed on the joints before plastering on both internal and external surfaces

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- (f) Particular attention of the Contractor is invited to take note of local practices and local availability of materials like bricks / stones, formwork, etc. for any extra quantity of mortar required for rendering smooth, extra dubbing required, touching up properly and achieving smooth and even surfaces. This shall be deemed to have been included in the rates quoted as applicable.

48.2 MATERIALS

- (a) Cement - Refer `Appendix-`C' to these particularspecifications.
- (b) Sand- Refer clause 14.5 of MES Schedule Part-I and sand shall be obtained from the sources as approved by the GE and shall conform to the sample kept in the office of theGE.
- (c) Water - Refer clause 14.11 of MES Schedule Part-I 2009.

48.3 CEMENT PLASTER(INTERNAL)

- (a) Cement plaster (internal) wherever indicated in drawings for walls shall comprise rendering of 8mm thick polymer modified ready mixed cement-based plaster finished even and fair with 3mm thick wall care putty (Make of plaster Acoplast of ACC, Ready Plast of Ultra Tech, Easy Plast from Wall Plast, ChemPlast).
- (b) The plaster work on the concrete surfaces adjoining to wall shall be carried out as per specification for the wallplaster.
- (c) The plaster on shear wall/ RCC wall shall not be provided and RCC wall/Shear wall shall be finished even and fair with 3mm thick wall care putty.

48.4 CEMENT PLASTER (EXTERNAL)

- (a) Cement plaster (external) wherever indicated in drawings for walls shall comprise rendering of 20mm thick polymer modified ready mixed cement-based plaster in two layers i.e. 15mm & 5mm finished even and fair (Make of plaster Acoplast of ACC, Ready Plast of Ultra Tech, Easy Plast from Wall Plast, Chem Plast).
- (b) Irrespective of what is shown in drawings top, front and side surfaces of Chajjas and front and sides of canopies shall be given plaster in two coats as specified hereinbefore.
- (c) The percentage of integral water proofing compound to be used in the work shall be as per the manufacturer's instructions, but in case of deviation the same shall be 3% (by weight of cement).

NOTE: - For all external surfaces of shear wall, EP3 as specified in Schedule of Finishes drawing is to be provided.

RAISED PLASTER

Cement Raised plaster (external) wherever indicated in drawings for exterior walls surface shall comprise rendering of 40mm thick polymer modified ready mixed cement-based plaster in two layers of 20mm finished even and fair. Before plastering second layer,GI chicken wire mesh of 0.9mm dia, 12mm mesh shall be nailed on the joints covering entire surface.

48.4A POLYMER MODIFIED READY MIXED CEMENT BASED PLASTER MORTAR (APPLICABLE FOR BOTH INTERNAL AND EXTERNAL SURFACES):

48.4A.1 It is a cement based plastering mortar for application over masonry walls, RCC columns, beams and ceiling areas. The shelf life shall be 12 months from the date of manufacture and it shall be stored in a cool and dry place.

48.4A.2 **SPECIFICATION:** The technical parameters shall comply with IS 1661-1972, IS 2250-1965, IS 2402-1963.

48.4A.3 METHOD OF APPLICATION:

- **SURFACE PREPARATION:** The surface shall be prepared before application of ready mixed cement based plaster mortar by removing oil, bond inhibiting agents, dirt, dust and laitance. The surface shall then be cleaned following suitable methods like by using wire brush, water jetting, mopping etc. The surface shall be prewet before the application of mortar. It is preferable to roughen the concrete surface or applying bonding agent over the concrete surface to have the required adhesion.
- **MIXING:** The mortar requires 16-19% potable water by weight of material. Add the mortar to the measured quantity of water and mix for 2-3 minutes to ensure a consistency free of lumps. Mix only the required quantity of material which can be consumed within one-hour pot life and do not add more water than the prescribed water ratio to the already mixed mortar.

48.4A.4 The following shall be the technical data as per relevant IS standards:

Bulk density	- 1500-1600 kg/m3
Water powder ratio	- 16-19% by weight

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Pot life	- 1 hour @ 27°C
Compressive strength @ 28days	- Minimum 10 MPa
Coverage per 40kg bag (depending on the substrate)	- 18-22 sq.ft @ 12mm
Thickness of layer	- 8-15mm per coat
Curing	- 2-3 days @ 2-3 times a day

48.4A.5 NOTE: The following shall be taken care of: -

- Allow a minimum of 48 hours for the subsequent usage over mortar applied areas. It should not be applied if temperature is likely to drop below 5°C or exceed 50°C. For harsh climate, curing has to be done for 4-5 days.

48.5 WALL CARE PUTTY FINISH TO CEILINGS & WALLS

All soffits of slabs i.e. ceiling shall be treated with wall care putty finish to thickness not less than 3mm trowelled to an even and smooth finish (Except where POP ceiling to be provided). Wall care putty to be used for 'Wall care putty finish' shall be Birla Wall Care Putty or SARA Putty (Ferrous Crete) or equivalent make and shall be as approved by the GE.

48.6 INTEGRAL WATER PROOFING COMPOUND

Integral water proofing compound wherever specified in these particular specifications shall conform to IS-2645, ISI marked and shall be in powder form and shall be of make as specified in hereinafter. Mixing shall be done strictly as per manufacturer's instructions. For purpose of deviations it shall be taken as 3% by weight of cement.

49 FLOORING**49.1 GENERAL**

(a) Provisions contained in Clause 13.25, 13.32, 13.38 and 13.39 of MES Schedule are to be adopted for laying floors and pavements.

(b) Floors shall be laid to levels as directed by the Engineer-in-charge.

(c) The dividing line between the floors of different types wherever they so meet between adjoining rooms, shall be determined on the basis of the finish visible when the doors are closed and the applicable finish shall accordingly be provided.

(d) Floor finish over RCC slabs shall be laid all as specified in MES Schedule.

49.2 MACHINE CUT MACHINE POLISHED KOTA STONE FLOORING

(a) Machine cut machine polished (if shown on drawing) kota stone flooring shall be provided in the locations as shown on drawings and as directed by the Engineer-in-charge.

(b) Machine cut mirror polished (if shown on drawing) Kota stone flooring shall be provided in the locations indicated in drawings/Schedule of finishes.

(c) Kota stone tiles/slab shall have size 450x450mm or 600x600mm for flooring shall be of selected quality, hard, sound dense & homogeneous in texture, free from defects & conforming to clause 13.12 of SSR Part-I. Thickness of tile shall be 18 to 20 mm as indicated in drawings. Mirror polished kota stone shall be cut to correct geometry at site and table rubbed to achieve fine joints.

(d) Kota stone tiles/slabs shall be set, jointed & pointed in neat cement slurry with pigment to match the colour of tiles and laid over 20mm thick bedding layer in CM 1:4 over concrete sub-base/ RCC slab. Joints shall be thin & nearly indistinguishable.

(e) Polishing of kota stone flooring shall be done to achieve mirror polish if shown on drawing with using polishing machine and required grinding stones and in a manner and to the satisfaction of the Garrison Engineer.

49.3 MACHINE CUT MACHINE POLISHED KOTA STONE SKIRTING

(a) Kota stone skirting shall be provided at locations as shown on drawings. The height of skirting shall be as shown on drawing and if not shown shall be 125mm height. Mirror polished Kota stone shall be cut to correct geometry at site and table rubbed to achieve fine joints.

(b) Kota stone tiles shall be laid over 12mm thick cement and sand mortar (1:4) irrespective of whatever specified elsewhere, jointed and pointed in grey cement. The exposed surfaces of Kota stone shall be mirror polished.

(c) Kota stone tile for skirting shall be of the selected quality hard, sound, dense and homogenous in texture, free from defects, machine cut and mirror polished (if shown on drawing) all as specified in clause 13.12 of MES Schedule Part-I. The size of the Kota stone tile skirting as shown in drawing and shall be 20mm to 25mm thick. Where size does not fit on the same place, it shall be provided as per directions of Engineer-in-Charge. The kota stone shall be uniform in thickness & shall be uniform in colour.

49.4 NON-SKID / GLAZED CERAMIC TILES FLOORING

(a) Non skid ceramic tiles in flooring / dado shall be provided in the locations indicated in

PARTICULAR SPECIFICATIONS (Contd.../-)

drawings/ Schedule of finishes. Non skid ceramic tiles in flooring shall be 300x300mm size and 7 to 8mm thick unless otherwise specified in drawing, coloured of group B-II(a)/B-II(b) and of abrasion resistance PEI-III or above. Ceramic tiles fixed with 20mm thick cement sand screed 1:4 over PCC sub base / RCC slabs. Tiles shall be set and jointed in neat cement paste and shall be grouted with Epoxy grout Ezy grout from Somany, Ferro102 from Ferrous Crete, Bal Endura, Fevimate TG from Dr Fixit. Joints shall be thin & nearly indistinguishable. The workmanship in all respects shall be as specified in Clause 13.40 of SSR Part-I.

(b) Non-Skid ceramic tiles shall be any one of the make as per make, colour, pattern & design of tiles shall be as approved by the GE. (Tiles with recycled content of min. 5%. Make: Kajaria/ Johnson/ Equivalent)

(c) Glazed ceramic tiles in dado shall be 300x300mm size and not less than 7 to 8mm thick, colored unless otherwise shown on drawing & shall be of same group as that of the floor and shall be provided in locations shown on drawing. Tiles shall be fixed over 10mm thick cement mortar 1:3 with polymer modified tile adhesive Ezy fix from Somany, Ferro 1111 from Ferrous Crete, Fevimate XL from Pidilite, Bal Endura. Joints grouted with Epoxy grout "Ezy grout from Somany", "Ferro102 from Ferrous Crete", Bal Endura, Fevimate TG from Dr Fixit. Joints shall be thin & nearly indistinguishable. The workman ship in all respects shall be as specified in Clause 13.40 of SSR Part I.

49.5 MACHINE CUT MACHINE POLISHED GRANITE STONE FLOORING/DADO :-

(a) Granite stone slab in flooring/dado shall be single piece of selected quality, hard, sound dense & homogeneous in texture, free from defects & conforming to clause 13.12 of SSR Part-I. Thickness of slab shall be 18 to 20 mm. Granite stone slab shall be machine cut machine polished (exposed surfaces only) and shall be provided as per locations shown in drawings. Colour of slab shall be 'Ruby Red' with 'Black' colour in border. Granite stone Slab in flooring shall be set, jointed & pointed in neat cement slurry & shall be laid over 20mm thick bedding in CM 1:3 over concrete sub-base/ RCC slab. Joints shall be thin & nearly indistinguishable.

(b) In case of dado Granite stone slab shall be fixed over 10mm thick cement mortar (1:3), jointed & pointed in grey cement. The exposed surface shall be machine polished.

49.6 GLAZED CERAMIC TILES / VITRIFIED TILES/ KOTA STONE /GRANITE IN SKIRTING

(a) Height of skirting shall be as shown on drawing.

(b) Skirting shall be provided at locations indicated in drawings and Schedule of finishes.

(c) Skirting shall be provided as stipulated and detailed in SSR Part-I 2009.

49.7 GLAZED CERAMIC TILES IN DADO

(a) Height of dado shall be as shown on drawing.

(b) Glazed ceramic tiles in dado shall be provided at locations indicated in drawings and Schedule of finishes.

(c) Dado shall be of 6 to 7mm thick, 300x450mm glazed ceramic tiles, matt finish over 12mm thick backing coat in CM 1:4 unless otherwise shown on drawing and jointed and pointed with epoxy grout fix with polymer modified adhesive.

49.8 MACHINE CUT MIRROR POLISHED BLACK GRANITE STONE PLATFORM FOR KITCHEN

Kitchen platform unless shown on drawings shall be provided with jet black granite slab which shall be in one piece of selected quality, hard, sound dense & homogeneous in texture, free from defects and conforming to clause 13.12 of SSR Part-I and of thickness 18 to 20mm machine cut machine polished (exposed surfaces only) and shall be provided over RCC slab as per locations shown in drawings. Colour of stone slab shall be jet black granite or any other colour as approved by the GE. Stone slab shall be provided in a chase inside the wall at least 25mm deep and set, jointed and pointed in neat cement slurry to match with the colour of the slab. The edge exposed shall be bull nosed as directed by the GE. 19mm thick pre-laminated particle board shutter below cooking platform shall be provided all as shown on drawing. Cuddappa stone shelving 20 to 25mm thick shall be provided below cooking platform as shown on drawing.

49.9 CEMENT CONCRETE SUB-FLOOR

Unless shown/specified in the drawing cement concrete sub-floor (i.e. PCC Sub base laid below floor finish) in ground floor unless otherwise indicated in Schedule of finishes shall be plain cement concrete (1:4:8) type D-2, using 40mm graded stone aggregate and same shall be provided as per thickness and locations as indicated in drawings.

49.10 CEMENT CONCRETE FLOORS

(a) PCC floors/wearing coat (laid over hard core/cement concrete sub floor/RCC slabs) as indicated in Schedule of finishes shall be plain cement concrete (25% replacement of OPC with fly ash/ use of PPC instead of OPC with min 25% Fly ash) M-20 using 20mm graded stone aggregate and the same shall be provided at location mentioned in drawings and as per the thickness indicated in drawings.

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(b) Cement concrete in floor/wearing coat shall be laid in alternate bays not exceeding 4sqm. 1.5mm thick PVC dividing strips shall be provided (to form joint) in all cement concrete floors and wearing coat. The PVC dividing strips shall be 3mm less than the thickness of PCC floor/wearing coat. The PVC dividing strips shall be inserted in the PCC floor/wearing coat while the concrete is still plastic and the strips shall be left in position. PCC floors/wearing coat to be provided with PVC strip shall not be laid in alternate bays and this will not involve any price adjustment.

(c) The surface of PCC floor/wearing coat shall be finished (with a steel trowel) to an even and smooth surface using extra cement. Cement concrete flooring shall be carried out as specified in clause 13.32 of MES Schedule Part-I.

(d) If chequered finished is shown on drawings, then same shall be achieved by making impression by expanded metal or mesh as directed by Engineer-in-charge on top surface of concrete while it is still green. The expanded metal shall be impressed to maximum possible depth by tamping and removing the same carefully.

49.11 GRANITE STONE FOR STAIRCASE

(a) 18 to 20mm thick polished granite stone slab in single piece, bull nosing/rounding to edges of stone slab one edge and two numbers grip line for staircase treads fixed over 20mm thick cement screed in CM 1:4 all as shown on drawing of schedule of finishes.

(b) 18 to 20mm thick polished granite stone slab in single piece for staircase treads fixed over 10mm thick cement screed in CM 1:4 all as shown on drawing of schedule of finishes.

49.12 ANTI-SKID VITRIFIED / VITRIFIED TILES IN FLOOR/DADO

(i) Anti-Skid Vitrified / Vitrified tiles, polished, dark in colour (or as approved) of size 600x600mm and 9 to 10mm thick unless shown on drawings and directed according to site conditions), conforming to IS-13006/EN/176 group bla shall be provided at locations as shown on drawings

(ii) Anti-Skid Vitrified / Vitrified tiles for flooring shall be of premium quality, hard, sound, dense and homogeneous in texture, free from defects, machine cut and factory mirror polished. Tiles shall be uniform in colour and of uniform thickness.

(iii) Anti-Skid Vitrified / Vitrified tiles shall be of first quality and all as specified in clause 13.5 of SSR Part-I, 2009 print. Anti-Skid Vitrified / Vitrified tiles shall be of size stipulated and fixed with cement sand screed 1:4 as shown in drawings and minimum uniform joint thickness of 3mm. Joints grouted with Epoxy grout from Somany, Ferro 102 from Ferrous Crete, Bal Endura, Fevimate TG from Dr Fixit.

(iv) The joints shall be preferably thin and nearly indistinguishable.

49.13 CHEQUERED TILE

(a) Chequered cement concrete tiles 20cm x 20cm x 25mm thick shall be provided in the locations indicated in drawings/ Schedule of finishes. It shall be set, jointed and pointed in neat cement slurry in floors with mixture of white and grey cement and pigment shall be laid over 50mm thick Cement Concrete Type C2 1:3:6 or as directed by the Engineer-in-charge.

49.14 WEAR PROOF TOPPING

(a) Wearing coat (laid over hard core/cement concrete sub floor/RCC slabs) as indicated in Schedule of finishes shall be provided as specified in MES Schedule Part-I clause 13.36 and the same shall be provided as per the thickness indicated in drawings.

(b) The surface of wearing coat shall be finished (with a steel trowel) to an even and smooth surface using extra cement.

50 WATER PROOF TREATMENT TO ALL SUNKEN PORTIONS OF SLAB

(a) All pipes passing through walls of sunken floor shall be laid before water proofing treatment is carried out. One No. 50mm dia, 35cm long medium grade GI pipe with wire gauge on inside mouth shall be provided to each sunken portion.

(b) Clear the sunken/lowered portion of RCC slab surface (Including vertical total depth plus 100mm) of floors by wire brush. Chisel out any mortar sticking the surface. There after rendering of uneven surfaces with 6mm thick cement mortar with 1:4 (1 Cement: 4 coarse sand) mixed with integral water proofing compound to make it even. Fill it with water and check for dampness and seepage. Wherever dampness/seepage is noticed, nozzle shall be fixed and grouting carried out. Fixing of nozzles and grouting shall be measured and paid separately.

(c) All junction points of side walls where CI/GI pipes are passing through shall be sealed with epoxy putty.

(d) After drying putty, wash the slab and sides of sunken portion with water and make it clear and clean.

(e) Apply two coats of polymer modified cementitious water proofing coating as per manufacturer's instruction to bottom and vertical sides up to finished floor level + 100mm height. The thickness of each layer shall be 1mm. When the second layer is still sticky, coarse sand spray shall be carried for the vertical and bottom surface.

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- (f) Plaster the bottom and sides up to bottom of the skirting with minimum 20mm thick cement mortar 1:4 mixed with integral water proofing compound as per manufacturer's specifications including rounding of corners and junctions sloping towards spout.
- (g) Test the water proofed area by filling water for at least 72 hours and tested for leakage seepage and to the entire satisfaction of GE. Tests shall be done in presence of reps of PMG and record for each sunken slab shall be maintained.
- (h) All pipes laid in sunken portion shall be covered with 50mm thick PCC 1:3:6 all round after painting with anticorrosive paint (Black Japan)
- (j) Contractor shall stand guarantee for 10 years against leakage/ seepages, of treated floor/slabs. Guarantee shall be given in performa at as per P S clause 52.9 from the approved applicators.
- (k) Spout(s) of 40mm dia PVC pipes projecting at least by 10cm clear of face of the outer wall or as shown in drawings shall be provided to drain out seepage water, if any.
- (l) The guarantee specified in clause No. 52.1, 52.2 and 52.9 hereinafter, shall also include for water proofing to sunken slabs also.
- (m) The water proofing treatment shall be carried out by the approved applicator of the manufacturer as approved by the GE.

51 **RAMP**
GROUND RAMP

- (a) Ramps shall be provided as per details shown in drawing. Unless otherwise shown/specified in the drawing ramp shall be provided with 100mm thick PCC (25% replacement of OPC with fly ash/ use of PPC instead of OPC with min 25% Fly ash) M-20 grade using 20mm graded stone aggregate over 100mm thick PCC (25% replacement of OPC with fly ash/ use of PPC instead of OPC with min 25% Fly ash) (1:4:8), type D2 using 40mm graded stone aggregates over 150mm thick hard core over approved earth filling surface.
- (b) PCC flooring shall be finished chequered. This shall be achieved by making impression by expanded metal or mesh as directed by the Engineer-in-charge on top surface of concrete while it is still green. The expanded metal shall be impressed to maximum possible depth by tamping and removing the same carefully.

RCC RAMP

- (a) PCC floors/wearing coat (laid over hard core/cement concrete sub floor/RCC slabs) as indicated in Schedule of finishes shall be plain cement concrete (25% replacement of OPC with fly ash/ use of PPC instead of OPC with min 25% Fly ash) M-20 using 20mm graded stone aggregate and the same shall be provided at location mentioned in drawings and as per the thickness indicated in drawings.
- (b) Cement concrete in floor/wearing coat shall be laid in alternate bays not exceeding 4sqm. 1.5mm thick PVC dividing strips shall be provided (to form joint) in all cement concrete floors and wearing coat. The PVC dividing strips shall be 3mm less than the thickness of PCC floor/wearing coat. The PVC dividing strips shall be inserted in the PCC floor/wearing coat while the concrete is still plastic and the strips shall be left in position. PCC floors/wearing coat to be provided with PVC strip shall not be laid in alternate bays and this will not involve any price adjustment.

52 **WATER PROOFING TREATMENT TO ROOF**

- 52.1** The contractor shall carryout waterproofing work over roof to ensure the entire roof water tightness during the guarantee period of 10 years and he will be responsible to keep the entire surface of roof water tight for a period of 10 years from certified date of completion of work. The security Deposit at the rate of 2.5% of the water proofing treatment work done amount towards the guarantee for water proofing treatment shall be retained from the RAR/final bill amount. The amount shall be released to the contractor after the satisfactory completion of TEN YEARS guarantee period. During the guarantee period if any leakage is found out same shall be got rectified by the contractor without any extra cost to the Government. In any case during the guarantee period the contractor who executed the WPT works should inspect and examine the treatment once in every year and make good any defects observed. Defects liability period of one year as laid down under condition 46 of IAFW-2249 is not applicable for water proofing work covered under this contract and shall be deemed to be amended to the extent mentioned above for WPT work. Garrison Engineer may accept Bank Guarantee Bond from Schedule Bank or fixed deposit receipt (pledged in favour of GE) from any approved Bank for the above said amount for a period of 10 years in which case no further amount will be recovered from the final bill on this account.
- 52.2** Tenderer shall submit 10 years guarantee certificate (as per performa enclosed herewith) duly undertaking and accepting the responsibility to carry out all required rectifications at his own risk

and cost. In case of contractor’s failure to carry out the rectifications, the Government shall be at liberty to get all such rectifications carried out at his risk and cost from security amount. Tenderer is required to visit the buildings in which the water proofing treatment is to be done in order to ascertain the exact nature and extent of work involved. His quoted rate in the Schedule ‘A’ Part I Item No 1 against the respective items shall be deemed to include for the following aspects for effective water proofing treatment and no extra claim on whatever account will be entertained from the contractor.

52.2.1 WATER PROOFING MEMBRANE

APP modified waterproofing membrane to be incorporated in the work for WPT shall be obtained from one of the following manufacturers:

- (a) SuperThermolay
- Manufactured by STP limited (formerly Shalimar Products) B-46, Hind Road Extension, Kolkata - 700008
- (b) Chemistik
- Chemisol Adhesives Pvt Ltd, 7/10 Botawala Building, 2nd floor, Horniman Circle, Fort, Mumbai - 400 023 (Tel: 022-2661936, 2625389 & 2625520)
- (c) Moply
- Manufactured by TEXSA India Ltd, A-418, 1st floor, DLF City, Gurgaon - 02
- (d) Hyperplas
- Manufactured by IWL India Ltd., W-360, North Main Road, Anna Nagar West Extension, Chennai - 600101(Tel: 044-45536000)
- (e) Hydrostop
- Manufactured by Tikitar’

52.2.2 PHYSICAL PROPERTIES The physical properties of APP modified waterproofing membrane shall beasunder:

- (i) Membrane Weight
- Not less than 4.0kg/sqm
- (ii) Not woven polyester weight
- Not less than 160gms/sqm
- (iii) Softening paint of membrane
- Not less than 150°C
- (iv) Joint tensile strength
- Longitudinal>650/sqcm at 230°C
Transverse> 450/Sqm
- (v) Tear strength(L/T)
- Longitudinal>150N,
Transverse> 150N
- (vi) Elongation
- >30%
- (vii) Impermeability under water pressure>3kg/cm

52.2.3 The water proofing membrane treatment shall be carried out by the approved applicator of the manufacturer as approved by the GE.

52.2.4 CERTIFICATE BY SPECIALISED AGENCY

A certificate by the specialized AGENCY who has executed the water proofing treatment under this contract will be rendered that they have executed the said work.

52.2.5 APPLICATION AND WATER PROOFING OVER ROOF

52.2.6 SURFACE PREPARATION

After rectification is completed, top surface of the RCC roof slabs shall be thoroughly cleaned of any dust, loose materials, grease etc. wire/coir brushes. The surface shall than be thoroughly washed with freshwater.

52.2.7 WATERPROOFING TREATMENT

- a)
- RCC roof slab shall be cast/laid to the slope as indicated in drawings.
- b)
- After RCC roof slab is laid, cured and fully set, water shall be ponded over the roof slab upto a height of 7.5cm for 96 hours. The location of seepage/leakage, if any, shall be identified and marked. The portion of the slab where leakage/seepage is observed shall be repaired with grouting at contractor’s expense.
- c)
- The area of dripping/ leakage shall be cleaned to expose the surface. Mark the spots for injection grouting. If leakage is through a crack, mark grouting points along the crack in a staggered manner. If the leakage is across the area mark grouting spots in a grid pattern. Drill grouting holes so as to neatly fit the injection packers. Drilling to be done at an angle of 45° to the plane of grouting surface. Fix PVC/MS nozzles in the grouting holes using suitable putty & allow to set. Inject the low viscosity, polyurethane resin/epoxy grout using a grouting pump. Repeat the process after 1 or 2 days if the leakage continues at some points. Allow to cure for 24 hours and seal the grouting holes appropriately using epoxy putty.
- d)
- Over the RCC slab a slope correcting layer of PCC M20 grade nominal mix shall be laid to

PARTICULAR SPECIFICATIONS (Contd.../-)

achieve a final slope of 1:80 with minimum thickness of 40mm at edges. The PCC layer shall be laid in panels of size not more than 2m x 2m with 10mm joints filled with non bituminous filler board and sealed with PU sealant. (**NOTE** : This PCC layer is required for flat roof slabs laid without any slope. For slabs already cast to a slope of 1:80 or more, this layer is not required.)

- e) The surfaces shall be made smooth with 10mm thick cement plaster (1:4) mixed with approved water proofing admixture. The plaster shall be done when the concrete surface is still moist. The plaster surface shall be allowed to set and dry.
- f) The dry surface shall be primed with Torch shield primer as per manufacturer's instructions, manufactured by the same agency as that of APP membrane.
- g) Providing and laying APP modified polyester reinforced water proofing membrane with minimum weight of 3.5kg/sqm, as specified here-in-after.
- h) The APP membrane shall be laid using torch-on butane application with minimum 10cm side overlap and 15 cm end over lap. The laying of membrane shall be got done through an authorised applicator of manufacturer of the membrane.
- j) The APP membrane shall be taken upto minimum 200mm on vertical surfaces. The edge of the membrane shall be fixed with termination bar and fasteners and end shall be properly sealed with sealant.
- k) The rainwater gutter portion shall be finished with cement mortar (1:4) to provide requisite slope towards rainwater pipe outlet.
- l) The finishing over the membrane shall be as specified here-in-after.
- m) **FINISHING LAYER FOR INACCESSIBLE ROOF:** In case of non-accessible roof, the APP membrane shall be finished with two coats of solar reflective bituminous aluminium paint @ 0.1kg/sqm, over the above specifications.
- n) **FINISHING LAYER FOR ACCESSIBLE ROOF AND TERRACES :** In case of accessible roof and terraces, provide a polypropylene/ polyester, non-woven geotextile fabric of 160gs/m² over the membrane, specified here-in-above. Over the geo textile fabric provide 20mm thick cement screed (1:4) and lay 22mm thick hydraulically pressed PCC tiles of size 250X250mm set and jointed over APP membrane. While laying tiles a care shall be taken to see that joints between the tiles are kept minimum (not exceeding 5 to 8mm). Top of finished surface of tiles shall be laid to the true slope so that no stagnation of water take place.

52.2.8 Wherever junction of vertical and horizontal structures occurs above roof level of size 75x65mm shall be formed at a height of 15cm above roof level for tucking in edge of water proofing treatment in case of brickwall etc. The groove shall coincide with the horizontal joint of brick course and shall be shaped with cement and sand mortar (1:3). In case of junction between RCC beam/ parapet etc. PCC 1:2:4 coving with 75mm in radius shall be provided. Cost of above provision shall be deemed to include in the quoted rate against respective Items of Schedule 'A' Part I.

52.3 Pipe Treatment

52.3.1 All PVC Sleeves, etc., shall be treated with polymer modified, cementitious elastomeric coating reinforced with 45 gsm glass fibre mesh sandwiched between two coats of Dr.Fixit Fastflex/ Sikagard®-694F(I)/Nitocote CM210 etc., at the junction of the pipes and slab/wall area, including proper cleaning of the junctions and sealing the junction with PU based Expansion Joint Sealant conforming to ISO11600:2002 Type F 25LM, ASTM C920-95 Type S, Grade NS, Class 25, US Fed Spec TT-S-00230a Type II, Grade NS, Class 25 as per manufacturers' specification, etc., complete. Make: Fosroc/PIDILITE/SIKA/STP.

52.3.2 Providing and carry out waterproofing treatment to water tank using polymer modified, cementitious elastomeric coating. System includes proper surface preparation, carry out cementitious injection grouting at leakage points using Plasticised expansive grout admixture supplied in 225 gm packet, treatment of construction joints using polymer modified mortar, application of polymer modified vatta at floor-wall junction prepared by using Latex-Screed modifier cum bonding agent, filling pipe cut-outs using Non-shrink cementitious grout, pre-dampen the concrete surface, mix and apply first coat of polymer modified, cementitious elastomeric coating coverage @ 1.9 kg/m², allow the same to dry for minimum 4 hrs at 20°C and apply second coat in perpendicular direction to achieve over all 2 mm thickness, which can accommodate maximum permissible limit of crack width as per BS8007:1987, meets BS6920, WRAS requirements for potable water at 50°C, water penetration test (DIN 1048) and fire tested as per BS476 :1987 part 6 and 7, having mixed density 1950 kg/cum, provides resistance to positive water pressure (DIN 1048) - 5 Bar, resistance to negative water pressure (ITM/FTM-181) - 2 Bar and excellent UV resistance performance. Make: Fosroc/PIDILITE/SIKA/STP.

PARTICULAR SPECIFICATIONS (Contd.../-)**52.4 Protection Plaster**

52.4.1 Providing & laying 15 - 25mm THK protective plaster of C:M – 1:4 admixed with appropriate integral waterproof compound Pidiproof LW+ @ 220ml per bag of cement/ Sikacim 0.1 kg per bag of cement/ Nitobond AR Std 2-5% by weight of cement/ Shali LW+, over the waterproofing membrane for vertical & Horizontal protection including application of epoxy bonding agent conforming to ASTM C 881 and sprinkling of sand to create key for the plaster. Make: Fosroc/PIDILITE/SIKA/STP.

52.5 Protection Cum Hygiene Coat

52.5.1 Providing mixing and applying over the finished substrate using Solvent free epoxy resin coating for potable water retaining structures waterproofing lining to tanks / reservoir lining, epoxy coating specifically designed for contact with potable water. The cured film shall comply with the requirements of IS: 9833 - 1981. specifically designed to provide a tough, Solvent free & Non – toxic, Impermeable, chemical resistance, corrosion resistant film and abrasion resistant lining shall be applied over prepare substrate at a thickness of 200 microns (100 micron /coat) dry film in two coats for internal sides of tank, strictly following the Instructions as per Fosroc specifications. Make : Fosroc/PIDILITE/SIKA/STP.

52.6 WET AREAS / TOILET /KITCHEN

52.6.1 Treatment to the Pipe Outlets / Drain outlets / Cutouts: Preparing the inside surface of core and PVC /MS Pipe by roughening using suitable Sand paper to get better adhesion prior to packing works. Cleaning the surface by wire brushing followed water jet to remove any laitance or loose flaky particles. Providing necessary formwork for packing the bore using suitable arrangement (depending upon site conditions). Packing the gap using Cementitious grout upto the surface followed by sealing the top surface using Single part PU Sealant after curing provide waterproof coat at pipe cut-out reinforced with 45 gsm glass fibre mesh or equivalent mesh sandwiched in two coats of Elastomeric cementitious coating covering at junction of pipe and concrete as per instructions of manufacturer, etc., complete. Make : Fosroc/PIDILITE/SIKA/STP.

Providing and carry out waterproofing treatment to Toilets, Sunken Slabs, wet areas etc. with High performance elastomeric cementitious waterproof coatings. System includes proper surface preparation carry out cementitious injection grouting at leakage points using Plasticised expansive grout admixture supplied in 225 gm packet, treatment of construction joints using polymer modified mortar prepared by using SBR Latex, application of polymer modified vatta at floor-wall junction prepared by using SBR Latex-Screed modifier cum bonding agent, filling pipe cut-outs using -Non-shrink cementitious grout, predampen the concrete surface, mix and apply two coats of high performance elastomeric cementitious coating at coverage 12-14 sqm per pack using suitable brush or roller to achieve over all 1 mm thickness. Curing shall comply with ASTM D4060, ASTM D4541, ASTM D638, ASTM C836 and possess below properties: Mixed density: 1.68 g/cc, Adhesion to concrete-> 1 N/mm², Non-toxic, Static crack accommodation-1 mm Make: Fosroc/PIDILITE/SIKA/STP.

52.7 Vertical Protection: Supplying & laying a protective plaster at vertical portion in 12-15 mm thickness in Sand Cement mortar (1:3) admixed with integral waterproofing compound Pidiproof LW+ @ 220ml per bag of cement/ Sikacim® 0.10 kg per bag of cement/ Nitobond AR Std 2-5% by weight of cement., over the waterproofing membrane to vertical surface including application of acrylic bond coat/ epoxy bonding agent and sand sprinkling to create key to plaster, etc., complete. Make : Fosroc/PIDILITE/SIKA/STP.

52.8 Horizontal Protection & Slope :

52.8.1 For Flat Slab: Supplying & laying 50mm THK protective screed of Cement Concrete of 1:1.5:3 mix admixed with integral compound conforming to IS 2645:2003, Pidiproof LW+ @ 220ml per bag of cement/ Sikacim® 0.10 kg per bag of cement/ Conplast WL @ 125 ml per bag of cement, to provide slope to the horizontal surface towards drain outlet and also to protect the waterproofing, keeping the surface broomed, curing and testing for water tightness for 7 days etc. complete. Make : Fosroc/PIDILITE/SIKA/STP.

52.8.2 For Sunk Slab: Filling sunken portion by laying brickbat coba/AAC Block coba of 200mm thk, laid over a bed of cement mortar (1:4), including integral waterproofing admixture, Pidiproof LW+ conforming to IS 2645 @ 100 ml per bag of cement/ Sikacim® conforming to ASTM C 881- 78 , Type II , Grade 2 , Class B+C, @ 0.10 kg per bag of cement/ Conplast WL @ 125 ml per bag of cement, filling the joints in cement mortar (1:4) including integral waterproofing admixture @ 100 ml per bag of cement and finishing on top with a screed of 20 mm thick in cement mortar (1:4) including integral waterproofing admixture @ 100 ml per bag of cement, keeping the surface broomed, curing and testing for water tightness for 7 days etc. complete. Make : Fosroc/PIDILITE/SIKA/STP.

52.9 REFUGE / LMR TOP / CHAJJA / BALCONY / UTILITY AREAS

52.9.1 Treatment to the Pipe Outlets / Drain outlets / Cutouts: Preparing the inside surface of core and PVC /MS Pipe by roughening using suitable Sand paper to get better adhesion prior to

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packing works. Cleaning the surface by wire brushing followed water jet to remove any laitance or loose flaky particles. Providing necessary formwork for packing the bore using suitable arrangement (depending upon site conditions). Packing the gap using Cementitious Grout upto the surface followed by sealing the top surface using Single part Sika swell S-2/Dr Fixit Fastflex with reinforced polyster mesh/Nitoseal PU-40 PU Sealant or equivalent cementecious sealant after curing provide waterproof coat at pipe cut-out reinforced with 45 gsm glass fibre mesh sandwiched in two coats of polymer modified, cementitious elastomeric coating covering at junction of pipe and concrete as per instructions of manufacturer, etc., complete. Make: Fosroc/PIDILITE/SIKA/STP.

52.9.2 Providing and carry out waterproofing treatment to utility areas using polymer modified, cementitious elastomeric coating, Dr.Fixit Fastflex/ Sikagard®-694 F (I)/ Nitocote CM210, System includes proper surface preparation, carry out cementitious injection grouting at leakage points using Plasticised expansive grout admixture, treatment of construction joints using polymer modified mortar prepared by using SBR Latex, application of polymer modified vatta at floor-wall junction prepared by using SBR Latex-Screed modifier cum bonding agent, filling pipe cut-outs using Non-shrink cementitious grout, predampen the concrete surface, mix and apply first coat of polymer modified, cementitious elastomeric coating coverage @ 1.9 kg/m², allow the same to dry for minimum 4 hrs at 20°C and apply second coat in perpendicular direction to achieve over all 2 mm thickness, which can accommodate maximum permissible limit of crack width as per BS8007:1987,meets BS6920,WRAS requirements for potable water at 50°C, water penetration test (DIN 1048) and fire tested as per BS476 :1987 part 6 and 7, having mixed density 1950 kg/cum, provides resistance to positive water pressure (DIN 1048) - 5 Bar, resistance to negative water pressure (ITM/FTM-181) - 2 Bar and excellent UV resistance performance. Make: Fosroc/PIDILITE/SIKA/STP.

52.9.3 The water proofing membrane treatment shall be carried out by the approved applicator of the manufacturer as approved by GE.

52.10 CERTIFICATE BY SPECIALISED AGENCY

A certificate by the specialized firm, who has executed the work of water proofing treatment under this contract will be rendered to the department stating that the said work has been executed by them and shall be signed jointly with the main building contractor. This certificate however does not absolve the main contractor from his responsibility in respect of specialist work as per contract condition. The main contractor shall be responsible to ensure that the roof slab shall be water tight/leak proof during guarantee period”

52.11 Wherever junction of vertical and horizontal structures occurs a groove of size 75 x 65mm shall be formed at a height of 15 cm above roof level for tucking in edge of water proofingtreatment incase of brick wall etc. The groove shall coincide with the horizontal joint of brick course and shall be shaped with cement and sand mortar (1:3). In case of junction between RCC beam/parapet etc. PCC 1:2:4 coving with 75mm in radius shall be provided. Cost of above provision shall be deemed to include in the quoted rate against respective Items of Schedule ‘A’ Part I.

52.12 TESTING OF MEMBRANE

The following tests shall be carried out in approved Government Laboratories and necessary test reports shall be submitted to the Garrison Engineer for the materials before incorporation in the work:

- (a) Thickness of membrane
- (b) Weight of membrane
- (c) Tensile strength (Longitudinal/Crosswise)
- (d) Tear Resistance
- (e) Softening point
- (f) Weight of Carrier (Polyester)

Apart from above tests Contractor shall also produce manufacturer’s test certificate. Test certificate shall be produced with every consignment of material brought at site by the Contractor.

52.13 TEMPLATE (LABEL)

Template (Label) made of 15mm thick plaster in CM (1:3) of size 60 x 60 cm showing the following particulars shall be provided on each building before the final completion of work without any extra cost to the Department :-

- | | |
|------------------------|----------------------|
| (a) Name of Contractor | (c) CA Number |
| (b) Date of completion | (d) Guarantee period |

The above information shall be written with white paint with 5 cm size letters and numbers. The entire quantity of materials such as water proofing membrane bitumen primer, bitumen and bituminous aluminium paint etc. required for the whole work shall be brought at site in sealed position and shall be entered in the MB as ‘NOT TO BE ABSTRACTED’ showing the date, total quantity brought. Each seal shall be opened in front of Engineer-in-Charge only. Paid vouchers

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from authorized dealer shall be submitted to the Engineer-in-Charge immediately after every consignment and copy of such paid voucher shall be forwarded to Garrison Engineer by Engineer-in-Charge duly endorsed.

52.14 GUARANTEE TO BE EXECUTED BY CONTRACTOR FOR REMOVAL OF DEFECTSAFTER COMPLETION IN RESPECT OF WATER PROOFING WORKS TOROOF

(to be submitted in a `100/- non-judicial stamp paper)

This agreement madethis_____ day of_____ two thousand_____ between_____ of _____ (sonof _____) (hereinafter called guarantor on the one part) and the PRESIDENT OF INDIA (hereinafter called the Government on other part).

WHEREAS this agreement is supplementary to a contract hereinafter called the contract) dated _____ and made between the GUARANTOR of the one part and the GOVERNMENT on the other part where by the Contractor inter alia, undertook render the buildings and structures in the said contract recited completely water and leak proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to effect that the said structures will remain water leak proof for ten years from the certified date of completion.

NOW THE GUARANTOR hereby guarantees that water proofing treatment given by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be Ten years to be reckoned from the certified date of completion.

Provided that the guarantor will not be responsible for leakages caused by earthquakes or structural defects or misuse of roof and sunken floor slabs or alterations and for such purpose.

(a) Misuse of and sunken floor slabs shall mean by operation which will damage roofing treatment, like chopping of firewood and things of the same nature which might cause damage to thereof.

(b) Alteration shall mean construction of any additional storey or any part of roof or construction adjoining to existing roof, where by roofing treatment is removed in parts and removal of finishes of sunken portion of slabs.

(c) The decision of the Garrison Engineer with regard to cause of leakage shall be final and binding. During this period of guarantee the guarantor shall make good all defects and in case of any defects being found, render the building water proof and finish the disturbed surfaces as existed to the satisfaction of the Garrison Engineer at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Garrison

Engineer calling upon him to rectify the defects, failing which the work shall be got done by the department by some other Contractor at the Guarantor's risk and cost. The decision of the Garrison Engineer as to the cost, payable by the Guarantor shall be final and binding.

That if the Guarantor fails to execute the water proofing or commit breach there under then the Guarantor will indemnify the Principal and his successors against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of GUARANTOR in performance and observing of this supplementary agreement. As to the amount of loss and/or damage and/or cost incurred by the Government, the decision of the Garrison Engineer will be final and binding on the parties.

IN WITNESS THEREOF these presents have been executed bytheobligator _____ and by _____ for and on behalf of the PRESIDENT OF INDIA on the day month and year first above written.

SIGNED sealed and delivered by OBLIGATOR in the presence of:

1.

2.

SIGNED ON BEHALF OF THE PRESIDENT OF INDIA BY _____

53 RAILING FOR STAIR CASE AND BALCONY

Stainless Steel railing shall be provided at locations shown on drawings. The diameter of pipe shall be as mentioned in relevant drawings. Stainless steel hand rail shall be of grade SS-304 provided to the size / diameter mentioned therein. Make of pipe shall be 'SALEM STEEL' or equivalent as approved by the GE.

54 SPOUTS

PVC Spouts shall be of 40mm dia and 450mm long. Where length / diameter of spout are not indicated it shall be taken as passing throughout the width of parapet or facia and projecting 15cm from outer face of the wall and of 40mm dia.

55 PVC RAIN WATER PIPE Where shown on drawing rain water pipe and fittings shall be of UPVC grade 'A' to withstand continuous internal hydraulic pressure of 4kg/sqcm conforming to IS-4985, and of size 110mm dia. Pipes and fittings shall be secured to wall just below all joint with MS flat clamps embedded in cement concrete blocks 100x100x100mm in mix M-15, type BI. MS clamps

PARTICULAR SPECIFICATIONS (Contd.../-)

shall be made from 1.6mm thick sheeting of 300mm width. Pipes and fittings shall be jointed with epoxy resin or compound as recommended in manufacturers' instruction. The grating shall be of CI, round type, weighing not less than 0.5kg each, provided and fixed at the inlet of rain water pipes

56 ROLLING SHUTTERS

(a) Steel rolling shutters shall be factory made conforming to IS-6248, self coiling (push pull) type or reduction gear type (as described in clause 10.23 of MES Schedule Part-I) and shall be provided wherever indicated in the drawings.

(b) The steel rolling shutters shall be with top cover and fixed on lintel/beam as indicated on drawing. Specifications for shutters shall be as given in clause 10.23 of MES Schedule Part-I. Rolling shutters shall be of design to withstand a wind pressure of 100kg/sqm. The thickness of steel slats shall be 1mm may be fabricated with hot rolled black sheet in lieu of cold rolled as given in IS. Three number ball bearings per shutter and ratable mild steel pulleys in lieu of CI pulleys shall be provided. Hood cover shall be of 1mm thick MS sheet fixed to brackets. Thermal insulation rubber gaskets shall be provided to the sides and bottom rolling shutters wherever shown on drawings where shown on drawings rolling shutter shall be provided with the wicket door of size indicated in the drawings.

(c) Rolling shutters and fittings shall be treated with one coat of approved anticorrosive paint (shop coat of paint) before fixing and two coats of approved aluminium paint after fixing, all as specified for painting to steel surfaces in SSR Part-I.

(d) The rolling shutters shall be obtained from any of the manufactures mentioned in Appendix-'B'.

(e) For the purpose of deviation, the rates given in relevant items of SSR (Part-II) shall be applicable without any adjustment. These rates shall however be subject to contractor's percentage given in relevant section of Schedule 'A'.

57 ROAD WORK

Work shall be carried out as mentioned in Schedule 'A'. Workmanship shall be as per relevant clauses of MES Schedule Part I and as directed by Engineer.

57.1 MATERIALS

(a) Stone metal for soling (or bottoming), water bound macadam and stone chippings for premix carpet shall be of trap stone obtained from approved quarries and shall conform to the sample kept in the office of the GE as mentioned here-in-before. Stone metal for soling (or bottoming) shall be clean, sound hard. It shall be reasonably free from lamination and unsound fragment free from decay and weathered stuff. Stone metal for soling (or bottoming) shall be of crushed/broken stone. The soling (or bottoming) shall be of gauge not exceeding 80mm all as per sample kept in sample room of the GE referred here-in-before.

(b) Stone metal for WBM shall be crushed or broken stone aggregate of size ranging from 40 to 63mm as specified in grading No. B in clause No. 20.A.3.2 (2) of SSR Part-I. It shall be hard and durable and shall be free from excess of flat, elongated, soft and disintegrated particles, dirt, and other objectionable matter.

(c) Moorum / approved soil shall be used as screening in WBM. Moorum / approved soil shall be as specified in clause 20.A.7.6 of SSR Part-I. Stone chippings for premix carpet shall be as per clause 20.A.9.3 of SSR Part-I.

(d) Binder for premixed carpet including tack coat and seal coat shall be paving bitumen conforming to IS-73-2006 specification for paving bitumen (Revised). The grade of bitumen shall be VG-30.

57.2 WORKMANSHIP IN FORMATION SURFACE The formation shall be rolled and formed with 8 to 12 tonne power roller, where in filling. Rolling of formations in cutting shall be done where specifically ordered by the Engineer-in-charge.

57.3 SOLING Where soling (hard core) specified for roads, soling (or bottoming) of stone shall be provided on the prepared sub grade in conformity with lines, grade, thickness and cross section as shown on drawings or specified. The edge of soling shall be marked out by straights and shall be carried out as specified in SSR Part-I vide clause 20. A.20.1.

57.4 WATER BOUND MACADAM (WBM)

(a) Stone aggregate, screenings and binding materials or water bound macadam shall be as specified in Clause 20-A.3 of MES Schedule and conform to the samples kept in GE's office and approved by the GE before incorporation in the work. Screenings shall be of Grade 'A' as specified in Clause 20-A.3.2 of MES Schedule.

(b) Each layer of water bound macadam shall consist of 75mm thick (compacted thickness) of broken stone aggregate consolidated in one layer. Spreading, rolling, applying screening

and watering shall be as specified in Clause 20-A.21.1 to 21.13 of MES Schedule. The rolling shall be done with power roller after the application of screenings and wet rolling as described in MES Schedule.

57.5 PRIMING COAT / TACK COAT The binder used for priming coat/tack coat shall be paving bitumen as per IS: 73-2006 over surfaces as specified in respective items of Sch-`A`. The binder shall be applied uniformly with the help of pressure sprayer. For methodology of using bituminous emulsion the provision in IS-3117-2004 and IRC shall be applicable in conjunction with SSR provisions.

57.6 BITUMINOUS MACADAM AND DENSE BITUMINOUS CONCRETE

57.6.1 GENERAL

(a) Bituminous macadam work shall be carried out as per IRC Specifications for Road Work and all as specified. Tenderers must be in possession of copy of IRC specifications for Road works. Contractor shall be deemed to have fully acquainted with the provisions of IRC Specifications, nature of site, local facilities of access and all matters affecting the execution and completion of work. No extra charges consequent on misunderstanding or otherwise will be paid. A Copy of IRC Specifications shall be made available at site by Contractor along with other site documents.

(b) Incase of any variance/discrepancy in Schedule-`A`, Particular Specifications and IRC Specification, Schedule-`A` shall supersede the other provisions. Incase of any dispute in this regard, decision of the Accepting Officer shall be final and binding.

(c) The mixing of the semi dense bituminous concrete/Bituminous Macadam shall be got done in batching plant. Contractor shall inform the location of batching plant to the GE who may visit the plant to ascertain the quality control exercised at the plant before according his written approval.

(d) Quality Control and test as specified in Clause 20.B.4.9 of SSR Part I shall be exercised during execution of works in conjunction with IRC Specifications. The Contractor shall provide all facilities in the form of equipment and materials for conducting test in laboratory of the CE (Navy) Mumbai. Complete record of tests shall be maintained at site sign by Engineer-in-Charge and the Contractor. Cost of testing {when carried out in laboratory other than the CE (Navy) Mumbai laboratory} shall be borne by the Contractor.

57.7 PREPARATION AND TRANSPORTATION OF MIX

(a) Hot Mix plant of adequate capacity and capable of producing a proper and uniform quality shall be used for preparing the mix. The plant may either be of batch type for continuous one, having co coordinated set of essential units such as dryer for heating the aggregates, device for grading & batching/feeding by weight or volume the required quantities of aggregates, a binder heating/control unit for metering out the correct quantity of heated binder together with a paddle mixer for intimate mixing of the binder and aggregates. A fine feeder for incorporation of the correct quantity of filler is also a necessary auxiliary.

(b) Temperature shall be as per table given below:

TEMPERATURE CONTROL OF VARIOUS STAGES

SI No	Item of operation	Temperature
(i)	Heating temperature of bitumen	163° C to 177°C
(ii)	Temperature of binder at the time of mixing	150° C to 177°C
(iii)	Temperature of aggregate at the time of mixing	155° C to 163°C
(iv)	Temperature of mix at the time of laying	121° C to 163°C
(v)	Temperature of mix at the time of completing rolling	100°C

* At no time the difference in temperature between the aggregates and binder exceed 14°C

57.8 SPREADING

(a) The mix transported from the hot mix plant to the site shall be spread as specified in clause 20.B.4.6 of SSR 2009 (Part-I) and as specified in IRC Condition 501.5.3

(b) Longitudinal joints and edges shall be constructed true to the delineation lines parallel to the centreline of the road. Longitudinal joints shall be offset by at least 150mm from those in the binder course. All joints shall be cut vertical to the full thickness of the previously laid mix and the surface painted with hot bitumen before placing fresh pneumatic rollers.

57.9 ROLLING

(a) Immediately after the spreading of mix by paver, it shall be compacted by rolling as specified in Clause 20.B.4.7 and its sub-clauses of SSR 2009 (Part-I) and as specified in IRC Condition 501.6 & 501.7.

(b) Rolling operations shall be completed in every respect before the temperature of the mix falls below 100°C

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(c) Surface finish and quality control of work: The surface finish of construction shall conform to the requirement as per special Publication 11 of MOST.

57.10 VISCOSITY GRADE BITUMEN VG-30 AND PAVING BITUMEN

Viscosity grade bitumen VG-30 shall be as per IS: 3-2009 and paving bitumen shall be of grade as specified in relevant item of Schedule 'A' confirming to relevant IS. The Contractor shall produce original receipt/purchase vouchers and test certificates for each lot of bituminous emulsion and Viscosity grade bitumen VG-30 before claiming any payment in RAR/Final bill. Viscosity grade bitumen VG-30 and paving bitumen shall be obtained from any of the following manufactures or from their authorized dealers/stockiest as approved by the GE.

(a) Viscosity grade bitumen VG-30

57.10.a.1 Indian oil corporation ltd

57.10.a.2 BharatPetroleum

57.10.a.3 Hindustan petroleum Corporation Ltd

(b) Bituminous Emulsion

57.10.b.1 Shalimar tar products

57.10.b.2 Tikki Tar Industries

57.10.b.3 Hindustan Coals Ltd

57.10.b.4 Chennai Petroleum Corporation Ltd

57.11 ROLLING FORMATION SURFACES

(a) The formation surfaces shall be rolled to the required gradient and camber with power roller including sprinkling the surfaces with water as required.

(b) Where rolling is not feasible, prior permission of the GE shall be obtained in writing for hand ramming. The laying of the coarse aggregate shall commence only after the earth formation is approved by the GE.

(c) At all the time the formation surfaces shall be kept drained by the Contractor. The Contractor shall provide such temporary open drain as may be necessary to prevent accumulation of water from any cause whatsoever the case may be.

57.12 MOORUM FILLING IN BERMS Moorum incorporated in the work shall be brought from outside the MD land, conform to the specifications given in clause 20.A.7.6 of MES Schedule and shall be got approved from the GE. The work shall be carried out all as specified in clause 20.A.22 of MES Schedule. However, hand roller shall be used in lieu of power roller.

57.13 KERB STONES Kerb stone shall be of PCC and as mentioned in Schedule- 'A'. Workmanship shall be as per relevant clauses of MES Schedule Part-I and as directed by the Engineer-in-charge.

57.14 INTERLOCKING TYPE PAVER BLOCKS

(a) The paver block shall be of PCC M-40, 80mm thick & PCC M-35, 60mm thick [as mentioned in Sch-'A'] reflective & inter locking type factory made as per sample kept in the office of the GE. The paver block shall be brought from the manufacturer mentioned hereinafter and as approved by the GE.

(b) The paver blocks must have **high SRI coating of minimum 0.50**.

(c) The compressive strength of paver block shall be 400kg/sqcm and of colour as approved by the GE.

(d) The top layer of paver blocks shall not be less than 6 to 8mm thick and should have antiskid groove finish (vermicular finish). Paver block should have 1mm spacer to provide minimum gap between paver unit to allow joint filling sand to go in it and establish complete interlocking between blocks. Paver blocks should be lacquer coated to seal the micro porosity and give glossy finish.

(e) The paver block shall be laid dry over 50mm thick (compacted thickness) sand bedding. Joints shall be filled with sand as directed by the Engineer-in-Charge.

(f) The sand shall be free from clay and alkaline particles and conform to relevant IS.

(g) The edges of the paver block shall be neatly trimmed to fit within kerbs along the periphery of the paved area.

(h) The unit rates quoted shall be inclusive of laying of paver block of different colour for making the Anchor pattern of size 4x6m and other pattern as directed by the GE/Engineer-in-Charge.

(i) Before incorporating the paver block in the work the paver block shall be got tested for compressive strength and record maintained signed by the Contractor and the Engineer-in-Charge.

57.15 SAND CUSHIONING / FILLING

(a) Sand for filling in trenches where specified shall be free from foreign matters and shall be natural river sand from the sources approved by the GE.

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- (b) Sand shall be stacked at site before incorporation and the entire quantity of sand shall be recorded in measurement books marked suitably as 'Not to be abstracted' before incorporation and shall be signed by the Engineer-in-charge and the Contractor. Consolidated thickness of sand as specified shall be recorded for payment purpose.
- (c) Sand filling shall be done as specified in Clause 3.21.2 of SSR Part-I 2009.

58 UPVC PIPES & FITTINGS These shall be as stipulated in clause No. 11.20 of SSR Part-I.

59 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

59.1 HDPE pipes shall conform to IS 4984-1995, Specification for high density polyethylene pipes for potable water supply. The pipes shall be smooth internal and external surfaces. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible provided that the wall thickness remains within the permissible limits. HDPE pipes shall be of pressure ratings (working pressure) as indicated. The pipes shall carry colour bands to indicate class of pipes as under:

<u>Class of pipe</u>	<u>Working pressure (Mpa)</u>	<u>Colour</u>
Class 1	0.2	Orange
Class 2	0.25	Red
Class 3	0.4	Blue
Class 4	0.6	Green
Class 5	1.0	Yellow

59.2 FITTINGS TO USE WITH HDPE PIPES These shall be injection moulded or fabricated type conforming to IS 8008 (Parts I to 6)-2003, Specification for injection moulded high density polyethylene (HDPE) fittings for potable water supplies or to IS 8360 (Parts I to III)-1977, Specification for fabricated high density polyethylene fittings for potable water supplies or as recommended by the manufacturers of the pipes used.

60 CAULKING LEAD

- (a) Pig lead and wool shall comply with IS-702, 1978 specified for caulking lead. Pig lead shall be of uniform quality, clean and free from foreign materials and shall be of uniform softness and capable of being easily caulked and driven.
- (b) Lead wool shall not contain sulphur and shall not be manufactured from discarded accumulator battery plates. The lead wool shall consist of fine strands or plate ribbons of lead. The cross section of individual strand shall be flat. The dimensions in sectional plane shall not be less than 0.13mm and not more than 0.9mm and of length same as the length of rope.
- (c) Run lead joint shall be provided as per clause 18.48.2 of SSR Part-I
- (d) Spun Yarn shall be hemp and good quality. It shall be free of oil, tar or greasy substance and shall be of sterilized quality.
- (e) Rubber gasket for jointing shall comply with IS 5382-1985 specification for rubber sealing rings for gas mains, water mains and sewers. Rubber rings shall be free from extractable substance, which impart taste, smell or toxicity to water.

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62 SCAFFOLDING & SAFETY MEASURES FOR WORKING AT HEIGHTS

- 62.1** The external works to be catered at heights shall be carried out by using scaffolding and or as directed by the Engineer-in-charge. Suitable protection viz. safety belts, safety helmets, etc. shall be provided for workmen. The Contractor shall be solely responsible for all the labourers deployed for the work for identity/security. In case of any accident/injury fatal or of partial disability, the Contractor shall be solely responsible for settling all claims, compensation. Department shall have all rights to recover any sum indicated/claimed by labour commissioner/court directives. Engineer-in-charge will have to ensure that Contractor has provided all adequate safety and required means for the workmen and Contractor may get his personnel insured as per labour law. The Contractor shall ensure that his workmen working at heights shall always wear safety belts, etc. and workmen working on ground shall wear helmets.
- 62.2** Scaffolding or staging more than 3.5m above the ground or floor, swung or suspended from any overhead support or erected with stationery support shall have a guard rail properly attached, braced and otherwise secured at least 1m high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
- 62.3** Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway of the stairway is more than 3.5m above ground level they should be closely boarded, should have adequate width and should

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be suitably fenced, as described hereinbefore.

62.4 Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1m.

62.5 Safe means of access shall be provided to all working platforms and other working places.

62.6 The rates quoted are deemed to include the above provision of scaffolding and no extra shall be payable to Contractor on this account. The scaffolding shall be removed only after obtaining clearance of the Engineer-in-Charge/Garrison Engineer after considering the quality of the work undertaken.

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64 **DISMANTLING AND MAKING GOOD**

64.1 All dismantling work (except for which separate item is given in BOQ / Schedule- 'A') required for execution of work mentioned in Sch-'A' shall be deemed to be included in the rate quoted. The Contractor shall make good all disturbed surface to match with the existing specification and to the entire satisfaction of the Engineer-in-charge. All dismantled material except shown in Schedule of credit shall be property of department and shall be handed over in store yard for which no removal shall be payable.

64.2 The Contractor should take necessary precaution for dismantling to the required shape/size. Contractor without any payment shall make all excess dismantling and damages caused to existing structure good.

64.3 Rates quoted for dismantling/taking down/fixed in repair shall include cost of making good, sorting of materials, and their removal as directed by the Engineer-in-Charge.

65 **INTERNAL ELECTRIFICATION**

65.1 **GENERAL REQUIREMENTS**

(a) This installation shall strictly comply with the provisions contained in the latest edition of the Indian Electricity Rules and amended IS-732-1963. Code of practice for Electrical wiring and fittings in buildings are applicable to these works except where such regulation and rule are modified by these specifications.

(b) The position of various electrical fittings and fixtures shown on the drawings may be changed by the Engineer-in-charge at the time of execution if found necessary.

(c) All electrical work shall be executed properly by skilled licensed electricians and ITI certificate holder under the supervision of suitably qualified electrical supervisors with minimum qualification shall be degree in electrical engineering. The Contractor on demand by Engineer-in-Charge shall produce such evidence of qualification of his workmen, supervisors(s) either at the time of commencement of the work or at any time thereafter during the contract period.

(d) The run of PVC/Steel conduits shall be marked on the walls and soffit of roof / floors slabs for the wiring. Approval of the Engineer-in-Charge shall be obtained in writing before starting the works.

(e) Looping back system of wiring shall invariably be used throughout the installation.

(f) All electrical fittings and wirings shall be clear of door, windows and other openings.

(g) The main switches and controls should have the voltage of supply clearly painted on them.

(h) The phase indication (RYB) should be provided at the main incoming switches and controls.

(i) The name of functions of each distribution board shall be clearly and neatly painted on the distribution boards.

65.2 **MATERIALS AND SAMPLE BOARD**

(a) All materials unless otherwise specified shall possess ISI mark or conform to relevant IS specifications or to BSS if ISS is not available. Approval of the GE referred to in clause 19.2.1 and 19.2.2 of MES Schedule shall be in writing. Approved samples shall be labelled as such and signed both by the Contractor and the Engineer-in-charge. These shall remain in the custody of Engineer-in-charge, till final completion of work.

(b) The Contractor is deemed to have included in rates, cost of making holes/chases where required through masonry or concrete work for taking in cables/conduits and conductors, etc. and making good the same to match with existing surfaces.

65.3 **TYPE OF WIRING** The type of wiring shall be as given in relevant section of Schedule-'A', particular specifications and as directed by the Engineer-in-charge. Point wiring for light/power/fan/bell or buzzer/telephone point(s) includes all works comprising of:

(a) Supplying and fixing/drawing of copper conductor cables including surface / concealed Non

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metallic PVC conduit and fittings and accessories for carrying out wiring as specified in Schedule 'A'.

(b) Supply and fixing of suitable size sunk CI/pressed steel terminal box covered with white plastic laminated sheet to accommodate requisite switches, fan regulator(s), sockets or switch socket combination.

- 65.4 CABLES** Cable for internal wiring for light, power and sub mains shall be with copper conductor and shall be wiring in concealed non-metallic PVC conduit, steel insulated single core multi stranded copper conductor sheathed cable upto 1100volts grade conforming to IS-694.
- 65.5 FLEXIBLE CORDS TWISTED WITH COPPER CONDUCTOR** Flexible cord twin core with tinned annealed copper conductor stranded, PVC insulated, twisted together, size 23/0076.
- 65.6 PVC CONDUIT AND FITTINGS** These shall be medium grade in accordance with IS specification and make as per Appendix 'B' attached.
- 65.7 PLUG, SCREWS AND FASTNERS** All as specified in Clause 19.30 and 19.31 of MES Schedule.
- 65.8 SUNK TYPE BOXES** These shall be of cast iron or pressed steel conforming to IS-5133 (Part I) and as specified in Clause 19.38 of MES Schedule.
- 65.9 CEILING ROSE, SHADES AND BULK HEAD FITTING** These shall be as specified in Clause 19.32 and 19.34 of MES Schedule.
- 65.10 SWITCH, SOCKET OUTLETS** These shall be of Bakelite flush type 5 or 15amps multipurpose non-shuttered type conforming to relevant IS.
- 65.11 LAMP HOLDER** These shall be of brass conforming with IS-1250 and as per Clause 19.41 of MES Schedule.
- 65.12 MINIATURE CIRCUIT BREAKER/MCB DB** These shall conform to IS: 8828 and shall be housed in suitable size standard sheet metal enclosure.
- 65.13 LIGHT FITTING** These shall be as specified in Schedule 'A', Particular Specifications and as shown in drawings.
- All the internal lighting fixtures must be LED as per BOQ item rating.
 - All the ceiling & exhaust fan must be BLDC type or as per BOQ.
 - 100% of outdoor lighting fixtures (lamps + lamp housing) meet the luminous efficacy requirements i.e. at least 75 lumens/ watt

Smart metering & Monitoring

The project intends to comply with the following **extended metering** requirements for energy and water. Energy meters shall be installed at Basement parking lighting, Outdoor lighting, Lifts, common areas & Water meter at each building level, at locations water being used for Irrigation, & water used for flushing.

- 65.14 LOCATION OF VARIOUS FITTINGS** Particular attention is drawn to the neatness in appearance which is to be achieved by judicious location of light fittings, switches socket outlets and main controls etc. Due regards shall be given to doors, windows, opening, etc. in fixing the run of cables, position of fittings, control switches etc. The location of fittings, etc. shall be marked in advance on walls etc. and approved by the GE.
- 65.15 APPROVAL OF SAMPLES** Sample of all materials to be incorporated should be approved by the GE before incorporation and shall conform to relevant IS wherever applicable.
- 65.16 EARTHING AND TESTING** Earthing shall be carried out as described in IS-3043 and as per Schedule-'A' and as shown in drawing. It shall be conforming to the clause 19.137 of MES Schedule.
- 65.17 SITING ELECTRICAL EQUIPMENT** The siting of cable conduit, controls, distribution boards, fittings and accessories, etc. shall be as laid down in IS 4648 'Guide for electrical layout in building' or as directed by the EIC/ the GE.
- 65.18 SYSTEM OF WIRING** Wiring shall be carried out with PVC insulated cable and shall run as far as possible near walls, ceilings so as to be easily accessible and capable of being inspected. Power wiring shall be kept apart and shall be distinct from other wiring. Separate conduit shall be used for power wiring.
- 65.19 CONTROLS AT POINT OF ENTRANCE OF SUPPLY** These shall be a linked main switch gear with MCB on each live conductors of supply main at the point of entrance. No fuse shall be inserted in the neutral.
- 65.20 FAN REGULATORS AND CLAMPS** All ceiling fans and regulators shall be earthed effectively by means of suitable aluminium earth continuity conductors. Cost of earthing of fans and regulators/fittings (with aluminium earth continuity conductors) shall be deemed to be included in the unit rate for point wiring for fans/lights.
- 65.21 TYPE OF SWITCH BOARD** Hinged type metal boards for mounting main switch/MCCB/MCB and electric meter shall be of 16 gauge MS sheets with provision of locking arrangement and all as

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specified.

65.22 TESTING

(a) On completion of the work the entire electrical installation shall be tested by the Contractor for the following tests which shall be carried out in accordance with IEE Regulations in the presence of the Engineer-in-charge.

- (i) Continuity,
- (ii) Insulation Resistance,
- (iii) Earth Resistance,
- (iv) Any other test prescribed by Engineer-in-charge.

(b) All testing equipment/apparatus materials, labour, etc. required for above test shall be provided by the Contractor by his own expense through his sources. Works for which test results do not conform to standards will be redone by the Contractor at his own expenses.

(c) The result of aforesaid test shall be recorded jointly and signed (in triplicate) by the Contractor and the Engineer-in-charge.

65.23 The lump sum quoted for item of Schedule-`A' Part-I are deemed to include for provision of wall mounting panel board made out of 2mm thick MS sheet on angle iron frame of suitable size for mounting the kWh meters & cut-outs/ MCBs catered for the respective Blocks.

66 SEWAGE DISPOSAL Irrespective of the width of trenches for the pipes excavated, the width for the purpose of payment shall be the authorised width as defined in Clause 3.2 of MES Schedule SSR 2020. Other requirements specified hereinbefore and in the MES Schedule as applicable shall be complied with.

66.1 SEWAGE PIPE AND FITTINGS

(a) Reinforced cement concrete pipes including fittings and accessories shall conform to the specifications laid down in Clause 18.29 of the MES Schedule and shall be of class NP-3, conforming to IS:458-2003.

(b) Laying and jointing of RCC pipe shall be done all as specified in Clause 18.69 and 18.74 of MES Schedule Part-I.

(c) PCC in concrete bedding and hunching shall be of the type and mix given in relevant section of Schedule-`A'.

(d) In Schedule-`A', bedding and hunching has been catered for. However, reference shall be made to IS: 4127 (Clause 4.1, 4.2 and 4.3) and if the site conditions regarding sub soil water level and other related factors so require, adjustment for providing bedding only or completely encasing the pipe shall be made through a deviation order.

(e) Filling of spoil in trenches and ramming shall be carried out in layers not exceeding 25cm thick and surfaces left slightly proud of the adjacent ground. Surplus spoil shall be disposed of outside MD land as directed.

66.2 TESTING Drains and sewers shall be tested as per Clause 18.79 and 18.79.2 to 18.79.5 of MES Schedule Part-I.

66.3 The layout of sewage disposal services shall be approved by GE before commencement of the work. The entire work of sewage disposal shall be carried out by a licensed plumber.

67 EXTERNAL WATER SUPPLY Works under this contract shall be carried out in accordance with the drawing and these particular specifications read in conjunction with the specifications, general rules, special conditions and all preamble contained in MES Standard Schedule of Rates 2009 Part I and SSR-2020 Part-II. Where at variance the provisions in these particular specifications, shall take precedence over the aforesaid provisions in the MES Schedule. Laying of GI Pipes and Fitting and connections from existing pipe line to building/ structure shall be as specified in SSR & relevant IS.

67.1 MATERIAL All materials incorporated in this work shall conform to the relevant Indian Standard Specifications and shall be best indigenous make of reputed firm approved by the GE.

67.2 TESTING OF PIPELINES

(a) Testing of pipelines shall be carried out as stated in Clause 18.48.7 and 18.50.4 of MES Schedule 2009, Part I and result of test shall be recorded.

(b) Testing shall be carried out by the Contractor all as specified in clause No 18.54 and 18.55 of MES Schedule Part-I (2009) in the presence of Engineer-in-charge. If any fittings, specials, joints leak during testing, the same shall be replaced / rectified by the Contractor without any extra cost to the Government. The lumpsum amount quoted by the tenderers against the Schedule- `A' is deemed to include for the above provision and no extra claim will be entertained on this account.

68 EXTERNAL ELECTRIC SUPPLY**68.1 GENERAL**

(a) All tools, ladders safety equipment, etc. required to execute the work shall be provided by the Contractor nothing extra will be admissible to him for the same.

PARTICULAR SPECIFICATIONS (Contd.../-)

(b) All the work mentioned in Sch- 'A' shall be carried out by properly skilled electricians holding valid license under the supervision of a qualified supervisor. All repair work shall be done to the entire satisfaction of the Engineer-in-charge and in case of any discrepancy, decision of the Accepting Officer shall be final and binding.

(c) The entire electrical work under this contract shall be carried out in compliance with these specifications and in conformity with the provisions contained in Indian Electricity Act 1948 & Indian Electricity Rules 1956.

(d) The works concerned shall be carried out through a licensed electrician/wireman. The Contractor shall produce such license when required by the GE.

68.2 PRECAUTIONS

(a) All safety precautions shall be taken by the Contractor to prevent danger to persons working on over headlines.

(b) The Contractor/his workmen shall not start work on the overhead electric line or on electric equipment unless he obtained proper shut down and unless he/they are reasonably satisfied that there is no danger to the life of workmen.

(c) The Contractor shall be responsible for providing all necessary safety equipment to his workmen to avoid accidents. In case of accidents the department will not be held responsible.

(d) The layout for external cabling shall be as indicated and as approved by the Engineer-in-charge.

(e) The entire work shall be carried out as specified in Indian Electricity Rules and regulations, ISS and MES Schedule

69 FEEDER PILLARS /PANELS

69.1 Feeder pillars or panel boards shall be fabricated out of CRCA of gauge / thickness as indicated in items duly treated to make it rust proof and finished in even baked powder coated paint

69.2 The feeder shall be dust proof and vermin proof in construction and factory made.

69.3 The feeder shall have earth terminals one on each end. GI earth strips of size of 50x6mm shall be provided at the back for the full length of the panel, cost of which shall be included in the feeder.

69.4 The bus bar shall be of electrolytic aluminium and will be completely enclosed by heat shrinkable PVC sleeves. Care should be taken to ensure that air is not rapped inside it.

69.5 Joints in the bus bar shall be with doubled fishplates having minimum two bolts and nuts on either side of the butt joint.

69.6 Minimum spacing as stated below shall be maintained:

- a) Phase to phase - 26mm
- b) Phase to neutral - 26mm
- c) Phase to earth - 26mm
- d) Neutral to earth - 19mm

69.7 The panel shall be air ventilated, dust, damp and vermin proof having continuous welding at joints.

69.8 Only neoprene gaskets shall be used at all joints adjacent section for doors/covers etc.

69.9 Inside area of the panel shall also be treated with anti-rust chemical and painted.

69.10 Thimbles of make M/s Dowells / M/s Axis M/s Indiana M/s Jaipuria shall only be used. Copper lugs for copper wires and aluminium lugs for aluminium wires shall be used and shall be of make M/s Dowells / M/s Axis M/s Indiana M/s Jaipuria.

69.11 The bus bar shall be supported on SMC supports.

69.12 All the hardware shall be zinc coated.

69.13 The compartmentalization between various/different feeders shall be achieved by using sheet steel partitions. There shall be complete partitioning between bus bars cable alleys and capacitors bank enclosures.

69.14 All voltmeter shall be flush mounted type and square in shape conforming to IS-1248 for accuracy.

69.15 LED cluster type ON/OFF indicators lamps shall be provided suitable for operation 230volts A/C supply lamps shall be provided with ON/OFF toggle switch as a control.

69.16 Small panel instrument wiring shall be done neatly and bunched effectively for easy identification. Complete wiring diagram shall be submitted for approval before manufacturing the panel.

69.17 The outgoing feeders as well as incoming feeders shall have clear identity mark in white paint on their respective covers. Similarly, indication for these feeders shall be given in bus bars and cables alley cambers for termination of cables.

PARTICULAR SPECIFICATIONS (Contd.../-)

- 69.18** A guarantee of Two years (defects liability period) from the date of commissioning of feeder panels shall be furnished by the Contractors against all sort of manufacturing defects and malfunctions of the system.
- 69.19** Inscription plates of anodized aluminium acrylic for individual feeder shall be provided
- 69.20** Power and control terminals shall be segregated power terminals shall be stud type and controls terminals shall be clip on type.
- 69.21** **MATERIALS** LT cables shall be XLPE insulated armoured and PVC sheathed heavyduty 1100V grade with multi-stranded aluminium conductor. LT cable shall be conforming to IS: 7098 Part-I.
- 69.22** **WORKMANSHIP** The entire work shall be carried out as specified in Indian Electricity Rules and regulations, ISS and MES Schedule.
- 69.23** **LAYING OF CABLE** Laying of underground cable shall conform to Clause 19.72 to 19.86 of SSR Part I.
- 69.24** **GI PIPE LIGHT GRADE** GI tubing and fittings shall be galvanised and conforming to IS: 1239 (Part-II). Pipes for drawing cables shall be all as described in Schedule-'A'.

70 **PANEL BOARD**

(a) The panel board shall be of size as specified in the Schedule 'A' including provision of the necessary materials and arrangements provide these accessories in the indoor panel board. The outdoor panel shall be made with 3.15mm thick CRCA sheet & shall be factory made with 2mm thick CRCA Sheet. Panel shall be provided with front and back hinged door with handle and locking arrangement. Panel shall be of size mentioned in Schedule- 'A' with 2 coats of synthetic enamel paint over one coat of red oxide primer after degreasing de-rusting. Acid Alkali cleaning and ample space between MCCBs/MCBs/other equipment's shall be given as per standard engineering practice.

(b) All connections from the bus bar to various outgoing controls inside the panel shall be given with adequate size of copper insulated cables with necessary crimping lugs. All live parts shall be shrouded with insulating materials. Each phase and neutral will be insulated with colour code tapes. The panel shall be mounted in wall/floor as directed with necessary foundation, etc. in mounted in floor. Necessary provision for 2Nos. earthing shall be given on the panel. Adequate locking arrangement shall also be provided. The makes of ACBs and MCBs with its enclosures shall be as mentioned in Schedule- 'A'. These shall be fitted flush with panel with front open (Compartment) type covers hinged type for each control for facilitating easy maintenance. Adequate space shall be provided in between the controls. Necessary drawing/layout of panels controls shall be given by the Contractor and shall be got approved from GE before ordering the same. The panel shall be tested as per IE Rules. Necessary nameplate identifying the controls shall be engraved on brass sheet and fitted in front of each panel.

71. **TESTS**

On completion of the installation, the resistance to earth of the whole installation and of each earth terminations shall be measured and the electrical continuity of all conductors, bonds and joints and their mechanical condition verified. The method of measuring resistance shall be as indicated in Appendix 'A' IS-2309. The ohmic resistance of the lightning conductor system shall be complete with air terminations but without the earth connection shall be a fraction of Ohm and in any case it should not exceed 1 Ohm. For this purpose, a continuous current of about 10 Amps shall be passed through the portion of the system under test and the resistance verified against its calculated value. Suitable precision tests for this purpose shall be used by the contractor. For this test the system may be divided into convenient sections at testing points by suitable joints. A test certificate for buildings as per Appendix- 'F' on IS-2309 of 1969 shall be rendered jointly signed by the Contractor and the Engineer-in-charge.

- 72.** **ALUMINIUM CONDUCTOR** Aluminium wire, rod and strips shall be at least 99percent pure of sufficient mechanical strength and effectively protected against corrosion. Aluminium should not be used underground and in direct contact with walls.

73. **APPOINTMENT OF SPECIALIST VENDOR FOR FIRE PROTECTION WORKS**

The Contractor shall appoint the Specialist Vendor for Fire Protection Works on the basis of the following criteria :

- (a) The Fire Fighting vendor should have executed Hydrant System works whose value should exceed the amount quoted by the Contractor for this project.
- (b) The Contractor will quote as per specialist vendor and ensure that the tender is submitted in proper manner.

74. **SAND CUSHIONING /FILLING**

- 74.1** Sand for filling in trenches shall be free from foreign matters and shall be natural river sand from

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the sources approved by the GE.

74.2 Sand shall be stacked at site before incorporation and the entire quantity of sand shall be recorded in measurement books marked suitably as 'Not to be abstracted' before incorporation and shall be signed by the Engineer-in-charge and the Contractor. Consolidated thickness of sand as specified shall be recorded for payment purpose.

74.3 Sand cushion shall be done as specified in clause 19.75 of SSR Part-I.

75. PRECAST CONCRETE CABLE COVERS

75.1 Pre-cast concrete cable covers shall comply with IS-5820-1970 specifications for pre-cast concrete cable covers and shall be of class and type as indicated in Sch- 'A'.

75.2 PCC cable covers shall be staked at site before use in work. PCC cable covers shall be passed by the Engineer-in-charge for incorporation in the work and shall be got approved by the Garrison Engineer. The entire quantity of covers shall be recorded in the MBs 'Not to be abstracted' before incorporation and shall be signed by the Engineer-in-charge and the Contractor.

75.3 These shall be factory fabricated and made as per procedure given in IS.

75.4 Covers shall be got tested for transverse strength to the expense of the Contractor from a recognized Govt lab or as specified in Appendix- 'D'.

75.5 PCC Cable cover shall be provided as specified in Schedule-'A' and as per SSR Part-I 2009 clause 19.20.

76. GUARD WIRES AND EARTH WIRE

Guard wire shall be of GI all as specified in clause 19.11.1 and 19.11.2 of SSR Part-I 2009.

77. GI OCTAGONAL POLES

i) Poles used in the work shall be as given in Sch 'A'. The poles (mast and pole shaft) shall conform to IS-5986.

ii) Galvanisation of poles shall be as per IS-4759/2629.

iii) Foundation of poles shall be as per IS-2062.

iv) Base plate shall be as per IS-2062.

78. EARTHING

78.1 Refer clause 19.137 to 19.145 of MES Schedule (Part-I) and electrical plate No. 3 MES Schedule (Part-I).

78.2 The Contractor shall execute installation of earth plate in the presence of the Engineer-in- Charge. Charcoal dust and salt and return filling shall be done in layers not exceeding 20cm depth, properly watered and rammed. Surplus spoil shall be carted away to a distance not exceeding 50m and the site left clean and tidy.

78.3 No earth pit shall be made within 2m of a wall or foundation. Efforts shall be made to locate them in grass or near flower beds or water taps and or as directed by the Engineer-in-charge. The distance between two earthing pits shall be at least 2m.

78.4 TESTING

78.4.1 TESTING OF EARTH CONTINUITY

The earth continuity conductor metal conduits shall be tested for electric continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed 1.00Ohm. The record sheets shall be signed by the Contractor and the Engineer-in-Charge.

78.4.2 TESTING POLARITY OF SWITCHES In a two wire installation, a test shall be made to verify that all switches in every circuit have been fitted in the same conductor throughout and such conductor shall be labelled or marked for connection to the phase conductor.

78.4.3 INSULATION TEST OF WIRING On completion of installation, the insulation resistance of wiring shall be measured as specified in clause 19.146.1 of MES Schedule 2009, Part-I. The insulation resistance & earth should be not less than 25mega Ohms divided by the number of outlets for PVC insulated cables. The records of test shall be signed by the Contractor and the Engineer-in-Charge.

78.4.4 Three copies of test result shall be submitted by the Contractor. In case the earth result does not fall within the specified limit as mentioned in IS/IE rules, the Contractor shall dig earth pit beyond 2.5m deep to obtain the desired earth results at his own cost. All testing instruments labour, materials and incidentals necessary to conduct the tests shall be arranged by the Contractor at his own cost.

PARTICULAR SPECIFICATIONS (Contd.../-)**79. LIFTS**

79.1 Scope This specification covers the technical requirements of design, manufacture, testing at work, delivery in well packed condition to site, installation, testing and commissioning of lifts.

79.2 GENERAL The work shall be carried out in accordance with local / state / municipal rules for electric lifts and the codes of practice for installation, operation and maintenance of electric lifts as per Indian Standard. In case of any discrepancy of specifications between the state acts, the superior specifications shall be adopted.

79.3 PERMITS AND INSPECTIONS The Contractor shall obtain approval of all necessary local /state/ Central Government authorities as the case may be and make arrangements for inspection and tests required thereby.

79.4 DRAWINGS

79.4.1 The lift well and other details are shown in the architectural drawings. The tenderer is advised to go through these and satisfy himself as to the adequacy of the provisions with respect to IS specifications / local / state rules / his requirements. However, if any changes to the structures are considered necessary by him, he shall specify them in his tender so that the owner can undertake necessary corrective work. Any change in structures, if not notified in his tender by the Contractor, but considered necessary for proper installation and working of lift, shall be executed by Contractor at no extra cost. Drawings showing general arrangements of lifts offered by the tender will be approved by the owner.

79.4.2 The tenderer shall submit full dimensioned working drawings of equipment offered together with detailed technical specifications thereof and illustrative and descriptive literature to enable full technical appreciation of the offer. The tender shall also submit drawings showing foundation details of equipment, layout of plant / equipment / accessories and electrical wiring diagrams.

79.4.3 The tenderer is advised to check the relevant dimensions of the lift wells at site for the purpose of tallying with those indicated on drawings. Any minor variation required in the overall dimensions to suit the actual dimensions at site shall be done by the lift contractor without any price adjustment.

79.5 GUARANTEE The tenderer shall submit the tender to suit overall specifications given in the tender and shall guarantee that materials and workmanship of the lift and connected equipment offered and installed by him under the contract are new / first class in every respect and he will make good any defects, damage which are not attributed to normal wear and tear or misuse and will be responsible for repairing / replacing any parts which are rendered defective within two years after the date of completion. He will produce test and inspection certificates for machine, motors, governors, controllers, motor generating sets, ropes buffers in triplicate, which are incorporated in the lifts, of having passed necessary tests required under Indian Standard. He will also produce high voltage test certificates of dielectric of electric apparatus as required as per Indian Standard.

79.6 PAINTING All exposed metal work (except aluminium or aluminium alloy) carried out under particular specifications shall be properly painted with two coats of approved enamelled paint over a coat of primer and wooden portions shall be given necessary preservation in hidden surfaces and two coats of varnish in exposed surfaces to produce a smooth glossy surface.

79.7 MAINTENANCE AND TRAINING Maintenance services for the equipment furnished under particular specification shall be provided by the contractor without any extra cost for a period of 24 months after the certified dates of completion. The maintenance service shall mean regular examination of lifts installed as needed or as directed by the owner and shall include necessary adjustments, greasing oiling, repair and replacement of major or minor parts rendered defective due to any reason with new genuine standard parts so as to keep the equipment in proper operation.

79.8 TEST INSTRUCTIONS All equipment / instruments for testing of the lifts shall be arranged by the Contractor. This will remain his property after the tests are over.

79.9 CIVIL WORKS

79.9.1 The tenderer shall include in his unit rates of items of Schedule- 'A' of tender, the cost of the following works:

(a) Foundation of plant / machinery and equipment including steel channels, RCC platform in the pits for buffers.

(b) Cutting holes in walls, floors etc. and making good to match the existing surface of walls, floors etc.

(c) Supplying and fixing necessary grouting bolts, nuts washers etc. adequate size required for fixing guides, brackets, etc. in the walls of lifts wells / pits / Compact rooms etc.

(d) Supply and fixing necessary ladder or steel rungs of adequate size and strength for access inside the lift pits and making good the surfaces of walls, floors, etc. of lift pits to match the existing surface.

79.9.2 All items of steel shall be procured by the contractor from market under his own arrangements the steel items procured by him shall be of tested quality and conforming to respective standard

PARTICULAR SPECIFICATIONS (Contd.../-)

specifications, code of practice as per Indian Standard.

79.10 INSTRUCTION BOOK & CATELOGUES

79.10.1 The tender shall submit the follow literature:

- (i) With tender : Two sets of complete literature giving technical information of components/parts of the equipment offered for each type of lift.
- (ii) After acceptance of tender : The tenderer shall submit after acceptance of tender four sets of the following for each type of lift.
 - (a) Manufacturer's instructions Book for case, maintenance & operation of the equipment.
 - (b) Complete literature giving technical information of all components / parts of the equipment offered (as desired by the Accepting Officer).
 - (c) Maintenance check chart, lubrication chart, schematic wiring diagram from MES control switch and relays / switches in hoist way / landing door etc.

79.11 SCAFFOLDING The Contractor shall make his own arrangements of scaffolding required for the erection of the lifts which shall be removed by the contractor after completion of work.

79.12 WORK TO BE DONE BY THE CONTRACTOR The following items of work required in connection with the installation of lifts shall be provided by the Contractor:

- (a) Lift wells properly framed and enclosed including pits of proper depth with drains and water proofing as required. The lift wells and pit walls shall be treated and painted to minimize accumulation and circulation of dust.
- (b) Properly lighted, well ventilated with thermostatically controlled exhaust fan and fire proof machine rooms including floors, access door and ceiling treated and painted to minimize accumulation of dust. The tender shall provide cut outs, cable channels and pockets for grouting bolts required lifts well slabs.
- (c) One MCB, as required, of suitable capacity at ground floor will be provided by the contractor for further wiring to the machinery, controls panels including main switch on controller.
- (d) Cill support projections on all floor landings architrave's at all landing and facias.
- (e) Illumination of lift shaft and pit shall be done by providing 15W LED corresponding to each floor level.

79.13 DESIGN STANDARDS, INTER CHANGEABILITY OF PARTS AND COMPLETION OF INSTALLATION

79.13.1 All materials, plants, equipment, apparatus and lift cars to be incorporated in the lift system shall conform to the highest standard and latest practice in design and manufacturer and shall be of robust construction liberally rated and capable of operating efficiently and economically under the stipulated service conditions.

79.13.2 Cost of all elements of installation, plant, equipment, apparatus and accessories, fittings and fixtures, electric works of every nature from the outgoing terminal of distribution boards in particular specification but are required and notified by the Engineer in charge for efficient operation and performance of the installation shall be deemed to be covered in the tendered rates.

79.14 PROTECTION AGAINST FIRE ACCIDENTS

- (a) Whole of the contained equipment and apparatus in the lift wells shall be rendered fire resisting to the greatest possible extent.
- (b) When the car rests on its fully compressed buffer, no part of the car or any equipment attached thereto shall strike any part of the pit or any part of the equipment located therein.

79.15 MISCELLANEOUS WORKS The tenderer shall include in his quotation the cost of all civil and miscellaneous works including:

- (a) All works related to the erection, testing and commissioning of the installations including two years' maintenance period.
- (b) Scaffolding as required during installation.
- (c) Any building work in the hoist way including making good to original finish, providing and fixing brackets, supports, beams etc. and final grouting of various items.
- (d) Conduit / trough work from compact machine rooms to various floors for control system and indicator wiring system etc.
- (e) Any temporary electric wiring and power connection, if required during installations, shall be the Contractor's responsibility, who will ensure that it conforms to requirements of the IE Act and rules and fulfils safety requirements.

PARTICULAR SPECIFICATIONS (Contd.../-)

(f) Necessary wiring for the alarm bell.

(g) All tools & tackles, equipment / appliances required for erection.

79.16 MACHINE LOCATION & LIFTS WELLS The lift machine shall be installed over lift car as per manufacturer's details specification, if any minor changes are considered necessary for the installation of equipment in the compact machine room and lift wells, the same shall be clearly got approved from the GE before execution of work and brought out at the time of submission of the tenders. The compact machine room is not to be air conditioned.

79.17 VIBRATIONS The system provided shall have vibration free and noiseless elevator movement. The reduce vibration, pads of proper density shall be provided to efficiently insulate the machine from supporting beams and floor slabs.

79.18 MACHINE

79.18.1 The elevator machine shall be squirrel cage type induction motor having high starting torque protected by means of thermister embedded in the stator winding complete with electronically controlled continuous speed monitoring and precision control for acceleration, deceleration and stopping all as integrated matching system to give excellent riding comfort. The motor shall be provided with class 'F' insulation with temperature rise limited to that of class 'B'. The machine shall include electromagnetic brake, steel work, bronze gear, steel sheave shaft and sheave all compactly moulded in base of bed plate.

79.18.2 The driving sheave shall be grooved to ensure sufficient traction and minimize rope wear. Adequate means of lubrication shall be provided for all bearings and work gear. The machine shall be equipped with an arrangement for manual winding of the machine for testing purposes or for operation when the power supply fails.

79.19 POWER SYSTEM The elevator induction motor shall be powered by a bank of thyristor working on three phase AC power supply. The thyristor bank shall be provided such that it shall have separate thyristor units for driving the machine motor and braking of the machine motor. Digital speed back from velocity transducer shall be provided for improved levelling accuracy.

79.20 VELOCITY TRANSDUCER A velocity transducer shall be provided to sense the elevator speed data and convert it into digital pulse. This velocity transducer (Pulse generator shall have closed lock system with a microprocessor to run machine motor and regulate it closest to the ideal speed curve.

79.21 POSITION OF TRANSDUCER Lift car shall be provided with a magnetic sensor to generate and feed the control unit the correct floor location data. The data so provided shall be taken as reference position to establish the precise position of lift car for levelling to ensure safety and correct floor location data. The data so provided shall be taken as reference position to establish the precise position of lift car for levelling to ensure safety and correct opening and closing of the lift car doors.

79.22 MOTOR CONTROL UNIT The motor control unit shall have provision to control the 3 phase AC voltage of thyristor bank to precisely regulate motor speed. The motor control unit shall ensure that the torque generated by the motor conform to the requirement of ideal speed curve. The motor control unit shall have a real time frame reference and shall control the firing angle of the thyristor to provide precision and riding comfort.

79.23 MICROCOMPUTER

(a) A microcomputer system shall be provided with EPROM (Erasable Programmable Read Only Memory) chips and RAM (Random Access Memory) chips. The microcomputer shall have provision to reprogram it through EPROM chips to meet future traffic demands.

(b) The microcomputer shall have input from shaft switches, Car calls, hall calls, machine motors, velocity transducer and position transducer. It shall have provision to process these simultaneous inputs at a very rapid rate and give command to motor control unit to start, accelerate, full speed run, decelerate and stop the elevator.

(c) The microcomputer shall compute in real time the speed of elevator, its position, distance travelled and will compare these input with the pre-programme data available with EPROM chips and correct the deviation, if any, immediately and to give a smooth riding in.

(d) The microcomputer shall also receive inputs and shall continuously monitor the elevator car sub system such as doors, brakes and machine motor accessories at every instant to ensure almost safety and efficient handling of passengers.

79.24 BRAKES The electromagnetic brakes mounted on the motor and gear shall work on rectified DC supply. The brakes shall be fitted, with self-aligning shoes and operated on power release principle to ensure safety, if the power supply fails. The tenderer shall specify the make of the rectifier and the arrangement of DC supply. The brakes shall design to provide smooth stops under variable loads.

79.25 **SHEAVES AND SUPPORTING BEAMS**

79.25.1 Reflector and overhead sheaves with their steel supporting beam shall be provided as needed for obtaining the proper load of the ropes to the car and counter weights. All sheaves shall be fixed by means of two sunk keys of sufficient strength and quality Drums and pulleys shall be of cast iron or steel. These shall have machine top machine rope and pulleys shall be of cast iron or steel. They shall have machine top machine rope grooves and shall be provided with suitable flanges. The grooving of drum diverts sheaves or pulley shall have radius of the rope but not less than it extends over at least one third of the circumstance of the ropes.

79.26 **SHAFT FILLETS & KEYS** A fillet shall be provided at every point of change of diameter of the machine shafts and sheave shaft to prevent excessive stress concentrations in the shaft which transmit torque with tight fitting keys.

79.27 **BUFFERS** Suitable spring buffers shall be provided for car and counter weight as required under Indian Standard. The mode of mounting of buffers i.e., RCC in the Block / any other steel work shall be included in the unit rate of item in Schedule-‘A’.

79.28 **COUNTER WEIGHT** The counter weight shall consist of cast iron weights and contained in rigid steel frame and shall be equal to the weight of the elevator car plus approximately 45% of the capacity specified. Specification as given in the relevant IS should be compiled with.

79.29 **COUNTER WEIGHT GUARD** The Contractor shall provide and install expanded metal counter weight guard of required length at the bottom of the hoistway.

79.30 **ROPES** The hoist ropes shall be traction steel of suitable size, construction and number to ensure the proper operation of elevator and shall give satisfactory wearing qualities. The governor ropes shall be of steel. All ropes shall consist of the least six strands wound about a hemp core. The factor of safety shall be a given in Indian Standard. No part of counter weight ropes shall be repaired or lengthened by splicing. Fixing arrangement shall conform to relevant IS.

79.31 **AUTOMATIC TERMINAL STOP**

(a) The elevator shall be equipped with an automatic stopping device arranged to bring the car to a stop at the terminal landings, independent of the regular operating device. Final limit switches shall be so provided in the hoist way operated by the car and so arranged as to stop the car and prevent its normal operation should it travel beyond the zone of the normal stopping device.

(b) All the elevators shall be provided with micro-self-levelling feature that shall automatically bring the car to the floor landings. This micro-self-levelling device shall, within its zone, be entirely correct for over travel or under travel and rope stretch.

79.32 **ALARM BELL** Battery operated alarm bell located at the main floor landing adjustment to the hoist way shall be solid state siren type operated by push button in car operating panel including wiring and batteries of suitable capacities and number to give a waxing and warning sound when alarm button in the car is pressed momentarily. The duration shall be between 25 to 30 seconds. The Battery shall be re-chargeable type, with charging circuit incorporated to keep the Battery fully operational at all times.

79.33 **CAR AND CAR FRAME**

79.33.1 The internal dimensions of the lift car shall be if suitable size of the specified load and in accordance with statutory requirements. The inside car measurement shall be based on lift well dimensions shown in drawing forming part of contract.

79.33.2 The lift shall be of metal construction with stainless steel finish inside. The metal sheet used for construction shall be adequate thickness and not less than 1.6mm thick (16 gauge). The floor of the lift car shall be sufficiently strong and rigid and covered with marble light grey flooring of not less than 20mm thickness, over suitable structural steel frame.

79.33.3 The car enclosure for the lifts shall be of stainless steel and shall be of an elegant design comprising of the following:

- | | | |
|---------------------------------------|---|--|
| (i) Ceiling | - | Stainless steel |
| (ii) Lighting | - | LED ceiling fitting as per OEM recommendation. |
| (iii) Ventilation | - | Concealed exhaust fan or pressure type fan grill in suspended ceiling. |
| (iv) Flooring | - | Aluminium chequered plate 5mm thick |
| (v) Panels | - | Stainless steel. |
| (vi) Car Door (on one side of car) | - | The car entrance shall be provided with automatic centre opening stainless steel sliding door. |
| (vii) Hoistway door (at each landing) | - | Door shall be automatic centre opening stainless steel sliding door. |

79.34 **SIGNAL AND OPERATING FIXTURE & FITTINGS** Following signal and operating fixtures shall be provided with stainless steel finish face in the lifts:

PARTICULAR SPECIFICATIONS (Contd.../-)

- (a) Combined Luminous hall buttons with seven segment digital hall position indicator on all floors.
- (b) Seven segment digital car position indicator in the car.
- (c) Inter phone shall have master unit in machine room, one master unit in control room and one slave unit in elevator car. The inter-phone system shall have a rechargeable battery backup system in case of main power failure.
- (d) Battery operated alarm bells and emergency light.
- (e) Car direction indicator in car.
- (f) Fireman switch: A toggle switch covered by a glass cover shall be provided on ground floor for each elevator. It shall facilitate the lift to stop at the ground floor with the door open to permit the fireman to have exclusive use of the elevator without any interference from the landing calls.
- (g) A key operated switch in each car to be operated by an attendant.
- (h) A 'non-stop' button for the purpose of by-passing landing calls for emergency use but the landing calls shall however, remain registered till they are answered.
- (j) Overload warning- Over load warning feature with audio visual indication (visual indication shall show 'OVERLOADED') with stainless face plate shall be installed in the elevator car so that when there is overload in the car the sign shall lit up a flashing light indicating 'OVERLOAD' and buzzer shall operate during this period and the elevator doors shall remain open until the overload is removed.
- (k) Provision of cross flow rectangular (low noise / mild air flow) fan of approved make.
- (l) A multi beam full length infra-red door sensor (minimum- 32) should be provided.
- (m) Extra cover in travelling cable for customer smoke detectors should be provided.
- (n) Back ground music speaker should be provided.

79.35 Each lift car shall be provided with one specification plate showing rated load.

79.36 **GOVERNOR**

The governor shall be placed where they cannot be struck by the lift car or counter weight in the event of over run. Governor for car safety gears shall be adjusted to actuate the safety gear at the following rated speed as mentioned in Indian Standard.

- (a) For rated speed up to 1.5m/second maximum governor tripping speed shall be either 140% of rated speed or 0.88m/second whichever is higher. For rated speed above 1.5 m/second maximum governor tripping speed shall be 115% of the rated speed plus 0.25 m/second.
- (b) Minimum governor tripping speed shall be 115% of the speed.

79.37 **EMERGENCY SAFETY DEVICES**

Every lift suspended by wire ropes shall be provided with one more safety device, attached to the lift car frame placed beneath the car. The safety device shall be capable of stopping and sustaining the lift car with full rated load in the car at tripping speed. Safety gear shall operate to stop and sustain the lift car in the event of lift exceeding a predetermined maximum speed in the descending direction when a speed governor is fitted. Every safety gear shall operate positively and mechanically independent of any springs used in its construction. Design will conform to Indian Standard.

79.38 **GUIDES**

Car and counter weight guides shall be of rigid steel in all the cases. 'T' sections shall be used continuous throughout the entire length and shall be provided with steel bracket or equivalent fixing of such design and spacing that the guide shall not deflect more than 5mm under normal operation. Guides shall be arranged to withstand the action of the safety gear when stopping a counter weight or fully loaded car. Guides shall be of such length that it shall not be possible for any of the car or counter weight to run off the guides. Mechanized 'T' section shall be provided for guides as per Indian Standard.

79.39 **GUIDE SHOES**

Guides shall be spring-loaded and shall be of phosphorous bronze or cast iron of adequate length and shaped to fit in the guide.

79.40 **CAR ENTRANCE CAR DOORS & LANDING DOORS**

Entrance to the lift car shall be one side only as shown in the drawings.

- (a) Car Door: The car entrance shall be protected by Central Opening Stainless Steel Sliding Door.
- (b) Hoist Way: At each landing centre opening stainless steel sliding door.

79.41 **BLANK**

PARTICULAR SPECIFICATIONS (Contd.../-)**79.42 ELECTRO-MECHANICAL HOISTWAY, CAR DOORINTER-LOCKS**

Each landing door shall be equipped with a positive electro mechanical inter lock auxiliary door closing device so that the lift car can only be operated after the inter locks are established. The inter locks shall also prevent the opening of the doors except at the landing where the car has stopped.

79.43 PROTECTIVE DEVICE

(a) A protective device / safety shoe shall extend to the full height of the door and project beyond front edge of the car door so that any person or object coming in contact with door while entering the doors, shall return to their original positions. Where the doors of the centre opening type are used, there will be two safety shoes one on each side. Reversal of the doors shall also be accomplished by pressing the (OPEN DOOR) buttons in the car operating panel.

(b) An air cord drive or other suitable arrangement shall be used to transmit motion from one door panel to the other.

(c) Sheave type hanger tied with suitable sound reducing materials and tracks shall be provided for car doors and landing doors. Sheaves and rollers shall be of steel and adjustment ball bearing rollers shall take the up thrust of the doors. Tracks shall be of cold drawn steel of heavy section with surface shaped in conformity to thread of hangers / sheaves and rollers.

79.44 INDICATOR AT LANDING

Indication lamps showing registration of calls made are to be provided at the landings, in addition to indication lamps, illuminated direction showing the directional movement of the cars and the positions shall be fitted at the landings. All face plates for operating and signal fixtures shall be provided in attractive stainless-steel plate.

79.45 POWER CONTROLLER UNIT

(a) The Power Controller Unit of latest improved design comprising main circuit breaker shall be with adjustable overload release, phases and phases failure and reverse phase relays etc. as per design and operational requirement of lifts.

(b) The controller shall be located in the control room and shall be suitable for the control system and facilities required in car and landings as detailed in particular specifications. All control wiring shall be suitable secured and conform to standard wiring practice. Ferrule of insulation materials shall be stamped on all terminations with identification letters or numerals corresponding to wiring diagram to be supplied by the contractor.

(c) Inspector's change over switch and a set of test buttons shall be provided at a suitable place. Operation of the inspector's change over switch shall make both the car and landing buttons in-operative and permit lift to be worked from the inspector switch in either direction for the purpose of testing.

(d) All central circuits shall be fused with HRC fuses or otherwise protected against faults or overloads independently of the main circuits.

(e) The interruption of the electric circuit shall stop and / or shall prevent the movement of car.

(f) The controller unit and operating device shall be provided according to best elevator practice and employing with the applicable Indian standards as adopted by BIS.

79.46 LIFT CONTROL**79.46.1 AUTOMATIC SIMPLEX UNIT AND OPERATING / COLLECTIVE PUSH BUTTONS MICROPROCESSOR BASED OPERATION WITH / WITHOUT ATTENDANT**

(a) The operation of the elevators shall be simply selective collective automatic push buttons, as per IS code. In the car, each landings level will be serviced by up and down buttons at the landings wherein the calls are registered by momentary actuation of the landing buttons made in order in which the landings are reached in each direction of travel after the buttons have been actuated.

(b) With this type of operation 'UP' landing calls are answered when the car is travelling in the 'UP' direction and all 'DOWN' landing calls are answered when the car is travelling in 'DOWN' direction except in the case of the upper most and lower most calls which are answered as soon they are reached irrespective of direction of travel.

(c) After the lift car stops at a landing in response to a call or landing call, the car will remain in operative from the landing buttons for a predetermined interval to allow car passenger to leave or landing passenger to enter and register his calls.

79.47 CAR OPERATING PANEL The car operating panel shall be flush mounted in the car enclosure and shall contain the following:

(a) A bank of buttons to correspond to the various landing levels served.

(b) An emergency stops push buttons for stopping the car independently of the regular operating device.

PARTICULAR SPECIFICATIONS (Contd.../-)

- (c) An alarm push buttons connection to an alarm bell located at the main floor landing outside of and adjustment to the hoistway.
- (d) A switch for the car fan.
- (e) A door open button for reversing the doors while closing.
- (f) A switch for operating fluorescent light inside the car.

79.48 ATTENDANT OPERATION

- (a) With attendant, operation shall be furnished in connection with selective / collective automatic operation specified.
- (b) The attendant shall press buttons in the car operating panel corresponding to the floors desired. The hall buttons shall stop the car as previously described.
- (c) For the use of the attendant, the following additional equipment shall be added to the car operating panel:
 - (i) Key operated switch for cutting in and out additional equipment for with attendant operation.
 - (ii) A buzzer for notifying the attendant when an up trip should be made in answer to hall calls.
 - (iii) A non-stop 'NS' button for the purpose of by-passing landing calls, but these landing calls shall remain registered however until they are answered.
 - (iv) Up and down light jewels for indicating the direction the car is set to travel.

79.49 LIFT CONTROL FEATURES

- (a) Detection of stuck hall button: If the car arrives at a floor and the hall button is jammed or kept pressed continuously for more than a pre-determined time, then the car shall proceed to attend the pending calls.
- (b) Home landing car after answering the last pending call.
- (c) Fast speed / declaration protection: If the elevator runs for more than 10 seconds in the fast speed without encountering slow vane, the elevator shall go into emergency stop. The elevator shall restart automatically.
- (d) Auto light and fan 'ON-OFF': If the car is not used for a predetermined time, the light and fan inside the car shall be automatically switched off. They shall be 'ON' automatically when someone calls car from main landing.
- (e) Load Non-stop: Upon detection of 80% and up to 100% of duty load the car shall ignore the registered hall calls and attend only to the car calls until the load inside the car reduce to less than 80% of the duty load.
- (f) Top of car in controller inspection operation: An inspection 'U' & 'D' buttons shall be provided on top of car and in controller. The elevator is put in inspection mode by operating a toggle switch. Upon continuously pressing the 'U' or 'D' button the elevator shall run inspection speed lower than normal speed i.e. 1.5 MPS.
- (g) Emergency Stop Button: Actuation of 'STOP' button (red colour) in car shall stop the car immediately (by application or brakes in machine) as long as the button is pressed. Upon releasing the button, the car shall proceed to answer the pending calls.

79.50 ELECTRICAL WIRING All cables and other wiring in connection with lift installation shall be of copper of suitable grade for the voltage at which these are intended to be worked and of ISI approved and if metallic covering is used, it shall be efficiently earthed. The machine motor and, control panel will be connected to independent earthing as per rules. Suitable caution notice shall be fixed on machine rooms, entrance. Circuit, which supplies current to electric motor shall be separate from the trailing cable used for controlling and for safety devices.

79.51 TESTING OF THE INSTALLATION ON COMPLETION All the lifts shall be tested on completion of work. The lifts shall be put into normal service and taken over. The tests at site will be in accordance with Indian Standard. Necessary weights and instruments for test shall be arranged by the lift contractor. During tests, electric power required for carrying out testing will be supplied free of cost. The following tests shall also be carried out in addition to the tests described in relevant IS:

- (a) Test to determine that safety gear will stop the lifts car with rated load. Owner speed test will be made with ropes attached and all electrical apparatus operative except the over speed switch in the Governor. Tests shall be carried permanent distortion, if any, safety gear shall be examined for signs of weights the distance related car or counterweights speed shall stop lift car with rated load or the counter weight from governor tripping speed within the range of stopping distance given in Indian Standard.
- (b) The installation will be taken over only, if the above-mentioned acceptance tests are found to be satisfactory and certificate to this effect is issued by the Accepting officer or his representative.
- (c) Commissioning of the lift shall be got approved by the Electrical Inspector/ Lift Inspector.

PARTICULAR SPECIFICATIONS (Contd.../-)

(d) It shall be the responsibility of the contractors of get all works in this scope approved from local state authority & competent department Engineer authority before completion of work.

(e) Apart from the above mentioned test, if any other test is recommended by the manufacturer or contractor or mentioned in Bombay lift act 1939 Para 29, Bombay lift rules 1958, IS code of practice and required for the smooth functioning keeping in mind the human safety shall also be carried out on recommendation of manufacture.

79.52 ACCIDENT/THEFT/INSURANCE COVER (DURING THE PERIOD OF CONTRACT INCLUDING PERIOD OF COMPREHENSIVE MAINTENANCE)

79.52.1 The contractor is required to get the complete lift installation insured against theft of parts/ fixtures of the lift and contractor is responsible to replace / repair the lift to make it functional within 24 hours.

79.52.2 The contractor is also liable to pay the compensation to the passengers on account of any major accident due to mal-functioning of Lift. The necessary insurance policy will be taken by the contractor and the cost of the same is deemed to be included in the unit rates quoted by the contractor for any claims due to accident. A minimum amount of the compensation to be paid to the next of kin deceased, shall be Rs 1,00,000/- (Rupees one Lakh only) per person.

79.53 COMPREHENSIVE MAINTENANCE OF LIFTS

The contractor shall provide free comprehensive maintenance service during defects liability. The maintenance service tendered shall include all kinds of routine and preventive maintenance and breakdown maintenance, these services shall be provided on 24 Hrs x 365 days basis.

79.53.1 This service shall include regular examination of installation, cleaning, the provision of necessary spares, assembly and consumables etc. as per proforma No 1 to 6 (Appx 'G') and as per Bombay Lift Act to keep the lift in proper operation and the contractor shall be responsible to carry out the above maintenance service as stipulated hereinafter.

79.54 GENERAL

The rates quoted in Sch 'A'/ BOQ shall be deemed to include for following: -

(a) Supervision by responsible qualified and trained staff for all the lifts in order to keep the lift's equipment properly adjusted, lubricated and maintained in proper neat and safe operating conditions.

(b) To examine periodically the equipment, gear relays, control devices, safety devices governor and carry out the customary annual safety tests. The senior mechanic or foreman shall carryout the inspection as per maintenance schedule and make necessary entries in the proforma No 01 to 06 respectively (attached as Appx 'H' to these particular specifications) and be kept in switch room. It will be responsibility of the contractor to see that the maintenance schedule book is maintained by their senior mechanic or foreman.

(c) To carry out daily, fortnightly servicing including cleaning, adjustment, lubrication repair and replacement of the worn out parts of lifts for effective functioning.

(d) To attend the break-down during day and night including holidays and putting the lifts in working condition in shortest possible time and including keeping sufficient stock of spares available always to ensure smooth and regular functioning of lifts.

(e) The contractor shall observe rules of Bombay lift Rules 1958 as amended from time to time and shall be responsible for preparation of drawings and obtaining necessary permission from lift inspector whenever additions/ alteration or changes to lifts are ordered.

(f) To ensure that alarm system always working in case of emergency.

(g) To ensure sufficient illumination in car always by replacing unserviceable parts as and when required.

(h) To ensure all car/landing gates movements is friction-less and free.

(j) To ensure that lift pit and lift car top and lift Machine room are clean and free from debris and waste materials at all time so that smooth functioning of lifts is ensured without any breakdown that may cause or caused due to debris/ waste materials. Contractor shall ensure that doors/windows are kept properly closed avoiding any damage to glass panes during rainy/ stormy days. If broken/damaged during rainy / stormy days, he will make good the same without any extra cost. Necessary protective arrangement for equipment of machine room shall be made to avoid any damage, cost of which shall be deemed to be included in the rates quoted for Sch 'A' / BOQ. If any break-down is caused due to this reason contractor shall immediately take action to rectify the defect without any extra cost of Govt.

(k) The contractor shall also make arrangement to pump out water from the lift pits immediately to avoid damage/ short circuiting in order to keep the lifts in working conditions during the contract period. Any damage that may cause/ caused due to water logging in lift pits shall be made good by the contractor immediately and no separate claim on this account shall be entertained.

(l) The maintenance shall be carried out on the daily basis for each lift and completion certificate be obtained from site in-charge on completion of the daily, weekly, fortnightly, quarterly, semi-

- annual and annual maintenance.
- (m) The contractor shall be responsible for proper functioning of electrical / mechanical fittings of the lifts and maintain the same in sound condition to work for 24 hrs and to avoid risk of accident and breakdown.
- (n) The contractor shall also repair/replace electrical fittings i.e. emergency call alarm bell/ buzzer indicator, LED lightand other accessories. The necessary materials and T & P required shall be arranged by the contractor and cost of the same shall be deemed to be included in the quoted rates in Sch 'A' / BOQ. In case of any doubt / dispute whether replacement/ repair of any part component is essential or not the matter shall be referred to Accepting Officer, whose decision shall be final and binding.
- (o) To ensure that the rescue operation be carried out within ½ hrs.

79.54.1 MAINTENANCE OF LIFTS/ DETAILING OF TECHNICAL STAFF

- (a) The contractor shall employ sufficient staff for efficient maintenance of lifts who shall work round the clock and shall be available at the nominated place that may be MES complaint Cell/ Service Centre to attend the complaints at each location. The qualification of staff employed for attending the preventive and breakdown maintenance should not be less than ITI in related filed and must have 3 to 10 Yrs experience of maintenance of lifts, its parts, accessories, Control panel etc. The related documents shall be verified by the Engineer-in- Charge, kept in record.
- (b) The contractor shall maintain the log book as per under mentioned format. The log book shall be kept in machine room/Complaint cell. Each lift shall be checked thrice a day at 0600 Hrs, 1300 Hrs, 2000 Hrs for the smooth functioning as a routine check where as the complaint received any time round the clock shall be attended promptly.

Date & Time when the liftchecked and complaint received	Block Nos./ Lift No.	Condition of lift found Serviceable/ Unserviceable	Nature ofDefect s Found	Spare Parts replaced	Time on whenlift made Serviceable	Signature Mechanic	Signature AGE E/M JE E/M	Signature GE	Remarks
1	2	3	4	5	6	7	8	9	10

- (c) The lift complaints will be attended whenever non-functioning of it is received on phone / verbally / hand written from the occupant / Engineer-in- Charge / GE. They shall promptly attend and call back and shall not keep any complaint pending for more than 04 hrs unless it has the prior approval of GE. The time allowed for minor and major repair is asunder: -
- (i) Minor repair - 4Hours

(ii) Major repair - 2Days
- (d) In case of any doubt / dispute whether repair is minor or major, decision of GE shall be final andbinding.
- (e) In case of failure on the part of the contractor to carry out minor / major repair/ replacement within the specified time, the contractor is to pay penalty charges as under :-
- (i) Up to 12 Hrs. @ Rs. 5000/-

(ii) Above 12 Hrs and up to 24 Hrs @ Rs. 20000/-

(iii) Above 24 Hrs @ Rs. 30000/- per day
- (f) Penalty charges as mentioned in Para (e) above shall be subject to max of 10% of the contract value but these penalties shall be in addition to provision made in condition 50 of IAFW – 2249.
- (g) The contractor shall obtain signature of authorised representative of GE at MES office in token of satisfactory completion of defects indicating the time of complaint received and time of complaint defect rectified.
- (h) The contractor shall stock sufficient spare parts to ensure putting the lifts in working condition in the above.
- (j) The decision of the GE as to whether a particular lift has been maintained or not on a particular day will be final and binding.

79.54.2 RESCUE OPERATION IN CASE OF AN EMERGENCY

In case of an emergency viz happening of a person inside the lift and lift getting stuck in between floors, it will be the responsibility of the mechanic to reach the lift within ½ to 1 hour of being informed by the operator / user and carry out rescue operation. The Engineer-in- Charge will

satisfy himself with regard to the capability of the mechanic to carry out rescue operations in an emergency. In case the mechanic fails to reach the lift with ½ to 1 hour being informed by operators / users a penalty of Rs. 5,000/- shall be imposed.

79.54.3 INSPECTION

- (a) The contractor shall employ a qualified & experienced supervisor to inspect each lift covered under this contract at least once in a quarter and he shall submit a written report for the serviceability of lifts and his recommendation for repairs/ renewals to ascertain the better and safety and service of the lift and machinery. Cost of these inspections is deemed to be included in the unit rates quoted in schedule ‘A’ Part-II.
- (b) MES representative shall be associated with this inspection. However, contractor shall submit a tentative progress of inspections arranged by him.
- (c) The lifts shall be inspected by the concerned Engineer-in-Charge/GE at regular intervals in order to check that lifts are in proper working conditions and proper records shall be maintained in the sub division.

79.54.4 RECORD

- (a) The record of documents in support of repair/ replacement, periodical maintenance and testing should be maintained as per the instructions given by Engineer-in-Charge / GE, which should be signed jointly by Engineer-in-Charge and contractor. The records so maintained for each lift shall be enclosed with each claim of RAR.
- (b) The contractor shall assist the Engineer-in-Charge to maintain the records as required as per the lift Rules 1958 and as amended from time to time.

79.54.5 INSPECTION BY GOVT LIFT INSPECTOR:

The lift shall be got inspected by Govt. Lift Inspector for the worthiness certificate as per the rules. Charges for inspection if any shall be payable by the contractor and are deemed to be included in the rates quoted in Sch ‘A’.

79.54.6 PENALTY FOR NOT CARRYING OUT MAINTENANCE SCHEDULE

The contractor will carry out daily fortnightly, monthly, quarterly, half yearly and annual maintenance as per Proforma 01 to 06 respectively (Attached to these Particular Specifications), in case contractor fails to carry out these maintenance following penalty will be imposed daily.

- | | | | |
|-----|--|---|-------------|
| (a) | Not carrying out maintenance daily | : | Rs. 1500/- |
| (b) | Not carrying out maintenance fortnightly | : | Rs. 2500/- |
| (c) | Not carrying out maintenance monthly | : | Rs. 3000/- |
| (d) | Not carrying out maintenance quarterly | : | Rs. 4000/- |
| (e) | Not carrying out maintenance half yearly | : | Rs. 5000/- |
| (f) | Not carrying out maintenance annually | : | Rs. 10000/- |

79.54.7 PURCHASE VOUCHER

Original purchase vouchers shall be submitted by the contractor in support of genuineness of material along with test certificate before claiming RAR payment.

80. STANDBY POWER SUPPLY (DGSET)

- (a) The work of DG set under this contract shall be carried out in accordance with Sch- ‘A’/BOQ description, particular specifications and drawing which shall be read in conjunction with the specification, general rules, special conditions and preambles contained in SSR Parts-I & II. Where at variance, the provision in the Schedule-‘A’ shall take precedence over the aforesaid provisions of SSR.
- (b) The work to be carried under this schedule comprise of supply, installation, testing and commissioning of diesel engine driven generating set on PCC foundation with anti-vibration pads. Common base plate, instrument panel board, fuel tank with fuel line and accessories manually operated, fuel pump and pipe, starting battery with cable lead, terminals, exhaust pipe, pipe connection with suitable insulation all as specified in Sch- ‘A’
- (c) Coupling of diesel engine with alternator should be through authorized original equipment manufacturers.

80.1 SPECIFICATIONS

(A) DIESEL ENGINE Multi cylinder, in-line 4 stroke radiator liquid cooled engine, turbo charged to deliver suitable BHP at 1500RPM under NTP conditions with an overload capacity of 10% for 12 hrs of continuous operation with the following accessories.
Make: Cummins or Kirloskar Green / Kirloskar Oil Engine / Greaves Ltd.

PARTICULAR SPECIFICATIONS (Contd.../-)

- (a) Required power: As per OEM
 - (b) Cooling: Liquid Cooled.
 - (c) Aspiration: Turbocharged, Charge Air Cooled.
 - (d) No of cylinders: As per OEM, in-line
 - (e) Performance class of Gen Set as per ISO 8528-1.
 - (f) Exhaust pipe size : As per OEM
 - (g) Well designed air handling system with, Dry type, replaceable paper element air cleaner with restriction indicator, air to air after cooler, optimised turbocharger for increased altitude capabilities.
 - (h) Best in class fuel economy with Bosch HPCR fuel system with A1 class electronic governing.
 - (j) Dual fuel filter system: Pre filter including water separator and water in fuel (WIF) sensor and main filter.
 - (k) Standard integral set-mounted radiator system designed and tested for 50°C ambient temperature.
 - (l) Full flow spin on lube oil filter.
 - (m) Plate type lube oil cooler. (n) First fill of lube oil and coolant.
 - (o) Electrical starter motor with soft start engagement feature.
 - (p) Battery charging alternator.
 - (q) Starting system 24 V DC electrical, (2 x 12 DC batteries)
 - (r) Silencer Hospital grade silencer suitably optimised to meet stringent exhaust air and noise emission standards laid down by MoEF/CPCB either as an original equipment or with use of RECD (in case the original engine with new CPCB norms technology is not under manufacture) still at the time of delivery of the subject plant. As per the latest directives regarding reduction in air pollution issued under National Clean Air Program (NCAP), the DG Set shall meet the following smoke emission standards: -
 - i) $\text{NO}_x + \text{HC} \leq 4.0 \text{ (gm/kW hr)}$
 - ii) $\text{CO} \leq 3.5 \text{ (gm/kW hr)}$
 - iii) $\text{PM} \leq 0.2 \text{ (gm/kW hr)}$
 - iv) $\text{Smoke limit} \leq 0.7 \text{ (m}^{-1}\text{)}$
 (Light Absorption Coefficient)
 - (s) Mounting Arrangement Engine and alternator are mounted on a common MS fabricated base frame with AVM pads, Base frame with integral fuel tank is provided with drain plug, air vent, inlet and outlet connection, level indicator and provision for cleaning all as recommended by the OEM and directed by Engineer-in-Charge.
 - (t) Shut off coil protection with safety for LLOP/HWT.
 - (u) Stainless steel exhaust flexible belows.
 - (v) Exhaust piping made out of STIC 'C' class MS pipe inclusive of all accessories and hardware, necessary support as per manufacture's recommendations to sustain back pressure with rain cap.
 - (w) Mineral insulation 2" thick covered with aluminium sheet of 30 gauges for the entire length of exhaust pipe.
 - (x) Interconnecting copper cabling of adequate capacity between batteries and controller
 - (y) Fuel Tank Built in diesel storage tank of capacity as per OEM specifications
- (B) ALTERNATOR** 160kVA at 0.8 PF lagging, 415volts, 3 Phase, 4 wire system, 50Hz suitable for operation at 1500RPM self-excited and self-regulated through AVR brushless excitation band of voltage $\pm 1.0\%$ Voltage regulation (max) in static conditions- IP: 23 protections with insulation class H, IP-23 protection self-ventilated and suitable for above mentioned diesel engine complete all as per Alternator frame. Model No: as per OEM and Make: Stamford (CGT) / Kirloskar Green / Kirloskar Electric/ Crompton Greaves.
- (a) Brushless type, screen protected, revolving field, self-excited alternator conforming to IS/IEC 60034-1
 - (b) Better motor starting capability
 - (c) Best in class efficiency
 - (d) Compact design with sealed bearings for longer life and lesser maintenance.
 - (e) Impregnation on all wound components for better mechanical strength.

PARTICULAR SPECIFICATIONS (Contd.../-)

(C) ACOUSTIC ENCLOSURE Factory made acoustic enclosure (canopy) having size suitable for 160kVA DG set as per OEM specifications.

- (i) This shall be specially designed to meet stringent MoEF/CPCB norms of 75dBA @1m at 75% load under free field conditions.
- (ii) The acoustic enclosure is made of CRCA sheets in munsel green shade and a structural/sheet metal base frame painted in black.
- (iii) High quality noise absorbent and fire-retardant grade acoustic insulation material (PU Foam) complying to IS-8183.
- (iv) Air inter-louvers specially designed to operate at rated load.
- (v) Two-point lifting for easy handling at customer site.
- (vi) Designed to have optimum serviceability.
- (vii) Made on special purpose CNC machines for consistency in quality and workmanship.
- (viii) 11 tank pre-treatment process and UV resistant powder coating of all parts to withstand extreme environment.
- (ix) Use of special hardware for longer life.
- (x) Flush styling – no projection.
- (xi) Fluid drains for lube oil and fuel.
- (xii) Fuel filling arrangement inside the enclosure.

(D) Control Panel Control panel is manufactured with 2 mm thick CRCA sheet and is powder coated for weather-proof and long-lasting finish, the control panel consists of the following parts:

- (i) Aluminium bus bars with 1500 Amps capacity with incoming/outgoing terminals.
- (ii) Indicating lamps for 'Load ON' and 'Set Running'.
- (iii) Instrument fuses duly wired and ferruled
- (iv) MCCB of 1000Amps, 415Volts, 50kA rating with overload and short circuit protections.
- (v) Intuitive operator interface which includes LED backlit LCD display with tactile feel soft-switches and generator set status LED lamps.

Power command 1.1 with following features

- (vi) The power command control system is a microprocessor-based gen set monitoring.
- (vii) Digital AVR for shunt or PMG excitation with torque matching.
- (viii) Digital electronic governing with temperature compensation and smart starting.
- (ix) SAE J1939 interface to Full Authority Electronic (FAE) engines.
- (x) Remote start -stop.
- (xi) Engine metering: Oil pressure, coolant temperature, Battery voltage, Engine speed.
- (xii) AC Alternator metering: L-L voltage and L-N voltage, Current (1 and 3 phase), Volt-Amperes (phases and total) and Frequency
- (xiii) Engine protection: Low lube oil pressure, High/low coolant temperature, over speed, battery over/under/weak volts, fail to crank/start, sensor failure.
- (xiv) AC alternator protection: Over/under voltage, over/under frequency, over current, short circuit and loss of AC sensing.
- (xv) Data logging : Engine hours, control hours, Engine starts and upto 10 recent fault codes.
- (xvi) Configurable glow plug control.
- (xvii) Configurable cycle cranking.
- (xviii) 12 and 24 volt DC operation.
- (xix) Sleep mode
- (xx) Programmable I/Os (4 inputs and 2 outputs), expandable with AUX101/ 102 modules.
- (xxi) Modbus interface (RS485 RTU).
- (xxii) In power compatible (PC based service tool)

(E) Automatic Main Failure (AMF) control panel The AMF Panel shall be one of the following **Make** : OEM / Gen Set Assembler Powerica / Goyel / Neptune / L&T / Kala Gen Set Pvt Ltd.

Indoor type, factory fabricated cubical type, freestanding, floor mounted, AMF control panel, provided with removable rear panel and hinged front panel for easy accessibility, fabricated out of not less than 2.0mm thick CRCA Sheet including of powder coated paint and comprising of:

- (i) AMF control circuit with 4 pole MCCB 1000Amps, micro-processor based with thermal and magnetic release setting 40% to 100% rupturing capacity 50kA-02Nos, Make : L&T/ Siemens / Legrand 2Nos. each one for commercial and DG set incoming supply with HRC back up fuse complete with all DC control relays/line voltage monitor (LVM) as per OEM specifications incorporating engine start ,stop, three attempt starting facility and failure to start etc.
- (ii) Digital ammeter (0-1000 Amps) and voltmeter (0-500Volts) with selector switch
- (iii) Digital frequency meter.
- (iv) Digital power factor meter (-1.0 to +1.0).
- (v) Indicating lamps for supply "ON" and Load "ON ".
- (vi) Instrument fuses (HRC type)
- (vii) Push button 01No each for start, stop & reset
- (viii) Copper busbar of capacity 400amps for phases and neutral
- (ix) Bottom gland plate including glands for incoming and outgoing LT cables
- (x) Circuit diagram plate.

PARTICULAR SPECIFICATIONS (Contd.../-)

- (xi) Automatic battery charging unit including facility for overcharging stop /trickle charging /boost charging 12volt complete with DC ammeter, DC voltmeter, Charging set selector switch,
- (xii) Facility for remote / auto start, auto/manual synchronizing, audio-visual announcing system and indication lamps for engine faults.

80.2 ACCESSORIES**(a) FUELTANK**

- (i) Fuel level indicator to indicate level of diesel in the tank.
- (ii) Drain pipe with 2m piping
- (iii) Fuel pipe for inlet, out let with connections.
- (iv) Fuel strainer
- (v) Air vent
- (vi) Angle iron floor mounting bracket including minor civil works

(b) **MOTOR DRIVEN PUMP** Motor driven fuel pump for filling diesel in the tank of adequate capacity with inlet connection to the tank. (Motor driven pump size and duty shall be intimated by tenderer in his offer)

(c) **BATTERIES**: Starting batteries heavy duty set of 2 Nos of 12Volts 180AH of EXIDE / AMRON make connected to the system fully charged and ready for use. All batteries shall be supplied with leads and terminals.

(d) **BASE PLATE**: Shall be MS structural channel fabricated base plate of rigidly welded construction duly ribbed suitable for receiving engine, alternator along with flexible coupling. It shall include foundation bolts, washers, nuts anti-vibration pads, drip tray and protective guards for coupling.

80.3 FOUNDATION Generating set shall be installed in accordance with latest engineering practice and adequately designed, vibration-proof. The tenderer shall submit details and drawings of PCC foundation immediately after acceptance of tender for approval of Engineer-in-charge. Necessary anti-vibration rubber device of adequate size and standard shall be provided.

Notes:

- (i) Voltage variation permissible is 415Volts +2.5%
- (ii) The alternator shall be self-excited and self-regulated.
- (iii) Frequency variation permissible is 50Hz +1%
- (iv) Generator set shall be provided with radio interference suppressor and surge arrestor.
- (v) Diesel, engine oil, grease etc. required for commissioning and testing shall be supplied by the contractor at his own cost.
- (vi) Fuel tank- (service tank) MS tank of 8hours full load diesel storage capacity shall be mounted with feed line to the engine including all supports, foundation etc.
- (vii) Exhaust piping with silencer shall be provided with asbestos rope insulation of appropriate size and the insulation extended upto 30cm away to the external face of the wall.

80.4 Scope of work shall also include for submission of list of spares and tools required for normal maintenance and repair of generating set, fast moving spares for normal maintenance of the set for a period of two years as recommended by the manufacturers. The tenderer is specifically required to note that the unit rate quoted shall not include the cost of these spares and tools.

80.5 The tenderer shall include in his quoted rate for all the connected work which are required in the installation of generating set, viz. providing suitable opening on wall, wiring and other incidental works which are essential for the entire completion of the work

80.6 Diesel engine for generating set shall conform to BS-5514, IS-10002 and shall be of make as mentioned in Sch-'A'. The engine shall be 4 stroke vertical and stationery design, water cooled and shall develop request at 1500RPM at NTP condition to drive alternator capacity as per schedule of 415Volts 3 phase 4 wire. The diesel engine shall be rated for continuous operation and shall be able to operate 10% over load for a period of 12 hours operation reliability.

80.7 ALTERNATOR

Under normal condition the voltage regulation will be + 2.5% of rated voltage + 2.5% and that of frequency regulation with in alternator of suitable capacity to give 50HZ 3 phase,4 wire output of capacity as per schedule, 0.8 PF lagging 415Volts supply at 1500RPM. It shall be of make as specified in Sch-'A'. The alternator shall be self excited and self regulated with automatic voltage regulation within $\pm 1\%$ and the alternator will have Class 'H', IP-23 insulation. The alternator shall be screen protected drip proof and single shaft extension type with damper winding in pole faces and self ventilated. The alternator shall be supplied with standard accessories and shall be fixed in common base plate/frame with nut, bolt and shall be coupled with diesel engine through flexible coupling. The cost of set shall include the cost of foundation bolts, nuts etc.

80.8 AMF CONTROL PANELThe AMF (Automatic on Mains Failure) panel shall be factory fabricated

PARTICULAR SPECIFICATIONS (Contd.../-)

cubical type free standing floor mounted, provided with removable rear panels & hinged front panels for easy accessibility, fabricated out of not less than 2mm thick CRCA sheet duly painted as mentioned in Sch-'A'. The AMF control panel shall comprise of all the accessories mentioned in Sch-'A'. The Contractor will submit test certificate obtained from the manufacture before commissioning.

80.9 ACOUSTIC ENCLOSURE(CANOPY)

(a) The acoustic enclosure (canopy) shall be suitable to reduce noise level to 75dB measured at 1.0m distance for audible frequencies as approved from ARAI for emission compliance as per the Central Pollution Control Board norms and manufacturer's specification.

(b) Features The construction and design of the acoustic enclosure shall be very rugged durable and virtually maintenance free. All materials used for acoustic treatment will be fire resistant/fire retardant grade. For effective sealing necessary gasket material will be provided. The sheet steel treatment will consist of de-rusting followed by two zinc coats of synthetic enamel paint in the shade approved by the GE.

(c) Performance Noise level from the outer surface of the enclosure, when measured at a distance of 1.0m will be maintained at not more than 75dB (A) under free field condition.

80.10 (a) The type of POL (Diesel, Engine oil, Grease) etc. to be used for running the set as per manufacturer's instructions shall be indicated with consumption per unit time.

(b) The POL (Diesel, Engine oil, Grease) etc. required for the commissioning, testing shall be supplied by the Contractor at his own cost. The unit rate quoted in Sch-'A' shall be deemed to include this aspect.

(c) The contractor shall ensure that the complete equipment to produce the least noise level. For this purpose, the contractor shall provide all necessary insulator arrangement, vibration proofing and such other arrangement required to reduce the noise level.

80.11 PERFORMANCES

(a) The entire plant shall be guaranteed for two years from the date of taking over the plant. The installation shall be taken over after the system has been commissioned and the Accepting Officer or his authorized representative is satisfied of tests specified hereinafter.

(b) The test shall be carried out by the Accepting Officer or his representative in the presence of the contractor in accordance with IE rules and regulations.IS-732 and the test results.

(c) The tests shall comprise of the following :

(i) Trial test

(ii) Generating set shall run for no load, full load and overload (10%) test

(iii) Regulation test shall be carried out in accordance with BS-649-1958.

(iv) The generating set shall run for total 12 hours for conducting above test and the performances of the plant as a whole shall be recorded in test sheet

(v) Efficiency test

(vi) IR and earth test of cable, generator

(d) If the performance or the test result of the test of the test as detailed above are not found satisfactory, the Contractor shall, on his own cost shall rectify/replace the defective installation or part thereof as directed by the Accepting Officer or his representative before the installation is taken over. The decision of the Accepting Officer in this regard shall be final and binding in this regard. The test results shall be recorded in triplicate and signed by both the parties.

(e) The Contractor shall submit the following after completion of work:

(i) Complete literature in English/catalogue giving technical information of components/parts of equipment offered by him.

(ii) Complete literature on maintenance and operation and installation of generating set-6 sets.

(iii) Spare part catalogue

(iv) Maintenance chart of the installation duly framed with glass-1 set (v) Shock treatment chart (in English & Vernacular) framed with glass-1set

(f) Artificial water load shall be arranged by the Contractor at his own cost for full load and overload test. The Contractor shall arrange a decibel meter to measure sound level during test.

(g) Rubber matting of full length of LT panel shall be provided by the contractor and rate quoted for the LT panel board is deemed to be inclusive of the cost of rubber matting.

80.12 The Contractor shall submit a copy type Approval certificate for generator set from the authorized dealer / manufacturer from one of the following five agencies:

[a] Automotive Research Association of India (Pune)

[b] National Physical Laboratory (NewDelhi)

[c] Naval Science and Technology Laboratory (Visakhapatnam)

[d] Fluid Control Research Institute (Palghat)

PARTICULAR SPECIFICATIONS (Contd.../-)

[e] National Aerospace Laboratory (Bangalore)

80.13 SYNCHRONIZATION OF DG SET

1 x160 kVA DG shall have a unified synchronizing panel with adequate relays, safeties, interlocks to run in isolation or in synchronization mode in case of requirement (i.e. when fire fighting pump are required to be tested / operated)

81. CUP BOARD (BUILT IN) / WARD ROBE :-

Unless otherwise shown in drawings, the specifications for Wardrobe shall be as under: -

- (i) Partitions: 18mm thick BWR grade type AA plywood conforming to IS-303.
- (ii) Shutter: 25mm thick block board flush shutter conforming to IS-1659 with 1.5mm thick 1 lamination (shade and colour as approved by GE).
- (iii) Internal surface finished with 207n galv polish.
- (iv) 200mm stainless steel handle 8mm thick one on every shutter.

82. CIGRATING

CI Gratings to each rain water pipe shall be provided. Grating shall be painted with Black Japan paint all as specified and directed.

83. SHELVES

25mm thick machine cut machine polished cudappah stone shall be provided as per locations & details shown in drawings. Polishing shall be done on both faces & exposed edges.

84. BLANK**85. FOLDING DOOR (SLIDING)**

Sliding folding door shall be provided all as shown on drawing as under :

- (i) Shutter shall be of 12mm thick plywood.

86. OVAL SHAPED/COUNTER TYPE WASH HAND BASIN

Where shown on drawings, Oval shaped/counter type wash hand basin shall be provided with the following :

- (i) Wash hand basin (white) of vitreous glazed ware, Oval shaped with waste union and perforated grating (both fittings of brass chromium plated) in case size of wash hand basin not shown it shall be of size 485mmX395X150mm. (Make: Cat No. JDS-WHT- 25909 of Jaquar or equivalent as approved by GE)
- (ii) A pair of cast iron brackets.
- (iii) 32mm dia galvanized steel medium grade down take pipe fitted with brass chromium plated waste coupling outlet complete. Length of waste pipe shall be as indicated in drawing.
- (iv) Vitreous china self or niche as specified here-in-before.
- (v) Granite top shall be 18mm thick polished granite stone on RCC slab. In case thickness of RCC slab and reinforcement details not shown on drawings, these shall be 40mm thick slab and reinforcement details as directed by GE. Granite slab shall be rounded on all exposed edges.
- (vi) 15mm dia chromium plated Pillar cock.

87. GEYSER

Geysers shall be installed as per BOQ/Schedule & as shown on drawings. It shall have 25 litre capacity, BEE 5 star rated including grouting nut bolt of suitable sizes. It should be highly Energy Efficient with Extra Thick & High Density CFC Free PUF Insulation for Maximum Heat Retention. It should be able to withstand 8 bar of pressure for being suitable for use in High rise building.

88. FIRE RATED METAL DOORS FOR STAIRCASES, FIRE MAN SHAFT & FIRE REFUGE AREA

- (a) Metal Fire door shall be of ISO 9001:2015 certified Manufacturer. The door must have been manufactured with GI sheet of GPSP Grade as per IS 277. All Fire doors shall satisfy the requirement of latest NBC 2016 Part 4 for Fire & Life Safety guidelines for 120 minutes Fire Rating with minimum 20 minutes Insulation properties along with its Stability & Integrity for 120 minutes. The Prototype sample of the door must carry a prior test evidence as per IS 3614 part-2 / BS 476 Part 20 & 22.
- (b) The manufacturer shall submit the copy of test evidence prior to start of production. The offered test certificate should either carry its Validity or certificate must not be older than 5 years from CBRI / NABL Accredited Lab i.e. Spectro / International Lab i.e. Exova / TBW etc. All doors should be finished with Powder coating in desired regular RAL Shades.

PARTICULAR SPECIFICATIONS (Contd.../-)

- (c) Door frame shall be Single rebate profile of section 105 x 60 mm made out of 1.50mm thick galvanised steel sheet with a factory pre-punched groove so as to accommodate Fire & smoke seal size 10x4mm. Frames should be butt jointed and field assembled with bolting system for proper strength. Frames should be provided with back plate for anchor fasteners (payable extra) for installation on a finished plastered wall opening.
- (d) Door leaf should be minimum 44mm thick fully flush double skin door. Door leaf must be manufactured from 0.8mm (22 gauge) thick galvanised steel sheet. The door should be provided with reinforcement pads to receiving appropriate Hardwares of Becker Fire Solutions or Equivalent make. The Shutter shall be filled with proprietary infill material. For Double leaf doors; astragal has to be provided on meeting stile for both active and inactive leaf. Vision panels wherever required should be of 120 minutes' fire rating and should be of non-wired type. All hardware's, Fasteners and FR Glass shall be payable in Extra item.

89. BLANK**90. AIR CONDITIONING**

Air conditioning work shall be carried out all as per BOQ/Schedule & as shown on drawings. It should be air cooled, split unit inverter type, electric driven, single phase, of capacity of 2 TR. It should be BEE 5 star rated & EER 3.59.

All air conditioner shall have Voltage stabilizer for automatic operation. It shall be single phase naturally air cooled indoor type & designed for input variation between 170V to 250V with output voltage, stabilized at 230V (+/- 2.5%) of capacity 3KVA.

91. COOLING APPLIANCES

- **Water coolers** shall be installed as per BOQ/Schedule & as shown on drawings. It shall be made of Stainless steel, electric driven single phase with storage capacity of 80 liter and nominal cooling capacity of 40ltr per hrs.
- **Refrigerator** shall be installed as per BOQ/Schedule & as shown on drawings. It shall be double door type, frost free, having inbuilt inverter compressor, electric driven single phase. It must be having capacity upto 360ltr and should be BEE 5 star rated.
- **Deep freezer** shall be installed as per BOQ/Schedule & as shown on drawings. It shall be having double door, glass top and a capacity of 320ltr capacity.

92. FIRE FIGHTING

Work under this schedule shall be carried out all as shown on drawings and as described in Schedule-'A' Part-X items and as specified in this Particular Specifications. Earthwork & excavation shall be measured and paid under Sch 'A' Part II.

92.1 SCOPE OF WORK

The scope of work of fire protection works for the Building consists of the following, but is not limited to the same:

Hydrant System (for Multi Storey Blocks only) consisting of Internal Hydrant Risers, Hydrant Stations with all accessories such as Hydrants, Hoses, First Aid Hose Reel, Branch Pipe etc.

Supply of Fire Extinguishers.

- ISI marked IS:15683 fire extinguisher with stored pressure ABC powder type 6 kg capacity with initial charge valve pressure gauge, discharge horn with nozzle & wall fixing bracket.
- ISI marked IS:15683 fire extinguisher carbon di-oxide (CO2) type 4.5 kg capacity with initial charge valve pressure gauge, discharge horn with nozzle wall fixing bracket.
- ISI marked IS:15683 fire extinguisher with mechanical foam type (AFFF), 9 LTR capacity with initial charge valve bend with ABC horn, handle wall fixing bracket.

Manual Fire Alarm System.

Obtain statutory approval from concerned Fire Authorities for the Systems installed as well as for the overall Building. This shall be without any cost to the Owners.

92.2 APPOINTMENT OF SPECIALIST VENDOR FOR FIRE PROTECTION WORKS

The Contractor shall appoint the Specialist Vendor for Fire Protection Works on the basis of the following criteria:

The Fire Fighting Vendor should have executed Hydrant System works whose value should exceed the amount quoted by the Contractor for this project.

Contractor will quote as per specialist Vendor and ensure that the tender is submitted in proper manner.

PARTICULAR SPECIFICATIONS (Contd.../-)**92.3 CO-ORDINATION WITH OTHER SERVICES**

The Contractor and his specialist agency shall be required to co-ordinate his activities with all other services such as Electrical, water and Civil.

92.4 DATA

The Contractor shall furnish all details and relevant data required for design and detailed engineering of all such civil work.

92.5 DRAWINGS

The drawings issued are indicative only and are issued for guidance only. The Contractor shall prepare and submit shop drawings/data sheets of all the relevant materials used in the systems. The Contractor also shall prepare the drawings of all the fabricated items used in the system and before execution of the same, the drawings shall be got approved by the Engineer in Charge.

92.5.1 SUPPLY OF DRAWINGS AND TECHNICAL DOCUMENTS

The Contractor shall provide to the Project Manager five sets of:

Approved final/As built Drawings including, but not limited to fabrication, structural general arrangement/layout, erection /installation drawing, wiring circuits/diagrams etc.

Maintenance and repair manuals of all equipment's incorporated in the system.

Illustrated spare part list along with sources of supply.

Operation manuals / working instructions.

Test Schedules, Test reports as per relevant IS code for equipment's.

Detailed Technical Specifications / Data of various equipment's / assembled parts actually supplied.

92.6 SYSTEM TESTING

The Contractor shall arrange interim / stage inspection during execution of the works as and when so called for and shall carry out any rectification/modification as may be required by the GE. Soon after the work is completed, the Contractor shall inform in writing to the GE for getting the complete system including all sub-systems and instrumentation control panels etc. thoroughly inspected and tested for satisfactory performance. After satisfactory completion of tests of the Systems by the GE, the Contractor shall be required to carry out all start up trials of the Systems provided by him. Any defects noticed during these tests shall be speedily rectified by the Contractor.

Note: The size and capacity of various equipment's selected are tentative and contractor will redesign/check before placing order to vendors to ensure that model /capacity selected by him gives net output of water quantity and pressure level as asked or in the schedule.

92.7 COMMISSIONING OF THE SYSTEMS

After completion of the start –up trials and duly tested by the AGE/GE, the GE may instruct the Contractor for commissioning of the Systems. All the equipment's/items in the system shall be operated to establish proper sequencing /synchronization and coordinated working of the equipment's/ items. Any defect noticed during this period shall be promptly rectified by the Contractor.

92.8 DEPUTING OF PERSONNEL AT SITE

The Contractor shall depute one qualified Engineer of this trade to site as his Project Engineer for Fire Protection Works during the currency of the Contract for handling the erection, testing and commissioning of his Systems on full time basis. He shall be present in all site meetings for appraisal of progress and site instructions till work is completed and commissioned.

92.9 PERFORMANCE CERTIFICATES OF VENDOR EQUIPMENTS

The Contractor shall be required to submit the Performance certificate from the manufacturer of the equipment's procured by him. Individual item or batch certificates shall be provided as applicable.

92.9.1 TRAINING OF EMPLOYER'S STAFF

The Contractor/Specialized Sub Contractors, shall undertake to train free of cost at least two personnel named by the AGE before taking over of the Systems.

92.9.2 SAMPLES

The Contractor shall be required to produce samples of the following items for approval, which shall be carefully maintained at site after approval. The Contractor shall use only those items whose samples have been approved. Pipes and fittings, Hydrant, swinging type Hose Reel, RRL Hose, Gun Metal Gate Valve, Pipe supports and clamps. All types of Fire Extinguishers, cast Iron Valves, Pressure Gauge, Pressure Switch, Gaskets, Nuts, Bolts, Response Indicators, Manual Call Box, Hooter cum Speaker, Conduit, Cable etc.

93 LIGHTNING PROTECTION & AVIATION LIGHT

93.1 Work under this schedule shall be carried out all as shown on drawings and as described in Schedule- 'A' / BOQ items and all as specified and directed by Engineer in charge.

PARTICULAR SPECIFICATIONS (Contd.../-)**94 BLANK****95 ARBORICULTURE / HORTICULTURE AND LAND SCAPING**

The work of Arboriculture shall be started on the existing ground levelled and dressed to required formation levels and slopes. In case where unsuitable soil is met, it shall be either removed or replaced or it shall be covered over to a thickness decided by Engineer-in-Charge with good earth. In the course of excavation or trenching during horticulture operations, cables etc. are met which shall not be dismantled without prior written permission of Engineer-in-Charge. Trenching of soil is done in order to loosen the soil, and turn over and trenched the top layer containing weeds etc. in the base and to bring up the lower layers of good earth to form a proper medium for grassing, pressing, hedging and shrubbery. Trenching shall be done to the depth ordered by the Engineer-in-Charge. The trenched ground shall, after rough dressing, be flooded with water for making small kyaries to enable the soil to settle down. Any local depression unevenness etc. shall be made good by dressing and/or with good soil. Weeds or other vegetation which appear on the ground are then rooted and removed and disposed of. The surface when hard enough is fine dressed, the excavated soil shall be straight away dumped into the adjoining positions so that double handling otherwise involved in dumping the excavated stuff outside and in back filling in the trenches shall be avoided.

95.1 MATERIALS**95.1.1 DUNG MANURE**

It shall be well decayed, free from grits and any other unwanted materials. It shall be a mixture of cow dung and sheep dung, matured in pit for a period of 3 to 12 months as approved by GE.

95.1.2. GOOD EARTH

The soil shall be suitable for gardening, free from kankar, Moorum, shingle, rocks, stones, brick bats, building rubbish and any other foreign matter. It shall also be free from clods or lumps of sizes bigger than 75 mm in any direction and shall have Ph value ranging between 6 to 8.5. Earth shall be obtained from quarries / site as approved by the Engineer-in-Charge outside the defence land. Unsuitable soil found at site shall be removed and disposed outside MOD land.

95.2. QUALITY AND GENERAL REQUIREMENTS OF PLANTS

Plants shall be typical of their species and varieties have normal growth habits, well developed branches, densely foliated with vigorous and fibrous root systems. Plants shall be free from defects and injuries. Bark shall be free from abrasion. Plants shall be freshly dug and nursery growth pots / bags. Plants shall have been grown under climatic conditions similar to those in locality of project to conditions of project location. Nursery grown plants shall have been at least once transplanted. Plants growing in natural ground prior to supply shall not be accepted. Each bundle of plants and all separate plants shall be properly identified by weather-proof level securely attached there to before delivery to project site. No plants shall be delivered to the project site, except for required samples, until inspections have been made in the field or at the nursery. Baled and Burlap plants must be removed with the root system as solids units in Balls of earth firmly wrapped with Burlap. The diameter and depth of the Balls of earth must be sufficient to encompass the fibrous and feeding root system necessary for the healthy development of the plant. No plant shall be used when the Ball of earth surrounding its roots have been badly cracked or broken prior to or during the process planting or after the equipment required in connection with its transplanting has been removed. The plant and ball shall remain intact as one unit during all operations. Container grown stock shall have been grown in container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole. No plants shall be loose in container. All plants shall be hardly under climatic conditions similar to those in the locality of the project. All trees, soon after planting shall be properly supported to ensure their safety against wind or other factor which may affect it adversely

95.3. SIZES OF PLANTS

All plants shall be not less than as described in schedule 'A' in height, which are minimum acceptable size. Plants shall be measured before pruning, with branches in normal position and healthy. The size of plant should be got approved from GE. Plants shall be stable and shall stand without support after planting and minimum length as specified and shall be straight and symmetrical with a crown and having a persistent main stem. The size of the crown shall be good overall proportion to the height of the plant. The height of plant shall be measured from the top of root up to top of foliage and not the isolated branch/leaf main stem up to half the containers height. Shrubs shall be well foliated with a crown typical of the species and variety shrub height dimension shall be average height of the top of all stems and not of the longest stem. Ground

PARTICULAR SPECIFICATIONS (Contd.../-)

cover plants shall be least one-year-old and shall be supplied in 8 inch earthen or other suitable posts/bags. Creepers and vines shall have at least four runners and shall be supplied in 8 inch earthen or other suitable pots. Creepers & vines in polythene bags are not acceptable.

95.4. SUPPLYING AND DUMPING OF MATERIALS**95.4.1. DUNG MANURE**

It shall be transported in Lorries / Trolleys to site of work. It shall be dumped at site as directed by the Engineer-in-Charge. Measurement shall be done in the transporting vehicle and gross volume shall be reduced by 8% to arrive the net quantity for payment.

95.4.2. GOOD EARTH

It shall be transported in Lorries / Trolleys to site of work. It shall be dumped at site as directed by the Engineer-in-Charge. Measurement shall be done in the transporting vehicle and gross volume shall be reduced by 10% to arrive the net quantity for payment.

95.5. MIXING OF GOOD EARTH WITH DUNG MANURE AND SPREADING

Good earth and dung manure shall be broken down to particles of sizes not exc. 6 mm in any direction. These shall be mixed in specified proportions and stacked. This mix shall then be removed from stacks by head load and spread evenly over the surface to the thickness ordered by the Engineer-in-Charge. It shall be spread with a twisting motion to avoid segregation and to ensure that spreading is uniform over the entire area. The excavated soil from the top 60 cm depth of the bed stacked at the site shall be thoroughly mixed with dung manure in the proportion 8:1 by volume (8 parts of stacked volume of earth after reduced by 10% to 1 part of stacked volume of dung manure after reduction by 8%) or other proportion as described in schedule 'A' in respective item. The mixed earth and dung manure shall be refilled over the trenched bed levelled neatly and profusely flooded so that the water reaches even the bottom most layers of the trenched depth of the bed. The surface after full subsidence shall again be refilled with the earth and dung manure mixture, watered and allowed to settle and finally fine dressed to the level 50 mm to 75 mm below the adjoining ground or as directed by the Engineer-in-Charge. Surplus earth if any, shall be disposed of as directed by the Engineer-in-Charge. Brick bats and other foreign matter if met with during excavation or trenching shall be removed and stacked within initial load and lift, such material as is declared unserviceable by the Engineer shall be disposal by spreading and levelling at places ordered by him.

95.6. PLANTING OF TREES IN GROUND

The holes of circular shape min 400 mm diameters in soil shall be excavated to a minimum depth of 500 mm, unless otherwise described in the Schedule 'A' and the excavated soil broken to clods of sizes not exceeding 75 mm in any direction, shall be stacked outside the hole. Stones, brick bats, unsuitable earth and other rubbish, all roots and other undesirable growth met during excavation shall be separated out and unserviceable materials removed from the site. Useful materials if any stacked separately. Good earth in quantities as required to replace such discarded stuff shall be taken out of the supplied good earth mixed with required manure etc. and filled. The tree hole shall be filled with manure uniformly mixed with the excavated soil after mixing manure has been broken down to powder (size of particle not to exceed 6 mm in any direction) in the specified proportion. The mixture shall be filled into the hole up to the level of adjoining ground and then profusely watered to enable the soil to subside. The refilled soil shall then be dressed evenly with its surface about 50 to 75 mm below the adjoining ground level or as directed by the Engineer-in-Charge. Immediately after plants pit is backfilled a shallow base slightly larger than pits shall be from with a ridge of soil to facilitate and contain watering. After planting cultivate the soil between the plant pit and rake smooth Spray the soil with water to settle.

95.7. MAINTENANCE OF PLANTS, SHRUBS, HERBS, GRASS ETC.

The maintenance of all trees, plants, climber, shrubs, edges, grass etc. shall be carried out by the contractor for a minimum period of 120 DAYS from the date of planting or more as directed by Engineer in charge. Maintenance of all trees, plants, climber, shrubs, edges, grass etc. from the next day of completion by employing 01 skilled Gardeners per day to ensure healing, up keeping /watering of plants, pour manure, carryout periodical tilling and using pesticides, cutting grass and removing unwanted grass and plants from work site as directed by Engineer-in-Charge. During the period any plant, shrubs, grass etc. is found dead, to shape or size as specified or not in satisfactory growth, plant of approved size and shape shall be replaced by the contractor without any extra cost to Govt. Supply and application of manure, good earth, sand, ATT chemical,

PARTICULAR SPECIFICATIONS (Contd.../-)

pesticide, fertilizer, cartage etc. as required are included in quoted rate during maintenance period. During this period any irregularities arising in ground levels due to watering or due to ramping by labour, or due to cattle straying thereon, shall be constantly made upto the proper levels with good earth. Constant watch shall be maintained to ensure that dead patches are replanted and weeds are removed. The Contractor shall be responsible for re-planting damaged ones, maintaining/protecting the plants, shrubs, herbs, grass etc. planted under this contract for a period of one year from the certified date of planting Rates quoted in Schedule 'A' shall deem to include all materials and labour required for regular wetting, watering, mulching the soil, fertilizing, punning/mowing, pesticides, T&P and other horticultural operation needed for proper growth of planted etc. implanted under the Contract. Any causality in implanted plants, herbs, shrubs, grass etc. during maintenance period shall be made good by the Contractor at his own cost and expense to the entire satisfaction of Engineer-in-Charge and nothing extra shall be admissible at any account. As soon as the grass is Approx. 3 cm high it shall be rolled with a light wooden roller in fine, dry weather and when it has grown to 5-8 cm above the ground, weeds must be removed and regular cutting with the scythe and rolling must begin. A top dressing of farm yard manure to the square yard or well decomposed well broken sludge manure shall be applied when the grass is sufficiently secure in the ground to bear the moving machine, the blade must be raised an inch above the normal for the grass could be cut so that it is from 4-5 cm in length, instead 3 cm necessary for manure grass. Damaged or dying back of grass due to any account shall be made good by the contractor at his own expense. Any Shrinkage below the specified levels during the contract period shall be rectified by the contractor at his own expense. The contractor is to exercise care in use of moving machines to reduce to a minimum the hazards of flying stone and brick bats. All moving machines are to be stationed with safely guards. Maintaining of the plantation and landscape area will include weeding, rolling, mowing, replacement of dead plants, watering, cultivating, control of insects, fungus and other diseases by means of spraying approved insecticide or fungicide, pruning, making of thalas, Manuring, applying fertilizer, side cutting, provision of seasonal flowers, plants in as directed and other horticulture operations necessary for proper growth and maintenance of the plants, trees so as to present a well-kept and neat appearance at all times. However, potted plants for nursery area and semi-grown up trees shall be arranged as decided by Engineer-in-Charge. A mower with roller shall be used periodically, taking care that the lawn is too wet and sodden. Edges shall be kept neat and must be cut regularly with the edging shears. Care must be taken to replace the damaged/dead plants with plants of equal height without any extra cost. The lawn, plants, trees shall be watered with sprinklers or the contractor's flexible water pipe or as required, soaking the soil through to a depth of at least 20 cm. The quoted rates shall be inclusive of cost of all materials like pesticides, manure, fertilizer etc. (except electricity), labour, tools, plants, equipment, transportation, taxes & levies etc. Water shall be made available from the places, earmarked within the defence area as per instructions of the Engineer-in-Charge for horticulture works where the contractor has to make his own arrangement at his cost so that watering could be done for the entire area under scope of work. Agency will execute the work as per specifications mentioned in these tender documents. However, where specification is not available in these tender documents or in SSR Part-I, work shall be executed as per sound engineering, arboriculture and landscaping practices and as per directions of GE.

95.8. PRECAUTIONS

During the maintenance period any irregularities arising in ground levels due to watering or due to trampling by labour, or due to cattle straying thereon shall be constantly made up to proper levels with earth as available or brought from outside as necessary. Constant watch shall be maintained to ensure that dead plants are replanted and weeds are removed. The rate shall include the cost of all labour and materials involved in all operations described above including supply of the requisite quantity of good earth from excavated soil of so needed properly maintaining the levels of the lawns.

96 LIST OF DRAWINGS Drawings listed hereafter shall form part of these tender documents.

Signature of Contractor

**AAD (Contracts)
for Accepting Officer**

LIST OF DRAWINGS

SI No	DESCRIPTION	REF DRG. NO	SHEET NO.	DATE	REV DATE
A.	<u>GENERAL DRAWINGS</u>				
1	LIST OF DRAWINGS	LD/2026/01	1/1	12/05/2026	
2	SITE PLAN - (B/R SERVICES)	S/2026/01	1/2	12/05/2026	
3	SITE PLAN - EXTERNAL (E/M SERVICES)	S/2026/01	2/2	12/05/2026	
B.	<u>ARCHITECTURAL DRAWINGS</u>				
4	GROUND FLOOR, TYPICAL FLOOR PLAN (1 ST FLOOR TO 6 TH FLOOR)	WD/2026/01	1/12	12/05/2026	
5	TERRACE, MACHINE ROOM LVL PLAN	WD/2026/01	2/12	12/05/2026	
6	FRONT & REAR ELEVATION	WD/2026/01	3/12	12/05/2026	
7	LEFT & RIGHT ELEVATION, DETAIL OF SINGLE DU	WD/2026/01	4/12	12/05/2026	
8	SECTION AA & SECTION BB	WD/2026/01	5/12	12/05/2026	
9	DETAILS – (STAIRCASE 1, FIRE ESCAPE STAIRCASE, TOILET, KITCHEN)	WD/2026/01	6/12	12/05/2026	
10	DETAILS – 2	WD/2026/01	7/12	12/05/2026	
11	DETAILS – 3	WD/2026/01	8/12	12/05/2026	
12	E&M PLAN GROUND FLOOR, TYPICAL FLOOR	WD/2026/01	9/12	12/05/2026	
13	E&M PLAN (SINGLE DU, MACHINE ROOM)	WD/2026/01	10/12	12/05/2026	
14	SCHEMATIC PLAN (WATER SUPPLY IN BLDG)	WD/2026/01	11/12	12/05/2026	
15	SCHEDULE OF FINISHES	WD/2026/01	12/12	12/05/2026	
C.	<u>STRUCTURAL DRAWINGS</u>				
16	STRUCTURAL GENERAL NOTES AND TYPICAL STRUCTURAL DETAILS	WD/S/2026/01	1/23 to 5/23	23/03/2026	
17	GENERAL LAYOUT OF RAFT FOUNDATION & SHEAR WALL	WD/S/2026/01	6/23	23/03/2026	
18	RAFT FOOTING – SHOWING EXTRA BOTTOM BARS & SECTION AT X-X	WD/S/2026/01	7/23	23/03/2026	
19	RAFT FOOTING - SHOWING EXTRA TOP BARS	WD/S/2026/01	8/23	23/03/2026	
20	STRUCTURAL PLINTH LEVEL PLAN – SHOWING SHEAR WALLS & BEAMS	WD/S/2026/01	9/23	23/03/2026	
21	STRUCTURAL TYPICAL PLAN FOR 1 ST FLOOR TO 6 TH FLOOR – SHOWING SHEAR WALLS & BEAMS	WD/S/2026/01	10/23	23/03/2026	
22	STRUCTURAL PLAN OF ROOF – SHOWING SHEAR WALLS, BEAMS & SLABS	WD/S/2026/01	11/23	23/03/2026	
23	STRUCTURAL PLAN OF LMR BASE SLAB – SHOWING SHEAR WALLS, BEAMS & SLABS	WD/S/2026/01	12/23	23/03/2026	
24	STRUCTURAL PLAN OF MUMTY TOP LEVEL – SHOWING SHEAR WALLS, BEAMS & SLABS	WD/S/2026/01	13/23	23/03/2026	
25	STRUCTURAL PLAN OF WATER TANK BASE AND LMR TOP LEVEL – SHOWING SHEAR WALLS, BEAMS & SLABS	WD/S/2026/01	14/23	23/03/2026	
26	RCC SCHEDULE OF BEAMS AT PLINTH LEVEL	WD/S/2026/01	15/23	23/03/2026	
27	RCC SCHEDULE OF BEAMS - FIRST FLOOR TO SIXTH FLOOR	WD/S/2026/01	16/23	23/03/2026	
28	RCC SCHEDULE OF BEAMS – ROOF LEVEL	WD/S/2026/01	17/23	23/03/2026	

LIST OF DRAWINGS (Contd/-)

SI No	DESCRIPTION	REF DRG. NO	SHEET NO.	DATE	REV DATE
29	DETAILS OF SHEAR WALL	WD/S/2026/01	18/23	23/03/2026	
30	DETAILS OF SHEAR WALL	WD/S/2026/01	19/23	23/03/2026	
31	DETAILS OF SHEAR WALL	WD/S/2026/01	20/23	23/03/2026	
32	DETAILS OF STAIRCASE 1 & 2	WD/S/2026/01	21/23	23/03/2026	
33	DETAILS OF WATER TANK	WD/S/2026/01	22/23	23/03/2026	
34	DETAILS OF LIFT WELL PIT & OTHER MISC DETAILS	WD/S/2026/01	23/23	23/03/2026	
D.	<u>TYPICAL DRAWINGS</u>				
35	DETAILS OF NAHANI TRAP AND PIPE CONNECTION	TD/2007/44	1/2 to 2/2	10/04/2007	
36	DETAILS OF FAN AND HOOK	TD/2007/6	1/1	10/04/2007	
37	ARCHITECTURAL NORMS FOR FIXING HEIGHTS OF LAVATORY FITTINGS	TD/2007/15	1/1	10/04/2007	
38	TYPICAL DETAILS OF PELMET BOX, RAMP, MS RUNGS, ROOF SLAB, ROOF PROJECTION, PEG SET, PCC COPING, PLINTH PROTECTION, RAILING & CURTAIN ROD	TD/2000/43	1/3 to 3/3	10/04/2007	
39	SYMBOLS FOR INTERNAL ELECTRIC & WATER SUPPLY INSTALLATION	TD/2007/41	1/1	10/04/2007	
40	TYPICAL DETAILS OF FIXING HDPE WATER STORAGE TANK OVER RCC SLAB)	TD/2007/12	1/1	10-04-2007	
41	TYPICAL DETAILS OF SWITCH BOX FOR DOMESTIC LIGHT AND POWER (MAIN SWITCHES & DISTRIBUTION BOARD INCLUDING METER)	TD/2007/42	1/3 to 3/3	10-04-2007	
42	TYPICAL DETAILS OF PCC STEPS	TD/95004	1/1	20-03-1995	08-03-2015
43	TYPICAL DETAILS OF SLIDING ALUMINIUM WINDOW	TD/2007/39	1/4 to 4/4	10-04-2007	04-09-2015
44	NOTES ON RCC WORKS	TD/S/2010/08	1/12 to 12/12	29-10-2010	
45	TYPICAL DETAILS OF RCC CHAJJA LINTEL AND SCHEDULE OF RCC LINTEL	TD/S/2010/09	1/10 to 10/10	29-10-2010	
46	TYPICAL DETAILS OF DUCTILE DETAILING STIRRUPS IN BEAMS, TIES IN COL AND BEAM	TD/S/2018/01	1/3to 3/3	06-02-2018	
47	TYPICAL DETAILS OF OPENABLE WINDOW AND VENTILATORS	TD/2007/40	1/5 to 2/5,	10-04-2007	04-09-2015
48	TYPICAL DETAILS OF STEEL GATE (MS PIPE) 3500 TO 5500 WIDE	TD/2007/03	1/1	20-04-2007	14-08-2014
49	TYPICAL DETAILSOF FIXING EXHAUST FAN AND ELEVATION AND SECTION	TD/2007/14	1/1	10-04-2007	
50	TYPICAL DETAIL OF ROADS AND DRAINS	TD/2007/18	1/2 &2/2	10-04-2007	
51	TYPICAL DETAILS OF EWC & MANHOLES	TD/87003	1/1	10-11-2010	
52	TYPICAL DETAILS OF SOAKAGE PIT	TD/94007	01/01	26-11-1994	10-04-14
53	TYPICAL DDETAILS OF SEPTIC TANK 150 TO 500 USERS	TD/2007/10	1/4 to 4/4	10-04-2007	
54	TYPICAL DETAILS OF FALSE CEILING FOR AC & NON AC ROOM AND INSULATION TO ROOF SLAB OF AC ROOMS	TD/2007/38	1/2 to 2/2	10-04-2007	
55	TYPICALFIXING DETAILS OF LIGHTENING CONDUCTORS	TD/99002	1/1	13-01-1999	
56	TYPICAL DETAILS OF CHAIN LINK FENCING WITH ANGLE IRON POST	TD/2007/37	1/2 &2/2	10-04-2007	
57	TYPICAL DETAILS OF STEEL DOOR FOR MACHINE ROOM AND CABLE SHAFT	TD/89001	1/1	14-01-1989	
58	TYPICAL DETAILS OF BARICADING AND ITS FIXING DETAILS 3MTR HEIGHT	TD/2021/04	1/1	14-09-2021	
59	TYPICAL DETAILS OF ALUMINIUM SLIDING DOOR	TD/2016/01	1/1	28-12-2016	
60	TYPICAL DETAILS OF FENCING FOR OUTDOOR OPEN TYPE TRANSFORMER INSTALLATION	TD/2023/02	1/3 to 3/3		

LIST OF DRAWINGS (Contd/-)

SI No	DESCRIPTION	REF DRG. NO	SHEET NO.	DATE	REV DATE
61	PIPE SUPPORTING SYSYTEM	TD/2023/01	1/3 to 3/3	14/02/2023	18/11/2024
62	TYPICAL DETAILS OF MOULDED PVC DOOR	TD/2021/02	1/4 to 4/4	14-02-2021	
63	TYPICAL DETAILS OF STANDARD ALUMINIUM DOOR	TD/2007/13	1/3 to 3/3	10-04-2007	09-03-2017
64	SCHEDULE OF FINISHES (SPECIFICATIONS)	TD/2024/01	1RR/1	24-04-2026	

Note: TD drawings referred in these tender documents, if not uploaded shall be referred to, by the Contractor as available on website www.mes.gov.in and in the office of the Chief Engineer (Navy) Mumbai and concerned CWE & GE office. No claim whatsoever on this account will be entertained by theDepartment.

Signature of Contractor

**AAD (Contracts)
for Accepting Officer**

Appendix-‘A’

LIST OF BIS CERTIFIED PRODUCTS TO BE INCORPORATED IN THE WORK

SI No.	Material	IS No.
1.	Concrete:	
	Integral water proofing compounds	IS-2645-2003
2.	Joinery:	
	Wooden flush door shutters, solid core type	IS-2202, Part I -1999
3.	Building Hardware:	
(a)	Steel butthingses	IS-1341-1992
(b)	Ferrous towerbolts	IS-204, Part I-1991
(c)	Non-ferrous towerbolts	IS-204, Part II-1992
(d)	Door handles(non-ferrous)	IS-208-1996
(e)	Parliament hinges(ferrous)	IS-362-1991
(f)	Continuous pianohinges	IS-3818-1992
(g)	Non-ferrous metal sliding doorbolts	IS-2681-1993
(h)	Tee and strap hinges	IS-206-1992
(i)	Mild steel sliding doorbolts	IS-281-1991
4.	Steel and Iron Work:	
	Steel Doors, Windows and Ventilators	IS-1038-1983
5.	Roof Covering:	
	Bitumen felts for water proofing and damp proofing	IS-1322-1993
6.	Ceiling & Lining:	
(a)	Plywood for generalpurposes	IS-303-1989
(b)	Blockboards	IS-1659-2004
(c)	Veneered particleboard	IS-3097-2006
(d)	Marine plywood	IS-710
(e)	Fibrehardboard	IS-1658-2006
(f)	Medium density fibreboard	IS-12406-2003
7.	Flooring:	
(a)	White Portland cement	IS-8042-1989
(b)	Cement concreteflooring	IS-1237-1980
8.	Water supply, plumbing, drains & sanitary appliances:	
(a)	Concrete pipes with or without reinforcement	IS-458-2003
(b)	Salt glazed stoneware pipes & fittings	IS-651-1992
(c)	Centrifugally cast (Spun) Iron spigot & socket soil, waste & vent pipes, fittings & accessories	IS-3989-1984
(d)	UPVC soil, waste & rain water pipes	IS-4985-2000
(e)	Cast iron / ductile from drainage pipe & pipe fittings for over ground non-pressure pipes, spigot & socket services	IS-1729-2002

LIST OF BIS CERTIFIED PRODUCTS TO BE INCORPORATED IN THE WORK (CONTD/-)

SI No.	Material	IS No.
	(f) Galvanised mild steel tubes	IS-1239 Part-I-2004
	(g) Galvanised mild steel tube fittings	IS-1239, Part II-1992
	(h) Vitreous China sanitary appliances	
	(i) Wash down water closets	IS-2556-Part-II-2004
	(ii) Squatting pans	IS-2556 Part-III-2004
	(iii) Wash basins	IS-2556 Part-IV-2004
	(j) Plastic WC seat covers	IS-2548 (Part-I & II)- 1996
	(k) Flushing cisterns for water closets and urinals other than plastic	IS-774-2004
	(l) Ball valves (horizontal plunger type) including floats for water supply purposes	IS-1703-2003
	(m) Cast copper alloy screw down bib taps and stop valves	IS-781-1984
	(n) Pillar taps	IS-1795-1982
	(o) Cast iron manhole covers and frames	IS-1726-1991
9.	Electrical Works:	
	(a) Ceiling rose	IS-371-1979
	(b) Tumbler switches	IS-3854-1966
	(c) Socket outlet – 3Pin plug and socket	IS-1293-2005
	(d) Switch fuses (mains & switches)	IS-4064-
	(e) Rigid steel conduit	IS-9537 Part-II-1981
	(f) Rigid non-metallic conduits	IS-3419-1988
	(g) Single core cable polyethylene insulated and PVC sheathed cable	IS-1596-1977
	(h) Starter for tube light	IS-2215-1983
	(j) Fluorescent lamps	IS-2418 Part-I to IV- 1977
	(k) Aluminium stranded conductor	IS-398-1976
	(l) MCBs	IS-1828-1996
10.	Code of practice for fire safety of buildings (general) firefighting equipment and its maintenance	IS-1648 – 1961
11.	Code of practice for installation of internal fire hydrants in multi-storied buildings	IS-3844 – 1966
12.	Dimensions for pipes, threads where pressure tight joints are required on the threads	IS- 554
13.	Sheet rubber jointing and rubber insertion jointing	IS- 638
14.	Copper alloy gate, globe and check valves for water work purposes	IS-778
15.	Sluice valves for water work purposes (50mm to 300mm)	IS-780
16.	Couplings double male and double female, instantaneous pattern for fire fittings	IS-901
17.	Mild steel tubes, tubular and other wrought (Part-I & II) steel fittings	IS-1239
18.	Swinging type wall mounted hose reel with drum	IS-884
19.	Fire hose tubing	IS-388

LIST OF BIS CERTIFIED PRODUCTS TO BE INCORPORATED IN THE WORK (CONTD/-)

20. Foot valves for water work purposes		IS-4038
SI No.	Material	IS No.
21. Landing valves		IS-5290
22. Anti-corrosion treatments for underground MS pipes		IS-10221
23. Swing check type reflux (non- return) valves		IS-5312
24. Firefighting delivery hose		IS-636-1988
25. Specification for fire hose, delivery coupling, branch pipe, nozzles		IS- 903-1984
26. Pumps		IS-12469

Note:Corresponding year against each IS code whether mentioned / not, latest version in the trade shall be implied

SignatureofContractor

AAD (Contracts)
for Accepting Officer

MAKES / NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

SI No.	Items	Brand / Makes
CONCRETE		
1.	Ready Mix Concrete	Lafarge (RMC), Ultra Tech, ACC, RMC Ready Mix, Ramco
2.	AAC blocks	Siporex (Ecolite), BIRLA AEROCON HIL Ltd Hyderabad, Ultratech Mumbai XTRALITE AAC, JVS Comatsco Industries Pvt Ltd Pune, Delite Blocks Pvt Ltd Akola Maharashtra, ECO Green Product Pvt Ltd Ahmedabad, Ortilite AAC walling Block Kota Rajasthan, R.S. Greeninfra Pvt Ltd SolanHP, Renaatus Procon Pvt Ltd Chennai, N.J. Eco Build Pvt Ltd Gujarat, Kansal Building solutions New Delhi, Magicrete Building Solutions Pvt Ltd. Surat, Ascolite Aswani Industries Pvt Ltd Surat, M/s Concecc, Greenway Building Materials India Pvt
JOINERY		
3.	Factory made wooden shutter / Flush doors / Frames	M/s Goel Brothers, Raipur / M/s Pioneer Timber, Chandigarh / M/s Goyal Industries, New Delhi / M/s Jain Doors Pvt Ltd, Haryana / M/s India Wood & Wood Products, Mangalore / M/s M P Wood Products, Indore/ M/s A1 Teak Products, Indore, M/s Jain Wood Industries (JAYNA)
4.	Factory made PVC, FRP shutters and frames	M/s Rajshri Plastiwood, Indore (Rajshri) / M/s Sintex Industries Ltd. (Sintex) / M/s Accucell / M/s Dura Plast Extrusion (Duraplast) / M/s Madhu Industries (Madhu Industries) / M/s Navratna Co Special Chemicals (GIZA) / M/s Accura Polytech (ACCUCEL), M/s Engco Industries Jodhpur, M/s SPC, M/s Janik Developers, M/s Kumar Arch Tech Pvt Ltd, M/s Black Cobra, M/s Jain Wood Industries (JAYNA), Maica
5.	UPVC doors, windows and ventilators	M/s Poly Windows, Pune / M/s Aparna Profiles Pvt Ltd (APARNA VENTSAR OKOTECH) / M/s Rajshri Plastiwood, Indore (Rajshri) / M/s Madhu Industries (Madhu Industries) / M/s Accura Polytech (ACCUCEL), M/s Yashashri Polyextrusions Pvt Ltd, M/s Chandni Industries, M/s Astrapia UPVC Tech Pvt Ltd
6.	Steel windows, ventilators, door frames, shutters	M/s Madhu Industries, M/s Godrej & Boyce Steel Mfg., Mumbai, M/s Ashwani & Sons, Ghaziabad, M/s Multiwyn Industrial Corporation, Kolkata, M/s Agew Steel, Ahmedabad, M/s Ishwar Industries, M/s JEW, M/s Deccan Structural Pvt Ltd Banglore, M/s Chandni Industries, M/s Anoop Industries, M/s Trishul Industries, M/s Ashish Industries
7.	PVC Foam Sheets/Boards	M/s Rajshri Plastiwood, Indore (Rajshri), Qute Extrusions Pvt Ltd (Brand: Qute), OM Industries, Duroplast
8.	WPC Boards	M/s Rajshri Plastiwood, Indore (Rajshri), Kalinga, Ecoste, Hardyplast, Qute Extrusions Pvt Ltd (Brand: Qute), M/s Yashashri Polyextrusions Pvt Ltd, M/s Kumar Arch Tech Pvt Ltd, M/s Giza, M/s Black Cobra
9.	Extruded PVC Profile Doors & Frames	M/s Rajshri Plastiwood, Indore (Rajshri), Qute Extrusions Pvt Ltd (Brand: Qute), OM Industries, Duroplast, M/s Ishwar Industries, Maica
10.	Aluminium section of shutters/frames for door/window/ventilators	M/s Hindalco Ind Ltd (HINDALCO) / M/s Indian A 1 Company (INDAL) / M/s Jindal, M/s Ishwar Industries, M/s Associated profile & Alum Ltd, M/s Sterlite, M/s Bhoruka Alum Ltd, M/s Architecture Incorporation Chennai, M/s Deco Grill, M/s Chandni Industries
11.	Rolled Formed GI section Pre Painted/ Pre Coated Windows	M/s NCL ALL TEK & SECCOLOR Elixir Met (SECCOLOR), JSW Steel, M/s Ishwar Industries
12.	Steel Rolling Shutters / grills & Collapsible Gates	M/s Shree Laxmi Engg Works, Bengaluru / M/s Prakash & Co New Delhi / M/s Senthil Rolling Shutters & Engg Co, Chennai / M/s Swastik Rolling Shutters, Mumbai / M/s Jayraj Industries, Chennai, M/s Darshan Rolling Shuttering Nashik, M/s Shalimar Rolling and Shutters & Co., M/s Ganesh Rollings and Shutters Hyderabad, M/s Shapana Dock & Steel
13.	Hydraulic Door Closer	M/s Everlite / M/s Universal / M/s Hardwin / M/s Dyna, M/s Ranjan, M/s Kelin, M/s Amar Engg & Co New Delhi, M/s Prabhat Door King, M/s Perfect Hydraulic, M/s Crown
14.	Stainless Steel Plate Rack	M/s Prayag (Prayag) / M/s Nirali / M/s Bluestar Sanitary Industries Pvt Ltd (SILVERSHINE), M/s SPC, M/s Asian

SI No.	Items	Brand / Makes
		Paints (Bath Division), M/s Dhawan Sanitary Udyog (Prima), M/s Jain Enterprises (Jaynam), M/s Crown
15.	Aluminium Tower Bolt / Aldrops / Door handle / Butt Hinges	Argent Industries (ARGENT/DOORGLOW), Jindal, ESSESS, M/s Aluminium Udyog (Global), M/s Kich, M/s Swastik, M/s Crown
16.	Towel Rails	M/s Jaguar, M/s KICH, Jaquar, Somany, Kohler, Grohe, Hindware, M/s Swastik, M/s Prayag, M/s Ambani, M/s Asian Paints (Bath Division), M/s Dhawan Sanitary Udyog. (Prima), M/s HINDWARE, M/s Aluminium Udyog (Global), M/s Bluestar Sanitary Industries Pvt Ltd (SILVERSHINE)
17.	Mortice Locks	M/s Harrison (HARRISON), M/s Godrej & Boyee Co Ltd, Dorset India, Spider Metal Products Ltd, ENOX, Jainson, M/s RP Lock Co New Delhi, M/s Kick, M/s Crown
18.	Drapery rod	M/s Vista Levolor, M/s MAC-DÉCOR, DECO Window, Jayesh Metal Corpn (JMC), M/s Sophia
19.	Venetian Blinds	M/s Vista Levolor, M/s MAC-DÉCOR, Aerolux, MAC
20.	Mangalore Tiles	M/s Charminar / M/s Raja / M/s RECHO / M/s Prajapati / M/s Kerala Tile Works, M/s Trisur, M/s Mari Tile Works Kawiyoor, M/s Saint Anthonys, M/s Muvattupuzha Ernakulam, M/s Haessika Decorative Tiles
21.	Non-asbestos Fibre reinforced (poly propylene), 6mm Cement Corrugated sheets	M/s Everest Industries Ltd (EVEREST) / M/s Charminar Fortune (M/s HIL Ltd) (Charminar Fortune) / M/s RAMCO Indus Ltd (RAMCO)
22.	Pre Painted Galvalume/ Galvanised Corrugated Steel Sheets	M/s Tata / M/s JSW / M/s ESSAR, M/s METCO Roof Pvt Ltd, M/s Proflex System
23.	Galvanised Plain/ Corrugated Steel Sheets	M/s Tata / M/s JSW / M/s ESSAR, M/s Indian Steel Corp Ltd, M/s National Steel And Agro Industries Ltd
24.	Pre-moulded non-bituminous joint filler board	M/s Elcon, M/s Duron Board HD-100
25.	Pre-moulded bituminous joint filler board	M/s STP Ltd, M/s Tikitar Industries Ltd., M/s Sikka
26.	AC Sheets & Ridges	M/s Charminar (CHARMINAR), M/s Everest, M/s UP Asbestos, M/s Ramco, M/s Visakha Indus, M/s Asbestos Cement Ltd
27.	Water Proofing Compound	M/s Pidilite Industries Ltd (PIDILITE), M/s FOSROC, M/s Dr Fixit, M/s SICO, M/s Imermo, M/s EXCOT, M/s Superaquacern Ltd, M/s STP
28.	APP Membrane	M/s STP Ltd, M/s Texsa India Ltd, M/s IWL Ltd, M/s Tiki Tech, M/s Torchtar Membranes & Bitumen Products Pvt Ltd, M/s Tiki Tar Danosa (India) Pvt Ltd, M/s Shivam Tar Product, M/s Bengal Bitumen, M/s IWL India Ltd.
29.	Perforated particle Board / tiles for insulation and acoustic wall panelling	M/s Anchor Ceiling Tiles, M/s Armstrong Wood Ind, M/s GYP Board, M/s Bison Panel, M/s Lagyp, M/s Diamond Ceilings
30.	PVC False ceiling, Wall lining & Solid PVC Partitions	M/s Rajashri Plastiwood, Indore (Rajashri), M/s Fenesta M/s Qute Extrusions Pvt Ltd (Brand Qute), M/s Embroshyal Pvt Ltd, M/s Diamond International Inex Pvt Ltd, M/s Gypsum Board, M/s Armstrong, M/s Ramco, M/s Bison, M/s Dexune, M/s Kumar Arch Tech Pvt Ltd, M/s GIZA, M/s, M/sAccucel, M/s Black Cobra, Maica
31.	Plywood	M/s Kitply (KITPLY)/ M/s Century Plywood / M/s Archid Ply (ARCHID)/ M/s Green Ply (GREEN PLY), M/s Anchor (ANCHOR), M/s United Timber Industries
32.	Particle Board Gypsum	M/s Mangalam Timber Product, M/s Gypsum Board, M/s Jolly Board, Mumbai, M/s Indian Gypsum product, M/s Armstrong World Industries
33.	Laminated Sheets	M/s Formica, M/s SunGloss, M/s Sunmica, M/s Backelite Hylum, M/s Eco Board, M/s Aldeko Panels Pvt Ltd.
34.	Adhesives	M/s Pidilite, M/s Fevicol, M/s Vermicol
35.	Pre-laminated Particle board	M/s Nava Pan, M/s Eco Board Industries, Pune, M/s Kitply, M/s Green Ply, M/s Anchor Lam, M/s Century Plywood
36.	Block boards and veneered particle board	M/s Bajaj Boards, M/s Nu Wood, M/s A-1 Boards, M/s Bhutan Boards (Bhutan), M/s Charminar (Charminar)
37.	Aluminium Formwork	M/s MIVAN, M/s S-FORM, M/s MFS, M/s KUMKANG KIND, M/s MAFS (Maini Aluminium Formwork System), M/s NAVKAR Aluminium Technocraft Industries Pvt Ltd

SI No.	Items	Brand / Makes
<u>FLOOR FINISHES & PAVINGS</u>		
38.	Glazed Ceramic wall / Flooring tiles	M/s Johnson Tiles, M/s Kajaria, M/s Somany, M/s Asian Granite Industried Ltd (AGI TILES), M/s RAK Cements Ltd (RAK CERAMICS), M/s Hindware Ltd., M/s Sega Granito LLP, M/s Bhagirathi Engineering Co, M/s Spartek, M/s Regency, M/s Murudeshwar Ceramics, M/s Orient Bell, M/s OASIS, M/s Sunheart, M/s Qutone, M/s Vermora, M/s Aparna Enterprises Ltd (VITERO), M/s Hindware, M/s Gypsonic,
39.	Non-skid Ceramic tiles	M/s Johnson Tiles, M/s Kajaria, M/s Somany, M/s Orient Bell Ltd, M/s Bhagirathi Engineering Co, M/s Asian, M/s Spartek, M/s Regency, M/s Ambani, M/s Naveen Tiles, M/s Hindware, M/s Aparna Enterprises Ltd (VITERO), M/s Gypsonic,
40.	Vitrified Tiles	M/s Johnson Marbonite, M/s Kajaria, M/s Somany, M/s Orient bell, M/s Asian Granite Industried Ltd (AGI TILES), M/s RAK Cements Ltd (RAK CERAMICS), M/s Bhagirathi Engineering Co, M/s Murudeshwar Ceramics, M/s Bell Granito, M/s Naveen Tiles, M/s Vermora, M/s Swastik Tiles, M/s Sunheart, M/s Cengres, M/s Osis, M/s Qutone, M/s Ambani, M/s Aparna Enterprises Ltd (VITERO), M/s Hindware, M/s Gypsonic,
41.	Mosaic/Cement Flooring Tiles	M/s NITCO Mumbai / M/s Ultra / M/s Duracrete / M/s Mehtab Tiles Indore/ M/s National Tiles / M/s Bharat Tiles & Engg Co Bangalore / M/s Modern Tiles and Marbels, M/s Bhagirathi Engineering Co, M/s Mehtab Tiles Indore, M/s Gawalior, M/s Gypsonic,
42.	Acid Resistant Tiles	M/S Johnson, Mumbai, M/s Somany, M/s Kajaria, M/S Burn Standard Co, Jabalpur, M/S Purshuram Pottery Wks, Marvi, M/s Bhagirathi Engineering Co, M/s Coromandal Products, M/s Ishwar Industries Delhi, M/s Regency Ceramic, M/s Duracrete, M/s Hindware, M/s Gypsonic,
43.	Cement Concrete Interlocking Paver Blocks / Tiles	M/s MehtabTiles, Indore, M/S Ultra Tiles, M/s Navya Tiles, Jodhpur, M/s NITCO, M/s Patel Fur Mart, M/s Ruchi Industries, M/s Bhagirathi Engineering Co, M/s SAP Paver Jodhpur, M/s Sagar, M/s CEME, M/s Topaaz Tiles, M/s Swami Tiles, M/s Sukhi, M/s Supreme, M/s LC, M/s Vaishnavi Developer, M/s Gypsonic,
44.	PVC Sheet and Tile flooring	M/s Krishna Vinyl Tiles, M/s Armstrong, M/S Marbles Tiles, M/s Polyfin Tiles, M/s Square Foot, M/s Krishna Vinyl tiles, M/s Bhagirathi Engineering Co,M/s Neelkamal, M/s Premeir Vinyl Flooring N/Delhi, M/s Rikvin Floors N/Delhi, M/s Wonder Floor, M/s Gypsonic,
<u>WHITE WASHING, COLOURING & DISTEMPERING</u>		
45.	Distemper oil-emulsion (OBD)	M/s Nerolac, M/s Asian Paints, M/s Berger Paints, M/s ICI India M/s Shalimar Paints, M/s Asian Paints, M/s Johnson & Nicolson, M/s Jotum, M/s Garware
46.	Plastic Emulsion Paint and Exterior Emulsion Paint	M/s Asian Paints, M/s Berger Paints, M/s Nerolac, M/s ICI India, M/s Alcolite India Road Safety Pvt Ltd.,M/s Shalimar Paints
47.	Cement Base Paint	M/s Super Snowcom, M/s Duracom, M/s Aquacem, M/s Shalimar Paints, M/s Berger Paints, M/s Ultratech Cement Ltd White Cement Div, M/s Asian , M/s Accrocem, M/s NITCO Mumbai, M/s Johnson & Nicolson
48.	Cement Putty	M/s Birla Cement, M/s JK White Cement, M/s Golden Mohar, M/s Asian Paints, M/s Jehnson & Nicolson, M/s Ultratech Cement Ltd, White Cement Div, M/s Shalimar
<u>GLAZING</u>		
49.	Sheet glass (plain)	M/s Saint Gobain, M/s Asahi Works, M/s Atul Glass Indus, M/s Modi Guard
50.	Sheet glass frosted	M/s Saint Gobain, M/s Asahi Works, M/s Atul Glass Indus, M/s Modi Guard
51.	Heat absorbing glass& reflective solar control film	M/s Hindustan Pilkington GlassWorks, M/s Saint Gobain, M/s Modi Float, M/s Modi Guard
52.	Rough cast wired glass	M/s Hindustan Pilkington GlassWorks, M/s Saint Gobain, M/s Modi Float, M/s Modiguard
53.	Oil Putty	M/s Jehnson & Nicolson, M/s Berger Paints, M/s Asian Paints M/s Shalimar Paints, M/s Anglo Dutch Colour & Vernish, M/s Najafgarh Road, M/s Golden Mohar, M/s Atul Dyes & Chemicals, M/s UK Paints Indus Gurgaon

SI No.	Items	Brand / Makes
54.	Mirror	M/s Modi, M/s Atul, M/s Saint Gobain, RS Industries(Polytuf), M/s Prayag, M/s Dhawan Sanitary Udyog
<u>PAINTING</u>		
55.	Synthetic Enamel Paint	M/s Asian Paints, M/s Nerolac Paints, M/s Dulux, M/s ICI Paints, M/s Shalimar Paints, M/s Johnson & Nicolson, M/s Jotum, M/s Backlite Coatings & Paints (P) Ltd
<u>WATER SUPPLY, PLUMBING, DRAINS & SANITARY APPLIANCES</u>		
56.	CI Pipe and fittings	M/s Electro-Steel Casting Ltd, M/s Kejriwal, M/s NECO, M/s Kesoram, M/s Euroaqua Plumtek Pvt Ltd.,
57.	GI Pipes & Fittings	M/s Tata, M/s Jindal, M/s Zenith, M/s Swastik, M/s Prakash, M/s Euroaqua Plumtek Pvt Ltd.
58.	DI Pipes & Fittings	M/s Jindal Ltd, Gujarat, M/s Electrosteel Castings Ltd, WB, M/s Tata Metallics, Kolkata, M/s SAW Pipes, M/s Srikalahasti Pipes Ltd, M/s Euroaqua Plumtek Pvt Ltd.
59.	MS Pipes & Fittings	M/s Tata, M/s Jindal Ltd Gujarat, M/s BST, M/s Zenith, M/s Euroaqua Plumtek Pvt Ltd., M/s Swastik , M/s Prakash, M/s Surya
60.	HDPE Pipes & Fittings	M/s Finolex, M/s Prince Pipes Fittings Ltd, M/s Supreme, M/s Jain Irrigation Systems, M/s Prayag polymers Pvt Ltd. , M/s Euroaqua Plumtek Pvt Ltd., M/s Core Fit, M/s Kisan, M/s Plasto, M/s Tirupati, M/s SFMC
61.	CPVC pipes and fittings (Chlorinated polyvinylchloride)	M/s Finolex, M/s Dutron, M/s SFMC, M/s Prince Pipes Fittings Ltd (SMART FIT), M/s Birla Aerocon (HIL Ltd), M/s Prayag polymers Pvt Ltd. M/s Euroaqua Plumtek Pvt Ltd., M/s Vectus Industries Ltd, M/s Ajay Industrial Corporation Ltd, M/s Ashirvad, M/s Ajay Flowguard Delhi, M/s Prayag, M/s HINDWARE, M/s Fusion Industries, M/s Plasto, M/s Avon Plast, M/s Dhawan Sanitory Udyog (PRIMA), M/s Prince (Aquafit), M/s SFMC
62.	PVC - Soil, waste, rainwater (SWR) & Drainage pipes	M/s Supreme, M/s Prince Pipes Fittings Ltd (ULTRA FIT), M/s Kisan, M/s Finolex, M/s Prayag polymers Pvt Ltd., M/s Euroaqua Plumtek Pvt Ltd., M/s Dinesh, M/s Amogh Plast, M/s Astron Plastic, M/s Dhawan Sanitory Udyog (PRIMA)M/s Ashirwad, M/s HIL, M/s Truflo(Hindware) , M/s Astral, M/s Prince, M/s SFMC
63.	PPR Pipes & Fittings	M/s Prince Pipes Fittings Ltd (GREEN FIT), M/s Finolex, M/s Supreme, M/s Euroaqua Plumtek Pvt Ltd., M/s SHK Polymers Indusries, M/s Dhawan Sanitory Udyog (PRIMA)M/s Kanha Plastics Pvt Ltd, M/s Vectus Industries, M/s Fusion Industries, M/s SFMC
64.	PVC Pipes & Fittings	M/s Prince Pipes Fittings Ltd (AQUA FIT), M/s Finolex, M/s Supreme, M/s Birla Aerocon (HIL Ltd), M/s Prayag polymers Pvt Ltd, M/s Euroaqua Plumtek Pvt Ltd., M/s Ashirvad, M/s GM Modular Pvt Ltd, M/s Dhawan Sanitory Udyog (PRIMA), M/s Avon Plast Ind Pvt Ltd, M/s SFMC
65.	UPVC Pipes and Fittings	M/s Prince Pipes Fittings Ltd (AQUA FIT), M/s Finolex, M/s Supreme, M/s Birla Aerocon (HIL Ltd), M/s KPT, M/s LLP, M/s AKG, M/s Greenline, M/s Dhawan Sanitory Udyog (PRIMA), M/s Kisan Moulding Ltd, M/s Vectus, M/s ASHIRWAD, M/s CRI, M/s Hindware, M/s Fusion Industries, M/s Plasto, M/s Avonplast, M/s Prayag polymers Pvt Ltd, M/s Euroaqua Plumtek Pvt Ltd., M/s SFMC
66.	UPVC Pipes & Fittings for SWR	M/s Prince Pipes Fittings Ltd, M/s Finolex, M/s Supreme, M/s Birla Aerocon (HIL Ltd), M/s Prayag polymers Pvt Ltd, M/s Euroaqua Plumtek Pvt Ltd, M/s LLP, M/s AKG, M/s Ajay Industrial Corp Ltd, M/s Dhawan Sanitory Udyog (PRIMA), M/s Vectus, M/s ASHIRWAD, M/s Hindware, M/s Avonplast, M/s SFMC
67.	Polyethylene / Aluminium / Polyethylene Composite Pressure Pipe	M/s Prince, M/s Finolex, M/s Supreme, M/s Euroaqua Plumtek Pvt Ltd., M/s Vectus Industries Ltd., M/s SFMC
68.	Plastic Pipe (for non-pressure Drainage & Sewerage)	M/s Prince, M/s Finolex, M/s Supreme, M/s Dhawan Sanitory Udyog (PRIMA), M/s Euroaqua Plumtek Pvt Ltd., M/s Foamfit, M/s Ashirwad
69.	CI soil, waste, rainwater (SWR) & Drainage pipes	M/s NECO, Nagpur, M/s Singhal Iron Foundry, Mathura (SKF) M/s Bengal Iron Co, M/s Dhatu Udyog, M/s Kapilansh, M/s Anand Founder & Enginners, M/s RPMF, M/s SFMC
70.	AC - Soil, waste, rainwater (SWR) & Drainage pipes	M/S Everest Asbestos, M/s Vishaka India Ltd, M/s Hyderabad Asbestos (Charminar), M/s Ramco, M/s Rajasthan Asbestos

SI No.	Items	Brand / Makes
		Cement Ltd, M/s Sarbamangala Mfg Co Kolkata, M/s Rohtas Indus Dalmia Nagar, M/s SWASTIK, M/s SFMC
71.	RCC pipes, drain pipes	M/s Indian Hume Pipes, M/s Everest Asbestos, Hyderabad, M/s Himalaya, M/s Thuluvananikal pipes, M/s Euroaqua Plumtek Pvt Ltd., M/s Poona Concrete Product, M/s Awathy Spun Pipes, M/s Vardhman Concrete Pro Pune, M/s Dhere Concrete Products Pune, M/s Shivam Industries, M/s SFMC
72.	Air Release Valves	M/s Leader, M/s BIR, M/s Kirloskar, M/s Upadhyay, M/s Sant, M/s Kartar Valves, M/s Venus, M/s AUDCO, M/s Normax, M/s Lauritz Knudsen
73.	Foot Valves	M/s Upadhyay, M/s Leader, M/s Kirloskar, M/s Sant, M/s Kartar Valves, M/s Varun, M/s Venus, M/s AARKO Pipe Gram Udyog, M/s Varun, M/s AUDCO, M/s Normax
74.	Reflex Valves	M/s Kirloskar, M/s Leader, M/s Sant, M/s Kartar Valves, M/s Upadhay, M/s Varun, M/s Venus, M/s AUDCO, M/s Normax, M/s Lauritz Knudsen, M/s RSM, M/s Xen
75.	Sluice valves	M/s Leader, M/s Kirloskar, M/s Zoloto, M/s BIR, M/s Upadhay, M/s Kartar Valves, M/s Venus, M/s AUDCO, M/s AARKO Pipe Gram Udyog, M/s Kalpana, M/s Cair Euromatic Automation Cair, M/s Lauritz Knudsen, M/s RSM, M/s Xen
76.	Butterfly Valves/ Disc valves	M/s Upadhyay, M/s Kirloskar, M/s Zoloto, M/s Sant, M/s Kartar Valves, M/s Leader, M/s BIR, M/s Normax, M/s AARKO Pipe Gram Udyog, M/s Castle, M/s QUINN, M/s Cair Euromatic Automation Cair, M/s AUDCO, M/s Lauritz Knudsen, M/s RSM, M/s Xen
77.	Gate valves	M/s Leader, M/s Sant, M/s Zoloto, M/s Kartar Valves, M/s Dhawan Sanitory Udyog (PRIMA), M/s Bluestar Sanitary Industries Pvt Ltd (SILVERSHINE), M/s CORONET, M/s RSM, M/s Xen
78.	Water Meters	M/s Capstan, M/s Kirloskar, M/s Anand Asahi, M/s Dashmesh, M/s Kaycee, M/s Capital, M/s Ashai, M/s GEC, M/s Dhawan Sanitary Udyog, M/s MECO, M/s RSM, M/s Xen
79.	PVC / Polythylene water tanks (ISI Marked)	M/s Sintex, M/s Rotex, M/s Polycon, Jaipur, M/s Plasto, M/s Acquatech By Carris Pipes Tubes Pvt Ltd, M/s Okey Polymers Pvt Ltd, M/s Polyplast, M/s Ergen Plastic Indus Jodhpur, M/s Vectus Industries, M/s Ashish Plast, M/s Piyush Plasto chems Pvt Ltd, M/s Simplex Plast, M/s Kaveri, M/s Rotomatic, M/s Infra, M/s Bejod Nagpur,
80.	C P Bib Cock, Stop cock, pillar cock and accessories	M/s Jaquar, M/s Marc, M/s CERA Sanitaryware, M/s Kohler, Players, M/s Bluestar Sanitary Industries Pvt Ltd (SILVERSHINE), M/s Kritika Udyog, M/s SOMA, M/s SIECO, M/s GEM, M/s Coronet, M/s Shakti, M/s Johnson, M/s Ambani, M/s Asian Paints (Bath Division), M/s Dhawan Sanitary Udyog (Prima), M/s HINDWARE, M/s Prayag, M/s Zoloto, M/s R S Industries (Polytuf), M/s Jain Enterprises (Jaynam), M/s RSM, M/s Xen, M/s CORONET
81.	Copper/ Brass Alloy Bib Tap, Pillar Tap, Angle Valve & Stop Valves and accessories	M/s Soma, M/s Leader, M/s Zoloto, M/s Jaguar Vo Pvt Ltd, M/s Kritika Udyog, M/s Dhawan Sanitary Udyog, M/s Kolher, M/s Grohe, M/s Cera, M/s Johnson, M/s Hindware M/s Prayag, M/s Prima, M/s L&T Valves, M/s AMCO, M/s VIP Valves, M/s Jain Enterprises (Jaynam), M/s Bluestar Sanitary Industries Pvt Ltd (SILVERSHINE), M/s CORONET
82.	PVC Stop Cock and Bib Cock /float valves and accessories	M/s Jaypee, M/s GMP, M/s Neta, M/s Zoloto, M/s Prayag Polymer, M/s Symet, M/s Kritika Udyog, M/s GEM, M/s Kingston, M/s Millenium, M/s Seiko, M/s Shakti, M/s Pearl, M/s Dhawan Sanitary Udyog (Prima), M/s Hindware, M/s CORONET, M/s RSM, M/s Xen
83.	Gun-Metal Globe/ Gate valves/ Angle Valves	M/s Leader, M/s Bir, M/s Zoloto, M/s Kirloskar, M/s Balaji, M/s Shakti, M/s Chambal, M/s Kartar, M/s QUINN, M/s Dhawan Sanitary Udyog (PRIMA), M/s Sant, M/s Hindustan Metal Industries, M/s Jaypee, M/s Kingstan, M/s Hansa, M/s CORONET, M/s RSM, M/s Xen
84.	Shower rose	M/s Jaquar, M/s Kohler, M/s Crabtree, M/s CERA Sanitaryware, M/s KINGSTAN, M/s Meera, M/s Marc, M/s Parco, M/s Prision Johnson Ltd, M/s Soma, M/s Ambani, M/s Asian Paints, M/s Dhawan Sanitary Udyog (PRIMA), M/s Hindware, M/s Bluestar Sanitary Industries Pvt Ltd (Silver Shine), M/s Kerovit, M/s CORONET, M/s RSM, M/s Xen

SI No.	Items	Brand / Makes
85.	CI / Brass Ball Cocks (float valves)	M/s Leader, M/s NETA, M/s Zoloto, M/s Kritika Udyog, M/s Prayag, M/s PRIMA, M/s AARKO, M/s Prayag, M/s Dhawan Sanitary Udyog (Prima), M/s Hindware, M/s Jain Enterprises (Jaynam), M/s CORONET, M/s RSM, M/s Xen
86.	Water Closet-Vitreous China (European /Indian)/ squatting pan Orissa pattern	M/s Cera, M/s Parryware, M/s Jaquar, M/s Hindware, M/s Johnson, M/s Kajaria Sanitaryware (KEROVIT), M/s RAK Ceramics, M/s Kritika Udyog, M/s Neycar, M/s Glint, M/s Ambani, M/s Somani, M/s Simpolo Vetrified Pvt Ltd, M/s Prayag Polymers, M/s Asian Paints (Bath Division), M/s CORONET, M/s RSM, M/s Xen
87.	Flushing Cistern - PVC Low Level including Flush Valves and Fittings for WC and Urinals	M/s Parryware, M/S Johnson Peddar, M/s RAK Ceramics, M/s Kritika Udyog, M/s Hindware, M/s Johnson, M/s Kolher , M/s Kajaria, M/s Prayag, M/s Parryware, M/s CERA Sanitaryware, M/s Neycer, M/s Jaquar, M/s Johnson, M/s PRAYAG, M/s Speed Flo, M/s POLY TUF, M/s Millineum, M/s Shakti, M/s Pearl, M/s Goel Sink, M/s Ambani, M/s Commander, M/s Asian Paints(Bath Division), M/s Dhawan Sanitary Udyog (Prima) , M/s Hindware, M/s Kerovit, M/s Jain Enterprises (Jaynam), M/s CORONET, M/s RSM, M/s Xen
88.	Plastic Seat Covers for EWC	M/s Cera, M/s Neycer, M/s Parryware, M/s Hindware, M/s Kajaria, M/s RAK Ceramics, M/s Duralite, M/s Champion, M/s Speed Flo, M/s PRAYAG, M/s Millineum, M/s Asian Paints, M/s Dhawan Sanitary Udyog (Prima) , M/s Hindware, M/s Jainko, M/s Pearl, M/s Bluestar Sanitary Industries Pvt Ltd (SILVERSHINE), M/s CORONET, M/s RSM, M/s Xen
89.	Urinals - Vitreous China	M/s Cera, M/s Parryware, M/s Neyveli Ceramics (Neycer), M/s Hindware, M/s Jaguar, M/s Johnson, M/s Kajaria Sanitaryware (KEROVIT), M/s Shakti, M/s Neycar, M/s Ambani, M/s Somani, M/s Simpolo Vetrified Pvt Ltd, M/s Prayag Polymers, M/s Asian Paints (Bath Division), M/s CORONET, M/s RSM, M/s Xen
90.	Wash Basin –Vitreous China	M/s Kajaria Sanitaryware (KEROVIT), M/s Cera, M/s RAK Ceramics, M/s Parryware, M/s Neyveli Ceramics (Neycer), M/s Hindware, M/s Jaguar, M/s Ambani, M/s Somani, M/s Simpolo Vetrified Pvt Ltd, M/s Prayag Polymers, M/s Johnson, M/s Shakti, M/s Asian Paints (Bath Division), M/s CORONET, M/s RSM, M/s Xen
91.	Sink Steel	M/s Jayna, M/s Nirali, M/s Neelkanth, M/s Parryware, M/s Bluestar Sanitary Industries Pvt Ltd (SILVERSHINE), M/s Diamond, M/s Prayag, M/s Shakti, M/s Phonix, M/s Plastocraft Sanitory Ltd, M/s Goel Sinks India Pvt Ltd, M/s Ambani, M/s Asian Paints(Bath Division) , M/s Dhawan Sanitary Udyog (Prima) , M/s Hindware, M/s Jain Enterprises (Jaynam), M/s RSM, M/s Xen, M/s CORONET
92.	Centrifugal / mono-block Pump	Kirloskar, Beacon, Crompton Greaves, KSB, Wilo Mather & Platt, Jyoti, V Guard, M/s CRI, M/s BEST, M/s Kalarna
93.	Submersible Pump / open well pumps	Kirloskar, KSB, Wilo Mather & Platt, Jyoti, V Guard, CRI Pumps
94.	Vertical Turbine Pumps	Kirloskar, KSB, Wilo Mather & Platt, Jyoti
95.	Non-clog Sewage submersible Pumps	Kirloskar, KSB, Wilo Mather & Platt
96.	Pumps for Fire Fighting	Kirloskar, Wilo Mather & Platt, Crompton, Bharat Bijlee
97.	Brass Forged Pressure reducing valves	Zoloto, Leader, Neta, M/s Dhawan Sanitory Udyog (PRIMA)
98.	Loft tank	Sintex, Rotex, Polycon, Jaipur
<u>ELECTRICAL WORKS</u>		
99.	Pole - Pre-stressed concrete	M/s Cement Fabric India, Jodhpur, M/s Hindustan Pre-stressed Concrete, Faridabad, M/s Indian PCC Poles, M/s Concrete Udyog Jhansi, M/s Sankla Udyog, Jhansi
100.	Pole - Steel tubular	India Tube and Co., India Electric Poles Mfg Co., MaharaSheetra, Bombay Tubes, National Tubing Company, Kanpur, Kalinga Tubes, Singh Profile, Pune
101.	GI octagonal pole	M/s Jindal, M/s Bajaj, M/s Philips, M/s Crompton
102.	Insulators HT/LT Disc / Pin / Shackle / loop / String Type	BHEL, Jayshree, W/S Insulators, Southern Insulators, MEI, Modern Insulators
103.	RMU & PSS	Schneider, Siemens, Crompton Greaves, ABB Ltd, Lauritz

SI No.	Items	Brand / Makes
		Knudsen
104.	Air Circuit Breaker (ACB) LT 1100Volts	Lauritz Knudsen, English Electric, GEC, Crompton Greaves, Siemens, ABB, Schneider Electricals
105.	Vacuum Circuit Breaker (VCB) suitable for 36kV, 22kV and 12kV system including accessories	SIEMENS, Schneider, Crompton Greaves, ABB Ltd, Alsthom, Lauritz Knudsen
106.	Automatic Power Factor and Correction (APFC) Panel	GEC, Siemens, ABB, Epcos, M/s Precision System Control, M/s Instruments & Equipment Co. M/s Shalab, M/s Indian Transformers And Electricals Pvt Ltd, Gurgaon, M/s Haresh Electricals, M/s Bafna Electric Comapany, M/s Lauritz Knudsen, M/s Power System and Control Pvt Ltd, M/s Ases Security Pvt Ltd, M/s HPL
107.	Power Factor Improvement Capacitor Banks	Siemens, EPCOS, GE, ABB, M/s Shreem, M/s Universe, M/s Havells, M/s Crompton, M/s Lauritz Knudsen
108.	HT Switch Gear 66/33/11kV 3 Phase, Gas Circuit Breaker circuit breaker SF-6 Type	Crompton Greaves, Siemens, Schneider, ABB Ltd, Lauritz Knudsen
109.	HT 11kV, 3 Ph Automatic switch Fuse Unit	ABB Ltd, Siemens, Crompton Greaves, Schneider, Lauritz Knudsen
110.	Air Brake Switch Gang operated (33kV/11kV)	Pacfit, Mumbai, Jaipuria Brothers, HEI, M/s Kewintech Pvt Ltd, M/s fine Switchgear
111.	Air-break Switch (Isolators)	MEI, Southern Switchgear, Andrew Yule, Crompton Greaves, M/s Kewintech Pvt Ltd , M/s fine Switchgear, Panasonic Life solutions (Panasonic Anchor), M/s Novateur Electrical & Digital Systems Pvt Ltd (Legrand)
112.	Arresters Lightning LT / HT	Oblum, Crompton & Greaves, AREVA T&D, BHEL, GEC-ELPRO
113.	Change Over Switch/ Starter/ Soft Starter/ Contactor DOL/ Star-Delta/ Synchronous/Single phase preventer	Siemens, ABB, Crompton Greaves, GE, Bentec (BENLO), M/s Kewintech Pvt Ltd, M/s fine Switchgear, M/s Bentec India Ltd (BENLO), M/s Lauritz Knudsen, M/s HPL
114.	Main Switch Iron Clad Switch Fuse Unit Fuse Switch unit	Siemens, Crompton, M/s Kewintech Pvt Ltd,M/s fine Switchgear, M/s Shalabh, M/s Lauritz Knudsen,M/s HPL
115.	Transformers 66/11kV, 33/11kV, 33/0.433kV, 22kV/11kV, 22/0.433kV copper wound all rating	ABB Ltd., Bangalore, Siemens Ltd., Mumbai, Bharat Bijlee Ltd, Mumbai, Crompton Greaves, Mumbai, Schneider, Alstom (GEC), M/s Kirloskar Electric, M/s EMCO, M/s BHEL, M/s Andrew Yule, M/s Sudhir Power Limit, M/s CG Power And Industrial Solution Ltd., M/s MSC Transformers,
116.	Transformer 11kV/433V Step Down Indoor/Outdoor type upto 1000 kVA capacity dry resin type	M/s Schneider, M/s Crompton, M/s Kirloskar, M/s ABB , M/s Sudhir Power Limit, M/s CG Power And Industrial Solution Ltd., M/s MSC Transformers, M/s Indian Transformers & Electricals Pvt Ltd,
117.	Transformers 33kV & 11kV, current & potential	Crompton Greaves, Kappa, Vishal, Schneider, ABB, Pragati, AP, M/s MSC Transformers
118.	Transformers 6.6kV/433V three phase upto and including 100kVA	Indian Transformer, Gurgaon, M/s Voltech Manufacturing Co Ltd M/s Sudhir Power Limit, M/s CG Power And Industrial Solution Ltd., M/s MSC Transformers
119.	Transformers 11 or 6.6kV/0.433kV copper wound,500kVA and above	Schneider, Crompton Greaves, Mumbai, Bharat Bijlee Ltd, Mumbai, ABB, Andrew Yule, M/s Kirloskar, M/s ECE, M/s Sudhir Power Limit, M/s CG Power and Industrial Solution Ltd., M/s Indian Transformers and Electricals Pvt Ltd, Gurgaon, M/s MSC Transformers
120.	Transformers 11kV/ 0.433kV copper wound, below 500kVA	Voltamp Ltd., CG, Transformers & Rectifiers Ltd, ITE Gurgaon M/s Sudhir Power Limit, M/s CG Power and Industrial Solution Ltd., Urja Tech, M/s MSC Transformers
121.	Transformers 11kV/ 0.433kV copper wound,100kVA and below	M/s PME, M/s Rajasathan Transformers, M/s Everest, M/s R K Industries, M/s PACTIL, M/s Hi Tech Industries, M/s Jaybee Ind (Jaybeeti), M/s Sudhir Power Limit, M/s CG Power and Industrial Solution Ltd., M/s MSC Transformers
122.	Cable jointing kit for 11kV/22kV	Raychems, Densons, M-Seal, Birla-3M
123.	UG HT XLPE, PVC Insulated aluminum conductor for 3.3/33/22/11kV system	Cable Corporation of India, Mumbai, Havells India Ltd., Universal Cables Ltd, Satna, Asian Cables, Gloster, RPG Cables Ltd, Thane, Finolex, RR Kabel, KEI Ind, Polycab Pvt Ltd, M/s S.S.Cables(SCI), M/s KEI Industries Ltd.
124.	HT Armoured XLPE Cable 132 KV Grade	M.s Polycab Pvt Ltd, M/s Harey Krishna Cables Pvt Ltd, M/s Seewal Power Industries .M/s S.S.Cables(SCI)

SI No.	Items	Brand / Makes
125.	UG LT XLPE, PVC Insulated aluminum conductor for 1100Volts	Cable Corporation of India, Mumbai, Asian Cable Co, Chattisgarh, Finolex Cable Ltd, Pune, Polycab, Gloster, Universal, M/s Bentec India Ltd(BENLO), M/s S.S.Cables(SCI), M/s Shalabh, M/s Kenter Cables India Pvt Ltd, M/s Vishal Cables and Wires, M/s HPLSS
126.	Aluminum conductor steel reinforced (ACSR)	All-Ind, ICC, Bharat Conductors, NICCO, Indian Aluminum CoM/s VK Conductors , M/s Ujala, M/s Kenter Cables India Pvt Ltd, M/s Konarkm, M/s Gupta Power Infra Ltd.
127.	Street light fittings (LED)	Bajaj, Phillips, Wipro, Crompton, GE, Havells, Luker, Jaguar, FIEM Ind Ltd, Pyrotech Electronic Pvt Ltd, BENTEC India Ltd (BENLO), Eveready Ind India Ltd, Orient Electric, Poly Cab, Surya Roshni (Surya), Halonise Technologies Pvt, Shri Sant Krupa Appliances (SYSKA), M/s Gold Medal Electricals Pvt , M/s HPL
128.	Solar street light fitting	Havells, Phillips, BHEL, Tata, Bajaj, M/s Vikram Power Tech Pvt Ltd, M/s Bentec India Ltd (BENLO), M/s HPL
129.	High Mast light	Bajaj, Phillips, Crompton, M/s Bajaj, M/s Metal Coats, M/s Utkarsh Tubes & Pipes
130.	Fluorescent tube light fittings/LED/ lamp holder	Wipro, Bajaj, Crompton, Phillips, Havells, Bentec (BENLO), M/s Pyrotech, M/s Orient Electric Ltd, M/s HPL
131.	Flame proof light fittings (LED)/ Fan/well glass/bulk head including accessories	M/s Sudhir, M/s Batiga, Flexipro Electricals, Nasik, M/s Shyam Switchgears, Mumbai, Bajaj, Crompton, M/s Pyrotech, M/s Orient Electric Ltd
132.	Florescent lamp LT (CFL)/ HPSV lamp	Phillips, Crompton, Wipro, Bajaj, GE- Lighting, Havells, Osram, M/s Pyrotech
133.	Light fittings LED	Phillips, Crompton, Wipro, Bajaj, GE, Havells, Osram, FIEM Ind Ltd (FIEM), Pyrotech Electronics Pvt Ltd, Luker, Jaguar, Eveready, Orient, Polycab, Surya Roshni (Surya), Holonix, SYSKA, M/s Bentec India Ltd (BENLO), M/s Gold Medal Electricals Pvt Ltd, M/s HPL
134.	LED Tubelights/bulbs	Phillips, Crompton, Wipro, Bajaj, GE, Havells, Osram, Luker, Bentec (BENLO), Eveready, Orient, Polycab, Surya Roshni (Surya), Jaguar, Halonix, Pyrotech, FIEM Ind Ltd, SYSKA M/s Pyrotech, M/s Orient Electric Ltd, Panasonic Life solutions (Panasonic Anchor), M/s HPL
135.	PVC cable 450/750V	Plaza, Finolex, Havells, Polycab, M/s Vishal Cables and Wires, M/s Kenter Cables India Pvt Ltd, M/s Gold Medal Electricals Pvt Ltd, M/s HPL
136.	Electronic / Photo-electric switch for auto-operation of street lights	Lauritz Knudsen, Legrand, Bajaj, GE, Siemens
137.	DBs/MCB (Miniature Circuit Breakers & MCCB (Moulded Case Circuit Breakers)	Lauritz Knudsen, Havells, Schneider, Legrand, ABB, Siemens, C&S Electric, Panasonic Life Solutions (Panasonic Anchor), M/s HPL
138.	Microprocessor based MCCB /RCCB LT 415 Volts	Lauritz Knudsen, Siemens, Schneider, ABB, Legrand
139.	LT Electrical Panel (TTA)	ABB, Siemens, Blokset, Rittal, Lauritz Knudsen, Adlec or OEM authorised manufacturer of Lauritz Knudsen, ABB, Siemens, Legrand & Schneider, M/s Perfect Engineer, M/s Bafna Electric Comapany, M/s Power System and Control Pvt , M/s Ajmera Electrotech
140.	Electric Accessories, Piano Suitables, Ceiling rose, call bells, Buzzers, Lamp Holders/ socket outlet, etc., Plug & Socket Boards	Panasonic Life solutions (Panasonic Anchor), Havells, Crabtree, Legrand, Leader, C&S Electric, M/s Bentec India Ltd (BENLO), M/s Gold Medal Electricals Pvt Ltd, M/s HPL
141.	Ammeter / Voltmeter / Power Factor/frequency Meters	IMP, MECO, Automatic Electric, Havells, M/s Lauritz Knudsen
142.	Digital Meters with built in selector switches for voltmeter, Ammeter, Frequency, Energy, kW, Power Analyser	Havells, Automatic Electric, Enercon, Secure Meter, M/s Novateur Electrical & Digital Systems Pvt Ltd (Legrand), M/s Lauritz Knudsen
143.	Modular Switches /Sockets	Anchor Roma, Crabtree, Legrand, Havells, Indo Asian, Polycab, Panasonic Anchor, Bentec (BENLO), M/s Kewintech Pvt Ltd, M/s fine Switchgear, M/s Bentec India Ltd (BENLO), Panasonic Life solutions (Panasonic Anchor), M/s Gold Medal Electricals Pvt Ltd, M/s Lauritz Knudsen, M/s HPL
144.	Electric Energy Meters, Tamper Proof/Smart Meter	Secure Meters, Havells, Jaspuria Meters, Elmeasure, Bentec (BENLO), M/s Lauritz Knudsen, M/s HPL
145.	SCADA System	Schneider, Elmeasure, Forbes Marshal

SI No.	Items	Brand / Makes
146.	Ceiling Fan	Bajaj, Orient, Crompton, Polar, Khaitan, Havells, V Guard, Polycab, Panasonic, M/s CG Power And Industrial Solution Ltd., M/s Gold Medal Electricals Pvt Ltd
147.	Exhaust fan/ Air circulators	Crompton, Almonard, Khaitan, Usha, Bajaj, Havells, Polycab, M/s CG Power And Industrial Solution Ltd., M/s Gold Medal Electricals Pvt Ltd
148.	Fan Regulator	Anchor, Legrand, Havells, Bajaj, Usha, Khaitan, GEC, Bentec (BENLO), M/s CG Power And Industrial Solution Ltd., Panasonic Life solutions (Panasonic Anchor), M/s Gold Medal Electricals Pvt Ltd
149.	Electronic type fan regulator	Legrand, Orient, Crompton, Havells, Bajaj, V Guard, Polycab, M/s CG Power And Industrial Solution Ltd., Panasonic Life solutions (Panasonic), M/s Gold Medal Electricals Pvt Ltd
150.	Geyser	Bajaj, Venus, Racold, Usha, Venus, Jaguar, V Guard, Panasonic Life solutions (Panasonic Anchor)
151.	Water Heater (Only five star rating)	Jaguar, M/s Havells, M/s AO Smith, Bajaj, Usha, Racold
152.	PVC insulated copper/aluminium cable 1100V of all types	Plaza, Finolex, Anchor, Havells, Nicco, Polycab, RPG, Gloster, RR Kabel, KEI, BENTEC India Ltd (BENLO), M/s S S cables Industries, M/s Vishal Cables and Wires, M/s Press Fit Pipe and Profile, M/s Kenter Cables India Pvt Ltd, M/s Gold Medal Electricals Pvt Ltd
153.	PVC conduits (Rigid or flexible)/ FRLS rigid PVC conduits/fittings	Anchor, Modi, Pressfit, Precision, Astral, Polycab, M/s Bentec India Ltd (BENLO), M/s Dhawan Sanitary Udyog (PRIMA), M/s S S cables Industries, M/s Gold Medal Electricals Pvt Ltd
154.	PVC Tape	GM, Panasonic Anchor
155.	MS conduit	BEC Industries, Kalinga, Jindal, Bharat, AKG
156.	Casing capping & accessories	Precision, Modi, Presto Plast, Supreme, Polycab, Plaza, Pressfit
157.	Indication Lamps Neon / LED type	Siemens, ABB, Schneider, EPCOS, Jaipuria, M/s Lauritz Knudsen
158.	LT Relay Numerical, Static/ Protective/ Auxiliary	Siemens, Schneider, ABB, L&T, EPCOS, Jaipuria
159.	Automatic voltage stabilizer (servo controlled)	Automatic Electric, Aplab, V Guard, Vintek Electronics (Valina), Vintec Electronic Laboratory (Vintec), M/s Instruments & Equipment Co., M/s Indian Transformers And Electricals Pvt Ltd, Gurgaon
160.	DG Set (engine)	Kirloskar, Cummins, Greaves Cotton, Ashok Leyland, Caterpillar, Sterling Gen, M/s Ruston, M/s Eicher, M/s Mahindra, Powerica, GMMCO
161.	DG Set (alternator)	Kirloskar, Stamford, AREVA, Alstom, Jyoti, Crompton Greaves, Bharat Bijlee
162.	DG Set assembled with sound proof canopy	Kirloskar, Jackson, Sudhir, Greaves –Cotton, Cummins India, M/s Meera &co. , M/s control and Switchgear, M/s Mahindra, Powerica, GMMCO
163.	Induction Motors	Crompton Greaves, Kirloskar Electric, Siemens, Bharat Bijlee, NGEF, ABB, M/s Crompton , M/s Jyoti, Powerica, GMMCO
164.	Gang operated devices (GOD)	Pactil (Metro), Jaipuria, Atlas, ECE, AREVA, M/s Universal, M/s MEI, M/s GEC, M/s GR Power Tech
165.	Precast concrete cable cover	Mehtab Tiles, Indore / M/s Patel Furniture Mart, M/s Lucky Cement Block Works, M/s Sukhi Enterprises
166.	Air handling unit	Bluestar, Voltas, Zeco, National
167.	Air curtains	Almonard, AirCon, Crompton Greaves
168.	Cooling towers	M/s Paharpur, M/s Mihir, M/s Delta, M/s Advance, M/s Weldon Engineers (India) (Make: Polo)
169.	Centrifugal Chillers & Screw Chillers	Carrier, Voltas, Daikin, Hitachi
170.	Relaysfor HT VCB's, RMU's, Transformer protection etc.,	Ashida/ GE/ Siemens
171.	Window type Air conditioner	Carrier, Bluestar, Voltas, Daikin, Hitachi
172.	Split type air conditioner	Carrier, Voltas, Daikin, Hitachi
173.	Solar water system	Tata-BP Solar System, BHEL, Best & Crompton, Noval Energy, New Delhi, Jain Solar, Racold, Whitline, Usha, Sudharshan, V Guard
174.	5 pair / 10 pair / 50 pair telephone distribution box	M/s Kenter Cables India Pvt Ltd, DELTA or any BIS marked make as approved by GE

SI No.	Items	Brand / Makes
175.	4-way splitter box for TV cable termination	STAR or any BIS marked make as approved by GE
176.	Bolard light / Spike light / Wall recessed light / Flexible LED strip light / Wall washers / Post top light LED	KLITE / HAVELLS / PHILIPS / BAJAJ / WIPRO / JAQUAR, M/s Pyrotech, M/s Orient Electric Ltd, M/s Gold Medal Electricals Pvt Ltd
177.	End line strainer for +ve suction / Double flange Ball type NRV / CI double flange butterfly valve	Zoloto / Kirloskar, M/s Lauritz Knudsen
178.	Motor Actuated butterfly valve	RITETORK / Leader / Kirloskar, M/s Lauritz Knudsen
179.	Float type point level sensor	RECKTRONIC Devices and Systems / Gems / Madison
180.	Outdoor type Wimax CPE stations	Siemens / Ubiquiti / Maksat Technologies Ltd / Sequans
181.	PN 1.6 rated CI ‘Y’ type strainer for suction	Zoloto / Kirloskar, M/s Lauritz Knudsen
182.	Bronze compact pressure reducing valve	Zoloto / Kirloskar, M/s Lauritz Knudsen
<u>FIRE FIGHTING</u>		
183.	Firefighting equipment like hose reel, nozzles, couplings, valves, etc.	Safex, Cease fire, M/s Flame Guard Indus, M/s Nitin
184.	Orifice Plate	Newage, AAAG, Minimax, Teleflo, Flowtech
185.	Gas leak Detector	Honeywell, True Safe, LPG/ ProElite, M/s Ases Security Pvt Ltd
186.	Addressable Relay Module, Monitor Module, Isolator Module	Notifier, XLS-3000, IFC-JC, M/s Ases Security Pvt Ltd
187.	DC Power Supply	Notifier, XLS-3000, IFC-JC
188.	Addressable Fire Fighter's Telephone Jack, Fire Fighter's Telephone Handset	Notifier, XLS-3000, IFC-JC, M/s Ases Security Pvt Ltd
189.	Digital Audio Amplifier	Notifier, XLS-3000, IFC-JC, M/s Ases Security Pvt Ltd
190.	Power Amplifier	Notifier, XLS-3000, IFC-JC, Honeywell, M/s Ases Security Pvt Ltd
191.	Multi-Tap Ceiling/ Wall Mount Speakers	Notifier, XLS-3000, IFC-JC, Honeywell, M/s Ases Security Pvt Ltd
192.	PA Rack for Power Amplifier	Walrack, Rittal, Ahuja
193.	Hose Cabinet	Newage, AAAG, Minimax
194.	Addressable Photoelectric Smoke Detector	Notifier, XLS-3000, IFC-JC, M/s Ases Security Pvt Ltd,
195.	Addressable Multi-criteria Photo-Thermal Detector	Notifier, XLS-3000, IFC-JC, M/s Ases Security Pvt Ltd
196.	Heat Detector	Notifier, XLS-3000, IFC-JC, Honeywell, M/s Ases Security Pvt Ltd
197.	Addressable Manual Call Point	Notifier, XLS-3000, IFC-JC, M/s Ases Security Pvt Ltd
198.	Sounder cum Strobe	Notifier, XLS-3000, IFC-JC, Fire Finder, System Sensor, M/s Ases Security Pvt Ltd
199.	Addressable Control Module for Sounders / Strobes / Sounder cum Strobes/Directional Sounder	Notifier, XLS-3000, IFC-JC, M/s Ases Security Pvt Ltd
200.	ICV / Alarm gong	HD Fire, Tyco, Viking
201.	Fire Alarm Panel	Notifier, New Age, Siemens, XLS-3000, IFC-JC, M/s Haresh Electricals, M/s Ases Security Pvt Ltd
202.	Network Repeater Panel	Notifier, XLS-3000, IFC-JC, M/s Ases Security Pvt Ltd
203.	Low Smoke Zero Halogen (LS0H) flame retardant fire alarm copper cable	Finolex, Polycab, RR Kabel, M/s Vishal Cables and Wires, M/s Kenter Cables India Pvt Ltd
204.	Pressure Switch	Danfoss, Potter, System Sensor, M/s Ases Security Pvt Ltd
205.	Pressure Gauge	Danfoss, Fiebig, H. Gure, M/s Lauritz Knudsen
206.	Fire hydrant landing valve	Safex, Newage, Safe Pro, Safeguard Industries
207.	Yard hydrant Post / Stand Post	Safex, Newage, Safe Pro, Safeguard Industries
208.	Yard hydrant Post / Stand Post	Safex, Newage, Safe Pro, Safeguard Industries
209.	Flow switch on sprinkler distribution header	Danfoss, Honeywell, Rapid Contro
210.	Higher Capacity Fire Extinguisher (Trolley Trailer/ Stud/ Vehicle mounted/ Portable Fire Extinguisher)	M/s Vimal Fire Control Pvt Ltd, Safex, Minimax, Kalpex, Safeguard, M/s Ases Security Pvt Ltd

SI No.	Items	Brand / Makes
211.	Fire hose delivery couplings, branch pipes, hand shower & nozzle spanners with all accessories	M/s Vimal Fire Control Pvt Ltd, Safex, Newage, Safe Pro, Safeguard Industries, Eversafe, Shah Bhogilal, HD Fire, Kalpex, M/s Ases Security Pvt Ltd
212.	Rubberised fabric reinforced rubber lined hose	Safex, Newage, Safe Pro, Safeguard Industries, M/s Ases Security Pvt Ltd
213.	Air Cushioning tank (Air vessel)	Sainath Fire, JMC Equipment Co, AN Exflame Fire Protection Pvt Ltd, M/s Ases Security Pvt Ltd
214.	Gun metal fire brigade inlet connection	Vintex Fire Protection, Safe Stakes Fire Safety Services, Fire Fighting India, M/s Ases Security Pvt Ltd
215.	Gun metal chrome finished Ball valves	Leader, Sant, Zoloto, M/s Dhawan Sanitory Udyog (PRIMA)
216.	Fundamental requirement for stand post type water monitor for fire fighting (Water/ Foam/ DCP)	M/s Vimal Fire Control Pvt Ltd, Danfoss, Honeywell, Rapid Control, M/s Ases Security Pvt Ltd
217.	Glass-bulb type spray sprinklers - Pendent Sprinkler & Sidewall Sprinkler	Safex, Newage, Safe Pro, Safeguard Industries, M/s Ases Security Pvt Ltd
218.	S.S. Rosette	Shreeji Fire Safety, Qutak Security Devices, Safez Links
219.	Stainless Steel Flexible Sprinkler pipe	Sadguru Safety Industries, Sai Fire Safety/ Easy Flex, Newage
220.	GI Duct (Pressurization System)	Ductofab, Techno duct, Rolastar, Allied Air, M K Enterprises, Hind fabricators & Engineers, Aircon Engineering Works, Unifrax India limited, M/s Vimal Fire Control Pvt Ltd
221.	Flexible Duct Connectors	Cori, Resistoflex, Dunlop, Alfa Star
222.	GI Birdscreen	Jindal, TATA, API, Apollo, M K Enterprises, Hind fabricators & Engineers, Aircon Engineering Works, Unifrax India limited
MISCELLANEOUS PRODUCTS MAKE :		
223.	Mechanical Splices, Groutec Coupler, Headed Bar, Glass Fibre reinforced Polymer (GFRP) rebar, GFRP Astec Active Anchor, GFRP Rock Bolt, GFRP Soil Nail	M/s Dextra India Pvt Ltd Mumbai
224.	Roof top SPV system PV Modules & Inverter	Manufacturers listed in the latest Approved List of Models and Manufacturers (ALMM) issued by the Ministry of New and Renewable Energy (MNRE), Government of India
225.	Lift	M/s Kone India, M/S Schindler India Pvt Ltd, M/s Mistubishi Elevator India Private Limited M/s Otis Elevator Company India Ltd, M/s Johnson, M/s Monarch Elevators
226.	Electrically Operated Rolling Shutters	Maxwell Automatic Doors Pvt.Ltd., Gandhi Automation Pvt. Ltd., Standard Automatic Solution
227.	Aluminium Composite Panels	M/s Euro Panels Product Limited (Make : Eurobond)

Notes:

- (i) Items shall be considered whichever is applicable only. Items if not mentioned shall bearing ISI mark and as approved by theGE.
- (ii) Sources indicated are only for guidance and approval of the Garrison Engineer shall be taken in proper time before procurement of materials and itsincorporation.
- (iii) The above list is not exhaustive but indicative of all items required for work under thecontract.
- (iv) Sources of materials shall be as above or in the vicinity thereof. The tenderer shall ascertain the actual position/exact location of source before submitting his tender and no additional payment shall be made on account of misunderstanding of its distance from site of works. Contractor may bring material conforming to contract specifications from other sources without any price adjustment after obtaining written approval of the GarrisonEngineer.
- (v) The tender shall amongst other things also ascertain all information such as royalties, taxes duties and other charges etc. on the materials and no additional payment shall be made on account of the foregoing.

SignatureofContractor

AAD (Contracts)
for Accepting Officer

Appendix - 'C'

1. CEMENT

1.1 GENERAL

Cement required for the work under the contract shall be procured, supplied and incorporated in the works by the Contractor under his own arrangement. Cement shall be of tested quality and shall comply with the requirements mentioned in the drawings, SSR, IS specifications as amended and particular specifications given hereinafter.

1.2 TYPES OFCEMENT

- (i) Ordinary Portland cement Grade 43 - (IS:269:2015)
- (ii) Ordinary Portland cement Grade 53 - (IS:IS:269:2015)
- (iii) Rapid Hardening Portland cement - (IS: 8041-1990)
- (iv) Portland Pozzolana Cement - (IS: 1489-1991Pt-I)
- (v) High Alumina Cement - (IS: 6452-1989)
- (vi) Sulphate Resisting Portland cement - (IS: 12230- 1988)

1.2.1 Type of cement for the subject work shall be Ordinary Portland Cement grade 43 (Forty-Three) in accordance with IS: 8112-1989 unless otherwise mentioned in structural drawings forming part of the tender documents.

1.2.2 Mixing of OPC and PPC is not allowed.

1.2.3 The type of cement to be selected for use shall invariably depend upon the specific usage in the work (s). 33 grade OPC shall not be used in the works. Use of PPC of required strength with fly ash content as per IS: 1489-1991 Pt-I is also permitted.

1.3 PROCUREMENT / SUPPLY OF CEMENT BY CONTRACTOR

(a) **PROCUREMENT** Cement shall be procured by the contractor from any of the following main producers only. However, cement can be procured from any of the manufacturers approved by E-in-C"s branch even after date of receipt of tender. The particulars of the manufactures of cement along with the date of manufacture shall be obtained from the Contractor for every lot of cement separately. The documents in support of the purchase of cement shall be verified by the Engineer-in-charge / GE and site staff. The cement shall be procured by the Contractor from the manufacturers as given below.

(b) **MANUFACTURERS** The following are the approved manufactures for MES works on Pan India level:

SI No.	Company name	Address	Cement Grades
1	2	3	4
1.	M/s The Associated Cement Companies Ltd Brand: 'ACC'	414-421, Splendor Forum (4 th Floor), 3, District Centre, Jasola, New Delhi – 110044, Ph : 011 46583600	All
2.	M/s Ultra Tech Cement Ltd Brand: 'ULTRATECH'	'B' Wing, 2 nd Floor, Mahakali Caves Road, Andheri (East), Mumbai-400093, Ph: 022-66917800	All
3.	M/s The India Cement	Dhun Building, 827, Anna Salai Chennai – 600002	All
4.	M/s Dalmia Cement (Bharat) Ltd. Brand: 'DALMIA INFRA PRO'	Dalmiapuram Dist-Truchirappalli, Tamil Nadu – 621 651	All
5.	Century Cements. Brand: "CENTURY"	Industry House, 159 Church gate Reclamation, Mumbai -400020, Ph- 022 22023936	All
6.	M/s Saurashtra Cement Brand: 'SAURASHTRA'	Gala No A-1, Ground Floor, UdhogSadan No 3 MIDC, Central Road, Andheri (East) Mumbai-400 093 Ph : 022-32955557/67, Mob : 9320290081	All
7.	M/s The Ramco Cements Ltd. (Formerly Madras Cement) Brand: 'RAMCO'	Auras Corporate Centre, 98-A, Dr Radhakrishnan SalaiMylapore, Chennai-600 004, Ph: 044-28478666	All
8.	M/s Mangalam Cement Ltd Brand: 'MANGALAM'	PO Adityanagar, Morak, Dist-Kota, Rajasthan-326520, Ph : 9351468076	All

SI No.	Company name	Address	Cement Grades
1	2	3	4
9.	M/s Birla Corporation Ltd Brand: 'BIRLA'	Birla Building (3rd & 4th Floor) 9/1, RN Mukherjee Road, Kolkata – 700001, Ph : 033-30573700	All
10.	M/s Orient Cement Brand: 'ORIENT'	5-9-22/57/D, 2nd & 3rd Floor, GP Birla Centre, Adarsh Nagar, Hyderabad – 500063, Ph : 044-23688600	All
11.	M/s Nuvoco Vistas Corporation Ltd (formerly Lafarge Cement) Brand: 'NUVOCO'	Equinox Business Park Tower-3, East Wing, 4th Floor LBS Marg, Kurla (West), Kurla Mumbai, Maharashtra-400070	All
12.	M/s Shree Cement Brand: 'SHREE'	Bangur Nagar, Beawar, Dist-Ajmer, Rajasthan-305901, Ph : 01462-228101-06	All
13.	M/s J K Cement Brand: 'J K'	Kamla Tower, Kanpur - 208001	All
14.	M/s JK Lakshmi Cement Ltd Brand: 'JK LAKSHMI'	Jaykaypuram, Dist-Sirohi, Rajasthan Ph: 02971-244409/10	All
15.	M/s Jaypee Rewa Cement Brand: 'JAYPEE'	Jaypee Nagar, P.O. – Jaypee Nagar, Rewa – 486450, M.P.	All
16.	M/s Ambuja Cement Ltd Brand: 'AMBUJA'	Kodinar, PO-Ambujanagar, Taluka-Kodinar, Dist-Junagadh, Gujarat-362715, Ph: 02795-237000	All
17.	M/s Chettinad Cement Corporation Pvt Ltd BRAND: CHETTINAD CEMENT	4 th Floor, Rani Seethai Hall Building, 603, Anna Salai Hall, Chennai - 600006 Tele : +91-44-28292727/42149955 Fax : +91-44-28291558 Email : shares@chettinadcement.com Website : www.chettinad.com	OPC-43 & PPC
18.	M/s My Home Industries Pvt Ltd Brand: MAHA CEMENT	9 th floor, Block-3, My Home Hub, Madhapur, Hyderabad – 500081, Telengana Tel : +91-40-66929696 Fax : +91-40-23118000 Email: corp@myhomegroup.in Website: www.myhomeindustries.com	PSC
19.	M/s My Home Industries Pvt Ltd Brand: MAHA CEMENT	9 th floor, Block-3, My Home Hub, Madhapur, Hyderabad – 500081, Telengana Tel : +91-40-66929696 Fax : +91-40-23118000 Email: corp@myhomegroup.in Website: www.myhomeindustries.com	OPC 43 & PPC

SI No.	Company name	Address	Cement Grades
1	2	3	4
20.	M/s Sagar Cements Ltd Brand " SAGAR"	Plot No 111, Road No 10, Jubilee Hills, Hyderabad - 500 033 Tele : +91-40-23351571, 2335672 Fax : +91-40-2335673 Email :- info@sagarcements.in Web Site : www.sagarcements.in	OPC 43, OPC 53, PPC & PSC
21.	M/s Wonder Cements Ltd Brand: WONDER CEMENT	17, Old Fatehpura, Seva Mandir Road, Udaipur – 313 004, Rajasthan (India) Tele : +91-294-33991133 Fax : +91-274-3006333 Email: corp.office@wibdercenebt.com Website: www.wondercement.com	OPC 43, OPC 53 and PPC

1.3.1 USE OF PPC (POZOLONA PORTLAND CEMENT)

1.3.1.1 While using PPC the following conditions shall generally be met:

- (i) Strength criterion for PPC cement shall be as per IS:8112-1989
- (ii) Stripping time shall be 14 days
- (iii) Both OPC and PPC shall not be permitted for use in the same building except for plaster and mortar
- (iv) Mandatory certificates of testing and quality assurance shall continue to be submitted with fly ash content as per IS: 1489-1991 (Part-I)

1.3.1.2 While procuring Portland Pozzollana Cement, the following requirement are to be ensured and certificate to be obtained from the manufacturer for each batch of PPC procured:

- (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 soils only pneumatic pumping is used.
- (iv) The fly ash is received from thermal power plant using high temperature combustion above 1000°C
- (v) The fly ash content in PPC is not more than 25%

1.3.2 The Contractor shall furnish the particulars of the manufacturer/ supplier of cement along with the date of manufacture to the Garrison Engineer for every lot of cement separately. The cement so brought shall be fresh and in no case older than 60days from the date of manufacture. The document in support of purchases of cement shall be verified by the Garrison Engineer. Before placing the order for supply of cement by the Contractor, he shall obtain written approval from the GE regarding name of manufacturer, quantity of cement, etc. Cement shall be procured for minimum requirement of one month and not exceeding the requirement of the same for more than two months at a time. The cement shall be consumed in the work within three months after receipt. Cement shall conform to the requirement of Indian Standard Specification and each bag of cement shall bear relevant ISI mark. The weight of each consignment shall be verified by the GE and recorded. The content of cement shall be checked at random to verify the actual weight of cement per bag. However, the content of cement per bag shall be 50kgs only subject to tolerance given in clause 9.2.1.1 and Annexure-`B' of IS-8112-1989.

1.4 TESTING OF CEMENT

1.4.1 The manufacturer shall carry out inspections and testing of cement in accordance with relevant BIS provisions. The Contractor shall submit the manufacturer's Test Certificate in original along with Test Sheets giving the result of each physical test as applicable and chemical composition of the cement in accordance with relevant IS provisions and the chemical composition of the cement or authenticated copy thereof duly signed by the manufacturer with each consignment, as per the following IS provisions:

- (a) Method of Sampling Hydraulic Cement as per IS:3535-1986
- (b) Method of Physical Tests for Hydraulic Cement as per IS-4031
- (c) Method of Chemical Analysis of Hydraulic Cement as per IS-4032-1985

The test certificate and test sheet shall be furnished with each batch of the manufacture. The Engineer-in-charge shall record these details in the Cement Acceptance Register as given in Appendix- 'A' to be maintained by him which will be signed by the /JE (Civil), Engineer-in-charge, the Garrison Engineer and the Contractor as given in the format hereinafter for verification.

(a) The Contractor shall however, organise setting time and a compressive strength test of cement through designated laboratory on samples collected from the lot brought at site before incorporation in work. The Contractor will be allowed to use the cement only after satisfactory compressive strength of seven days to meet this requirement, Contractor is required to keep minimum 10days stock before any new lot brought at site which can be used in the work. The Contractor shall be required to remove the cement not meeting the requirement from the site

within 24 hours. Seven days' strength test will be relied upon to accept the lot of cement to commence the work. 28days compressive strength test will be the final criteria to accept/reject the lot.

(b) The GE shall carry out independent testing as per the tests mentioned in the 'CEMENT SUPPLY/ ACCEPTANCE FORM' of random samples of cement drawn from various lots, if sample fails in 7 days' compressive strength. The testing shall be carried out through NATIONAL TEST HOUSE, SEMT wing CME, REGIONAL RESEARCH LABORATORIES IITs, GOVT Engineering Colleges, MES ZONAL LABORATORIES, National Institute of Technology as per BIS and as per test methods referred hereinbefore and shall be recorded in respective portion of Appendix- 'C-1'. The decision as to where the testing of cement is to be done shall be taken by the GE. In case the cement is not of requisite standard despite manufacturer's test certificate, the Contractor shall remove the total consignment from the site at his own cost after written rejection order of the consignment by the GE. The cost of test shall be borne by the Contractor irrespective of the results of testing.

(c) The random samples as per relevant IS shall be selected by the GE before carrying out testing. The random samples of cement to be tested shall be drawn as per MES Quality Assurance Manual. The record of such samples selected by the GE for testing shall be properly maintained in the 'Cement Testing Register' giving cross reference to relevant consignment of cement and quantity received etc.

(d) Cost of transportation of samples to the approved laboratory / test house and all testing charges including cost of sample shall be borne by the Contractor.

1.4.2 The Contractor shall be required to set up adequate testing facilities at site to the entire satisfaction of the Garrison Engineer for conducting 'Setting Time Test' and 'Compressive Strength Test' as per IS codes referred to hereinbefore for the samples collected from the lot brought at site. These tests shall be carried out within 7days of receipt of cement at site. The tests can alternatively be carried out at the Zonal Laboratory so designated by the GE.

1.4.3 The Contractor shall submit original purchase vouchers for the total quantity of cement supplied under each consignment to be incorporated in the works. All consignments received at the work site shall be inspected by the GE along with the relevant documents to ensure the requirements as mentioned hereinbefore, before acceptance. The original purchase vouchers and the test certificates shall be verified for subject contract and defaced by the Engineer-in-Charge and kept on record in the office of GE duly authenticated and with cross reference to the consignment/ control number recorded in the Cement Acceptance Register. The 'Cement Acceptance Register' shall be signed by the JE (Civil), Engineer-in-charge, GE and the Contractor. The Contractor shall maintain schedule of supply of cement for each consignment.

1.4.4 The Accepting Officer may order a Board of Officers for random check of cement and verification of connected documents during the currency of contract.

1.4.5 For repair, maintenance and works where entire requirement of cement is less than 300bags, cement can be procured from authorised dealers of the firm listed hereinbefore.

1.5 STORAGE / ACCOUNTING / PRESERVATION OF CEMENT

1.5.1 Cement shall be stored in covered godown over dry platform at least 20cm high in such a manner as to prevent deterioration due to moisture or intrusion of foreign matters. In case of store rooms, the stack should be at least 20cm away from floors and walls. The stacking of cement shall be not more than 10bags and or done as specified in relevant IS. The storage, accounting and preservation of cement supplied by the Contractor shall be done as per standard engineer practice till the same is incorporated in the work and the cost of the same is deemed to be included in the unit rate/amount quoted by the tenderer. The Engineer-in-charge shall inspect once a day to verify that cement lying at site is stored, accounted, preserved and maintained as per the norms. The cement shall be stored so as to differentiate each tested and untested consignment separately with distinct identification.

If the GE is not satisfied with the storage/ preservation of cement, he may order for any test(s) of cement as applicable for that consignment to ensure its conformity to the quality mentioned in the manufacturer's test certificate. The Contractor shall bear the cost of necessary testing(s) in this regard and no claim whatsoever shall be entertained.

1.5.2 Stacking of cement shall be done as per relevant IS and as under :

(a) Each cement consignment shall be stacked separately and removal shall be made on the basis of 'First in Firstout'.

(b) Adequate top cover will be provided

(c) Stacks in no case shall be higher than 10bags. The maximum width of each stack shall be 3.00m. If the stack is to be more than 7 or 8bags high, the bags shall be arranged in header and stretcher fashion, alternatively lengthwise and crosswise so as to tie the piles together and avoid danger of topping over.

(d) Adequate space shall be kept between two stacks.

- 1.5.3** Cement godown 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 Contractor's authorised agent at site of works so that cement is removed from the godown only according to daily requirement with the knowledge of both the parties. During the period of storage, if any cement bag(s) found to be in damaged condition due to whatsoever reason, the same shall be removed from the cement godown on written orders of the GE and suitable replacement for the cement bag(s) so removed shall be made and no claim whatsoever shall be admissible on this account.
- 1.5.4** Cement shall be removed from the store only according to daily requirement with the knowledge of both the parties and daily consumption of cement shall be recorded in cement consumption register which shall be signed by the Engineer-in-charge and the Contractor. Cement constants given in Appendix-'A' to E-in-C's branch letter No.19280/E8 dated 03 May 1976 shall form the basis of consumption of cement for various items of works unless indicated otherwise.
- 1.5.5** In case of consumption of cement as per cement consumption register is found to be more than the estimated quantity of cement due to whatsoever reason, the Contractor shall not have any claim whatsoever for such excess consumption of cement.
- 1.6** **SCHEDULE OF SUPPLY** The Contractor shall procure the cement timely as required in accordance with CPM chart agreed between GE and himself. The Contractor will forfeit his right to demand extension of time if the supplies of cement get delayed due to his failure in placing order in time to the manufacturer.
- 1.7** **DOCUMENTATION, MEASUREMENT AND PAYMENT OF CEMENT**
- 1.7.1** The Contractor shall submit original vouchers from the supplier for the total quantity of cement supplied under each consignment to be incorporated in the work, all consignment received at the work site shall be inspected by the GE along with relevant documents received at the work site. The original vouchers and the test certificate shall be defaced by the Engineer in Charge and kept on record in the office of the GE duly authenticated with cross reference to the control number recorded in cement acceptance register. This register shall be signed by the JE, Engineer-in-charge, GE and the Contractor.
- 1.7.2** The Accepting Officer may order a Board of Officer for random check of cement and verification of connected documents. The entire quantity of cement 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.
- 1.7.3** The payment shall only be allowed after production of original purchase voucher, certified copies of test certificates from manufacturer for each consignment and results of testing carried out in laboratory on receipt of cement (7days compressive test) are found satisfactory after testing as specified hereinbefore. Cement shall be paid as material lying at site under Condition 64 of IAFW-2249. Rate of cement given in SSR shall be applicable for cement irrespective of grade of cement specified for use in the work.

Signature of Contractor

AAD (Contracts)
for Accepting Officer

RECOVERY RATES OF TESTING CHARGES

Srl No.	Materials	Test	Method of testing	Frequency of tests	Level of test	Rate per test Rs. Ps.	Remarks												
1.	Bricks	i. Compressive strength	IS-3495 (Part-II)	As per IS-5454 as given under : <table><tr><td>Lot size</td><td>Sample size</td><td>Permissible No. of defective bricks</td></tr><tr><td>1001 to 10000</td><td>5</td><td>0</td></tr><tr><td>10000 to 35000</td><td>10</td><td>0</td></tr><tr><td>35001 to 50000</td><td>15</td><td>1</td></tr></table>	Lot size	Sample size	Permissible No. of defective bricks	1001 to 10000	5	0	10000 to 35000	10	0	35001 to 50000	15	1	A	330/-	Checks for visual and dimensional characteristics shall also be carried out as per IS- 5454.
		Lot size	Sample size		Permissible No. of defective bricks														
		1001 to 10000	5		0														
		10000 to 35000	10		0														
		35001 to 50000	15		1														
		ii. Water absorption	IS-3495 (Part-II)		A	330/-													
		iii. Efflorescence	IS-3495 (Part-I)		A	330/-													
2.	Coarse aggregate	i. Sieve Analysis	IS-2386 (Part-I)	One test for every 15 Cum of aggregates or part thereof brought to site.	A	660/-													
		ii. Flakiness Index	IS-2386 (Part-I)	-do-	A	250/-													
		iii. Estimation of deleterious material	IS-2386 (Part-I)	One test for every 100 Cum of aggregates or part thereof brought to site.	A	600/-													
		iv. Organic impurities	IS-2386 (Part-I)	One test for source of supply	B	275/-													
		v. Moisture Content	IS-2386 (Part-II)	Regularly as required	A	330/-													
		vi. Specific Gravity	IS-2386 (Part-II)	One test for each source of supply	B	330/-													
3.	Fine aggregate	i. Sieve analysis	IS-2386 (Part-I)	One test for every 15 Cum of aggregates or part thereof brought to site.	A	660/-													
		ii. Test for clay, silt and	IS-2386	-do-	A	500/-													

RECOVERY RATES OF TESTING CHARGES (contd...)

Srl No.	Materials	Test	Method of testing	Frequency of tests	Level of test	Rate per test Rs. Ps.	Remarks												
		Impurities	(Part-I)																
		iii. Specific gravity	IS-2386 (Part-II)	One for each source of supply	B	330/-													
		iv. Moisture content	IS-2386 (Part-II)	Regularly as required subject to 2 tests per day when being used.	A	330/-													
		v. Test for organic impurities	IS-2386 (Part-II)	One test for each source of supply.	B	275/-													
4.	Structural concrete (M-25 Grade and above)	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 :- <table><tr><th>Qty of concrete in the work in Cum</th><th>No. of samples</th></tr><tr><td>1-5</td><td>1</td></tr><tr><td>6-15</td><td>2</td></tr><tr><td>16-30</td><td>3</td></tr><tr><td>31-50</td><td>4</td></tr><tr><td>51 and above</td><td>4+1 for each additional 50 Cum or part thereof.</td></tr></table>	Qty of concrete in the work in Cum	No. of samples	1-5	1	6-15	2	16-30	3	31-50	4	51 and above	4+1 for each additional 50 Cum or part thereof.	A	300/-	Random sampling shall be carried to cover all mix units.
Qty of concrete in the work in Cum	No. of samples																		
1-5	1																		
6-15	2																		
16-30	3																		
31-50	4																		
51 and above	4+1 for each additional 50 Cum or part thereof.																		
		ii. Compressive strength	IS-516		A	900/-	As per IS-456 clause 14 for frequency of sampling.												
5.	(a) PCC Block for walling (Hollow Block)	i. Compressive Strength	IS:2156-1984 (Appx B)	08 blocks out of 14	A	900/-													
		ii. Water absorption	IS:2156-1984 (Appx B)	03 blocks out of 14	B	330/-													
		iii. Density	IS:2156-	03 blocks out of 14	B	330/-													

RECOVERY RATES OF TESTING CHARGES (contd...)

Srl No.	Materials	Test	Method of testing	Frequency of tests	Level of test	Rate per test Rs. Ps.	Remarks
	(b) PCC Solid block for walling		1984 (Appx C)				
		i. Compressive Strength	IS-2185	12 blocks out of 18	A	900/-	Sample: 20 blocks from consignment of every 5000 blocks or part thereof. These blocks to be checked for dimension and weight.
		ii. Water absorption	-do-	03 blocks out of 18	B	330/-	
		iii. Density	-do-	03 blocks out of 18	B	330/-	
6.	Cement flooring tiles/ terrazzo tiles	i. Water absorption	IS-1237 (Appx D)	06 tiles out of 18	B	330/-	Sample of 18 tiles from each source of supply selected at random.
		ii. Wet transverse strength	IS-1237 (Appx E)	06 tiles out of 18	B	660/-	
		iii. Resistance to wear	IS-1237 (Appx F)	06 tiles out of 18	C	1000/-	
7.	Burnt clay roofing tiles (machine made as per IS-2690 (Part- I)) Length:150mm to 250mm Width:100mm to 200mm Thickness: 35mm to 50mm	i. Water absorption	IS-3495 (Part-II)	06 tiles out of 12	B	216/-	Sample: 12 tiles from each source of supply selected at random
		ii. Compressive strength	IS-3495 (Part-I)	06 tiles out of 12	A	180/-	

RECOVERY RATES OF TESTING CHARGES (contd...)

Srl No.	Materials	Test	Method of testing	Frequency of tests			Level of test	Rate per test Rs. Ps.	Remarks
				1001 and above	80				
		ii. Strength test		From each lot 5% of the factory made shutters shall be manufacturer tested for strength tests.					
		a) Slamming	IS: 1303-1990						
		b) Impact indentation	-do-						
		c) Shock resistance	-do-						
		d) Edge loading	-do-						
13.	Plywood (IS: 303-1989)	Moisture content	IS:1734-1983 (Part- I)	Six test pieces cut from each of the boards selected as per table shall be subjected to tests.			C	240/-	Sampling shall be as per IS:7835-1975 Tables.
14.	Wood particle board (Medium density) (IS:3097-1985)	i. Density	IS:2360 (Part-III)	Three test specimens from each sample (size: 150mmx 75mm)			A	60/-	Sampling shall be as per IS:3487-83.
		ii. Moisture content	IS:2360 (Part-III)	-do-			A & B	60/-	
		iii. Water absorption	IS:2360 (Part-16)	-do- (Size: 300mm x 300mm)			A	60/-	
		iv. Swelling due to surface absorption	IS:2360 (Part-17)	-do- (Size: 125mm x 100mm)			A	60/-	
		v. Swelling in water	IS:2360 (Part-17)	-do- (Size: 200mm x 100mm)			A	60/-	
		vi. Modulus of rupture	IS:2360 (Part-4)	Three test specimens as per IS:2380-77			B	90/-	
		vii. Screw withdrawal strength	IS:2360 (Part-4)	Three test specimens as per IS:2385			C	120/-	

RECOVERY RATES OF TESTING CHARGES (contd...)

Srl No.	Materials	Test	Method of testing	Frequency of tests	Level of test	Rate per test Rs. Ps.	Remarks
15.	Cement	i. Setting time	IS4031-63 Reaffirmed 1980	Once for each consignment or as and when required	B	500/-	
		ii. Soundness		Once for each consignment or as and when required	B	550/	
		iii. Compressive Strength		Once for each consignment or as and when required	B	550/-	
		iv. Fineness		Once for each consignment or as and when required	B	275/-	
16.	Reinforcement steel	i. Physical test up to 16mm dia (normal mass, tensile elongation, bend and rebind)	As per IS	As per IS	B	2500/-	
		ii. More than 16mm dia	As per IS	As per IS	B	2750/-	

LEGEND :
A – Site Lab
B– Command Test Lab
C – Approved test house/ Engg. College

Signature of Contractor

AAD (Contracts)
for Accepting Officer

CEMENT SUPPLY & ACCEPTANCE FORM

1. Contract No. :
2. Name of work :
3. Control No. :
4. (a) Name of Manufacturer : (b) Brand Name: (c) Grade of Cement:
5. (a) Quantity of Cement (bags): (b) Lot No. /Week No.:
6. Manufacturer’s Test Certificates No. :
7. Random Test Details :

(a) Physical Test Report from (*) vide their letter No.: (Name of approved lab /Engineering College)

(b) Chemical Test Report from (*) vide their letter No.: (Name of approved lab /Engineering College)

**to be filled the name of approval Lab/Engg. College*
8. Details of Physical & Chemical Proprieties :

	Physical Requirement (as per IS: 4031)								Chemical Requirements (as per IS: 4032)							Remarks			
	Specific Surface (m²/kg)	Soundness by Le Chatelier Expansion (%)	Soundness by Auto Clave Expansion	Initial Setting Time (minutes)	Final Setting Minutes (minutes)	Compress -sieve Strength (Mpa)			Temperature during testing (°C)	Standard Consistency (%)	Lime Saturation Factor (Ratio)	Alumina Lon Ratio (Ratio)	Insoluble Residue (%)	Magnesia (%)	Sulphuric Anhydride (%)		Loss Opn Ignition (%)	Alkalis (%)	Chlorides (%)
As per relevant IS						03days	07days	28days											
As per Manufacturer's certificate																			
As per random test certificate																			

Remarks with signature

Accepted/Rejected

Contractor

JE (Civil)

Engineer-in-Charge

Garrison Engineer

Remarks of BOO/Inspecting Officer/CWE:
* To be allotted serially by the GE consignment wise

STEEL SUPPLY & ACCEPTANCE FORM

1.

Contract No.

:
2.

Name of work

:
3.

Control No.

:
4.

Name of Manufacturer

:
5.

(a)

Type of steel (TMT/CRS)

:

(b)

Dia of bar (mm)

:

(c)

Quantity of steel

(i) Actual Weight (MT)

:

(ii) Conversion Weight (MT)

:
6.

Manufacturer’s Test Certificates No.

:
7.

Random Test Details :

(a)

Physical Test Report from (*) vide their letter No.

:

(b)

Chemical Test Report from (*) vide their letter No.

:

*

to be filled the name of approval Lab/Engg. College
8.

Details of Mechanical & Chemical Proprieties

:

	Chemical Test						Mechanical Test						Remarks
	Carbon (%)	Sulphur (%)	Phosphorous (%)	Manganese (%)	Silicon (%)	Corrosion Resistant Element	Weight per meter (kg)	Stress 0.2% proof (N/mm ²)	Tensile Strength (N/mm ²)	Elongation (%)	Bend Test	Rebend Test	
As per relevant IS													
As per Manufacturer’s certificate													
As per random test certificate													

Remarks with signature

Accepted /Rejected

Contractor

JE (Civil)

Engineer-in-Charge

Garrison Engineer

Remarks of BOO/Inspecting Officer/CWE:

PROFORMA NO-1
DAILY MAINTENANCE

Sr No	Nature of work to be completed	Record of Replacement/ maint carried out	Signature of Mechanic	Sign of AGE E/M/ JE E/M
1	Cleaning the traction machines, relay panels, Control panels, starter panels, selectors, governors, car top, car gates, sills, machine room pits, car panels, car mirror, Landing gates, indicator panels, push buttons, car ceiling, car base, Lights, alarm etc.			
2	Checking and repairs of all relays contacts.			
3	Checking and topping of oils/grease in all bearings, rings and chains.			
4	Checking and repairing of breaking action.			
5	Checking and repairing of movement of door switches, gate switches, emergency stop switches			
6	Checking and repairing of all indicator lamp and indicator.			
7	Checking and repairing of annunciator Lights, Buzzer, Car Lights, Emergency Light, car top light, machine room lights, landing door lights, car ventilation fan etc.			
8	Checking and repair to ARD function.			
9	Checking and Adjusting levelling difference, brake slippage, acceleration, deceleration and riding comfort.			
10	Checking and repairing of earthing connection of Lift car panels, machines and all other metal parts			
11	Checking and repairing movements of Car Control buttons, switches etc. Note : 1 During the above maintenance if any other component found unserviceable that shall also be repaired/replaced and recorded in proforma No.1.			
	Note : 2 During the maintenance all defective parts shall be replaced and record for them shall be mentioned in appropriate column. The rates for replacement of defective parts, topping of oil/greasing etc. is deemed to be included in the unit rate quoted by the Contractor under BOQ.			
	Note : 3 This maintenance sheet shall be part of RAR & FB.			

Signature of Contractor

Signature of GE

PROFORMA NO-2
FORTNIGHTLY MAINTENENCE (IN ADDITION TO DAILY CHECK)

Sr No	Nature of work to be completed	Record of Replacement	Signature of Mechanic	Sign of AGE E/M / JE E/M
1	Checking and cleaning to traction motor brushes, brush holders, internal frame, hoist way, beams slow downcams, outside cages, rails, counter weight rails.			
2	check lift stops in down word direction properly with 25 % overload with operation of the Emergency stop when lift is moving at full speed. It required carry out necessary repair and replacement.			
3	Check and lubricate by grease cup for speed governors, compensating pulleys.			
4	Check, repairs top up rail lubricators, oil selectors.			
5	Check, Lubricate and repair to main ropes, compensating rope, tensioning pulleys etc.			
6	Check and adjust slip rings, commuturs.			
7	Check and oil electric brake pins and pins of door operation and door opening mechanism.			
8	Check and repair door closers and Leavers.			
9	Check and repair door protection edge.			
10	Check and repair main sheaves, Secondary sheaves, rope sheaves on car top and counter weight top.			
11	Check and repair brake wheels, shoes.			
	Note : 1 During the above maintenance if any other component found Unserviceable that shall also be repaired/replaced and recorded in proforma No. 2.			
	Note :2 During the maintenance all defective parts shall be replaced and record for them shall be mentioned in appropriate column. The rates for replacement of defective parts, toping of oil/greasing etc. is deemed to be included in the unit rate quoted by the Contractor under BOQ.			
	Note : 3 This maintenance sheet shall be part of RAR & FB.			

Signature of Contractor

Signature of GE

PROFORMA NO-3
MONTHLY MAINTENENCE (IN ADDITION TO ALL DAILY, FORTNIGHTLY MAINTENANCE)

Sr No	Nature of work to be completed	Record of Replacement	Signature of Mechanic	Sign of AGE E/M / JE E/M
A <u>CONTROLLER</u>				
1	Clean contract and shields with carbon tetra chloride (CC l4)			
2	Move relay armature by hand for free movement and see thatcontacts are aligned			
3	Replace carbon contacts if worn out			
4	Check flexible leads to relays.			
5	Check fuses of controller and fans.			
6	Break oil in dash pots.			
B <u>MOTOR GENERATOR AND / OR DC MOTOR</u>				
7	Check and adjust carbon brushes spring pressure commutator resent brushes.			
8	Grease bearings.			
C <u>AC MOTOR</u>				
9	Lubricate bearings			
10	Clean ventilation passages.			
D <u>GEAR BOX</u>				
11	Inspect for tray noises.			
12	Check axial play of worn shaft			
13	Lubricate bearing and top up oil in Gear box.			
E <u>BRAKE</u>				
14	Clean if any and trace source of oil leakage.			
15	Adjust clearance between shoes and drum			
F <u>SELECTOR</u>				
16	Clean contacts.			
17	Adjust for proper levelling.			
18	Check tape safety switch			
19	Lubricate shaft bearings.			
20	Check performance without load and with full load.			
G <u>GOVERNOR</u>				
21	Lubricate bearings.			
22	Check that the levers work smoothly.			
23	Check that electrical contact opens before the rope getslooked			
H <u>ROPES</u>				
24	Check condition of hoist ropes and Governor ropes.			
25	Check slack rope safety switch.			
26	Lubricate rope if too dry.			
27	Check the dia of rope in mm.			
J <u>HOISTWAY</u>				
28	Lubricate guides and guide shoes.			
29	Check that the buffers are in proper position and measureand record counter weight buffer cleans with car at the top.			
K <u>RETIRING CAR AND LOKS</u>				
30	Check operation of car and lock from the top at each landing. Check that retiring car Solenoid is not getting over heated and that movement of car is smooth.			
31	Check that all locks are functioning properly mechanically and electrically after opening the cover. Check all set screws and springs and replace if necessary. The lever should lock thebrake properly.			
32	Check that the retiring car does not touch the lock roller atthe landing which is being passed.			
33	Check that car gate switch operates properly.			
34	Check car stop controls and emergency stop.			

Sr No	Nature of work to be completed	Record of Replacement	Signature of Mechanic	Signof AGE E/M / JEE/M
35	Check door closures safety clean and adjust, If necessary.			
36	Lubricate top track and door motor and linkage.			
37	Check that landing doors can be opened by emergency Keys.			
	Note : 1 During the above maintenance if any other component found Unserviceable that shall also be repaired/replaced and recorded in proforma No.3.			
	Note : 2 During the maintenance all defective parts shall be replaced and record for them shall be mentioned in appropriate column. The rates for replacement of defective parts, topping of oil/greasing etc. is deemed to be included inthe unit rate quoted by the Contractor under BOQ.			
	Note : 3 This maintenance sheet shall be part of RAR & FB.			
	Note : 4 If the ropes area is reduced to as shown below the contractor will have to replace complete set of ropes and the rates for the same is deemed to be included in the unit rated quoted by the contractor under Schedule “A” Part-II. Nominal dia (in mm) 12.0, 14.0,16.0, 18, 20.0,23.0. Actual reduced dia (in mm) 11.2, 13.2, 14.8, 16.8, 18.8, 21.4 respectively. The complete set of ropes shall be from same manufacturer and of some material, grade, construction and diameter and preferably cut from same reel.			

Signature of Contractor

Signature of GE

PROFORMA NO-4
QUATERLY MAINTENENCE (IN ADDITION TO MONTHLY OPERATION)

SI No	Nature of work to be completed	Record of Replacement	Signature of Mechanic	Signof AGE E/M / JEE/M
1	Check, Lubricate and repairs to door hangers, door rails, interior of hanger case.			
2	Check and repair eccentric rollers, car door hangers, door connecting ropes and chains.			
3	Check and repair door shoe.			
4	Check, Lubricate and repair car and counter weight guide shoes.			
5	Check, Lubricate and repair to interior of terminal Limit switches and position switches. Replace rubber rollers ofterminal limit switches.			
6	Check and repair interior of door switches, gate switches and car control switches.			
7	Check and repair to travelling/flexible cable, termination junction boxes.			
8	Check and repair to push buttons of car-control panels, landing doors etc.			
9	Check and repair the sleeves and plungers of the electromagnetic brakes.			
10	Check and repair to power wiring in termination switches, motor controller, power switching relays over load relays, phase failure relay etc.			
11	Check upper and lower limit switches for proper connection after physical inspection. Get the lift to over travel by holding from the controller and see that the switches operate properly.			
12	Check and repair to rope fasteners, guide clamps etc.			
13	Check the batteries, tighten the terminal, provide terminal jelly.			
	Note : 1 During the above maintenance if any other component found Unserviceable that shall also be repaired/replaced and recorded in proforma No.4.			
	Note : 2 During the maintenance all defective parts shall be replaced and record for them shall be mentioned in appropriate column. The rates for replacement of defective parts, toping of oil/greasing etc. is deemed to be included inthe unit rate quoted by the Contractor under BOQ.			
	Note : 3 This maintenance sheet shall be part of RAR & FB.			

Signature of Contractor

Signature of GE

PROFORMA NO-5
HALF YEARLY MAINTENENCE (IN ADDITION TO ALL QUATERLY MAINTENANCE)

SI No	Nature of work to be completed	Record of Replacement	Signature of Mechanic	Sign of AGE E/M / JE E/M
1	Check and repair the operation of terminal limit switches and final limit switches.			
2	Check and repair the governor switches.			
3	Check and repair the brush holders and commutators of the door motors.			
4	Check and replace the traction ropes if wire found projected and broken. Complete set of rope shall be replaced.			
5	Check and repair to voltage rectifiers, thyristors.			
6	Check and repair the operation of safety gears.			
7	Check and top up oil in buffers.			
8	Check and repair the hall buttons and contacts.			
9	Check and repair the compensating chains or ropes.			
10	Check. Lubricate and repair the bearing of door motors.			
11	Check, Lubricate and repair to secondary sheaves, car top sheaves, and counter weights.			
12	Check and replace to guide shoes of cars and counter weights.			
	Note : 1 During the above maintenance if any other component found Unserviceable that shall also be repaired/replaced and recorded in proforma No.5.			
	Note : 2 During the maintenance all defective parts shall be replaced and record for them shall be mentioned in appropriate column. The rates for replacement of defective parts, toping of oil/greasing etc. is deemed to be included in the unit rate quoted by the Contractor underBOQ.			
	Note : 3 This maintenance sheet shall be part of RAR & FB.			

Signature of Contractor

Signature of GE

PROFORMA NO-6
ANNUAL MAINTENENCE (IN ADDITION TO ALL HALF YEARLY MAINTENANCE

SI No	Nature of work to be completed	Record of Replacement	Signature of Mechanic	Sign of AGE E/M / JE E/M
1	Inspect the lift car, car doors, landing doors and ceiling etc. carry out buffing on steel hair line finish to get them shine. Replace the inside mirror, hand rail, Light fittings, ventilatingfan etc. if found broken/Unserviceable.			
2	Open all the indicating panels from car, landing etc. clear from inside replace all defective items.			
3	Check and replace all defective push buttons.			
4	Check and repair the worm gear and the thrust bearing from the gear box.			
5	Check and repair the power Ckt in junction boxes, cables, controllers power relays, motor etc. at every landing and car cages. Check the condition of cables and conduit inlets andoutlets.			
6	Check and repair the operation of car over speed safety gearby moving the leavers manually and ensure that they are working properly.			
7	Check, repair and tighten screws and foundation bolts of traction machine, Secondary sheaves exterior of lift frame, guide rails, guide rail clamps and bracket etc.			
8	Dismantle, clean and repair the electro magnetic brake of gearless machines, replace the necessary parts for smoothfunctioning.			
9	open all control panels, starter panels, relay panels replace allworn out parts, all contacts to be replace, screws to be tighten, indicators to be replace, relays to be testedetc.			
10	Check and repair the ARD, replace the batteries if required.			
11	Check and repair the VVVF drive and replace if creating frequent breakdown.			
12	Check and ensure all earthing connections areinsoundconditions, check earthing resistance and maintain therecord.			
13	Check and replace the alarm system, Emergency lights, announcing system etc.			
14	Carry out joint inspection of lift in the presence of IEM andgarrison engineer. During inspection if any item related to the operation of lift found unserviceable shall be replaced.			
	Note:1 During the above maintenance if any other component found Unserviceable that shall also be repaired/replaced and recorded in proforma No.6.			
	Note:2 During the maintenance all defective parts shall be replaced and record for them shall be mentioned in appropriate column. The rates for replacement of defective parts, toping of oil/greasing etc. is deemed to be included in the unit rate quoted by the Contractor under BOQ.			
	Note:3 This maintenance sheet shall be part of RAR & FB			

Signature of Contractor

Signature of GE

Tel: 022-22150513, 22185694

REGISTERED ACK DUE
Headquarteres
Chief Engineer (Navy) Mumbai,
Shahid Bhagat Singh Road,
Colaba, Mumbai - 400 005

87979 / 25 / E8

02 Jun 2026

M/s _____

NAME OF WORK: PROVISION OF DEFICIENT MARRIED ACCOMODATION FOR SAILORS (POS AND BELOW) AT NAVAL BASE PORBANDAR (48 DUs)

Dear Sir (s),

1. Tender documents in respect of above work are uploaded on the site <https://defproc.gov.in> and published on _____ **2026**. The quoted e-Tender will be received upto _____ **2026** upto **1800** hrs and opened on or after _____ **2026** at **1100** hrs. 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 the ACCEPTING OFFICER upto the date and time mentioned in the NOTICE INVITNG TENDER (NIT). No tender/bid will be received in physical form and any tender/bid received in such manner will be treated as non bonafidetender/bid.
3. Bid will be opened on due date and time fixed for opening in the presence of tenderers/bidders or their authorized representatives, who have uploaded their quotation bid and who wish to be present at the time of opening thebids.
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/drawing and to clarify doubts, if any, on or before _____ **2026**. You are requested not to write piece meal points and forward your points duly consolidated before due date viz. _____ **2026**.
5. Un-enlisted Contractors are required to submit the scanned copies (in pdf file) of documents required as per eligibility criteria mentioned in instructions for filling the tender documents and Appendix 'A' to NIT along with EARNEST MONEY DEPOSIT (EMD) and tender fee on e-procurement portal and submit the physical documents in the office of HQ Chief Engineer (Navy) Mumbai, 26 Assaye Buildings, Colaba, Mumbai-400 005 within time limit specified in NIT. Inadequacy/deficiency of documents shall make the bid liable for rejection resulting in disqualification for opening of financebid.
6. **PERFORMANCE SECURITY DEPOSIT:** After acceptance of the Tender, the contractor will be required to lodge with the Accepting Officer PERFORMANCE SECURITY DEPOSIT @ 5% of contract amount. The amount is required to be lodged within 28 (Twenty Eight) days of the receipt by the contractor of notification of acceptance of tender/bid, failing which action as stipulated in Condition 19 of GCC shall be taken.
7. Enlisted Contractors of MES shall submit the scanned copies (pdf file) of enlistment letter, tender fee and such other documents as mentioned in Appendix- 'A' to NIT on e-procurement portal and submit physical documents in the office of HQ Chief Engineer (Navy) Mumbai, 26 Assaye Building, Colaba, Mumbai-400 005 before date and time fixed for thispurpose.
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-I 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 TENDERER, WHICH PROPOSES ALTERATIONS TO ANY OF THE CONDITION, SPECIFICATIONS LAID DOWN IN THE TENDER DOCUMENTS OR ANY NEW CONDITION, WHATSOEVER, IS LIABLE TO BE REJECTED.
- 12. This letter shall form part of the tender documents.

Yours faithfully,

Signature of Contractor

(Rajesh Kumar)
AAD (Contracts)
for Accepting Officer