



भारत सरकार
Government of India
केन्द्रीय लोक निर्माण विभाग
Central Public Works Department
NOTICE INVITING e-TENDERS

NIT No.	: 05/CE-cum-ED/Gurugram/2026-27
Name of Work	: “Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. (SH: Providing and fixing wardrobes in bedrooms, modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geysers, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana) ”.
Estimated Cost	: Rs. 8,05,68,767/- (Rs 4,41,54,620/- (Civil) + Rs. 3,64,14,147/- (Elect))
Earnest Money	: Rs. 16,11,375/- in favour of Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD)
Performance Guarantee	: (a) 5% of tendered value or Estimated Cost Put to Tender (ECPT) (Whichever is higher) (b) Where the tendered amount is less than eighty percent (80%) of the Estimated Cost Put to Tender (ECPT), the Performance Guarantee, in addition to the requirement under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tendered amount.
Completion Period	: 05 (Five) Months
Last Date & Time of Bid Submission	: Up to 15:00 Hrs. on 21.07.2026
Date & Time of Opening of Financial Bid	: At 15:30 Hrs. on 21.07.2026

Executive Engineer & Senior Manager
Faridabad Project Division, CPWD
Block-I, CGO Complex, NH-IV, NIT, Faridabad- 121001
Phone: 0121-2421330, Email: eecumsm.fpd@gmail.com

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Amount of Civil component Rs. 4,41,54,620/-, Amount of Elect. component Rs. 3,64,14,147/-
Total - Rs. 8,05,68,767/-

Assistant Executive Engineer (E),
Faridabad Project Elect. Division,
CPWD, Faridabad

Executive Engineer & Senior Manager(E),
Faridabad Project Elect. Division,
CPWD, Faridabad

Assistant Engineer (C),
Faridabad Project Division,
CPWD, Faridabad

Executive Engineer & Senior Manager (C),
Faridabad Project Division,
CPWD, Faridabad

This NIT amounting to ₹ 8,05,68,767/- (Rupees Eight Crore Five Lakh Sixty-Eight Thousand Seven Hundred Sixty-Seven Only) is hereby approved which contains pages from page no 1 to page no.183.

Chief Engineer & Executive Director,
Gurugram Project Zone,
CPWD Faridabad

PART-I

GENERAL INFORMATION

NOTICE FOR ONLINE BIDS

The Executive Engineer & Senior Manager (C), Faridabad Project Division, Central Public Works Department, Faridabad (Mobile: 9540768446, Email ID eecumsm.fpd@gmail.com) on behalf of the President of India invites online bids (on percentage rate) from Eligible CPWD enlisted contractors of appropriate class in Building & Roads (erstwhile Composite/Building/Infrastructure) Category in single bid system (Eligibility cum Financial Bid) for the following work:

NIT No.	: 05/CE-cum-ED/Gurugram/2026-27
Name of Work	: “Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. (SH: Providing and fixing wardrobes in bedrooms, modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana) ”.
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Earnest Money	: Rs. 16,11,375/- in favour of Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD)
Completion Period	: 05 (Five) Months
Last Date & Time of Bid Submission	: Up to 15:00 Hrs. on 21.07.2026
Date & Time of Opening of Financial Bid	: At 15:30 Hrs. on 21.07.2026

INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING

The Executive Engineer & Senior Manager (C), Faridabad Project Division, Central Public Works Department, Faridabad (Mobile: 9540768446, Email ID eecumsm.fpd@gmail.com) on behalf of the President of India invites online bids (on percentage rate) from Eligible CPWD enlisted contractors of appropriate class in Building & Roads (erstwhile Composite/Building/Infrastructure) Category in single bid system (Eligibility cum Financial Bid) for the following work:

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Location	Faridabad
Estimated Cost put to Tender	Rs.8,05,68,767/- (Rs 4,41,54,620/- (Civil) + Rs. 3,64,14,147/- (Elect)
Earnest Money	Rs. 16,11,375/- in favour of Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD)
Period of Completion	05 (Five) Months
Last Date & Time of Submission of Bid	Up to 15:00 Hrs. on 21.07.2026
Time and date of Opening of Bids	At 15:30 Hrs. on 21.07.2026

* To be filled by Executive Engineer & Senior Manager

1. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
2. Information and instructions for bidders posted on website shall form part of bid document.
3. The bid document consisting of conceptual plans, specifications, schedule of quantities of various types of items to be executed and the set of terms & conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website <https://etender.cpwd.gov.in> or www.cpwd.gov.in free of cost
4. But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the period of bid submission and uploading the mandatory scanned documents such as Insurance Surety Bonds, Account Payee Demand draft or Banker's Cheque or Fixed Deposit Receipts or/ and Bank Guarantee including e- Bank Guarantee (for balance amount as prescribed) from any of the Commercial Bank

towards EMD in favour of Executive Engineer as mentioned in NIT, receipt for deposition of original EMD to division office of any Executive Engineer (including NIT issuing EE/ AE), CPWD and other documents as specified

5. Those Bidders, who are not registered or have not updated their profile on the website mentioned above, are required to get registered / update their profile beforehand. The necessary training materials including the videos with step to step process are available on download section of <https://etender.cpwd.gov.in>
6. The intending bidder must have valid digital signature certificate with encryption key (combo type) to perform any operations/transactions on the e-tendering portal / website and the bidder should download and install the eMsigner on their system as per instruction available on download section of <https://etender.cpwd.gov.in>.
7. On opening date & time, the Bidder can login and see the bid opening process. After opening of bids, he will receive the competitor bid sheets.
8. Bidder can upload documents in the form of **JPG** format and **PDF** format.
9. Bidder must ensure to quote rate of each item. The column meant for quoting rate in figures appears in yellow colour and the moment rate is entered, it turns sky blue.

In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0". Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (Zero).

However, if a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the lowest amount of the tender or any section/sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.

10. Compulsory ERP Training:

The Existing enlisted contractor either himself or his/her authorised representative shall take compulsory ERP training through any of the CPWD Regional Training Institutes (RTIs) at Delhi, Mumbai, Chennai and Kolkata, National CPWD Academy (NCA) Ghaziabad, Training arranged by Graduates of ERP "Train the Trainers Programme" conducted by NCA, Ghaziabad or through any other special training arranged by ERP unit of CPWD. Training will be valid only when participants are registered and certificate issued through LMS (Learning Management System) in ERP.

The enlisted contractor will not be allowed to participate in the tendering process without uploading the certificate of the above training.

The newly enlisted contractor or his/her authorized representative shall take compulsory ERP training within Ninety (90) days of the date of issue of enlistment order, after which they will not be allowed to participate in tendering process without uploading the training certificate. The enlisted contractors may contact any of the CPWD Regional Training Institutes or NCA Ghaziabad or the Director (O&T), ERP Unit CPWD Headquarter for training purpose.

List of Documents to be scanned and uploaded within the period of Bid submission:

- i. Copy of receipt for deposition of original EMD to division office of any EE, CPWD. Scanned copy of original Insurance Surety Bond/Demand Draft/ Account Payee Banker's Cheque / FDR/ Bank Guarantee including e-Bank Guarantee of any commercial Bank against EMD. **EMD shall be made / issued only from the account of the bidder / tenderer submitting the bid/tender. EMD made/ issued from the account other than that of the bidder/ tenderer submitting the bid, shall not be accepted**
- ii. Enlistment Order for CPWD Contractors who are enlisted in appropriate Class of Building & Roads Category.
- iii. GST registration Certificate *as applicable*, if already obtained by the bidder.

If the bidder has not obtained GST registration *as applicable*, then he shall scan and upload following undertaking along with other bid documents:

"If work is awarded to me, I/we shall obtain GST registration Certificate, *as applicable*, within one month from the date of receipt of award letter or before release of any payment by CPWD, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on a/c of the work executed and/or for any action taken by CPWD or GST department in this regard."

- iv. Compulsory ERP Training Certificate for existing enlisted contractor and for newly enlisted contractor undertaking for compulsory ERP training within Ninety (90) days of the date of issue of enlistment order.
- v. Undertaking on structural stability and soundness as per prescribed format Form 'F'.
- vi. Any other document as specified in the Bid document.

CPWD-6 FOR e-TENDERING

1. **Percentage Rate Bids** in Single Bid System (Eligibility cum Financial Bid) are invited) on behalf of the President of India from Eligible CPWD Enlisted Contractors of appropriate class in Building & Roads (erstwhile Composite / Building/ Infrastructure) category for the work of “Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. **(SH: Providing and fixing wardrobes in bedrooms, modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana)”**.
2. The enlistment of the CPWD Contractors should be valid on the last date of submission of bids. In case the last date of submission of bids is extended, the enlistment of contractor *should be valid on the original date of submission of bids*.
 - 1.1. The work is estimated to **cost Rs.8,05,68,767/- (Rs 4,41,54,620/- (Civil) + Rs. 3,64,14,147/ (Elect))**. This estimate, however, is given merely as a rough guide.
3. Agreement shall be drawn with the successful bidder on prescribed Form No. **CPWD-7** (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website www.cpwd.gov.in. Bidder shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
4. The time allowed for carrying out the work will be **05 (Five) Months** from the date of start as defined in schedule ‘F’ or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
5. (i) The site for the work is available; however, the quarters shall be handed over in phased manner block-wise/floor-wise depending upon completion and clearance by the existing finishing contractor. The contractor shall plan execution accordingly and no claim on account of idle labour/resources due to phased availability shall be entertained. However, suitable extension of time shall be considered where justified
(ii) The Architectural drawings of completed quarters have been provided and the drawings of wardrobe and modular kitchen cabinet shall be prepared based on it by the contractor and shall be got approved from Engineer-in-charge. The contractor shall prepare and submit detailed shop drawings within 10 days of award for Approval of engineer-in-charge. No work shall be carried out without approval.
6. The bid document consisting of *architectural* plans of buildings, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen from website <https://etender.cpwd.gov.in> free of cost.
7. After submission of the bid the contractor can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
8. While submitting the revised bid, contractor can revise the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of bid as notified.
9. When bids are invited in three stage system and if it is desired to submit revised financial bid then it shall be mandatory to submit revised financial bid. If not submitted, then then the bid submitted earlier shall become invalid.
10. Earnest Money in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker’s Cheque or Bank Guarantee including e- Bank Guarantee (for the balance amount as prescribed) from any of Commercial Banks (drawn in favour of **Executive Engineer & Senior Manager (C)**, Faridabad Project Division, CPWD) shall be scanned and uploaded to the e-tendering website within the period of bid submission. The original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the

period of bid submission. The EMD receiving Executive Engineer (including NIT issuing EE/AE) shall issue a receipt of deposition of Earnest Money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT.

A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money or Rs.20 lacs, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee including e- Bank Guarantee of any Commercial Bank having validity for **90 days** or more from last date of receipt of bids which is to be scanned and uploaded by the intending bidders.

The Earnest Money given by all the tenderers except the lowest tenderer shall be refunded immediately after the expiry of stipulated bid validity period or immediately after acceptance of bid of the successful bidder, whichever is earlier. However, in case of two/three bid system, earnest money deposit of bidders unsuccessful during technical bid evaluation etc. shall be returned within 30 days of declaration of result of technical bid evaluation.

Copy of Enlistment Order and other documents as specified in the bid document shall be scanned and uploaded on the e-tendering website within the period of bid submission. However, certified copy of all the scanned and uploaded documents as specified in the bid document shall have to be submitted by *the lowest bidder* along with physical EMD of the scanned copy of EMD uploaded within a week physically in the office of tender inviting authority. *Online bid documents submitted by intending bidders shall be opened only of those bidders, who's original EMD deposited with any division of CPWD and other documents scanned and uploaded are found in order.*

The bid submitted shall be opened at **03:30 PM on 21.07.2026.**

11. The bid submitted shall become invalid and e-tender processing fee (if applicable) shall not be refunded if:
 - (i) The bidder is found ineligible.
 - (ii) The bidder does not upload scanned copy of all the documents stipulated in the bid document.
 - (iii) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidder in the office of bid opening authority.
 - (iv) If a tenderer quotes nil rates against each item on item rate tender or does not quote any percentage above/below on the total amount of the tender or any section/sub-head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
12. The contractor whose bid is accepted will be required to furnish performance guarantee at specified percentage of the tendered amount as mentioned in Schedule E and within the period specified in Schedule F. This guarantee shall be in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee from any of Commercial Banks in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F' including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The earnest money deposited along with bid shall be returned after receiving the aforesaid performance guarantee. The contractor whose bid is accepted will also be required to furnish either copy of applicable licenses/registrations or proof of applying for obtaining labour licenses, registration with EPFO, ESIC and BOCW Welfare Board including Provident fund code no. if applicable and also ensure the compliance of aforesaid provisions by the sub-contractors, if any engaged by the contractor for the said work within the period specified in Schedule F.
13. The description of the work is as follows:

"Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. **(SH: Providing and fixing wardrobes in bedrooms,**

modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana)".

Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidder shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other Services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

14. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidders shall be summarily rejected.
15. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable to rejection.
16. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.
17. The contractor shall not be permitted to bid for works in the CPWD Circle (Division in case of contractors of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the Central Public Works Department or in the Ministry of Urban Development. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
18. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the previous permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.
19. The bid for the work shall remain open for acceptance for a period of **30 (Thirty) days** from the date of opening of bids in case of single bid system.
 - (i) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department **within 7 days** after last date of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 50% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.
 - (ii) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department **after expiry of 7 days** after last date of submission of bids, then the Government shall without prejudice to any other right or remedy, be at

liberty to forfeit 100% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.

- (iii) In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidders shall not be allowed to participate in the rebidding process of the same work.

20. This notice inviting Bid shall form a part of the contract document. The successful bidder/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:

- (i) The Notice Inviting Bid, all the documents including Additional Conditions, Specifications and Drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the Rates quoted online at the time of submission of Bid and Acceptance thereof together with any correspondence leading thereto.
- (ii) Standard **CPWD Form-7** or other Standard CPWD Form as mentioned.

21. For Composite Bids

21.1.1. The Executive Engineer in charge of the Major Component will call bids for the Composite work. The cost of bid document and Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite bid.

21.1.2. The Bid document includes following Components:

Part-I: GENERAL INFORMATION - Notice for Online Bids, Information & Instructions for Bidders for e-Tendering, CPWD-6 for e-Tendering.

Part-II: ELIGIBILITY BID - Brief of Work, Information & Guidelines for Bidders, Proformas for Information Regarding Eligibility (BG for EMD/PG etc.)

Part III: FINANCIAL BID -

Section-A: Tender Form, Schedules A to F and General Conditions of Contract

Section-B: Associate Specialized Agencies

Section-C: Additional Conditions & Specifications and for Civil Works (Major Component)

Section-D: Additional Conditions & Specifications for E&M Works (Minor Component)

Section-E: Schedule of Quantities & Price Bid

Section-F: Site Location Map

21.1.3. The bidders must associate himself, with agencies as per NIT conditions.

21.1.4. The eligible bidders shall quote rates for all items of major component as well as for all items of minor components of work.

21.1.5. After acceptance of the bid by competent authority, the EE in charge of major component of the work shall issue letter of award on behalf of the President of India. After the work is awarded, the main contractor will have to enter into one agreement with EE in charge of major component and has also to sign two or more copies of agreement depending upon number of EE's/DDH in charge of minor components. One such signed set of agreement shall be handed over to EE/DDH of minor component(s).

21.1.6. EE of major component will operate the agreement in general. EE/DDH in charge of minor component(s) shall operate relevant parts of the agreement pertaining to respective minor components of the work.

21.1.7. Entire work under the scope of composite bid including major and all minor components shall be executed under one agreement.

21.1.8. Security Deposit will be worked out separately for each component corresponding to the tendered cost of the respective component of works.

21.1.9. The main contractor has to associate agencies for specialized component(s) conforming to eligibility criteria as defined in the bid document and has to submit detail of such agency(s) to Engineer-in-charge of relevant component(s) within prescribed time. Name of the agency(s) to be associated shall be approved by Engineer-in-charge of relevant component(s).

- 21.1.10. In case the main contractor intends to change any of the above agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-charge of relevant specialized component(s).
- 21.1.11. The new agency/agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-charge is not satisfied with the performance of any agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.
- 21.1.12. The main contractor has to enter into MoU with agency(s) associated by him. Copy of such MoU shall be submitted to EE/ DDH in charge of each relevant component as well as to EE in Charge of major component. In case of change of associate contractor, the main agency(s) has to enter into MoU/agreement with the new contractor associated by him.
- 21.1.13. Running payment for the major component shall be made by EE of major discipline to the main contractor. Running payment for minor components shall be made by the Engineer-in-charge of the discipline of minor component directly to the main contractor. The CMB shall be maintained independently by Engineer-in-Charge of major and minor components.
- 21.1.13.1. The composite work shall be treated as complete when all the components of the work are complete. The completion certificate of the composite work shall be recorded by Engineer-in-charge of major component after record of completion certificate of all other components.
- 21.1.13.2. Final bill of whole work shall be finalized and paid by EE of major component. Engineer(s) in charge of minor component(s) will prepare and pass the final bill for their component of work and pass on the same to the EE of major component for including in the final bill for composite contract.
22. The intending bidders are required to update their profile in CPWD e- tender portal and to upload their bids well in advance of last date of submission of tender. Any issue related to updating profile to uploading tender can be resolved through the concerned Executive Engineer & Senior Manager (C) or ERP help line no. 18001803286 or e-mail ID cpwd.support@techmahindra.com. The e-tendering bidders are also advised not to wait to raise any issues till the last
23. Price Preference to Contractor belonging to SC/ST for Award of work: Price preference in quoted item rate/percentage rate tender shall be applicable to the individual enlisted/non-enlisted SC/ST contractor as under:-
- (i) For works upto and equal to an estimated cost of Rs. 2.80 lakh, a price preference upto 5% (with reference to the lowest valid price bid) may be allowed in favor of individual SC/ST contractor. In such cases tender may be entertained even from non-enlisted SC/ST contractors. No earnest money is required in such cases.
 - (ii) For works beyond an estimated cost of Rs. 2.80 lakh and upto and equal to estimated cost of Rs. 6.40 lakh, tenders may be invited only from CPWD enlisted contractors. The price preference upto 5 % (with reference to the lowest valid price bid) may be allowed in favour of individual SC/ST Contractor. However, earnest money at a reduced rate of ½% may be accepted in such cases. In all such cases, the above concession shall be allowed only after proper verification of the individual contractor's claim of belonging to SC or ST community, as the case may be.

PART-II

ELIGIBILITY BID

SECTION-I

BRIEF PARTICULARS OF THE WORK

1. The construction of **198 Nos. Staff Residential Quarters** (Type-II – 96 Nos. and Type-III – 102 Nos.) for the **Income Tax Department** at Sector-28, Faridabad, Haryana is at the final stage of completion. The Income Tax Department intends to carry out **additional works**, including the provision of wardrobes in bedrooms, modular kitchen cabinets, and other miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in the said residential quarters.
2. The scope includes design, fabrication, supply, transportation, assembly, and installation of factory-made modular wardrobes and kitchen cabinets in 198 residential quarters, complete with all fittings, fixtures, hardware, accessories, and finishing, strictly as per approved shop drawings and specifications.
3. The work shall include all incidental and allied works such as minor cutting, making good, alignment adjustments, and integration with existing civil and electrical services required for proper installation and functionality.
4. The contractor shall execute the work through approved OEMs and shall ensure complete installation, testing, and handing over in functional condition.
5. Salient details of the works for which bids are invited are as under

SI No.	Name of work	Estimated cost	Period of completion
1	"Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. (SH: Providing and fixing wardrobes in bedrooms, modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana) ".	Rs.8,05,68,767/-	05 (Five) months

6. The work is situated at Faridabad, Haryana.
7. **General features and major components of the work are as under: -**
 - (i) Providing and Fixing wardrobe in bedrooms, modular kitchen cabinets, and other misc. work in 198 Nos. Staff Residential Quarters (Type-II-96 Nos., Type-III-102 Nos) at Sector-28, Faridabad, Haryana.
 - (ii) All other miscellaneous, associated, and related works necessary for the proper completion of the above items.

- (iii) SITC of **solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters.**

The above list is not exhaustive.

8. The brief scope of work is given above; however detailed scope has been provided in this bid document.
9. Work shall be executed according to General Conditions of Contract for Central P.W.D. Works available separately at printer's outlets. The bidder may obtain the address of the outlets from the Executive Engineer

SECTION-II

INFORMATION AND GUIDE-LINES FOR BIDDERS

1.0 General:

- 1.1 Forms for deciding Eligibility are given in Section III.
- 1.2 All information called for in the enclosed forms should be furnished against the relevant columns in the forms. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even, if no information is to be provided in a column, a 'nil' or 'no such case' entry should be made in that column. If any particulars/query is not applicable in case of the bidder, it should be stated as 'Not applicable'. The bidders are cautioned that not giving complete information called for in the application forms or not giving it in clear terms or making any change in the prescribed forms (or) deliberately suppressing the information may result in the bid being summarily disqualified. Bid made by telegram or telex and those received late will not be entertained.
- 1.3 References, information and certificate from the respective clients certifying suitability, technical knowledge or capability of the bidder should be signed by an officer not below the rank of Executive Engineer or equivalent.
- 1.4 The bidder may furnish any additional information, which he thinks is necessary to establish his capabilities to successfully complete envisaged work. He is, however advised not to furnish superfluous information.
- 1.5 No information/documents shall be entertained after submission of bid unless it is required to clarify the query raised by Employer. No fresh/revised mandatory document is permitted at this stage.

2.0 Definitions:

- 2.1 In this document the following words and expression have their meaning here by assigned to them.
- 2.2 EMPLOYER means the President of India, acting through Executive *Engineer & Senior Manager (C), Faridabad Project Division, CPWD, Block-I, CGO Complex, NH-IV, NIT, Faridabad - 121001*
- 2.3 BIDDER/AGENCY means the individual, proprietary firm, firm in partnership, limited company (private or public) or corporation.
- 2.4 "YEAR" means "Financial year" unless stated otherwise.
- 2.5 USER/CLIENT/OWNER Means Income tax department represented by its authorized persons.
- 2.6 Terms used for Engineer in charge like EE, Executive Engineer, Executive Engineer & Senior Manager are one and same thing.
- 2.7 The 'site' shall mean the land/ or other places on, in, into or through which the work is to be executed under the contract or any adjacent land, path or street through which the work is to be executed under the contract, or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.
- 2.8 The Contract means the documents forming the Bid and acceptance thereof and the formal agreement executed between the competent authority on behalf of The President of India and the successful bidder, together with the documents referred to therein including the general conditions, correspondence with bidder and instructions issued from

time to time by the Engineer-in- Charge and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.

3.0 Method of Application:

- 3.1 If the bidder is an individual, the application shall be signed by him above his/her full type written name and current address.
- 3.2 If the bidder is a proprietary firm; the application shall be signed by the proprietor above his/her full type written name and the full name of his firm with its current address.
- 3.3 If the bidder is a firm in partnership, the application shall be signed by all the partners of the firm above their full type written names and current addresses or alternatively by a partner holding power of attorney for the firm. In the later case a certified copy of the power of attorney should accompany the application. In both the cases a certified copy of the partnership deed and current address of all the partners of the firm should accompany the application.
- 3.4 If the bidder is a limited company or a corporation, the bid shall be signed by a duly authorized person holding power of attorney for signing the application and certified copy of such power of attorney shall also be furnished. The bidder should also furnish a copy of memorandum of articles of association duly attested by a Public Notary.

4.0 Final Decision-Making Authority:

The Employer reserves the right to accept or reject any bid and to annul the process and reject all bids at any time without assigning any reason or incurring any liability to the bidders.

5.0 Particulars – Provisional:

The particulars of the work given in Section - I are provisional. They are liable to change and must be considered only as advance information to assist the bidder.

6.0 Site Visit:

The bidder is advised to visit the site of work, at his own cost, and examine it and its surroundings to himself collect all information that he considers necessary for proper assessment of the prospective assignment.

7.0 Award criteria:

- 7.1 The employer reserves the right, without being liable for any damages or obligation to inform the bidder to :
 - (a) Amend the scope and value of contract to the bidder.
 - (b) Reject any or all the applications without assigning any reason.
- 7.2 Any effort on the part of the bidder or his agent to exercise influence or to pressurize the employer would result in rejection of his bid. Canvassing of any kind is prohibited.

SECTION-III
PROFORMA FOR INFORMATION REGARDING ELIGIBILITY

RECEIPT OF DEPOSITION OF ORIGINAL EMD

Receipt No.....#...../Date.....#.....
Name of Work: “Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. (SH: Providing and fixing wardrobes in bedrooms, modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana)”. 1. NIT No. : 05/CE-cum-ED/Gurugram/2026-27 2. Estimated Cost: Rs.8,05,68,767/- (Rs 4,41,54,620/- (Civil) + Rs. 3,64,14,147/- (Elect) 3. Amount of Earnest Money Deposit : Rs. 16,11,375/- 4. Last date of submission of Bid : Upto 15.00 Hrs. on 21.07.2026
1. Name of Contractor:#..... 2. Form of EMD #..... 3. Amount of Earnest Money Deposited.....#..... 4. Date of submission of EMD # Signature, Name and Designation of EMD receiving officer (EE/AE(P)/AE/AAO) with Officer stamp

(# to be filled by EMD receiving EE/AE/AAO as the case may be)

**UNDERTAKING ON STRUCTURAL STABILITY AND SOUNDNESS OF ALREADY
COMPLETED BUILDINGS AND INFRASTRUCTURE PROJECTS**

I/we undertake and confirm that any building / infrastructure constructed by our firm /partnership firm/ company has not suffered any failure, making it unfit for intended use, either due to structural design and defects or due to use of sub-standard materials or execution of sub-standard work, poor workmanship or any other reason during the last 25 (twenty five) years.

I/we, further, undertake that if such information comes to the notice of CPWD, then Engineer-in-Charge shall be free to terminate the bid/agreement and to forfeit the entire amount of earnest money deposit, performance guarantee and security deposits.

I/we, also undertake that in addition to above, the Engineer-in-Charge shall be free to debar us forever from tendering in CPWD.

The decision of Engineer-in-Charge or any higher authority shall be final and binding.

Signature of
Notary with seal

Signature of bidder or an authorized person of the
firm with stamp

Note: Affidavit to be furnished on a 'Non-judicial' stamp paper of Rs. 200/- (scanned copy of the notarized affidavit to be uploaded at the time of submission of bid).

On non- Judicial stamp paper of minimum Rs. 100

(Guarantee offered by Bank to CPWD in connection with the execution of contracts)

**Form of Bank Guarantee for Earnest Money Deposit /Performance
Guarantee/Security Deposit/Mobilization Advance/ Refund of milestone withheld
amount**

1. Whereas the Executive Engineer (name of division) CPWD on behalf of the President of India (hereinafter called "The Government") has invited bids under (NIT number). dated for (Name of Work) The Government has further agreed to accept an irrevocable Bank Guarantee for Rs. (Rupees only) valid up to (date)*..... as *Earnest Money Deposit* from (name and address of the contractor) (herein called "the Contractor") for compliance of his obligations in accordance with the terms and conditions of the said NIT.

OR**

Whereas the Executive Engineer (name of division), CPWD on behalf of the President of India (hereinafter called "The Government") has entered into an agreement bearing number with(name and address of the contractor) (hereinafter called "the Contractor") for execution of work..... (name of work) The Government has further agreed to accept an irrevocable Bank Guarantee for Rs. (Rupees only) valid up to (date)..... as *Performance Guarantee / Security Deposit / Mobilization Advance* from the said Contractor for compliance of his obligations in accordance with the terms and conditions of the agreement.

2. We, (indicate the name of the bank) (herein after referred to as "the Bank"), hereby undertake to pay to the Government an amount not exceeding Rs. (Rupees only) on demand by the Government within 10 days of the demand.
3. We, (indicate the name of the bank), do here by undertake to pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs (Rupees only).
4. We, (indicate the name of the Bank), further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor in any suit or proceeding pending before any Court or Tribunal, our liability under this Bank Guarantee being absolute and unequivocal. The payment so made by us under this Bank Guarantee shall be a valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment
5. We, (indicate the name of the Bank), further agree that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation here under to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. We, (indicate the name of the Bank), further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Government may have in relation to the Contractor's liabilities.
7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor
8. We, (indicate the name of the Bank), undertake not to revoke this guarantee except with the consent of the Government in writing.
9. This Bank Guarantee shall be valid up to unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs..... (Rupees only) and unless a claim in writing is lodged with us within the date of expiry or extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date

Witnesses:

- | | |
|------------------|----------------------|
| 1. Signature | Authorized signatory |
| Name and address | Name |
| | Designation |
| | |
| 1. Signature | Staff code no. |
| Name and address | Bank seal |

*Date to be worked out on the basis of validity period of 90 days where only financial bids are invited and 180 days for two/three bid system from the date of submission of tender.

**In paragraph 1, strike out the portion not applicable. Bank Guarantee will be made either for Earnest money / Performance Guarantee / Security Deposit / Mobilization Advance, as the case may be.

PART-III

FINANCIAL BID

SECTION - A

TENDER FORM, SCHEDULES A TO F AND GENERAL CONDITIONS OF CONTRACT

A1. PERCENTAGE RATE TENDER FORM (CPWD-7))

GOVERNMENT OF INDIA CENTRAL PUBLIC WORKS DEPARTMENT

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the work of “Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. **(SH: Providing and fixing wardrobes in bedrooms, modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana)**”.

- (i) To be submitted / uploaded up to 15:00 Hrs. on 21.07.2026 on website: <https://etender.cpwd.gov.in>
- (ii) To be opened in the presence of bidders who may be present at 15:30 Hrs. on 21.07.2026 in the office of the Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD, Block-I, CGO Complex, NH-IV, NIT, Faridabad- 121001

TENDER

I/We have read and examined the notice inviting tender, schedule-A, B, C, D, E & F, Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, Clauses of contract, Special conditions, Schedule of Rate & other documents and rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the President of India within the time specified in Schedule ‘F’ viz., schedule of quantities and in accordance in all respect with the specifications, designs, drawing and instructions in writing referred to in Rule-1 in General Rules and Directions and in Clause-11 of the Conditions of Contract and with such materials as provided for, by, and in respect of accordance with, such conditions so far as applicable..

I/We agree to keep the tender open for **30 (Thirty) days** from the date of opening of Financial bid and not to make any modification in its terms and conditions.

I/We have deposited EMD for the prescribed amount in the office of concerned Executive Engineer as per the bid document.

A copy of Earnest Money deposit of prescribed amount deposited in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee including e-Bank Guarantee (as prescribed) issued by a commercial Bank, is scanned and uploaded (*strike out as the case may be*). If I/We, fail to furnish the prescribed performance guarantee within prescribed period, I/We agree that the said President of India or his successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely.

Further, if I/We fail to commence work as specified, I/We agree that President of India or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely, the said performance guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in clause 12 of the tender form. Further, I/We agree that in case of forfeiture of Earnest Money or Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work.

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EE&SM(E)

AE(C)

EE&SM(C)

I/we undertake and confirm that eligible similar work(s) has/have not been got executed through another agency on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for bidding in CPWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-charge shall be free to forfeit the entire amount of Earnest Money Deposited/Performance Guarantee.

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

Dated:

Signature of Contractor

Postal Address:

Witness:

Address:

Occupation:

ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of the President of India for a sum of Rs. (Rupee.).

The letters referred to below shall form part of this contract agreement:

- (a)
- (b)
- (c)

(For & on behalf of President of India)

Dated:

Signature.....

Designation.....

A2. SCHEDULES A TO F

SCHEDULE 'A'

Schedule of quantities for the Work : **As Enclosed**

SCHEDULE 'B'

Schedule of material to be issued to the Contractor : NA

SCHEDULE 'C'

Tools and Plants to be hired to the Contractor : NA

SCHEDULE 'D'

Extra schedule for specific requirements/documents for the work, if any: NA

SCHEDULE 'E'

Reference to General Conditions of Contract: General Conditions of Contract - 2023 (**Construction Works**) as amended / modified up to the last date of submission of bids.

Name of Work: "Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. **(SH: Providing and fixing wardrobes in bedrooms, modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geyser, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana)**".

Estimated cost of work: Rs.8,05,68,767/- (Rs 4,41,54,620/- (Civil) + Rs. 3,64,14,147/- (Elect)

(i)	Earnest Money	Rs. 16,11,375/- (to be returned after receiving Performance Guarantee)
(ii)	Performance Guarantee	(a) 5% of tendered value or Estimated Cost Put to Tender (ECPT) (Whichever is higher) (b) Where the tendered amount is less than eighty percent (80%) of the Estimated Cost Put to Tender (ECPT), the Performance Guarantee, in addition to the requirement under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tendered amount.
(iii)	Security Deposit	2.5% of the accepted tendered value of the work or 2.5% of tendered value plus 50% of PG for contracts involving maintenance of the building and services/ other work after construction of same building.

SCHEDULE 'F'

General Rules & Directions:

Officer inviting Tender: Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD, Block-I, CGO Complex, NH-IV, NIT, Faridabad- 121001

Applicable Mode of Contract	:	Percentage rate
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EE&SM(C)

Definitions:

2 (i)	Engineer-in-Charge	Major Component (Civil Works): Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD, or successor thereof Minor Component (E&M Works): Executive Engineer & Senior Manager (E), Faridabad Project Electrical Division, CPWD or successor thereof
(ii)	Accepting Authority	Chief Engineer & Executive Director, Gurugram Project Zone, CPWD or successor thereof
(iii)	Percentage on cost of materials and Labour to cover all overheads and profits	15%
(iv)	Standard Schedule of Rates	Delhi Plinth area Rates 2023 and Delhi Schedule of Rates as below: Civil Works: Delhi Schedule of Rates 2023 (Vol. 1 & 2) with up-to-date correction slips modified as per cost index of Delhi NCR Horticulture Works: Delhi Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping) - 2020 with up-to-date correction slips modified as per cost index of Delhi NCR E&M Works: Delhi Schedule of Rates 2025 (E&M) along with (i) Item for BEE 5 star rated, ceiling fan with Brush Less Direct Current (BLDC) Motor - 2019 (ii) Item for Solar Photovoltaic Power Plant - 2019 (iii) (E&M) Item for Facade Lighting - 2019, (iv) Items for VRF/VRV Air-Conditioning System - 2019 and (v) Wet Riser and Sprinkler System - 2019 with up to date correction slips modified as per cost index of Delhi NCR
(v)	Department	Central Public Works Department (CPWD)
(vi)	Standard CPWD Contract Form:	CPWD Form-7 (Percentage Rate) and General Conditions of Contract-2023 (Construction Works) as amended / modified up to the last date of submission of bids

Clause-1:

(i)	Time allowed for submission of Performance Guarantee, programme chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance.	07 (Seven) days
(ii)	Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period provided in (i) above	03 (Three) days

Clause-2:

(i)	Authority for fixing compensation under clause 2	Chief Engineer & Executive
AEE (E)	EE&SM(E)	AE(C)
		EE&SM(C)

		Director, Gurugram Project Zone, CPWD or successor thereof
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Clause-5:

(i)	Authority to convey the decision of shifting of milestone and extension of time. (Engineer-in-Charge or Engineer-in-Charge of Major Component in case of Composite Contracts, as the case may be)	Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD, or successor thereof
(ii)	Authority to decide rescheduling of milestone and extension of time. (SE/SE&PD/ CE/ CE&ED).	Chief Engineer & Executive Director, Gurugram Project Zone, CPWD or successor thereof
(iii)	Shifting of date of start in case of delay in handing over of site. (SE/SE&PD/CE/ CE&ED).	Chief Engineer & Executive Director, Gurugram Project Zone, CPWD or successor thereof

Time allowed for completion of work: - **05 (Five) Months**

Number of days from the date of issue of letter of acceptance for reckoning date of start: - **10 days**

TABLE OF MILE STONES

S. No.	Description of milestone (Financial)	Time allowed in months (from stipulated date of start)	Amount to be withheld of in case non achievement of milestone
1	1 st Mile stone: - 50% work done as per financial target	2.5 months	2.5% of accepted tender value
2	2 nd Mile stone:-Full work	5 months	2.5% of accepted tender value

1. Withheld amount shall be released if and when subsequent milestone is achieved within respective time specified. However, in case milestones are not achieved by the Bidder for the work, the amount shown against milestone shall be withheld.
2. Intending bidder may submit phasing of activities/milestones based on their resources and methodology at the time of bidding corresponding to physical milestones/stages indicated in the above table. These shall be formed part of the agreement after approval of the accepting authority, otherwise it would be assumed that agency agrees with the above-mentioned physical milestones.

Recovery for delay in submission of Monthly Progress Report: Monthly recovery for delay in submission of the monthly progress report within specified period: **Rs. 5000/- per day (not exceeding Rs. 50000/- per month)**

Schedule of handing over of Site:

Part	Portion of site	Description	Time period for handing over reckoned from date of issue of letter of intent
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Part A	Portion without any hindrance	NA	The site for the work is available; however, the quarters shall be handed over in phased manner block-wise/floor-wise depending upon completion and clearance by the existing finishing contractor.
Part B	Portions with encumbrances	NA	
Part C	Portion dependent on work of other agencies	NA	

Clause 6 :- Mode of measurement: CMB

Clause-7:

Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment	Major Component (Civil Work)	Rs. 50 lacs
	Minor Component (E&M Work)	Rs. 10 lacs

Note: However, to expedite the progress of work, Engineer-in-Charge, on the request of contractor, may make interim payment(s) even before the net payment limit specified in schedule 'F' is achieved. In such case(s) no interest / compensation shall be recoverable from contractor. Such payment by Engineer-in-Charge shall not be construed as waiver of limit specified in schedule 'F' for subsequent interim payment(s).

Clause-7A:

Whether Clause 7A shall be Applicable	Yes, No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable as submitted by the Bidder to the Engineer-in Charge.
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Clause 8: Competent Authorities to inspect and issue part/final completion certificate:

Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD, or
successor thereof

&

Executive Engineer & Senior Manager (E), Faridabad Project Electrical Division, CPWD
or successor thereof

Clause-10A: Not Applicable

Clause-10B:

Whether Clause shall be Applicable	Yes
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Clause-10C: Applicable Component of labour expressed as percent of value of work: - 25%

Clause-10CC: Not Applicable

Clause-11:

Specifications to be followed for execution of work:	
Civil work	CPWD Specifications 2019 Vol. 1 and Vol. 2 or latest version of above specifications as issued / amended up to last date of tender submission
E&M Work	CPWD General Specifications for Electrical Works (Part I for Internal) - 2023, (Part II for External) - 2023, (Part III for Lift & Escalators) - 2003, (Part IV for Sub Station) - 2013, (Part V for Wet Riser & Sprinkler System) - 2020, (Part VI for Fire Detection & Alarm System) - 2018, (Part VII for DG Sets) - 2013, (Part VIII for Gas Based Fire Extinguishing

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	System) - 2013 and CPWD General Specifications for HVAC Works – 2017, CPWD General Specification for Modular OT- 2022, CPWD General Specification for Nurse Call System 2022 or latest version of above specifications as issued / amended up to last date of tender submission
Horticulture	CPWD Specifications 2020 (Horticulture & Landscaping) with up to date correction slips.
All above shall hereinafter to be collectively referred to as ' CPWD Specifications '	

Clause-12: Type of work: - Original work

12.2 (c)	Deviation Limit beyond which clauses 12.2 (c) shall apply for all construction work (for all the items)	100%
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Clause-16:

Competent Authority for deciding reduced rates:	
Civil work	Chief Engineer-cum-Executive Director, Gurugram Project Zone, CPWD or successor thereof

Clause-19:

Clause 19C: Rs.1000/- for each default	Authority to decide penalty for each default: Executive Engineer & Senior Manager (C), Faridabad Project Division, CPWD or his successor thereof
Clause 19G: Rs.1000/- for each default and Enhanced penalty 1000 per day for continuous default	
Clause 19D: Rs.1000/- for each default per day (subject to max 5% of ECPT)	
Clause 19K: Rs.500/- per tradesman per day	

Clause-25:

(i)	Conciliator	Special Director General (Chandigarh), CPWD or Successor thereof
(ii)	Arbitrator Appointing Authority	Chief Engineer & Executive Director, Gurugram Project Zone, CPWD or successor thereof
(iii)	Place of Arbitration	New Delhi or Gurugram

Clause-32:

Requirement of Technical Representative(s) and Recovery Rates:

S. No.	Requirement of Technical		Minimum Experience (Years)	Designation of Technical Staff	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 32(i)
	Qualification	Number of Major + Minor Component)			
1	Graduate Engineer	1	5(and having experience of one similar nature of work)	Project Manager	Rs. 25,000/- per Month
2	Graduate Engineer Or	1+1	02 or 05 Respectively	Project planning/quality/bil	Rs. 15,000/- per Month per person

AEE (E)

EE&SM(E)

AE(C)

EE&SM(C)

	Diploma Engineer			ling Engineer	
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Note:

- (i) Assistant Engineers retired from Government services, who are Diploma holders will be treated at par with Graduate Engineers. Diploma holder with minimum 10- years relevant experience with a reputed construction company can be treated at par with Graduate Engineers for such deployment subject to the condition that such diploma holders should not be in excess of 50% of requirement of degree engineers.
- (ii) The above given strength shall be required to be deployed as and when necessity arises at site or so directed by Engineer-in-charge.
- (iii) The Bidder shall submit a certificate of employment of the technical representative (s) (in the form of copy of Form -16 or CPF deduction issued to the Engineers employed by him) along with every account bill/final bill and shall produce evidence of regular physical availability of such engineers on the above project at any times if so, required by the Engineer-in-charge.
- (iv) The Recovery on account of non-deployment of technical staff shall be made by the Engineer in Charge of the respective Discipline / Component.

Clause-38:

i)	Schedule/statement for determining theoretical quantity of cement & bitumen based on Delhi Schedule of Rates	Delhi Schedule of Rates 2023 with Amendments up to the date of submission of bid.
ii)	Variations permissible on theoretical quantities:	
(a)	Cement for works with estimated cost put to tender more than Rs.5 Lakh.	3% Plus/Minus
(b)	Bitumen for all works.	2.5% Plus only and nil on minus side.
(c)	Steel reinforcement and structural steel sections for each diameter, section and category.	2% Plus/minus
(d)	All other materials	Nil

A3. GENERAL CONDITIONS OF CONTRACT – 2023 (CONSTRUCTION)

1. Latest edition of “**General Conditions of Contract - 2023 (Construction)**” as amended / modified up to the last date of submission of bids, which is available in market as CPWD publication and also available on CPWD official website at https://cpwd.gov.in/Documents/cpwd_publication.aspx shall be deemed to be part of the Tender document and Agreement.
2. The GCC is amended from time to time through issue of OMs under series DG/CON which are available on CPWD official website at [http://www.cpwd.gov.in/Documents/Official Circulars/ DG CON](http://www.cpwd.gov.in/Documents/Official%20Circulars/DG%20CON). These amendments/modifications issued after publication of above GCC and up to last date of submission of Tenders shall be deemed to be part of the Tender document and Agreement.
3. The GCC and its amendments as mentioned above, though not attached with this tender document, shall be deemed to be part of the Tender document and Agreement to be signed with the successful bidder.

SECTION - B
ASSOCITE SPECIALIZED AGENCIES

B1. ASSOCIATE SPECIALISED AGENCIES FOR SPECIALIZED WORKS (CIVIL)

1.0 List of Specialized Works (Civil)

The following work are the specialized works for which contractor has to associate specialized agencies to execute the work based on eligibility:

2.0 PROCEDURE FOR EXECUTION OF SPECIALIZED CIVIL ITEMS:

- 2.1 Specialized Items of civil work listed herein below shall be got executed through eligible associated specialized agencies **currently actively engaged** in execution of the said specialized item and fulfil eligibility criteria prescribed in the agreement.
- 2.2 The Contractor(s) shall submit his proposal for the approval of the Engineer-in-Charge, the names of specialized agencies of repute along with their technical capability /experience proposed to be engaged by him. The proposal shall be submitted as early as possible but not later than one month before proposed date of start of execution of such items as per approved work programme.
- 2.3 It shall be the responsibility of main contractor to sort out any dispute / litigation with the Specialized Agencies without any time & cost overrun to the Department. The main contractor shall be solely responsible for settling any dispute / litigation arising out of his agreement with the Specialized Agencies. The contractor shall ensure that the work shall not suffer on account of litigation/ dispute between him and the specialized agencies / sub-contractor(s). No claim of hindrance in the work shall be entertained from the Contractor on this account. No extension of time shall be granted and no claim what so ever, of any kind, shall be entertained from the Contractor on account of delay attributable to the selection/rejection of the Specialized Agencies.

3.0 ELIGIBILITY CONDITIONS FOR SPECIALIZED CIVIL WORKS

- 3.1 The tenderer(s) must associate eligible agencies to execute the specialized works, who fulfil the prescribed eligibility criteria. However, the contractor himself shall also be eligible to carry out any or all of such specialized works without associating any specialized agency provided he fulfils the prescribed eligibility criteria
- 3.2 Eligibility requirement for associate specialized agencies for execution of the specialized civil items shall be as below:
- The agency must be **currently actively engaged** in execution of the said specialized item and must have satisfactorily executed **similar works** during last 5 (five) years from date of submission of proposals for approval of associate specialized agency as below:
- (i) Three works each of value not less than 40% of corresponding estimated cost of the specialized items of the work in the NIT.
- or**
- (ii) Two works each of value not less than 60% of corresponding estimated cost of the specialized items of the work in the NIT.
- or**
- (iii) One work of not less than 80% of corresponding estimated cost of the specialized items of the work in the NIT.

MEMORANDUM OF UNDERSTANDING (MOU)

Between

M/s.....having his registered office at
..... [Henceforth called the Main Contractor] which expression shall unless repugnant to the subject or context include its administrators, successors and assigns.

And

M/shaving his registered office at
..... [Henceforth called Associate Contractor] which expression shall unless repugnant to the subject or context include its administrators, successors and assigns.

Whereas, the Central Public Work Department (CPWD), have awarded Contract to the Main Contractor for the work of:” as per Schedule of Quantities, Specifications, Terms and Conditions contained in the Agreement.

Whereas, This Memorandum of Understanding has been entered into for assigning responsibility of execution of (mention category) component of specialized civil works forming part of the above work to the Associate Contractor by the Main Contractor.

Now therefore, it is agreed between the Parties here to as follows:

- 1 Both the parties have gone through and understood the various Terms & Conditions and Clauses of the Contract for the work awarded to the Main Contractor and willingly agree to abide by them.
- 2 The 'Associate Contractor' will execute (mention category) Component of specialized civil works in the wholesome manner as per Terms & Conditions of the Contract. However, both Parties shall be jointly and severally responsible for the execution of said Component of work as per the Contract.
- 3 It is understood that payment for (mention category) component of specialized civil works even though executed by the Associate Contractor shall be done by the Department (CPWD) to the Main Contractor as per Terms & Condition of the Contract. The Parties have entered into separate agreement on Terms & Conditions for payment to be made by the Main contractor to the Associate Contractor for the work done by them. The main Contractor shall promptly make payment to the Associate Contractor as per agreed Terms & Condition between them. In the event of failure to make due payments to the Associate Contractor by Main Contractor, the Department (CPWD) may make such payments directly to the Associated Contractor after deducting the same from Bills payable to the Main Contractor.
- 4 In case of any dispute between Parties, either of them may go for mediation by the Engineer-in-charge. In the event of disagreement with decision of Engineer-in-Charge, either of the Parties may appeal against the mediation to the SE/SE-cum-PD/CE/CE-cum-ED in whose jurisdiction the work falls. His decision shall be final and binding on both Parties.
- 5 The 'Associate Contractor' shall be liable for disciplinary and penal action(s) as per Contract if he fails to discharge his contractual commitments related to said component of specialized civil works.
- 6 All the machinery and equipment, tools and tackles required for execution of (mention category) component of specialized civil works, as per the Contract, shall be the responsibility of the 'Associate Contractor'.
- 7 The Technical and other site staff required for the said (mention category) component of

specialized civil works shall be arranged by the 'Associate Data Centre Contractor' as per terms and conditions of the Contract.

- 8 Site Order Book & other Registers maintained for the said work shall be signed by the Representatives of Main Contractor as well as 'Associate Contractor' or themselves.
- 9 All the correspondence regarding execution of the (mention category) component of specialized civil works shall be done by the department with the Associate Contractor with a copy to the Main contractor. In case of non-compliance of the provisions of the Contract, the Main Contractor, as well as the Associated Contractor shall be responsible and action under Clauses 2 and 3 may be initiated and taken against the Main Contractor.
- 10 This MoU between Parties will be treated as an agreement and has legality as per Indian Contract Act (amended up to date) and the Department (CPWD) can enforce all the Terms and Conditions of the Contract for execution of the above work.
- 11 This MOU shall be valid till the duration of completion of above work and shall be extended if so required by the CPWD.

Date

Place:

Signature of Main Contractor

Signature of Associate Contractor

1. Witness with address

2. Witness with address

(From Main Contractor side)

(From Associate Contractor side)

ASSOCIATE SPECIALISED AGENCIES FOR E&M WORKS

1.0 CONDITIONS FOR ASSOCIATE AGENCY FOR E&M WORKS:

- 1.1 Specialized items of E&M work shall be got executed only through eligible associated specialized agencies **currently actively engaged** in execution of the said specialized items and fulfil eligibility criteria prescribed in the agreement.
- 1.2 Also, unless the main contractor himself meets the eligibility conditions for execution of E&M works (Normal items), he will have to associate with agencies, fulfilling the eligibility requirements prescribed in the tender document.
- 1.3 In the event of the associated E&M agency not performing satisfactorily or failure of associate agency to complete the E&M work, the main contractor on written directions of the department, shall remove the Associate agency deployed on the work and shall submit proposal for approval of new associate agency without any loss of time or variation in cost to the department. Such new associate agency shall also give an undertaking along with the main tenderer that both of them shall guarantee for the equipment already supplied for which payment has been released by the department in part. If any equipment supplied for the work, during the currency of the earlier associate agency and paid partly by the department, becomes redundant /not in a position to be installed and commissioned and put to beneficial use due to change in agency for execution of E&M work, the main contractor shall be liable for replacement of the equipment(s) at no cost to the department. No change of associate agency will be allowed without prior approval of the Engineer-in-charge of the work.
- 1.4 The main contractor shall be responsible and liable for proper and complete execution of the E&M works despite having engaged associated agencies and ensure coordination and completion of all E&M works.
- 1.5 The Composite Contractor and the associated specialized agencies shall give required affidavit to confirm their association.
- 1.6 The associate contractor shall attend the inspection of the work by the Engineer-in-charge of E&M works as and when required.

2.0 ELIGIBILITY CRITERIA FOR ASSOCIATED AGENCY FOR E&M WORKS:

- 2.1 The tenderer(s) must associate eligible agencies to execute components of E&M Works who fulfil the prescribed eligibility criteria. However, the contractor shall also be eligible to carry out himself any or all the components of E&M Works without associating any specialized agency provided:
 - a) He fulfils the prescribed eligibility criteria respectively for these work(s).
 - or**
 - b) He directly procures the equipment of approved make from manufacturer and get it installed from authorized agency/service provider of the manufacturer or specialized agency as per the eligibility criteria mentioned below:
- 2.2 **ELIGIBILITY CRITERIA:** Eligibility criteria for various components E&M Works (Normal and Specialized) shall be as below:
 - (a) For Normal E&M Works e.g. Internal Electrical Installations, External Lighting/Cabling/Earthing & Service Connection etc.:**

The associate agency shall be registered/enlisted in CPWD in Building & Roads category in appropriate class and should have a valid electrical license.

3.0 SUBMISSION OF PROPOSAL FOR APPROVAL OF ASSOCIATED AGENCY:

- 3.1 The Contractor(s) shall submit his proposal for the approval of the Engineer-in-Charge, the names of associate agencies of repute along with verifiable completion certificates of similar work experience, valid Electrical Contractor's license, self-attested GST registration and other documents in respect of the associated agencies, duly attested by both associated agency and the main contractor.
- 3.2 The proposal shall be submitted as early as possible but not later than one month before proposed date of start of execution of such components of E&M work as per approved work programme.
- 3.3 In case the main contractor is himself eligible (as per eligibility criteria) for executing all or some components of E&M work and intends doing job himself, the main contractor must submit the documents as per eligibility criteria mentioned for associated agency of individual E&M component(s) for approval of Engineer-in-charge.
- 3.4 Proposal for associating agency for components of E&M work shall be submitted, as per proforma given in this tender document, from each of proposed associate independently for all E&M component in prescribed Proforma given herein.

MEMORANDUM OF UNDERSTANDING (MOU)

Between

M/shaving his registered office at
..... [Henceforth called the **Main Contractor**] which expression shall unless repugnant to the subject or context include its administrators, successors and assigns.

And

M/shaving his registered office at
..... [Henceforth called **Associate E&M Contractor**] which expression shall unless repugnant to the subject or context include its administrators, successors and assigns.

Whereas, the Central Public Work Department (CPWD), have awarded Contract to the Main Contractor for the work of:” as per Schedule of Quantities, Specifications, Terms and Conditions contained in the Agreement.

Whereas, This Memorandum of Understanding has been entered into for assigning responsibility of execution of (mention category) **component of E&M Work** forming part of the above work to the Associate E&M Contractor by the Main Contractor.

Now therefore, it is agreed between the Parties here to as follows:

1. Both the parties have gone through and understood the various Terms & Conditions and Clauses of the Contract for the work awarded to the Main Contractor and willingly agree to abide by them.
2. The 'Associate E&M Contractor' will execute (mention category) Component of E&M Work in the wholesome manner as per Terms & Conditions of the Contract. However, both Parties shall be **jointly and severally responsible** for the execution of said Component of work as per the Contract.
3. It is understood that payment for (mention category) component of E&M Work even though executed by the Associate E&M Contractor shall be done by the Department (CPWD) to the Main Contractor as per Terms & Condition of the Contract. The Parties have entered into separate agreement on Terms & Conditions for payment to be made by the Main contractor to the Associate E&M Contractor for the work done by them. The main Contractor shall promptly make payment to the Associate E&M Contractor as per agreed Terms & Condition between them. In the event of failure to make due payments to the Associate E&M Contractor by Main Contractor, the Department (CPWD) may make such payments directly to the Associated E&M Contractor after deducting the same from Bills payable to the Main Contractor.
4. In case of any dispute between Parties, either of them may go for mediation by the Engineer-in-charge. In the event of disagreement with decision of Engineer-in-Charge, either of the Parties may appeal against the mediation to the SE/SE-cum-PD/CE/CE-cum-ED in whose jurisdiction the work falls. His decision shall be final and binding on both Parties.
5. The 'Associate E&M Contractor' shall be liable for disciplinary and penal action(s) as per Contract if he fails to discharge his contractual commitments related to said component of E&M works

6. All the machinery and equipment, tools and tackles required for execution of (mention category) component of E&M Work, as per the Contract, shall be the responsibility of the 'Associate E&M Contractor'.
7. The Technical and other site staff required for the said (mention category) component of E&M Work shall be arranged by the 'Associate Data Centre Contractor' as per terms and conditions of the Contract.
8. Site Order Book & other Registers maintained for the said work shall be signed by the Representatives of Main Contractor as well as 'Associate E&M Centre Contractor' or themselves.
9. All the correspondence regarding execution of the (mention category) component of E&M Work shall be done by the department with the Associate E&M Contractor with a copy to the Main contractor. In case of non-compliance of the provisions of the Contract, the Main Contractor, as well as the Associated E&M Contractor shall be responsible and action under Clauses 2 and 3 may be initiated and taken against the Main Contractor.
10. This MoU between Parties will be treated as an agreement and has legality as per Indian Contract Act (amended up to date) and the Department (CPWD) can enforce all the Terms and Conditions of the Contract for execution of the above work.
11. This MOU shall be valid till the duration of completion of above work and shall be extended if so required by the CPWD.

Date:

Place:

Signature of Main Contractor

Signature of Associate E&M Contractor

1. Witness with address

2. Witness with address

(From Main Contractor side)

(From Associate E&M Contractor side)

PROPOSAL FOR ASSOCIATING AGENCY FOR E&M WORKS

I/we hereby propose the following agency for execution of E&M work component mentioned herein.
Consent Letter from the proposed associated agency is enclosed.

- (i) Name of work :
- (ii) Component of E&M Work :
- (iii) Name of Associated Agency :
- (iv) Details of Enlistment :
- (v) Category and Class of Enlistment :
- (vi) Monetary limit of work in Enlistment :
- (vii) Validity of Enlistment :
- (viii) Copy of Enlistment Order attached : (Yes /No)
- (ix) Copy of electrical contractor license attached : (Yes /No)
- (x) Copy GST Registration attached : (Yes/No)
- (xi) Copy PAN Card Attached : (Yes/No)
- (xii) Consent Letter of agency attached : (Yes/No)
- (xiii) Copy of completion certificates of similar work experience attached: (Yes /No)

Encls: Self Attested photocopies of as stated above

Seal & Signature of the Main Contractor

CONSENT LETTER FROM ASSOCIATE AGENCY FOR E&M WORKS

Name of Work:

I / We hereby give my consent to associate with M/s, for executing the (mention category) component of E&M work of the above-mentioned work.

I / We will execute the work as per specifications and conditions of the agreement for the work and as per directions of the Engineer-in-Charge for the said component of E&M work till the completion of the work.

I / We will be responsible for necessary action to handover the installations and for rectification of defects and repair during the maintenance / warranty period.

I / We will employ full time technically qualified Engineer / supervisor for the said component of E&M work as required for the work.

I / We will attend inspection of work by officers of the department as and when required.

Dated:

Seal & Signature of Associate E&M Contractor

SECTION - C

ADDITIONAL CONDITIONS & SPECIFICATIONS FOR CIVIL WORKS (MAJOR COMPONENT)

C1. ADDITIONAL CONDITIONS FOR CIVIL WORKS

1. Except for the items, for which Specifications are given herein or where it is specifically mentioned otherwise in this bid document, the work shall generally be carried out in accordance with the **“CPWD Specifications - 2019 (Vol. I & II)”** for Civil works or their latest version with up to date correction slips and CPWD Specification for Horticulture works with up to date correction slips (hereinafter to be collectively referred to as ‘CPWD Specifications’. Wherever CPWD Specifications are silent, the latest BIS Codes/Specifications, National Building Code-2016, MoRTH Specification, Manufacturers Specifications, Sound Engineering practices or well-established local construction practices as decided by the Engineer-in-charge shall be followed.
2. The order of preference in case of any discrepancy as indicated in condition no. 8.1 under “Conditions of Contract” given in the Standard CPWD Contract form may be read as the following:
 - a. Description of Schedule of Quantities.
 - b. Additional & Special Conditions for Civil Works
 - c. Contract Clauses of Standard CPWD contract form.
 - d. Drawings
 - e. CPWD Specifications as applicable.
 - f. Indian standard specifications of BIS
 - g. Manufacture’s specifications
 - h. Sound Engineering Practice as per direction of Engineer-in-charge.
3. The proposed work is a prestigious project and quality of work is of paramount importance. Contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipment to execute the work. Many items & specialized works will require engagement of specialised agencies & skilled workers having experience in execution of such items.
4. The tenderer shall acquaint himself with the proposed site of work, its approach roads, working space available etc. before quoting his rates and no claim on this account shall be entertained by the department.
5. The contractor shall make his own arrangements for obtaining water & electricity connections for self-use and make necessary payments directly to the department concerned.
6. The contractor(s) shall get himself acquainted with nature and extent of the work and satisfy himself about the availability of materials from kiln or approved quarries for collection and conveyance of materials required for construction.
7. The tenderer shall see the approaches to the site. In case any approach from main road is required at site or existing approach is to be improved and maintained for cartage of materials by the contractor, the same shall be provided, improved and maintained by the contractor at his own cost. No payment shall be made on this account.
8. The work shall be carried out in the manner complying in all respects with the requirements of the relevant bye laws and regulations of the local body under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-charge and nothing extra shall be paid on this account.
9. The contractor(s) shall inform/issue notices to the Municipality, police and other authorities that may be required as per law and obtain all requisite permission/ licenses for temporary obstructions, enclosures etc. Contractor(s) shall pay all fee, taxes and charges which may be leviable on account of these operations in executing the contract. He shall make good any damage

to the property whether public or private and shall supply and maintain lights either for illumination or for cautioning the public at night.

10. For construction works which are likely to generate malba / rubbish, the contractor shall reuse it at site as directed by the Engineer-in-charge or hand over to recycling agents or dispose of at his own cost to the notified/specified Municipal dumping ground. No deduction on this account shall be made from the agency as well as no extra payment will be made to agency for the same.
11. The contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupiers of adjacent properties and to the public in general and to prevent any damage to such properties and any pollution of smoke, streams and water-ways. He shall make good at his cost and to the satisfaction of the Engineer-in-Charge, any damage to roads, paths, cross drainage work or public or private property whatsoever caused thereon by the contractor. All waste or superfluous materials shall be carried away by the contractor without any reservation entirely to the satisfaction of the Engineer-in-Charge.
12. Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants / users of building/adjacent properties.
13. Before commencement of any item of work, the contractor shall correlate all the relevant architectural and structural drawings of the work and satisfy himself that the information available thereof is complete and unambiguous. The discrepancy, if any shall be brought to the notice of the Engineer-in-Charge before execution of the work. The contractor alone shall be responsible for any loss or damage executing by the commencement of work on account of any discrepancy and/or incomplete information
14. Other agencies may also be simultaneously executing works assigned to them for this Project and the contractor shall coordinate and facilitate for the same. The contractor shall leave such recesses, holes, openings trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, clamps etc. shall be supplied free of cost by the department unless otherwise specifically mentioned) and the contractor shall fix the same at time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.
15. The contractor shall conduct work so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose of the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of others.
16. Some restrictions may be imposed by the security agencies/client on the working hours and on movement of labour, materials etc in the campus/site and may require issuing identity cards to all persons authorized by contractor to do work / visit the work site. The contractor shall be bound to follow all such restrictions / instructions and no claim whatsoever shall on this account will be entertained. The loss of time on this account, if any, shall have to be made up by generating additional resources etc.
17. The rates quoted by the contractor are deemed to be inclusive of site clearance, setting out work, profile, establishment of reference bench mark, spot levels, construction of all safety and protection measure, earth embankments, preparatory works, all testing of materials, working during monsoon, working at all depths, height and locations etc. unless specified in the schedule of quantities.
18. Royalty at the prevailing rates wherever payable shall have to be paid by the contractor on the

boulders, metal, shingle, sand and bajri etc. Or any other material collected by him for the work direct to revenue authorities and nothing extra shall be paid by the department for the same.

19. No payment shall be made for any damage caused by rain, snowfall, flood or any other natural calamity, whatsoever during the execution of the work until handing over to the client. The contractor shall be fully responsible for any damage to the govt. property and work for which the payment has been advanced to him under the contract and he shall make good the same at his risk and cost. The contractor shall be fully responsible for safety and security of his material, T&P, Machinery brought to the site by him.
20. The contractor shall deploy resources e.g. manpower, labour, T&P, Plant & Equipment etc. as per actual requirement of work as per work program within stipulated time and contractor himself shall be responsible for their efficient use avoiding any idling. No damages/compensation shall be payable on account of idle manpower, labour, T&P, Plant and Equipment and loss of profit etc. for whatsoever reason, not even for delay in work due to justified hinderances.
21. The rates for all items of work shall, unless clearly specified otherwise, include cost of all labour, material, tools and plants and other inputs involved in the execution of the item.
22. The contractor (s) shall quote all-inclusive rates against the items in the schedule of quantities and nothing extra shall be payable for any of the conditions and specifications mentioned. In the tender documents unless specifically specified otherwise.
23. Unless otherwise specified in the schedule of quantities the rates for all items shall be considered as inclusive of pumping/baling out water, if necessary, for which no extra payment shall be made. Those conditions shall be considered to include water from any source such as inflow of flood, surface and sub-soil water etc. and shall apply to the execution in any season.
24. The work shall be executed and measured as per metric dimensions given in the Schedule of quantities, drawings etc. (FPS units wherever indicated are for guidance only).
25. Unless otherwise specified in the schedule of quantities, the rates tendered by the contractor shall be inclusive of all costs & taxes/levies/royalties etc. and shall apply to **all leads and lifts and nothing extra shall be payable** on this account.
26. The foundation trenches shall be kept free from water while works below ground level are in progress.
27. No foreign exchange shall be made available by the Department for importing (purchase) of equipment, plants, machinery, materials of any kind or any other items required to be carried out during execution of the work. No delay and no claim of any kind shall be entertained from the Contractor, on account of variation in the foreign exchange rate.
28. All ancillary and incidental facilities required for execution of work like labour camp, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level, temporary structure for plants and machineries, temporary barricading or fencing around the working sites, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, protection works, facilities for taking samples etc. during execution or any other activity which is necessary (for execution of work and as directed by Engineer-in-Charge), shall be deemed to be included in rates quoted by the Contractor. Nothing extra shall be payable on these accounts.
29. For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). Normally contractors shall not be allowed to execute the RCC, electrical and finishing work at night. Work at night shall, however, be allowed if the site conditions/circumstances so demand. No claim whatsoever shall be entertained on this account,

not with-standing the fact that the contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the contractor with them.

30. The contractor shall maintain in perfect condition, all portions executed till completion of the entire work allotted to him. Where however phased delivery of work is contemplated these provisions shall apply separately to each phase.
31. All material shall only be brought at site as per program finalized with the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.
32. The contractor(s) shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, services and compound walls are to be constructed. The stacking shall take place as per stacking plan however, if any change is required, the same shall be done with the approval of Engineer-in-Charge.
33. The Contractor shall bear all incidental charges for cartage, storage and safe custody of materials issued by department/arranged by the contractor.
34. ***All mass Reinforced Cement Concrete work/RCC in Structural Members shall be design mix concrete of specified grade. The contractor shall procure RMC from automatic batching plant (RMC plant) located near the project site to be approved by Engineer-in-charge for production of design mix concrete.***
35. The terms machine batched, machine mixed, and machine vibrated concrete used elsewhere in agreement shall mean the concrete produced in concrete batching and mixing plant and if necessary transported by transit concrete mixers, placed in position by the concrete pumps, tower crane and vibrated by surface vibrator /needle vibrator / plate vibrator, as the case may be to achieve required strength and durability.
36. Any legal or financial implications resulting out of carriage of earth from outside or disposal of earth shall be sole responsibility of the contractor. Nothing extra shall be paid on this account.
37. The work of water supply, internal sanitary installations and drainage etc. shall be carried out as per CPWD Specifications, NBC-2016 and bye laws of the Municipal Corporation or any other local body and the contractor shall produce necessary completion certificates from such authority after completion of work wherever applicable.
38. In case of local Municipal regulations / restrictions by client /non-availability space at site if huts for labour are not allowed to be erected at the site of work, the contractor shall be required to provide such accommodation at suitable place at his own cost and nothing extra shall be paid on this account.
39. Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar service encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. The contractor shall identify all underground / overhead services and take necessary measures to protect the services before starting any excavation / activity. All temporary supports and other measures required to protect and maintain the services during construction period as per direction of Engineer-in-charge, shall be deemed to be included in the quoted rate / amount of the contractor and nothing extra shall be paid on this account. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. For any permanent shifting contractor shall arrange to shift

the services as and when required. For the same contractor shall be paid separately at the rates as decided by the Engineer-in-charge based on the actual quantum of the work involved in shifting such utilities/services. The decision of the Engineer-in-Charge in this regard shall be final and binding.

40. The contractor shall be responsible for the watch and ward/guard of the buildings, safety of all fittings and fixtures including all equipment's, services provided by him against pilferage and breakage during the period of Installations and thereafter till the building is physically handed over to the Client Department. No extra payment shall be made on this account and no claim shall be admissible on this account.
41. The contractor shall prepare mock-ups/sample units including one complete modular kitchen and one wardrobe unit for approval before commencement of bulk production. Bulk execution shall not be permitted prior to written approval of the mock-up by the Engineer-in-Charge. After the sample is approved by the Engineer-in-Charge, the Contractor shall be allowed to commence the work and the quality of work shall conform to the approved sample. No extra payment shall be made on this account beyond the payment stipulated in agreement shall be admissible.
42. The Contractor shall take adequate precautions to protect all existing and newly executed works, including floors, walls, doors, windows, fittings, fixtures, furniture, and services, from damage, dust, or stains during execution. Any splashes, droppings, or damages arising from construction activities shall be promptly removed or rectified by the Contractor at his own cost on a daily basis. No extra payment shall be admissible on this account.
43. The Contractor shall comply with the provisions of the Construction and Demolition Waste Management Rules, 2016, and all other applicable statutory regulations
44. Where specified board thickness is 18 mm and commercially available thickness is 19 mm, the same may be used without extra payment. However, reduction in specified thickness shall not be permitted
45. The Contractor shall provide warranty/guarantee bonds for materials and products as issued by the manufacturers/vendors.
46. Statutory approval fees, if specifically required for the work shall be reimbursed on actual basis, subject to submission of valid documentary proof and approval of the Engineer-in-Charge.
47. The rates quoted by the contractor shall be for all floors & all heights unless otherwise specified. Nothing extra shall be paid on this account.
48. SCAFFOLDING: - Wherever required for the execution of work, all the scaffolding shall be provided and suitably fixed, by the contractor. It shall be provided strictly with steel double scaffolding system, suitably braced for stability, with all the accessories, gangways, etc. with adjustable suitable working platforms to access the areas with ease for working and inspection. Single scaffolding system is strictly prohibited and shall invite necessary action. It shall be designed to take all incidental loads. It should cater to the safety features for workmen. Nothing extra shall be payable on this account unless otherwise specified in the corresponding items of work. It shall be ensured that no damage is caused to any structure due to the scaffolding.
49. In case of reduction in scope of work no claim on account of reduction in value of work, no claim on account of idle labour, loss of profit, overheads, or any consequential damages shall be entertained.
50. All expenditure to be incurred for testing of samples e.g. packaging, sealing, transportation, loading, unloading etc. including testing charges shall be borne by the contractor.

51. The amount quoted by the tenderer is inclusive of all taxes and levies including GST prevailing at the time of last date of submission of bid and nothing extra shall be payable.

52. **SETTING OUT**

52.1. Contractor shall provide permanent bench marks and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings.

52.2. The contractor shall establish, maintain and assume responsibility for grades, lines, levels and bench marks. He shall report any errors or inconsistencies regarding grades, lines, levels, dimensions to the Engineer-in-Charge before commencing work. Commencement of work shall be regarded as the contractor's acceptance of such grades, lines, levels and dimensions and no claim shall be entertained at a later date for any errors found.

52.3. If at any time, any error in this respect shall appear during the progress of the work, the contractor shall, at his own expense rectify such error if so required to the satisfaction of the Engineer-in-Charge.

52.4. Though the site levels may be indicated in the drawings the contractor shall ascertain himself and confirm the site levels with respect to GTS bench mark from the concerned authorities.

52.5. The approval by the Engineer-in-Charge of the setting out by the contractor shall not relieve the contractor of any of his responsibilities.

52.6. The contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignment, the level and correctness of every part of the work and shall rectify effectively any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost to the instructions and satisfaction of the Engineer-in-Charge.

53. **DE-WATERING**

53.1. De-watering required, if any, shall be done conforming to BIS Code IS: 9759 (guide lines for de-watering during construction) and / or as per the specifications approved by the Engineer-in-charge. Design of an appropriate and suitable dewatering system shall be the Contractor's responsibility.

53.2. In trenches where surface water is likely to get into cut / trench during monsoons, a ring bund of puddle clay or by any other means shall be formed outside, to the required height, and maintained by the Contractor. Also, suitable steps shall be taken by the Contractor to prevent back flow of pumped water into the trench. Nothing extra shall be payable on this account.

53.3. For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of the water is required, the contractor shall do the same at his own cost and nothing extra shall be paid. Nothing extra shall be paid for execution of work in or under water and / or liquid mud including pumping out of water as required.

54. **PROGRAMME CHART**

54.1. The Contractor shall prepare an integrated programme chart in MS Project, Primavera software for the execution of work, showing clearly all activities from the start of work to completion, with details of manpower, equipment and machinery required for the fulfilment of the programme within the stipulated period or earlier and submit the same for approval to the Engineer-in-Charge within ten days of award of the contract. Non-submission of such programme shall attract the recoveries as mentioned in the Schedule-F of the tender document.

54.2. The programme chart should include the following:

- (a) Descriptive note explaining sequence of the various activities.
 - (b) Network (PERT/CPM/BAR CHART) in MS Project/Primavera Software (For small works, Bar-Chart in Excel sheet may be accepted as approved by Engineer-in-charge)
 - (c) Programme for procurement of materials by the contractor.
 - (d) Programme of procurement of machinery / equipment having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor.
- 54.3. If at any time, it appears to the Engineer-in-Charge that the actual progress of work does not conform to the approved programme referred above, the contractor shall produce a revised programme showing the modifications to the approved programme to ensure completion of the work. The modified schedule of programme shall be approved by the Engineer-in-Charge. Non-submission of such revised programme shall attract the recoveries as mentioned in the Schedule-F of the tender document.
- 54.4. The submission for approval by the Engineer-in-Charge of such programme or the furnishing of such particulars shall not relieve the contractor of any of the duties or responsibilities under the contract. This is without prejudice to the right of Engineer-in-Charge to take action against the contractor as per terms and conditions of the agreement.
55. **PROGRESS REPORT**
- The contractor shall submit to the Engineer-in-charge on the 5th day of each month, hard copy of monthly progress report of the work. Such progress report will include the project progress, work progress (planned vs actual), CPM chart, status of financial progress and achievement of milestone, manpower deployment status, inventory of materials and photographs of important activities. For delay in submission of the report, compensation @ Rs. 5000/- (Rupees Five Thousand only) per day of delay subject to maximum of Rs.50,000/- for each report will be recovered from the amount payable to the contractor.
56. **SAFETY PRECAUTIONS**
- 56.1. Contractor at his cost put up the barricading all around the construction site as per guidelines of NGT and Local Bodies/Authorities or Client directions in case of in campus works, through suitable method for segregating the construction site and also to control the dust pollution in the campus. Entry to the site shall be controlled for proper security of man and materials to avoid accidents.
- 56.2. The Contractor(s) shall take all precautions to avoid accidents by exhibiting necessary caution boards, day and night speed limit boards, red flags, red lights and providing barriers. He shall be responsible for all damages and accidents caused to existing/new work due to negligence on his part. No hindrances shall be caused to traffic during the execution of the work.
- 56.3. In case of any accident of labours / contractual staff's the entire responsibility will rest on the part of the contractor and any compensation under such circumstances if becomes payable the same shall be entirely borne by the contractor and department shall have no role on this account.
- 56.4. It shall be ensured by the contractor that no electric live wire is left exposed or unattended to avoid any accidents in this regard.
- 56.5. Any trenching and digging for laying sewer lines/water lines/cables etc. shall be commenced by the contractor only when all men, machineries and materials have been arranged and closing of the trench(s) thereafter shall be ensured within the least possible time.
- 56.6. In the event of the contractor(s) committing a default or breach of any of the provisions of the

Central Public Works Department, Contractor's Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any under the provisions of the above Regulations and' Rules which is materially incorrect, he/they shall, without prejudice to any other liability, pay to the Government of Rs.5,000/- per day for each day of default subjected to a maximum of 5 percent of the estimated cost of the work put to tender. The decision of the Engineer-in-Charge shall be final and binding on the parties.

- 56.7. The Contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc. under various labour laws and other regulations applicable to the works, at his site office.

57. SECURITY MEASURES

- 57.1. Contractor has to follow the security requirement of the campus and obtain necessary entry passes for the labour and vehicles and follow security checks at entry / exit gates, restriction on movement of vehicle, restricted timings of working etc. The Department however shall assist the contractor in obtaining such passes for movement of vehicles and labour. No claim whatsoever shall be entertained on account of delay in entry of vehicles and labour including restrictions in working hours, if there is any.
- 57.2. The contractor shall employ only Indian Nationals after verifying their antecedents and loyalty. The contractor shall, on demand submit list of his agents, employees and work people concerned & shall satisfy antecedents of such people.
- 57.3. The contractor & his work people shall observe all relevant rules regarding security promulgated in which work is to be carried out by the Controlling Administrative Authority of the campus/area (hereinafter referred to as "Administrator").
- 57.4. The contractor, his representative, workman shall be allowed to enter through specified gates & timing as laid down by the controlling authority. They shall be issued an identity card or an individual pass in accordance with the standing rules & regulations & they should possess the same while working. The contractor shall be responsible for the conduct & actions of his workmen, agents/ representatives.
- 57.5. Normally contractor shall be allowed to carry out work between 7 AM to 6 PM. However, he may also be allowed to carry out the work beyond 6 PM & up to 7 AM if the site conditions/circumstances so demand with prior written permission from the "Administrator". However, if the work is carried out in more than one shift or at night, no claim on this account shall be entertained.
- 57.6. Normally contractor's material / vehicles etc shall be allowed to move in / go-out between 7 AM to 7 PM only & no movement of material / vehicles out of work site shall be allowed during night hours unless specific permission is obtained from the "Administrator".
- 57.7. In case if a separate entry has been allowed, the contractor has to make all arrangement for making a separate entry gate and barricading of the working area to segregate/separate the same from other areas. All these have to be done by the contractor at his own cost including safeguarding any untoward incident in the restricted area due to separate entry gate and barricading arranged by the contractor. No extra amount on this account shall be payable by the department.
- 57.8. In the event of any restrictions being imposed by the Security agency, CPWD, Traffic or any other authority having jurisdiction in the area on the working or movement of labour /material, the contractor shall strictly follow such restrictions and nothing extra shall be payable to the contractor

on such accounts. The loss of time on these accounts, if any, shall have to be made up by augmenting additional resources whatever required. Nothing extra shall be payable on this account.

58. **QUALITY ASSURANCE**

- 58.1. **It shall be mandatory for the contractor to provide the self-attested (by agencies/ contractors) copies of Tax paid bills of the materials entered in the MAS Register viz., Steel, Cement, Bitumen, Paint, Primer, Distemper, varnishes, Tile Adhesive, Admixture, Anti termite chemical, Water proofing compound material and any other item as decided by Engineer in charge.**
- 58.2. Self-attested copies of Tax paid bills of materials taken in MAS Register shall be provided by the agencies/ contractors before settling the payments. In case of any doubt the same can be verified by the CPWD. However, onus of genuineness of Tax paid bills rests with the agencies/ contractors.
- 58.3. The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material/work beyond set out tolerance limit shall be summarily rejected by the Engineer-in-Charge.
- 58.4. The contractor shall ensure quality control measures on different aspects of construction including materials, workmanship and correct construction methodologies to be adopted.
- 58.5. ***Wherever work is specified to be done through specialized agencies, their names shall be got approved well in advance from Engineer in charge. Failure to do so shall not justify delay in execution of work. It is suggested that immediately after award of work, contractor should negotiate with concerned specialist agencies and send their names for approval to Engineer in charge.***
- 58.6. All materials obtained from Govt. Stores or otherwise shall be got checked by the Engineer-in-Charge or his any authorized supervisory staff on receipt of the same at site before use.
- 58.7. The contractor shall provide at his own cost suitable weighing and measuring arrangements at site for checking the weight / dimensions as may be necessary for execution of work. The sealed samples are to be handed over to the testing lab by contractor in the presence of Junior Engineer/Assistant Engineer-in-Charge of work.
- 58.8. ***Samples of various materials required for testing shall be provided free of charges by the contractor. Testing charges, if any, unless otherwise provided shall be borne by the contractor. All other expenditure required to be incurred for e.g. packaging, sealing, transportation, loading, unloading etc. shall also be borne by the contractor.***
- 58.9. The contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case, he or his authorized representative is not present or does not associate him, the results or such tests and consequences thereon shall be binding on the contractor.
- 58.10. For certain items, if frequency of tests not mentioned in the CPWD Specifications and then relevant IS code shall be followed and tests shall be carried out as per the frequency specified therein.
- 58.11. If any load testing or special testing is to be done for any sample whose strength is doubtful, the cost of the same shall also be borne by the contractor.
- 58.12. Samples of all materials and fittings to be used in the work in respect of brand manufacturer and quality shall be got approved from the Engineer-in-Charge, well in advance of actual execution and

shall be preserved till the completion of the work. If a particular brand of material is specified in the item of work in Schedule of Quantity, the same shall be used after getting the same approved from Engineer-in-Charge. Wherever brand / quality of material is not specified in the item of work, the contractor shall submit the samples as per approved list of brand names given in the tender document / additional specifications for approval of Engineer-in-charge. For all other items, materials and fittings of ISI Marked shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material / fittings are not available, the contractor shall submit samples of materials / fittings manufactured by firms of repute conforming to relevant specifications or IS codes and use the same only after getting the approval.

- 58.13. In case of non-availability of material of the brands specified in the list of approved materials, an equivalent brand may be used after getting written approval of the Engineer-in-charge giving details to indicate the brand proposed to be used is equivalent to the brands mentioned in the agreement. Decision of the Engineer-in-charge shall be final and binding in this respect.
- 58.14. To avoid delay, contractor should submit samples as stated above well in advance so as to give timely orders for procurement. If any material, even though approved by Engineer-in-Charge is found defective or not conforming to specifications shall be replaced / removed by the contractor at his own risk & cost.
- 58.15. The contractor shall get the source of all other materials, not specified elsewhere in the document, approved from the Engineer-in-Charge. The contractor shall stick to the approved source unless it is absolutely unavoidable. Any change shall be done with the prior approval of the Engineer-in-Charge for which tests etc. shall be done by the contractor at his own cost. Similarly, the contractor shall submit brand/ make of various materials not specified in the agreement; to be used for the approval of the Engineer-in-Charge along with samples and once approved, he shall stick to it.
- 58.16. The contractor shall get the water tested with regard to its suitability and conforming to the relevant IS Code. The contractor shall obtain written approval from the Engineer-in-Charge before he proceeds by using the same for execution of work. The water testing charges shall be borne by the contractor. If tube well water is not suitable, the contractor shall arrange Municipal water or from any other source at his own cost and nothing extra shall be paid on this account. The water shall be got tested at frequency specified in latest CPWD Specifications / BIS Code.
- 58.17. The Stone aggregate/stone, sand shall be brought from any quarries subjected to the said materials conform CPWD specifications.
- 58.18. The gradation of well graded coarse sand to be used in cement plaster work shall be strictly as per CPWD Specifications 2019, conforming to IS:1542-1977 and as per manufactures specifications/relevant IS codes for polymer added Ready mix plaster of approved makes. The plastered surface shall be fairly smooth without any undulation of any kind for applying paint/white wash.
- 58.19. **The contractor shall invariably prepare the samples of finishing items** i.e. flooring of different types, external & internal finishing i/c colour scheme of paint, tiles in dado, flooring in platforms & staircase, water supply & sanitary fittings and any other item as per direction of Engineer-in-charge. The contractor shall proceed with further finishing items only after getting the samples of these items approved in writing from Engineer-in-charge.
- 58.20. The construction joints shall be provided in predetermined locations only as decided by Engineer in charge. The cost of shuttering for these construction joints shall be included in item of Concrete work / RCC work and nothing extra shall be payable on this account to the contractor.
- 58.21. Water tanks, taps, sanitary, water supply and drainages pipes, fittings and accessories should

conform to the specifications provided in bidding documents. The contractor(s) should engage approved, licensed plumbers for the work and get the materials (fixtures/fittings) tested, by the municipal Body/Corporation authorities, wherever required, at his own cost. The Contractor(s) shall submit for the approval to the Engineer-in-Charge the name of the plumbing agency proposed to be engaged by him.

- 58.22. All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested in presence of Engineer in charge as per the design conditions submitted before covering.
- 58.23. The contractor shall give a performance test of the entire installation(s) as per standing specifications before the work is finally accepted by making his own arrangements for water supply, electricity etc. and nothing extra whatsoever shall be payable for the same.
- 58.24. Door/window frames/shutters and other factory-made materials shall be procured from reputed and approved manufacturers or their authorized dealers. Decision of Engineer-in-charge in this regard shall be final and binding.
- 58.25. The work shall be carried out in accordance with the drawings to be issued/Approved/NOC given from time to time by the Engineer-in-Charge. Before commencement of any item of work, the contractor shall correlate all the relevant drawings, nomenclature of item and specification etc. issued for the work and satisfied himself for the information available there from is complete and unambiguous. The figure and written dimension of drawing shall be superseding the measurement by scale. The discrepancy if any, shall be brought to the notice of the engineer-in-charge before execution of the work. The contractor along shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and/or incomplete information and no claim whatsoever shall be entertained on this account.

58.26. **Testing of Materials:**

- (i) **Other Laboratories:** The contractor shall arrange carrying out all tests required under the agreement through the laboratory as approved by the Engineer-in-Charge and ***shall bear all charges in connection therewith including charges for testing for all materials including cement*** for which separate condition is provided in the tender document.

While sending samples of the material for testing in the external laboratories the following should be ensured:

- a. Letter for sending sample for testing of material shall be sent through e-mail to the Lab along with name (s) of test (s) to be done on the material by AE/EE concerned with the work. The Lab shall preferably generate QR/ Bar Code for each test of the work, and it will be pasted on the box at the time of receipt of sample mentioning the number and type of material, lab tests required etc. The labs shall invariably acknowledge receipt of sample and intimate through e-mail to AE, EE, SE/CE and contractor. The test reports shall be emailed by the lab to the AE, EE, SE/CE and contractor. The bill of the testing shall be sent to the contractor for payment with a copy to the AE/EE for information.
- b. The agency shall collect the sample & send it to the lab, make the necessary payment for the testing at the time of submitting the samples of material to the testing lab. If he fails either to collect the samples or to submit to the lab, within the time mentioned in the specifications or within three working days, whichever is earlier, the department will make arrangement to collect and submit sample(s) and make the necessary payment to lab, the recovery on account of collection, submission and testing charges of samples shall be done from next R/A bill/ final bill of the agency.

- c. If the agency fails three times in collection and submission of samples for materials or fails to make payments of testing to the testing labs at each occasion within seven days of receipt of bill from the concerned lab, the Engineer-in-Charge will send the case along with all documents and his recommendations to the CE/SE (as the case may be) for initiating disciplinary action against the agency. CE/SE will take action in the matter as under:
 - (i) In case of non-enlisted contractors, CE/SE will give an opportunity to the agency to submit his version within 15 days. After considering the reply of the agency, CE/SE will take decision on debarment of the agency from participation in tendering in CPWD for a period of two years. However, running contracts shall remain unaffected by the debarment order.
 - (ii) In case of CPWD enlisted contractors, CE/SE will send the case to the Enlisting Authority along with his recommendations. As per directions of the Enlisting Authority, disciplinary action shall be initiated by the Empowered Committee as per extant enlistment rules. After considering the recommendation of the Empowered Committee, Enlisting Authority will take decision on debarment of the agency for a period of two years. However, running contracts shall remain unaffected {by the debarment order.

58.27. Maintenance of Site Registers:

- (i) All the Site Registers including Tests registers for tests to be carried out at construction site or in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-Charge in the same manner as being issued to CPWD field staff.
- (ii) The various registers (whichever required) to be issued to the contractor are:
 - a) Materials at site account register.
 - b) Cement register.
 - c) Master test registers.
 - d) Cube test register.
 - e) Inspection register.
 - f) Drawing register.
- (iii) All the entries in the registers will be made by the designated engineering staff of the contractor and same should be regularly reviewed by JE/AE/EE.
- (iv) All the registers of tests carried out at in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-Charge in the same manner as being issued to CPWD field staff.
- (v) All samples of materials including cement concrete cubes shall be taken jointly with contractor by JE and out of this at least 50% samples shall be taken in presence of AE in charge. If there is no JE, all samples of materials including cement concrete cubes shall be taken by AE jointly with contractor. All the necessary assistance shall be provided by the contractor. Cost of sampling & testing are to be borne by the contractor and he shall be responsible for safe custody of samples to be tested at site/ outside laboratory.
- (vi) All the tests in field lab at construction site shall be carried out by the Engineering staff deployed by the contractor and shall be 100% witnessed by AE-in-Charge. At least 10% of the tests are to be witnessed by the Executive Engineer.
- (vii) Submission of copy of all test registers, material at site register along with each alternate

running account bill and final bill shall be mandatory. These registers should be duly checked by AE(P) in division office.

58.28. Removal of Rejected / Sub-standard Materials:

The following procedure should be followed in case of removal of rejected/sub-standard materials from the site of work.

- (i) Whenever any material brought by the contractor to the site of work is rejected, entry thereof should invariably be made in the site order book under the signature of the AE/AEE giving approximate quantity of such materials.
- (ii) As soon as the material is removed, a certificate to that effect may be recorded by the AE/AEE against the original entry, giving the date of removal a mode of removal i.e. whether by truck, carts or by manual labour. If removal is by truck, the registration number of the truck should be recorded.
- (iii) When it is not possible for the AE/AEE to be present at the site of work at the time of actual removal of the rejected/sub-standard materials from the site the required certificate should be recorded by the Junior Engineer and the AE/AEE should countersign the certificate recorded by the Junior Engineer.

58.29. Inspection of Work: -In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by the senior officers of CPWD in addition of the Engineer-in-Charge and his authorized representative. The contractor shall at times during the usual working hours and at all times at which reasonable notices of the intention of the Engineer-in-Charge or other officers as stated above to visit the works shall have been given to the Contractor, either himself be present to receive the orders and instructions or have a responsible Site Engineer duly accredited in writing, to be present for that purpose Senior Officers of CPWD Authorities shall be inspecting the on-going work at site at any time with or without prior intimation.

58.30. AS BUILT DRAWINGS: - On completion of work, the Contractor(s) shall submit four (04) sets of "As Built Drawings" which shall include Building Drawings (Architectural & structural drawings) and services drawings like drainage, sewerage, water supply and electrical installations of the completed buildings/services. These drawings shall have details of layout with diameter of soil waste pipe and vertical stacks, ground and invert levels of all drainage pipes together with locations of all manholes and connections, layout of all water supply lines with diameters, locations of control valves, access panels etc. The agency shall also submit at least 2 sets of above drawings in soft copy (Both PDF & AutoCAD format) in Pen Drives.

Contractor shall submit literatures, manuals, warranty certificates etc. of various fittings, fixtures and equipment and specialized items installed in the completed building/services.

59. ADVANCE PAYMENTS:- Contractor shall not divert any advance payments or part thereof for any work other than that needed for completion of the contracted work. All advance payments received as per terms of the contract (i.e. mobilization advance, secured advance against materials brought at site, secured advance against plant & machinery and/or for work done during interim stages, etc.) are required to be re-invested in the contracted work to ensure advance availability of resources in terms of materials, labour, plant & machinery needed for required pace of progress for timely completion of work.

60. PANDEMIC & GRAP RESTRICTIONS:- Contractor shall comply all the Conditions, Procedures, Guidelines issued time to time by authority of Central/State Govt. in case of pandemic situations (e.g. COVID) and emergency measures imposed under Graded Response Action Plan (GRAP) to prevent deterioration of air quality. The Contractor shall quote the rates considering all these

factors and nothing extra shall be paid on this account.

C2. SPECIAL CONDITIONS

1. SPECIAL CONDITIONS FOR CEMENT:

- 1.1. The contractor shall procure 43/53 grade Ordinary Portland Cement (OPC) conforming to IS:8112 / Portland Pozzolana Cement (PPC) conforming to IS: 1489 (Part-I) as required in the work, from reputed manufacturers of cement, such as ACC, Ultratech, Ambuja, Birla, J.K. Cement **or from any other reputed cement Manufacturer having a production capacity not less than one million tonnes per annum as approved by ADG/SDG for the Sub-Region/Region or as per list of preferred makes.**

The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacturer(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer, fully or partially.

Supply of cement shall be made in 50 kg. bags bearing manufacturer's name and ISI marking **or through cement bulker.** Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of the relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not conform to the relevant BIS code the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-charge to do so.

- 1.2. The cement shall be brought at site in bulk supply of approximately 10 tonnes or as decided by the Engineer-in-Charge.
- 1.3. Double lock provision shall be made to the door of the cement godown. The keys of one lock shall remain with the Engineer-in-charge or his authorized representative and the key of the other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge at any time.
- 1.4. The cement shall be got tested by the Engineer-in-Charge and shall be used on the work only after satisfactory test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to test laboratories. **The cost of tests shall be borne by the contractor**
- 1.5. The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in clause 38 of the contract and shall be governed by conditions laid therein. Less than theoretical consumption of cement shall not be allowed and in case of excess consumption, no cost adjustment shall be paid.
- 1.6. The cement brought to site and the cement remaining unused after completion of the work shall not be removed from site without the written permission of the Engineer-in-Charge.
- 1.7. The damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-Charge. If he does not do so within three days of receipt of such notice, the Engineer-in-Charge shall get it removed at the cost of the contractor
- 1.8. Cement bags shall be stored in separate godowns to be constructed by the contractor at his own cost as per sketch (which is only indicative and actual size will depend on the site requirements) given in CPWD specifications with weather proof roofs and walls. Each godown shall be provided

with a single shutter door with two locks. The key of one lock shall remain with Engineer-in-charge or his authorized representative and that of the other lock with the authorized agent of the contractor at the site of work so that the cement is issued from the godown according to the daily requirements with the knowledge of both parties and proper account for the same is maintained in the standard proforma.

- 1.9. Separate cement registers showing the receipt of the OPC and PPC shall be maintained at site. The contractor shall construct separate godowns for storage of OPC & PPC at site and nothing extra on this account shall be payable.
- 1.10. In order to have an effective control over the issue of cement, the following drill should be observed:
 - (i) The cement godown(s) should be properly and effectively double locked, keys of one of the locks remaining with the department and that of the other with the contractor.
 - (ii) The pages of the Cement Register should be as per Annexure-30 of CPWD Works Manual, machine numbered and each page initiated by the Executive Engineer.
 - (iii) Periodical checking of cement godown.: The cement godown and the Cement Register should be checked by the Assistant Engineer/Executive Engineer in-charge of the work as per following schedule:
 - a) At least weekly or fortnightly, respectively, in case of works at the headquarters of the Assistant Engineer/Executive Engineer.
 - b) Whenever they visit the site of work in case of works that are located outside the Sub-Divisional/Divisional headquarters.

2. SPECIAL CONDITIONS FOR STEEL REINFORCEMENT BARS:

- 2.1. The Contractor shall procure Bar Set I type reinforcement conforming CPWD OM No. CSQ/SE(TAS)/Steet/2024/262-H Dated: 14.08.2024 (attached in this tender documents below) and conforming with other relevant IS Codes Provision and standard sound Engineering practices. TMT steel /Low Alloy Steel reinforcement Bars of various grades only from Reputed Steel manufacturers such as SAIL, RINL, TATA, JSW & JSPL.
- 2.2. The contractor shall obtain manufacturer's certificate stating the process of manufacture, chemical composition, and test sheet giving result of each mechanical test applicable to the material purchased and submit it to the Engineer-in-charge. Each test certificate shall indicate the number of the cast to which it applies corresponding to the number or identification mark to be found on the material.
- 2.3. The Engineer-in-charge shall get each consignment tested for both chemical composition and physical properties (including bend and re-bend test) as specified in CPWD OM No. CSQ/SE(TAS)/Steet/2024/262-H Dated: 14.08.2024 and IS:1786 from labs as approved by the Engineer-in-charge.
- 2.4. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time or written orders from the Engineer-in-Charge to do so.
- 2.5. The steel reinforcement bars shall be brought to the site in bulk supply of 10 tonnes or more as decided by the Engineer-in-charge.
- 2.6. The steel reinforcement shall be stored by the contractor at site of work in such a way as to prevent distortion and corrosion and nothing extra shall be paid on this account. Bars of different

sizes and lengths shall be stored separately to facilitate easy counting and checking.

- 2.7. For checking nominal mass, tensile strength, bend test, re-bend test etc. specimen of sufficient length shall be cut from each size of the bar at random at frequency not less than that specified below:

Size of bar	For consignment below 100 tonnes	For consignment above 100 tonnes
Under 10mm dia. bars	One sample for each 25 tonnes or part thereof	One sample for each 40 tonnes or part thereof
10mm to 16mm dia bars	One sample for each 45 tonnes or part thereof	One sample for each 50 tonnes or part thereof
Over 16mm dia bars	One sample for each 50 tonnes or part thereof	One sample for each 75 tonnes or part thereof

- 2.8. The contractor shall supply free of charge the steel required for testing including transportation to testing laboratories. The cost of tests shall be borne by the contractor.
- 2.9. The actual issue and consumption of steel on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of steel shall be worked out as procedure prescribed in clause 38 of the contract and shall be governed by conditions laid therein. Less than theoretical consumption of reinforcement shall not be allowed and in case of excess consumption, no cost adjustment shall be paid.
- 2.10. Steel brought to site and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.
- 2.11. Steel bars brought by the contractor for use in the work shall be got checked from the Engineer-in-Charge or his authorized representative of the work on receipt of the same at site before use.
- 2.12. In case the contractor brings surplus quantity of steel the same after completion of the work will be removed from the site by the contractor at his own cost after approval of the Engineer-in-Charge.
- 2.13. Reinforcement including authorized spacer bars and overlaps shall be measured in length of different diameters, as actually (not more than as specified in the drawing) used in the work, nearest to a centimetre. Wastage and unauthorized overlaps shall not be measured.
- 2.14. The standard sectional weights referred to as in Table 5.4 under para 5.3.4 in CPWD Specifications for works 2019 Vol. 1 will be considered for conversion of length of various sizes of MS bars, Tor steel bars and TMT steel /Low Alloy Steel reinforcement Bars into standard weight.
- 2.15. Records of actual sectional weight shall also be kept dia-wise & lot-wise. The average sectional weight for each diameter shall be arrived at from samples from each lot of steel received at site. The decision of the Engineer-in-Charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will constitute one single lot for the purpose. The weight of steel by conversion of length of various sizes of bars based on the actual weighted average sectional weight shall be termed as derived actual weight.
- 2.16. If the derived weight as in para 2.15 above is lesser than the standard weight as in para 2.14 above, the derived actual weight shall be taken for payment. If the derived actual weight is found more than the standard weight, as worked out in para 2.15 above shall be taken for payment. In such case nothing extra shall be paid for the difference between the derived actual weight and the standard weight.

- 2.17. Mixing of different type of steel/different grades of steel shall not be allowed in the same structural members as main reinforcement to satisfy clause 26.1 of IS:456.
- 2.18. Tolerances on Nominal Mass (individual sample) shall be as under:

S. No.	Nominal size mm	Tolerances on the Nominal Mass (in %age)
1.	Up to and including 10 mm	-8%
2.	Over 10 up to & including 16 mm	-6%
3.	Over 16 mm	-4%



भारतसरकार
केंद्रीय लोकनिर्माणविभाग
तकनीकीअनुप्रयोग एवंमानक एकाई

कमरा सं० 418 ए-विंग, निर्माणमवन, नईदिल्ली।

टैलीफैक्स-011-23062339 ईमेल-delsetascsq.cpwd@nic.in



E-9156762

No. CSQ/SE(TAS)/Steel/2024/ 262-H

Dated: 14/08/2024

OFFICE MEMORANDUM

Subject:- Guidelines for use of TMT steel /Low Alloy Steel reinforcement Bars in CPWD works and enlistment of the steel manufactures in respect of TMT steel /Low Alloy Steel reinforcement Bars in CPWD.

1. The Ministry of Steel, through notification dated 12.05.2016 and order dated 9.8.2016, abolished classification of steel producers as Integrated steel producers, primary steel producers, secondary steel producers, main producers, major producers or others as well as on the basis of process route of steel manufacturing in India.
2. The Ministry of Steel, vide Circular No. 4(13)/2016-SD(I) dated 14.12.2016, reiterated their Notification dated 12.05.2016. They further issued an order dated 09.08.2016, asking the users to ascertain the quality of the steel products, to be procured, as per relevant BIS standards.
3. Para 27.2 of Works Manual 2014 was modified through OM No. DG/MAN/382 dated 06.02.2019. In this OM, under the heading "Special Condition of Steel reinforcement bars", eligibility criteria and other technical parameters were set for steel manufactures. In the eligibility criteria, incorporation details of the company, various licences, certifications, in house testing facility at plant, and refining technologies used for manufacturing of steel and TMT bars (like BF-BOF route, COREX-BOF Route, DRI-EAF route) were cited. Those manufacturers, who met the aforesaid eligibility criteria, could be included in the preferred make list of Notice Inviting Tenders (NITs) of CPWD works.
4. However, CPWD Works Manual 2014 was replaced by CPWD Works Manual 2019 and came into force with effect from 07.03.2019. In CPWD Works manual 2019, para 4.10.1 deals with use of steel and cement in works and states that "Special conditions shall be incorporated by the NIT approving authority keeping in view the guidelines issued by the Directorate from time to time in this regard which are available on CPWD website".
5. Since no Criteria /guidelines were available for approval of TMT bars manufacturer after release of the CPWD works manual 2019, an Office Memorandum No. CE(CSQ /SE(TAS) /EE(TAD) /Steel/ 2019/ 497-H dated 27.12.2019 was issued. This OM specified that (i) only ISI marked TMT bars of various grades shall be procured for use in CPWD works, (ii) SDG/ADG shall approve the steel manufacturers based on eligibility criteria and other technical parameters as per OM No. DG/MAN/382 dated 06.02.2019
6. The OM 497-H dated 27.12.2019 was withdrawn and modified guidelines for use of reinforcement bars in structures was issued vide OM No. 50-H dated 17.02.2021. The use of corrosion resistant steel (CRS) reinforcement bars in structures was also mandated vide OM No. 50-H dated 17.02.2021. Further,

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clarification regarding corrosion resistant steel was issued vide OM No. 257-H dated 23.06.2022.

7. The single bench of Hon'ble High Court at Calcutta in the case of SRMB Srijan Private Limited & others V/s Union Of India & Others (W.P.A 9990 of 2020) SRMB Srijan Private Limited & others Vs. Union of India & others With (W.P.A 24267 of 2019) has quashed the modified Clause 27.2 of the CPWD Works Manual of 2014, para 4.10.1 of the CPWD Works Manual of 2019, and consequential Memorandums issued by the CPWD and directed to implement the Notification of the Ministry of Steel, Government of India dated May 12, 2016, the Order dated August 9, 2016 and the reminders of the said Ministry dated December 14, 2016 and February 7, 2017.
8. Subsequently an appeal was filed in Division Bench (DB) of Hon'ble High court at Calcutta by CPWD. In the said case, Hon'ble High court at Calcutta, passed the judgment dated 15.04.2024. The operative part of this judgement reads as *"Accordingly we find no grounds to interfere with the order passed by the Learned single bench except with regard to the direction issued in paragraph 53 of the impugned order whereby the modified clause 27.2 of the CPWD Works Manual has been quashed and instead of quashing the said modified clause 27.2 we direct the CPWD to appropriately amend their Works Manual to be in consonance with the notification issued by the Ministry of Steel, Govt. of India as done by the notifications referred to above."*
9. In compliance of the above directions of the Hon'ble High Court at Calcutta, an Expert Committee was constituted by DG CPWD vide OM No. CSQ/SE(TAS)/EE(TAD)/Steel/2024/190-H dated 10.06.2024 for deciding the criteria for the selection of steel manufacturers for CPWD works. The expert committee has conveyed their final recommendation {enclosed as annexure I(d)} vide Minutes of Meeting dated 24th July 2024 and the same has been accepted by DG, CPWD. The brief of these recommendations are as follows:

Steel Bars shall be classified as:

- a) Bar Set I, if it complies with the requirements given in the latest version of IS 1786, and additional requirement (e.g. Chemical Composition Requirement for Manganese and Copper, Tempered Martensite (TM) Ring Requirement, Marking Requirement and compliance of the provisions of ISO 9001:2015 and ISO 14001:2004) mentioned in the recommendations.

And

- (b) Bar Set II, if it complies with the requirements given in the latest version of IS 1786.

The committee has also recommended use of above mentioned Steel Bar sets considering the importance of quality in construction of public structures in different projects of CPWD, on the basis of (a) earth quake zones, (b) environment conditions (coastline and exposure condition), (c) Structure category, and (d) heights of buildings and structures.



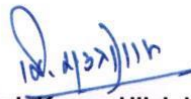
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10. Accordingly, it is decided that the reinforcement steel bars produced by plants of SAIL, RINL, TATA, JSW & JSPL which are in wider use in CPWD may be continued to be used as preferred make in the NIT in respect of Bar Set-I mentioned in para no. 9 above and Annexure-1(c). Further, it has also been decided that DG, CPWD may enlist more manufacturer plants for TMT steel/Low Alloy Steel reinforcement Bars on the basis of selection criteria recommended by the Expert Committee. These enlisted manufacturers plants for particular bar set may also be considered for stipulation as preferred make in the NIT depending upon their use.
11. The procedure for enlistment of the steel manufactures in respect of TMT steel /Low Alloy Steel reinforcement Bars in CPWD works is also enclosed herewith as Annexure-I and I (a) to I (f)

This issues with the approval of DG, CPWD.

Encl: As above


(Dinesh Kumar Ujjainia)
Superintending Engineer (TAS)


Copy to (Through CPWD Website):

The SDG (Chennai) / SDG (Chandigarh) / SDG (Kolkata) / SDG (Mumbai) for information please.



PROCEDURE FOR ENLISTMENT OF THE STEEL MANUFACTURES IN RESPECT OF TMT STEEL / LOW ALLOY STEEL REINFORCEMENT BARS IN CPWD WORKS.

1. The following procedure shall be adopted for enlistment of the manufacturers, in respect of TMT steel / Low Alloy steel reinforcement bars of different diameter and grades for use in CPWD works.
 - i. All manufacturers having their manufacturing plants in India are eligible for enlistment in CPWD subject to the condition that they are producing steel bars of different grades conforming to the latest version of IS 1786.
 - ii. The Thermo Mechanically Treated (TMT) steel / Low Alloy steel reinforcement bars conforming to IS:1786 must be manufactured using iron ore, virgin or processed with necessary refining facilities. The rolling / processing facilities, from iron making to finished steel reinforcement bar, may be owned by the same company or its subsidiary company (ies). In this regard the necessary proof may be submitted along with application.
 - iii. The eligible manufacturer shall apply **online** to CPWD website portal to **SDG (Chennai, Chandigarh, Kolkata, & Mumbai)** on their letter head along with requisite details in prescribed application (**as per Annexure-I(a)**) along with documents (**as per Annexure-I (b)**). The manufacturer shall mention name and location of plants to be enlisted for supply of steel reinforcement bar and shall pay enlistment fee of Rs. 1,00,000.00 (Rs. One Lac Only) per plant. The manufacturer is required to pay total enlistment fees to CPWD through e-payment in **Account Number 244189- AE(Cash), CSQ, NirmanBhawan, New Delhias per Annexure-I (f)** and receipts of payment shall be enclosed with the application form.
 - iv. The enlistment fee, once paid, is non-refundable due to any reason. Therefore, manufacturers are advised to ensure that they fulfil the eligibility requirements and possess all necessary documents for enlistment before payment.
 - v. The online application submitted along with documents will be scrutinized by the **CE (Works & TLQA) O/oSDG (Chennai,**



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Chandigarh, Kolkata, & Mumbai) and shortcoming (s) or deficiency (ies) in the submitted application, if any, will be communicated to the applicants through online portal. The applicants will be allowed to submit clarifications or information online within a period of one month from the date of intimation of shortcomings.

- vi. If the manufacturer fails to submit the required clarifications or information within one month from the date of intimation of shortcomings, the application shall be summarily rejected and no further communication shall be entertained. The enlistment fees shall be forfeited.
- vii. All the relevant clarifications and/or information received within the time period shall be considered and if found in order, such manufacturer shall be informed about the dates of plant (s) visit by the team of CPWD officers consisting of **one SE, one EE and one AE (to be nominated by respective SDG)**.
- viii. On site verification of documents, submitted at the time of application, will be done by the CPWD team, during the plant(s) visit. Further, the testing of individual bars of particular grade (s), at each plant, shall be carried out in the lab available at plant in presence of CPWD team and representative of manufacturer **(as per Annexure-I(c))**. The entire testing process shall also be video recorded.
- ix. CPWD team, at each plant, shall also collect the samples (i.e. one sample consist of three bars) of each diameter of different grades and sealed in presence of manufacturer's representative. The type testing of these samples shall be done in one of the designated lab of National Test House, IITs, NITs and NCCBM in presence of CPWD representatives. The dates of testing of samples in the designated laboratory shall be decided by the manufacturer in consultation with the lab authorities and CPWD team. The entire testing process, including opening of sealed samples, shall be video recorded.
- x. After plant visit by the CPWD team, a report along with photographs / video of the plants and results of the tests conducted during visit shall be uploaded on the portal within 5 working days.
- xi. The results of the type tests, conducted in the designated lab, shall be uploaded on the portal within 5 working days of receipt of the same.

- xii. After getting all the test reports, complete case along with documents and recommendation of respective SDG (**Chennai, Chandigarh, Kolkata, & Mumbai**) will be sent to CE, CSQ (Civil), CPWD, Nirman Bhawan, New Delhi.
2. A committee comprising of following officers will evaluate the case received from SDG (**Chennai, Chandigarh, Kolkata, & Mumbai**) for the enlistment of steel manufacturers' plant for reinforcement bar of different grades on the basis of criteria given in **annexure-I(d)** in CPWD Directorate, Nirman Bhawan, New Delhi.

ADG (Tech)	-	Chairman
CE (Project)	-	Member (to be nominated by ADG (Tech))
CE, CSQ (Civil)	-	Member
SE (Design)	-	Member (to be nominated by ADG (Tech))
SE (TAS)	-	Member Secretary

The committee will recommend the steel manufacturers' plant for enlistment or otherwise to DG, CPWD for his approval.

3. The approval of the competent authority shall be intimated to the respective manufacturer in respect of a particular plant for each diameter of different grades of steel under category Bar Set I / Bar Set-II
4. If, no bar diameter of specific grade of steel of the particular plant of a manufacturer is found suitable, then he will be intimated accordingly. The manufacturer may apply afresh next time when applications are re-invited for enlistment. In case of rejection of application, the decision of the CPWD shall be final and binding on the applicants.
5. **Validity of Enlistment:** The enlistment of manufacturer's plant for particular bar diameter and grade of steel shall be valid for a period of 3 (three) years from the date of issue of enlistment order. The enlistment shall be open to review by the enlisting authority i.e. Director General, CPWD at any time. In case any adverse report is received against the manufacturer, the enlistment is liable to be suspended/cancelled/or manufacturer can be black listed for future enlistment in CPWD or any other action as deemed fit (as per **Annexure-I(e)**).



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Annexure-I(a)

Application for Enlistment OF THE STEEL MANUFACTURES IN RESPECT OF
TMT STEEL / LOW ALLOY STEEL REINFORCEMENT BARS and re-enlistment
(Supporting documents annexed with the application form should be uploaded
as per Annexure-I(b))

1. (a) Name of the applicant

(b) Status of entity (Limited Liability Partnership/Ltd. Company).....

2. Address

(a) Registered Office.....

(b) Head Office (if different from Registered office).....

3 Contact Details

(a) Name of contact person and Designation.....

(b) Telephone Number.....

(c) Mobile Number

(d) Email Id.....

(e) Website URL (If any)

4 Detail of Plant (s) for which Enlistment applied:

i. (a) Name of Plant.....

(b) Location.....

ii. (a) Name of Plant.....

(b) Location.....

5. Enlistment fee(s) detail (Fees Rs. 1,00,000.00 per Plant) :

(a) Transactions Reference Number

(b) Transaction Date.....

(c) Amount.....

6. Certificates (Strike out whichever is not applicable)

- a. I/We (including all partners) certify that I/we have read the Rules for
Enlistment of steel manufacturer in CPWD as amended upto date and shall
abide by them.



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- b. I/We certify that I/we are not enlisted and will not get myself / ourselves registered as steel manufacturer in the Department under more than one name.
- c. I/We have neither employed nor shall we employ any person within one year of his retirement from the Government except with the prior permission of the Government.
- d. I/We will not make changes in the owner ship of the company without prior intimation to department.
- e. I/We have not declared or is in the process of being declared bankrupt, insolvent, wound up, dissolved or partitioned.
- f. I/We have not been removed/suspended/blacklisted/debarred/restrained from the business by any central /state government department/PSUs.

I/We certify that the information given above is true to the best of my/our knowledge. I/We understand that if any information is found incorrect, our enlistment is liable to be cancelled and I may be blacklisted / suspended / debarred for future enlistment in CPWD.

Place :

Signature of applicant

Date:

(Authorized Signatory)



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Annexure-I (b)

A. Documents required to be submitted with application:

1. Documents regarding Ownership / Promoters of the manufacturing plant, its head office address, location and address of steel manufacturing facility.
2. If any subsidiary company(ies) exists, then documents regarding Ownership / Promoter ship of the subsidiary company, Subsidiary company's address and its relation with main company, location and address of manufacturing units of subsidiary company.
3. Copies of Certificate of Incorporation & Memorandum of Article of Association of Main Company.
4. Approval/ enlistment of manufacturer company by CPWD (in past), or any other Central/State Government departments/PSUs for use of steel reinforcement bars.
5. Document and Production process flow diagram / chart of steel making for production of TMT and Low alloy steel (Corrosion Resistant Steel) Reinforcement bars for Fe 415D, Fe 500D, and Fe 550D of bar sizes 8 mm to 45 mm dia.
6. Document related to Quality Assurance Plan adopted in manufacturing of steel and calibration record of measuring and testing equipments.
7. Authenticated copies of BIS certificate for billets (IS 2830 : 2012) & BIS certificate for TMT bars (IS 1786 :2008) (with up to date Amendment)
8. Copy of ISO-9001:2008 (Quality Management System), Quality Management System, ISO-14001:2004 (Environment Management System).
9. The CO2 emission per kg of steel production.
10. Whether manufacturer is blacklisted/suspended/debarred/restrained from business by any Central / State Government Department or PSU for poor quality of reinforcement steel bar (if any) supplied by the company.
11. Test results of bars as per Annexure-I(c).

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Annexure- I(c)

Testing requirement for individual reinforcement bar diameter of Particular Grade of steel:

Tests required for Fe 415D, Fe500D, Fe550D grade of steel and Low alloy steel reinforcement bars:

A. FOR BAR SET- I

1. Tests as per IS 1786 (latest version) and specified therein

1.1 Chemical Properties

Ladle analysis of steel for above grades for maximum percentage of constituents

- i. Carbon (C), (ii) Sulphur (S) and (iii) Phosphorous (P) and (iv) Nitrogen and Carbon Equivalent

1.2 Physical Properties

- (i) 0.2 percent proof stress / yield stress, minimum, N/mm².
- (ii) Ratio of Tensile Strength (Ts) to Actual Yield Strength (or 0.2 % of yield stress (Ys)) of the test piece N/mm².
- (iii) Elongation, percent, Minimum, on gauge length $5.65\sqrt{A}$, where A is the cross-sectional area of the test piece.
- (iv) Total elongation at maximum force, percentage, minimum on gauge length $5.65\sqrt{A}$, where A is the cross-sectional area of the test piece.
- (v) Bend test and re-bend test.
- (vi) The mean area of ribs (in mm²) per unit length (in mm) above the core of the bar, projected on a plane normal to the axis of the bar.
- (vii) Pull-out testing in accordance with IS 2770 (Part 1)

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2. Additional requirement

2.1 Permissible limit for Manganese and Copper as follows:

Constituent	Permissible Limit (% of cast metal quantity)		
	Fe 415 D	Fe 500 D	Fe 550 D
Manganese (Mn)			
Maximum	1.60	1.60	1.60
Copper (Cu)			
Maximum	0.80	0.80	0.80
Minimum	0.20	0.20	0.20
Notes: The above composition shall be obtained as per latest version of IS 228 1. Manganese using Periodate Spectrophotometric Method (Part 12), and 2. Copper using Thiosulphate Iodide Method (Part 15) or Spectrophotometric (Diethyl Dithiocarbonate) Method (Part 21)			

2.2 Tempered Martensite Ring Test as per Annexure-I (d).

2.3 The process of manufacturing steel shall comply with the provisions of ISO9001: 2015 and ISO14001: 2004.

(B)FOR BAR SET-II

1. The test requirements given in para 1.1 and 1.2 above.



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1. CRITERIA FOR CLASSIFICATION OF BARS

The steel bars manufactured in India shall be classified as specified hereunder for the purposes of their use in works of CPWD.

1.1 Process of Classification

Steel Bars shall be classified as *Bar Set I* and *Bar Set II*. The bars shall be placed under one of these categories based on *Type Test* (the test performed to select the bars) performed as specified hereunder. These tests to be performed are those specified in the latest version of **IS 1786** published by the Bureau of Indian Standards, and the additional tests mentioned in Para 2 of this document.

The *Type Test* shall be performed at any one of the National Test Houses, IITs, NITs, and NCCBM, subject to:

- (a) The test samples being collected from the manufacturing facility by the representative engineer of CPWD,
- (b) The availability of the required test facility at the said laboratory, and
- (c) The test being witnessed by representative engineer of CPWD.

1.2 Classification of Steel Bars

The bar shall be classified as:

- (1) *Bar Set I*, if it complies with the requirements given in the latest version of **IS: 1786**, and those given in Para 2 of this document, and
- (2) *Bar Set II*, if it complies with the requirements given in the latest version of **IS 1786**.

2. ADDITIONAL REQUIREMENTS

Four additional requirements as specified hereunder.

2.1 Chemical Composition Requirement

The permissible limits of additional elements shall be as per **Table 1**.

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Table 1: Permissible limits of additional elements

Constituent	Permissible Limit (% of cast metal quantity)		
	Fe 415 D	Fe 500 D	Fe 550 D
Manganese (Mn)			
Maximum	1.60	1.60	1.60
Copper (Cu)			
Maximum	0.80	0.80	0.80
Minimum	0.20	0.20	0.20
Notes: The above composition shall be obtained as per latest version of IS 228 : (1) Manganese using Periodate Spectrophotometric Method (Part 12), and (2) Copper using Thiosulphate Iodide Method (Part 15) or Spectrophotometric (Diethyl Dithiocarbonate) Method (Part 21).			

2.2 TM Ring Requirement

The following two requirements shall be met with:

- (1) Does the *Tempered Martensite(TM)* Ring satisfy the visual analysis as per **Step 1** of **Table 2**; and
- (2) The thickness of the TM Ring obtained as per **Step 2** of **Table 2** shall be between 0.07f and 0.15f, where f is the *original nominal diameter* of the bar.

(a) Test Procedure

The following is the procedure:

- (1) The test setup to capture the *Cross-Sectional Phase Distribution (CSPD)* of the TMT bars shall be as shown in **Figure 1**.
- (2) Steel bars may be cut using handsaw or an abrasive cutter with continuous supply of coolant to limit the temperature of steel, and thereby avoid any transition or changes in *Tempered Martensite(TM)* and *Ferrite-Pearlite (FP)* phases (**Figure 2**). The sharp edges of cut bars should be smoothened using

silicon carbide abrasive sheets. A metal polishing machine can be used to achieve effective smoothening.

- (3) The smoothened steel specimen shall be moulded in cold setting epoxy with good surface finish. Setting time of epoxy is about 10-15 minutes.
- (4) The moulded specimen surface shall be course polished using abrasive sheets of 80, 150, 220, 320, and 600 grit sizes in sequence. Specimens shall be micro-etched using Nital (5% Nitric acid in alcohol) to capture the CSPD.

(b) Measurements

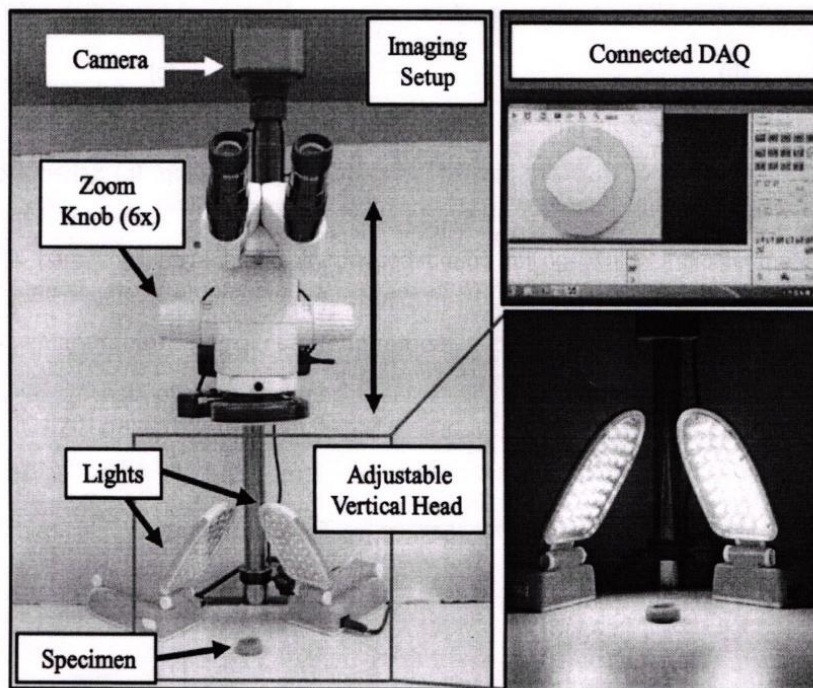
The procedure for obtaining the CSPD of the TM Ring along the perimeter shall be as per **Table 2**.

2.3 Marking Requirement

All bars shall have marks introduced during rolling, which indicate the *name of manufacturer or brand name*, and *grade of steel*.

2.4 Manufacturing Process Requirement

The process of manufacturing steel shall comply with the provisions of ISO 9001:2015 and ISO 14001:2004.



(a)

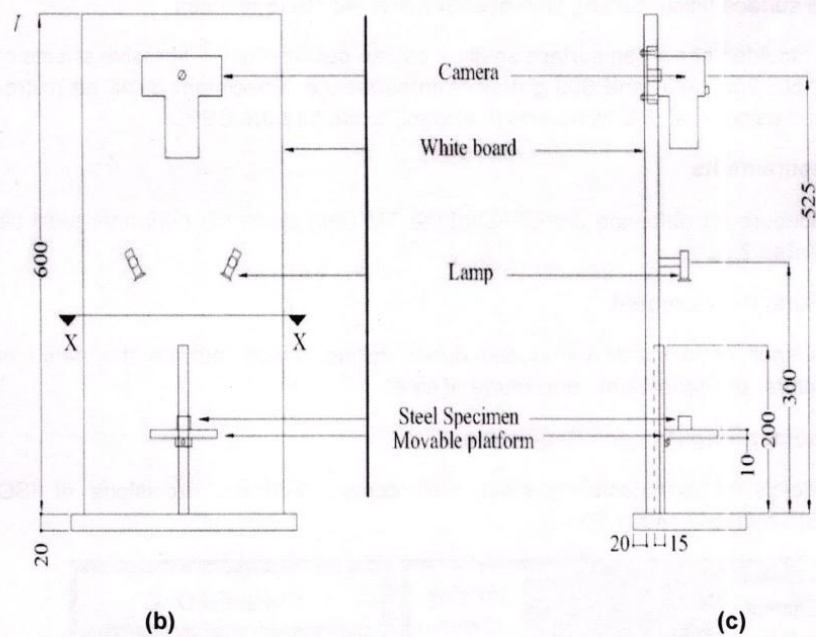


Figure 1: Test setup for CSPD of the TMT bars: (a) Imaging Setup, (b) Schematic Front View (c) Schematic Side View

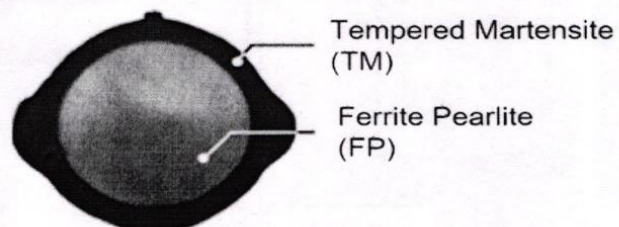


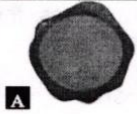
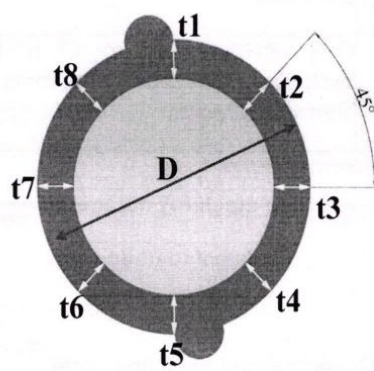
Figure 2: Cross-section of the steel bar showing the TM and FP areas

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cont'd-13

Table 2: Method of obtaining CSPD of TM Ring

Step 1: Visual Analysis of etched Cross-Section			
			
	A	B	C
	Acceptable	Not acceptable	Not acceptable
1.	Is a dark grey peripheral region and light grey core seen as in Case A?		Yes/No
2.	Does the dark grey peripheral region form a continuous outer ring?		Yes/No
Step 2: Dimension Analysis of TM-Ring thickness			
3.	Diameter D (mm) of the steel bar		
4.	Geometry		
		t_1	
		t_2	
		t_3	
		t_4	
		t_5	
		t_6	
		t_7	
		t_8	
		Measured t_{min} (mm)	
		Measured t_{max} (mm)	
5.	Is the measured $t_{min} \geq 0.07 f$?		Yes / No
	Is the measured $t_{max} < 0.15 f$?		Yes / No

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Contd --- 14

3. GUIDELINES FOR USE OF STEEL BARS IN DIFFERENT PROJECTS

Considering the importance of quality in construction of public structures, the basis for use of bars in different projects of CPWD shall be as given in **Table 3**.

Table 3: Use of Bar Sets I and II in CPWD Projects

S.No.	Consideration	Bar Set I	Bar Set II
1.	Earthquake Zones	All zones	Only <i>Earthquake Zone II</i>
2.	Environment Conditions		
	(a) Coastline	All conditions	Beyond 10 km from the coastline of India
	(b) Exposure Conditions	All exposure conditions as per IS 456 (latest version)	Only <i>Mild</i> and <i>Moderate</i> Exposure Conditions as per IS 456 (latest version)
3.	Structure Category	All categories	Only <i>Normal Buildings</i> as per Table 4 and standalone <i>Normal Structures</i> as per Table 5 .
4.	Heights of Buildings and Structures	All heights	Only structures up to 12 m height excluding <i>staircase headroom</i> and <i>liftmachine rooms</i>

Table 4: List of Normal Buildings

Residential or Non-Residential Buildings with occupancy less than 100 persons, <i>excluding</i>: (1) Educational buildings, (2) Buildings of strategic importance, (3) Buildings and structures identified by Government of India and State Governments to be critical for governance or Disaster Management, (4) Hospital buildings, (5) Buildings that house the control or operations of utilities (for example, water, power, and sewage disposal), and lifeline (for example, communication and transportation facilities) structures, (6) Buildings related to defense and space applications, (7) Buildings identified by Government of India, State Governments and UT Administrations to be of <i>Special Importance</i>, and (8) Any other building identified with the approval of DG, CPWD.

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Table:5 List of Standalone Normal Structures

Water Tanks and Water Sumps up to 50,000 liters, and Pump Rooms of area less than 20 m ²
Septic Tanks, Sewage Treatment Plants, and Effluent Treatment Plants up to 10,000 liters/day
Bridges and Culverts of spans up to 6 m
Earth Retaining Structures up to 4 m
Compound Walls, Entry Gates, and Small Reception Rooms
Storm Water Drains
Cable Trenches
Parking Structures of single storey
Security Cabins and Sentry Post
Any other structure identified with the approval of Technical Sanctioning Authority of CPWD

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Annexure-I(e)

Grounds for Removal/ Suspension/ Blacklisting/ Debarring of manufacturer from CPWD

1. The manufacturer may be removed/suspended/blacklisted/debarred, if any of the following is established:
 - i. If found to have given false particulars at the time of Application; or
 - ii. Has indulged in any type of forgery or falsification of records; or
 - iii. Changes in the ownership of the company without prior intimation to department.
 - iv. Declared or is in the process of being declared bankrupt, insolvent, wound up, dissolved or partitioned or
 - v. Violates the labour rules and regulations or
 - vi. Is involved in complaints of serious nature received from any source which have been proved; or
 - vii. Ceases to fulfil eligibility criteria based on which manufacturer's name was approved; or
 - viii. Is considered as not required to be in list of CPWD enlisted manufacturer for any other reason considered fit by the enlisting authority; or
 - ix. Received reports from field units of CPWD for supply of sub-standard quality of steel in more than one occasion; or
 - x. Has been removed/suspended/blacklisted/debarred/restrained from the business by any central /state government department/PSUs.
2. Whenever, any type of complaint mentioned above at serial number (i) to x), is received against a manufacturer. The manufacturer will be served with suitable show cause notice to give reply within a period of 15 days. After considering the reply/non-reply of the Show cause notice and other facts on records, further action will be taken as deemed fit. In case of Removal/ Suspension/ Blacklisting/ Debarring of the manufacturer, the minimum period will not be less than three years from the date of issue of the order. The re-application/application already under consideration for fresh enlistment of such manufacturer shall not be processed till the period of Removal/ Suspension/ Blacklisting/ Debarring is over. The manufacturer has to apply afresh for enlistment after period of Removal/ Suspension/ Blacklisting/ Debarring is over.

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Procedure for online payment of enlistment fee

1. Log on to home page of NTR portal on <https://bharatkosh.gov.in>.
2. Go to "Quick Payment" link on the home page.
3. Select the Ministry/Department "030-Housing and Urban Affairs" from the drop-down menu.
4. Select the purpose as "Enlistment fee from contractor" from the drop-down menu.
5. Click NEXT and Select the DDO as" 244189-AE(CASH),CSQ, NIRMAN BHAWAN, NEW DELHI" from the drop-down menu.
6. Enter the amount of enlistment fee(s) in the amount window.
7. Under Remarks write "enlistment fee for enlistment of steel manufacturer for the plants (i)...., (ii)...,(iii)...., ".
8. After filling all the mandatory fields in "Depositor's detail", click" Next".
9. Confirm the information entered in the preview and click the "Confirm" button.
10. After confirmation, the portal will open the Payment Gateway.
11. Make payment using the Payment Gateway and download the system generated electronic receipt.



3. SPECIAL CONDITIONS FOR MODULAR KITCHEN CABINET AND WARDROBE

- 3.1. **Watch & Ward and Safety:** -The contractor shall be solely responsible for the watch and ward, safety, and security of all modular kitchen cabinet, wardrobe, fittings, fixtures, accessories, equipment, and services supplied and installed by him against theft, pilferage, damage, or breakage during execution and until the work is physically handed over to the Income Tax Department, and no extra payment or claim whatsoever shall be admissible on this account. The contractor shall take all necessary precautions to prevent damage to floors, walls, existing structures, utilities, plants, and vegetation within the project premises during execution of the work. The contractor shall also ensure accurate setting out and proper installation of all cabinet, wardrobe units, and any minor civil modifications required for proper installation shall be carried out by him at his own cost without any extra payment.
- 3.2. **Sample Unit and Approval:** - Before commencement of mass production, the contractor shall prepare detailed shop drawings and fabricate one complete sample kitchen unit for inspection and approval by the Engineer-in-Charge at the factory premises. The approved sample shall serve as the reference standard for workmanship, finish, material quality, fittings, and overall appearance. The contractor shall arrange packing, transportation, and safe custody of the approved samples without any additional cost to the department.
- 3.3. **General Specifications of Modular Kitchen & Cabinets**
- 3.3.1. **Materials and Hardware:** - All materials, fittings, fixtures, and hardware used in the work shall be of first quality and sourced from reputed manufacturers. All hardware components including hinges, channels, clamps, nuts, bolts, washers, screws, brackets, rollers, guides, slides, casters, handles, locks, and accessories required for proper functioning of the units shall be deemed included in the quoted rates unless otherwise specified. All materials shall conform to relevant BIS standards and CPWD specifications (latest revision). All wood and wood-based products shall be treated with approved anti-termite treatment, and the resins used in furniture manufacture shall be Phenol Formaldehyde based.
- 3.3.2. **Factory Manufacturing and Site Installation:** - Only factory-manufactured modular cabinet and wardrobe shall be permitted. All basic modules, components, and units shall be factory-made/shop-fabricated, and only assembly and installation activities shall be carried out at site. No on-site fabrication, cutting, pressing, edge lamination, or modification of any kind shall be permitted at site. Each consignment shall be accompanied by factory dispatch challans/documents. The Engineer-in-Charge shall have full access to the manufacturing facility for carrying out inspection and quality checks during the fabrication process.
- 3.3.3. **Surface Finish and Edge Banding:** - All exposed edges of boards, except post-formed edges, shall be sealed with 2 mm thick PVC edge banding tape using hot-melt glue on an edge-banding machine, and the edge banding shall be rounded to a radius of 2 mm to 3 mm to ensure smooth finish and durability.
- 3.3.4. **Storage and Protection:** - All materials brought to site shall be properly packed, protected, stacked, and stored to prevent damage due to handling, transportation, weather, moisture, or installation activities. Any damaged or rejected material shall be removed from site within 48 hours of instructions from the Engineer-in-Charge, failing which the same may be removed at the risk and cost of the contractor.
- 3.3.5. **Quality Control and Documentation:** -The contractor shall ensure that all materials bear valid BIS certification marks wherever applicable. Where BIS certification is unavailable for a specific material, the material shall conform to relevant BIS codes and CPWD specifications, subject to prior written approval of the NIT Approving Authority. No material shall be used without prior

approval of the Engineer-in-Charge.

The contractor shall submit the following documents along with each RA Bill:

- Original purchase invoices, bills, and vouchers
- Manufacturer's Test Certificates (MTC) for HDHMR boards
- OEM work orders and invoices
- Manufacturer's warranty certificates
- BIS certification/test certificates

3.3.6. **Approved Makes:** - The OEM for modular kitchen system and wardrobe shall be from any of the following approved makes or equivalent approved by the Engineer-in-Charge:

- Godrej Interio
- Durian
- Sleek by Asian Paints
- Brown crust
- Neelkanth wood industries
- Rajdhani Furniture Pvt. Ltd.

3.4. **Execution Of Work:** -The work shall be executed strictly in accordance with the approved drawings, BOQ items, specifications, and directions of the Engineer-in-Charge, and no deviation, substitution, alteration, or extra item shall be carried out without prior written approval of the Engineer-in-Charge. Any unauthorized work executed without such approval shall neither be measured nor paid for. Necessary cut-outs for electrical, computer, telephone, plumbing, or other service outlets shall be provided as per approved drawings without any extra cost. The work shall be considered complete only after ensuring proper alignment, smooth functionality, finishing, cleaning, and satisfactory handing over of all units.

3.5. **Additional security deposit:** - In addition Five percentage (5%) of the cost of wardrobe and kitchen cabinet work including fittings shall be retained as additional security deposit and the amount so withheld would be released after five (05) years from the date of completion of the entire work under the agreement. If the performance of the wardrobe and kitchen cabinet work is found unsatisfactory and any defects noticed during the guarantee period, they shall be rectified by the agency within seven days of receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of the agency.

However, the security deposit deducted may be released in full against bank guarantee of equivalent amount in favour of Engineer-in-Charge, if so decided by the Engineer-in-Charge.

The additional security deposit against this item of work shall be in addition to the security deposit mentioned elsewhere in contract form.

3.6. **Warranty and Guarantee:** -The contractor shall provide a comprehensive manufacturer's warranty for a minimum period of 5 (Five) years from the date of handing over to the Income Tax Department, covering manufacturing defects, workmanship, hardware, boards, and finishing. During the guarantee period, the contractor shall immediately rectify, at his own cost, all defects pointed out by the Engineer-in-Charge. In the event of failure to rectify such defects within the stipulated period, the department shall be at liberty to carry out the rectification work at the risk and cost of the contractor, and the expenditure incurred thereon shall be recovered from the additional security deposit or any other dues payable to the contractor. The additional security deposit shall be released only after expiry of the guarantee period, subject to satisfactory rectification of all defects.

GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR 5 (FIVE) YEARS GUARANTEE AGAINST MANUFACTURER'S WARRANTY, WORKMANSHIP, QUALITY OF FURNITURE/MATERIAL AND FINISHING.

The agreement made this _____ day of _____ two thousand and _____ between _____ S/o _____ (hereinafter called the GUARANTOR of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part).

WHEREAS THIS agreement is supplementary to a contract. (Herein after called the Contract) dated _____ and made between the GUARANTOR OF THE ONE PART AND the Government of the other part, whereby the contractor interalia, undertook to render the furniture in the said contract the work in the said contract recited completely of good quality, finishing and workmanship.

THE GUARANTOR hereby guarantee that he will be fully responsible for proper design and performance of all furniture items/materials i/c finishing.

The decision of the Engineer-in-charge with regard to quality and performance of furniture shall be final.

During the period of guarantee the guarantor shall make good all defects and in case of any defects being found render to the satisfaction of the Engineer-in-charge at his cost and shall commence the work for such rectification within seven days from the date of issue of notice from the Engineer-incharge calling upon him to rectify the defects, failing which the work shall be got done by the Department through some other contractor at the guarantor's cost and risk. The security deposit shall be effected for the amount spent of rectification of defects. The security deposit of the work shall be refunded after expiry of the guarantee period if no defects are observed in the said period and if the defect have been rectified to the entire satisfaction of the Engineer-in-charge. The decision of the Engineer-in-charge as to the cost payable by the Guarantor shall be final and binding.

IN WITNES WHEREOF those presents have been executed by the obligator _____ 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 presence of:

1. _____

2. _____

SIGNED FOR AND ON BEHALF OF THE PRESIDENT OF INDIA BY _____ in the presence of :

1. _____

2. _____

4. SPECIAL CONDITIONS FOR PREVENTION OF AIR POLLUTION AS PER DIRECTIVES OF NATIONAL GREEN TRIBUNAL (NGT):

- 4.1. The contractor shall not store/dump construction material or debris on metalled road.
- 4.2. The contractor shall get prior approval from Engineer-in-charge for the area where the construction material or debris can be stored beyond the metalled road. This area shall not cause any obstruction to the free flow of traffic/inconvenience to the pedestrians. It should be ensured by the contractor that no accidents occur on account of such permissible storage.
- 4.3. The contractor shall take appropriate protection measures like raising wind breakers of appropriate height on all sides of the plot/area using CGI sheets or plastic and/or other similar material to ensure that no construction material dust fly outside the plot area.
- 4.4. The contractor shall ensure that all the trucks or vehicles of any kind which are used for construction purpose or are carrying construction material like cement, sand and other allied materials are fully covered. The contractor shall take all necessary precautions that the vehicles are properly cleaned and dust free to ensure that enroute their destination, the dust, sand or any other particles are not released in air / contaminate air.
- 4.5. The contractor shall provide mask to every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris to prevent inhalation of dust particles.
- 4.6. The contractor shall provide all medical help, investigation and treatment to the workers involved in the construction of building and carry of construction material and debris relating to dust emission.
- 4.7. The contractor shall ensure that C&D waste is transported to the Municipal C&D waste disposal site or as directed by the Engineer-in-charge and due record shall be maintained by the contractor.
- 4.8. The contractor shall ensure compulsory use of wet jet in grinding and stone cutting.
- 4.9. The contractor shall comply all the preventive and protective environmental steps as stated in the MoEF guidelines.
- 4.10. The contractor shall carry out on road inspection for black smoke generating machinery. The contractor shall use cleaner fuel.
- 4.11. The contractor shall ensure that all DG sets comply emission norms notified by MoEF.
- 4.12. The contractor shall use vehicles having pollution under control certificate. The emissions can be reduced by a large extent by reducing the speed of a vehicle to 20 KMPH. Speed bumps shall be used to ensure speed reduction. In cases where speed reduction cannot effectively reduce fugitive dust, the contractor shall divert traffic to nearby paved areas.
- 4.13. The contractor shall ensure that the construction material is covered by tarpaulin. The contractor shall take all other precaution to ensure that no dust particles are permitted to pollute air quality as a result of such storage.
- 4.14. The paving of the path for plying of vehicles carrying construction material is more permanent solution to dust control and suitable for longer duration projects.

C3. LIST OF PREFERRED MAKES FOR CIVIL WORK

The preferred makes of materials for use in the work are specified in the table below. In general, only BIS-marked materials shall be used. Non-BIS marked materials may be permitted by the Engineer-in-Charge only where BIS certification is not available for the relevant product category. The Contractor shall obtain prior approval from the Engineer-in-Charge before procuring any material or engaging any specialized agency. Detailed submittals, including catalogues, highlighted specifications, and scope of work of the specialized agency, shall be submitted for approval. Samples of all proposed materials shall be submitted for approval prior to procurement. Materials not conforming to the contract specifications or approved samples shall be rejected.

The listed makes are indicative. Equivalent materials from reputed manufacturers conforming to the technical specifications may be considered, subject to non-availability of the specified makes in the market or their inability to meet project requirements within the stipulated time, and with prior approval of the NIT approving authority, as recommended by the Engineer-in-Charge as per contract conditions. Such proposals shall be submitted at least one month in advance of the requirement at site. If the approved alternative make is of lower cost than the specified make, the corresponding cost adjustment shall be affected.

The Contractor remains fully responsible for ensuring the quality and performance of all materials, irrespective of their inclusion in the preferred makes list. Necessary quality checks and due diligence shall be carried out before use.

S. No.	Material	Preferred Make
1.0	Excavation	
(i)	Anti-Termite Pesticides	Bayer, FMC India, Hindustan Insecticides
(ii)	Pile Integrity Testing	CBRI, AIMIL, NDM Technology, Geo-Dynamic, AvanTech Engg. Consortium Pvt. Ltd.
2.0	Concrete Work	
(i)	Ordinary Portland Cement / Portland Pozzolana Cement.	ACC, Ultratech, Ambuja, Birla, J K Lakshmi
(ii)	White Cement	Birla White, J K White, Ultratech
(iii)	Construction Chemicals / Admixtures / Plasticizers / Super Plasticizers/Curing compounds	BASF, FOSROC, Endura(PJL), Mapei, MC Bauchemie, Weber (Saint Gobain), Sika, MYK, Asian paints, Ferrouscrete,
(iv)	Precast Cover Blocks	ACC, Nuvoco, Modi Cover blocks, Steelmax
3.0	Reinforced Cement Concrete	
(i)	TMT steel /Low Alloy Steel reinforcement Bars	SAIL, RINL, TATA, JSW & JSPL
(ii)	Mechanical Couplers for Reinforcement	Dextra India, Sanfield, G-Tech
(iii)	Anchor fastener, Rebar chemical/Mechanical Fastener, Core Cutting, Expandable Fastener	Hilti, Fisher, Bosch, Wuerth

(iv)	Ready Mix Concrete Plants	ACC, Ultratech, JK or own Batch Mix Plant with appropriate capacity to be set up by contractor at or away from the site
(v)	Aluminium customized Shuttering	S-Form, MFE, Eins Technik Pvt. Ltd. ALFOAC
4.0	Water Proofing	
(i)	Crystalline Water Proofing Compound	Penetron, Xypex, Kryton (Dosage As Per Manufacturer Specification Or That Required To Achieve Performance Criteria Of DSR Item 22.22 I.E. More Than 90% Permeability Reduction And Resistance To Hydrostatic Pressure Up To 16 Bar, Whichever Is More)
(ii)	Water swellable hydrophilic waterstops tape (Bentonite Based) for Construction Joints	Penetron, Xypex, Kryton
(iii)	Crystalline Waterproofing Coating	Penetron, Xypex, Kryton
(iv)	High Strength Crystalline Mortar	Penetron, Xypex, Kryton
(v)	Waterproofing Self-adhesive & (HDPE) Membrane	Fosroc, Pidilite, Mapei, Cico, MYK arment, Technonicol
(vi)	Polymer Modified Cementitious Grout	Penetron, Tikidan, Fosroc, Pidilite, Cico
(vii)	Waterproofing hybrid Polyurea	Fosroc, Pidilite, Weber (Saint Gobain), Mapei, Cico, MYK arment, Technonicol
(viii)	Double Component Liquid PU Elastomeric Membrane (spray applied)	Fosroc, Pidilite, Weber (Saint Gobain), Mapei, Cico, MYK arment, Technonicol
(ix)	Acrylic polymer modified Cementitious Coating	Tikidan, Fosroc, Pidilite, Cico
(x)	Expanded polystyrene sheet (EPS) and Extruded Polystyrene Sheet (XPS)/ Dimple board / Drainboard	Fosroc, Tikidan, Pidilite , Virendra Textile, Ovidrain, Supreme, Insuboard, Owens Corning, Shalimar, Cico, MYK arment, Technonicol
(xi)	Food Grade Epoxy Coating	Fosroc, Pidilite, Weber (Saint Gobain), Mapei, Cico
(xii)	Non-Toxic Epoxy Coating	Fosroc, Pidilite, Weber (Saint Gobain), Mapei, Cico
(xiii)	Bituminous Epoxy Coating	Fosroc, Pidilite, Weber (Saint Gobain), Mapei, Cico
(xiv)	Backer Rod	Fosroc, Pidilite, Weber (Saint Gobain), Mapei, Cico
(xv)	Polysulphide Sealant for Joints	Fosroc, Pidilite, Weber (Saint Gobain), Mapei, Cico

(xvi)	Water proofing compound	Fosroc, Pidilite, Penetron, Mapei, Weber (Saint Gobain), , Cico
(xvii)	Polyurethane over deck insulation foam	Fosroc, Penetron, Cico, MYK arment
(xviii)	PVC water stops	Jyoti rubber, Maruti rubber, Fosroc, Sika, Master Builder, Kantaflex
(xix)	Micro Concrete	Sika, Fosroc, Basf, Myk Arment, Ultratech, Ferrouscrete
5.0	Masonry Work	
(i)	AAC Blocks	ACC, Tata Tiscobuild, Ultratech, Ferrouscrete, Birla Aerocon, JK Lakshmi
(ii)	AAC Block adhesive	Ultratech, Ardex Endura, Ferrouscrete, Weber (Saint Gobain), Asian paints, Mapei
6.0	Steel Work	
(i)	Structural Steel Sections / Tubular Sections	SAIL, Tata Steel, RINL, JSPL, JSW, APL APOLLO
(ii)	Dash / Anchor Fasteners, Rawl Plug	Hilti, Fisher, Bosch, Wuerth
(iii)	EPDM Gasket	Schuco, Hanu, Raven, Anand
(iv)	Metal deck profile sheet	Ezydeck of TATA , Lloyd Superdeck, JSW
(v)	Roofing Steel Sheet (Precoated)	Tata Bluescope Steel Ltd., Jindal Steel, JSW Steel
(vi)	Polycarbonate Sheet	GE-LEXAN, Polygal, Tuflite Dalphalon, Coxwell
7.0	Aluminium Work	
(i)	Aluminium Extrusions	Hindalco, Jindal, NALCO
(ii)	Anodised Aluminium Hardware (Heavy Duty)	HARDIMA, EVERITE, Alu Alpha, Hindalco, Pulse of LGF Sysmac
(iii)	Alluminium Door & Window Systems	Schuco, Technal, Eternia-Hindalco, AIS Windows, Alupure, Axsys, A2Z Infra Solutions, Pabros
(iv)	Aluminium Glass Facade & Structural Glazing Systems	Schuco, Technal, Eternia-Hindalco, Dow, Lindner AG, Art N Glass, AIS Window system, A2Z Infra Solutions, Pabros
(v)	Aluminium Composite Panels / Honeycomb Composite Panels / Aluminium-HPL Panels	Allucobond, Alstone, Aludecor, Kalco, Alutech, Virgo , Alumaze, VIVA
(vi)	Metal (Aluminium) Facade Panels	Hunter Douglas, Dwall Metallic, Lindner AG, Anakon, Hindalco
(vii)	Silicone Sealant / Weather Sealant / Fire Sealant / Polysulphide Sealant	Alstone, Sika, Dow corning, Choksey, Hilti, Wuerth (Promat), GE Plastics, Pidilite, FOSROC, BASF
8.0	Flooring	

(i)	Ceramic glazed & Vitrified wall / floor Tiles (Antiskid / Matt / Glossy)	Manufactured in own mother plant by : Kajaria, Johnson, Somany, Nitco, Vermora, Orient bell, AGL, Simero
(ii)	Epoxy Grouts / Tile adhesive / Polymer modified cementitious grouts/	Ardex Endura, Ferrouscrete, MYK laticrete, Pidilite, FOSROC, Sika, Weber (Saint Gobain), Asian paints, UltraTech
(iii)	Engineered wood / Wooden Laminated Flooring	Vista, Action Tesa, Pergo, Apex, Greenply,
(iv)	Floor hardener	Ardex Endura, Weber (Saint Gobain), MC Bauchemie, Ferrouscrete, UltraTech
(v)	Heat Resistant Tiles	Kajaria, Johnson, Somany, Nitco, Vermora, Orient bell, AGL
(vi)	Vinyl Flooring (Gym Flooring)	Forbo, Ebaco, Armstrong, Tarkett, LG, Gerflor, Polyflor
9.0	Roofing / False Ceiling / Partition EPF	
(i)	GRG (Glass Fibre Reinforced Gypsum) false ceiling with GI grid system	Diamond ceilings, Saint Gobain, Armstrong, Hunter Douglas
(ii)	Calcium Silicate / Mineral Fiber False Ceiling Tiles and frame work	Saint Gobain, Armstrong, Aerolite, Ramco Hilux, USG Borals, Anakon, Dexune, Aerolite
(iii)	Gypsum Board False Ceiling/Partition and frame work	Saint Gobain Gyproc., USG Boral Armstrong, Knauf AMF, Anakon, Dexune, Western, Gyptech
(iv)	Metal / U-Baffle / Open Cell / Wooden Laminated false ceiling i/c framework	Diamond ceilings, Armstrong, Hunter Douglas, Knauf, Gyptech, Tranquil
(v)	Fibre Cement Board	HIL (Birla Aerocon), Bison (NCL), RAMCO Hicem, Everest, Visaka Industries, Dexune
10.0	Doors / Windows / Wood work / Furniture	
(i)	Flush Door Shutter	Century, Greenply, Archidply, Duro
(ii)	Ply Wood / Block Board	Century, Greenply, Bhutan, Archidply
(iii)	Laminated Particle Board / veneered Particle Board	Greenlam, Century, Archidply, Merino
(iv)	Laminates/Veneers	Greenlam, Century, Archidply, Merino, Virgo
(v)	Acrylic sheet/Acrylic laminate	Rehau, Opulux, Treelam, Praveedh Décor, EGR, Virgo
(vi)	Wood Plastic Composite (WPC) Board/Door Shutter/Door Frame	Century, Greenply, Floresta, Alstone
(vii)	Factory made wooden Door Frames & Shutter (Except Flush door)	D S Doors, Duro, Ambika Wood, Shreeji Woodcraft, SM Corporation, Jayna, Neelkanth wood industries
(viii)	Moisture resistant HDF/MDF/BOILO	action TESA, GREENPANEL, CENTURY

	board	
(ix)	OEM for Factory made kitchen cabinets, wardrobes etc.	Godrej interio, Durian, Slek by Asian paints, Brown crust, Neelkanth wood industries, Rajdhani Furniture Pvt. Ltd.
(x)	UPVC Doors & Windows	Fenesta, VEKA, KOMERLING, Aluplast, Deceuninck, Saint Gobain, Prominace, Duroplast,
(xi)	G.I. Steel Door Frame	Kutty Doors, Shakti Hormann, Metdoor, NAVAIR, Synergy Thrislington, Sukriti
(xii)	Fire Rated Metal/Wooden/Acoustic Doors (Glazed/Unglazed/sliding)	Shakti Hormann, Pacific, Navair, ASES, Sukriti
(xiii)	Fire Rated Glass	SCHOTT, Saint Gobain, ASAHI, Pyroguard
(xiv)	Hardware for Fire Check Doors	Dorma, Hafele, Assa Abloy, Geze, Hormann, Becker FS
(xv)	S.S. Hardware, Door & Window Fittings, Hinges	Dorma, Godrej, Hafele, Dorset, Becker FS, Kich
(xvi)	Brass Hardware	Magnum (Mukund Overseas), Artistick's (Artistic Art Forum), EPPW, Décor, Palladium
(xvii)	Friction Stay Hinges/Soft closing spring hinges/SS kitchen basket/ Telescopic drawer channel	Hettich, Kich, Hafele
(xviii)	Floor Spring / Door Closer	Godrej, Dorma, Hafele, GEZE, Assa Abloy, Dorset, Becker FS, Kich
(xxiv)	Storage - Compactors, Metal Almirah etc.	Godrej, Compress, HNI, Integrity
(xxv)	Aluminium/U-PVC Doors & Windows Hardware	Rotto, Mccoy 8M, Oben
11.0	Finishing Works	
(i)	Polymer added Ready mix plaster	Ardex Endura, Ferrouscrete, MYK arment, Pidilite, FOSROC, Sika, UltraTech
(ii)	Gypsum Plaster	Saint Gobain (Elite 90), Ardex Endura, Pidilite, FOSROC, Ferrouscrete
(iii)	Polymer modified self-curing Mortar	Saint Gobain (Elite 90), Ardex Endura, Pidilite, FOSROC, Ferrouscrete, Berger
(iv)	Cement Primer	Nerolac, Berger, Berger, Asian paints, Dulux, Acro paints,
(v)	Cement Based & Acrylic Wall putty	Birla, JK White, Asian paints, Ferrouscrete, Acro Paints, Weber (Saint Gobain),
(vi)	Oil Bound Washable Distemper	Asian paints, Nerolac, Berger, Dulux ICI,
(vii)	Dry Distemper	Asian paints (Professional Acrylic Distemper), Nerolac: (Beauty Acrylic Distemper), Berger (Bison

		Acrylic Distemper), Dulux ICI (Maxilite)
(viii)	Acrylic Distemper (washable/ Real mix/ Low VOC)	Asian paints (Tractor Aqua Lock Paint), Berger (Commando) Acro Paints (Aqualin AWD) or equivalent paints of Nerolac or ICI-Dulux,
(ix)	Acrylic Emulsion Paints	Asian paints (Professional Premium Interior Emulsion Paint), Nerolac (Beauty Gold), Berger (Rangoli total care), ICI-Dulux (Super Cover),
(x)	Texture Finish	Asian paints, Bakelite & Hylam, Spectrum, Heritage, Birla Opus, Berger
	Exposed Concrete Texture Finish	Ultratech Texture Paints, Armourcoat, Oikos, Heritage, Spectrum, Berger
(xi)	Steel Primer (Red Oxide Zinc Chromate Primer)	Asian paints, Nerolac, Berger, ICI-Dulux
(xii)	Synthetic Enamel Paint	Asian (Apolite Premium gloss enamel), Nerolac (Synthetic Hi gloss), Berger (Luxol Hi gloss), ICI-Dulux (Gloss Synthetic Enamel),
(xiii)	Paint- Texture Concept Paints (Interior)	Asian paints, Birla Opus, Berger,
(xiv)	Paint- Anti carbonation paint	Fosroc, Pidilite, BASF, Asian pants, Sika, Berger
(xv)	Wood Primer	Asian paints, Berger, ICI-Dulux, Nerolac.
(xvi)	Melamine Polish for wood work	Asian Paints Melamine Gold, Wudfin of Pidilite, Timbertone of ICI-Dulux, MRF
(xvii)	PU Polish for wood work	ICA, MRF, Asian, Berger
(xviii)	Epoxy Paint	Asian, Nerolac, Berger, ICI, Akzo Nobel, Weber (Saint Gobain)
(xix)	Fire Resistant Paint	Asian paints, Akzo Nobel, Viper
(xx)	Thermoplastic Paint	Asian, Nerolac, Shalimar, Berger, Dulux
(xxi)	Wood Adhesive	Fevicol, Araldite, kerakol, Astral, 3M
(xxii)	POP	Ferrouscrete, Birla, JK White
12.0	Water Supply & Sanitary Works	
(i)	Stainless Steel pipe and fitting of grade 316L as per EN-10312 standard for water supply line & Fittings	SAIL (Salem Steel), Jindal, J-Press, Viega, Alfa press, Aquinox india
(ii)	G.I. Pipe	Tata Steel, Jindal Pipes, Surya Roshni, APL Apollo Tubes
(iii)	GI Pipe Fittings	Unik, Zoloto, Surya, Jinda Pipes, Tata Steel
(iv)	U-PVC pipe and Fittings	Supreme, Finolex, Astral, Prince, AKG, Ashirvad, Birla HIL

(v)	C-PVC pipe and Fittings	Supreme, Finolex, Astral, Prince, AKG, Ashirvad, Birla HIL
(vi)	M.S. Black Pipes	Tata, Jindal, SAIL, APL Apollo, Surya
(vii)	CP Fittings (Premium range)	Kohler, Jaquar, Grohe, Kerovit, Roca
(viii)	Sanitary ware / Fixtures / Fittings (Premium range)	Kohler, Grohe, Kerovit, Hindware, Jaquar, Parryware, Cera
(ix)	Urinal Frosted Glass partition	Greenlam, Jaquar, Merino, Fundermax, Cera,
(x)	Sensor Operated Urinal	Jaquar, Hindware, Roca, Kohlar, Cera, Kerovit, Euronics
(xi)	Glass Mirror	Saint Gobain, Modi Guard, Atul, Cera
(xii)	Specially abled Fitting	Pressalit, Hindustan, Cardin, Euronics
(xiii)	Gun Metal Valves/Sluice Valves/ Air Release Valves	Zoloto, Audco (L&T), Castle, Leader Valves, SKS
(xiv)	Sluice Valve / Pressure Reducing valve / Non-Return valve / check valve / Butter fly valve / ball valve	Zoloto, Kirloskar, Leader Valves, Zoloto, SKS, Castle, Audco (L&T)
(xv)	Insulation for external / exposed hot water pipes	KAIFLEX, ARMAFLEX, CAREFLEX
(xvi)	Pipe protection for external water supply pipes	PYPKOTE, ARMAFLEX, AKPOLYKOTE
(xvii)	Water Meter	Prima, Kranti, Leader, Zoloto, Dashmesh
(xix)	Brass stop & Bib Cock	Zoloto, Sant, L&K, Leader,
(xx)	Brass Ferrules	Dhawan Sanitary Udyog (PRIMA), Annapurna, Kalsi
(xxi)	PVC water storage tank	Syntex, Amitex, SPL
13.0	Drainage	
(i)	Soil Waste / Vent Pipes and Fittings:	
	a) Hubless Centrifugally Cast Spun Iron Pipe and fittings	NECO, SKF, Hepco, Saint Gobain, RPMF
	b) Centrifugally (Spun) CI Pipes Class 'LA'	Kesoram, Electro Steel Castings Ltd., NECO, RPMF
(ii)	C.I. Manhole covers, frames & GI Gratings	NECO, BIC, RIF, SKF, Hepco, Kapilansh,
(iii)	Unplasticized Non-Pressure Polyvinyl Chloride (PVC-U) Pipes underground conforming to IS: 15328-2003 & Fittings	Supreme, Finolex, Astral, Prince, AKG, Ashirvad
(iv)	Low noise system rain water pipes and fittings made of mineral reinforced Poly Propylene	Supreme, Finolex, Astral, Prince, AKG, Ashirvad

(v)	Drainage AC/HDPE Pipes	Jain Pipes, Oriplast, Reliance, MAZZA AC Pipes, Supreme
(vi)	DI Pipes & Fittings	Supreme, Electrosteel, Jindal, TATA DUCTURA, Kesoram
(vii)	SFRC Manhole covers & gratings	KK, JAIN, PARGATI
(viii)	FRP Manhole covers, Drain Covers & gratings	Dudhi, Neco, HP, Indogyp
14.0	Stainless Steel & Glass Works	
(i)	Modular SS-304/316 Grade / Glass Railing with SS-304/316 grade Hardware	Dorma, Jindal, GEZE, Hafela, Kich, Konzept
(ii)	Stainless Steel Sink (Out of Salem steel)	Neelkanth, Niralli, Jayna, Hindware
(iii)	Toughened/Float Glass	Saint Gobain, AIS Glass, Modi Guard, Gold Plus
(iv)	High Performance Glass	Saint Gobain, AIS Glass, Modi Guard, Gold Plus
(v)	Lacquered Glass	Saint Gobain Glass, AIS Glass, Art N Glass, Guardian
(vi)	Glass Processor for making DGU/Toughening	Art N Glass, Shankar Tuff, Sheeshmahal, Shivshakti, GSC, Kaimapnat Glass, SK Tuff, AIS Glass
(vii)	Frosted film	LG, 3M, Garware, Dupont, Saint Gobin
15.0	Miscellaneous	
(i)	Terracotta Cladding Tiles	Nuvocotto, Terracon, Kajaria, Johnson, Hunter Douglas, Moeding, Anakon, Terreal
(ii)	SS Dry Cladding Anchor with SS Clamp	Hilti, Fisher, Bosch, Wuerth
(iii)	Solid Acrylic Surface Boards	Dupont, LG Himacs, Neonnex, Hanex, GMGR India
(iv)	Modular Expansion / Seismic Joint System	Herculus, Sanfield, Vexcolt, MigUA, Katanaflex, Inprocorp, Bizzar
(v)	Solid Surface (Corian)	Dupont, Neonnax, LG, Samsung
(vi)	Window Blinds	Vista, Deck, Huntar Douglas, MAC, TRAC
(vii)	Fire Sealant	Hilti, 3M India, Wuerth, Fischer
(viii)	Modular Rainwater Harvesting system	Retas Enviro Solutions Pvt Ltd, Bantair Pvt Ltd, Adwyn Impex Pvt Ltd, Life green system Ltd
(ix)	Factory made WPC jali	Archidply, Century, Greenlam, Floresta, Alstone
(x)	Wall Paper	D'décor, Lifencolours, India Circus, Ego, Vescom, Nilaya by Asian Paints, Muraspec, Marshalls
(xii)	Wall Guard/Column Guard/Corner guard	Wallpro, C/S Group, SPM International
(xiii)	Expansion filler board	Supreme, Insuboard, Supreme, Shalimar, Owens

		corning, Technonicol
(xiv)	Concrete / HDPE/Grass grid pavers	Ovilite Industries, Eco Vision Industries, Dalal, Unistone, NTPC Limited
(xvi)	Expansion Joint filler / Joint covers	Vexcolt International Ltd, Construction Specialities, Sainfield, Hercules, MIGUA, Mapei, Balco India, Z-tech, Inprocorp, Moldo Sports
(xvii)	Poly-sulphide Sealant for Joints joint width up to 25 mm	Pidilite, Sika, Dow Corning, Wacker, Ferrouscrete
(xviii)	Window Roller/Zebra Blind/Curtains	Aerolux, Hunter Douglas, Deck, D'décor
(xix)	Footpath Tiles & Paver	NTPC Limited, Dalal, KK, Unistone
(xx)	Precast GRC / Sand Stone Jali (Screen)	Unistone, Dalal, Birla GRC, Sanderson
(xx)	Signages	247 Sign (Ergomax), Klikin (Ins & Out), Cosign India

Note:- All products approved by the Chief Engineer-cum-Executive Director, Gurugram, as on the date of publication of the tender, shall also be deemed included for preferred make list.

PART - D
ADDITIONAL CONDITIONS AND
MINIMUM REQUIREMENTS & SPECIFICATIONS
FOR E&M WORKS (MINOR COMPONENT)

D1. ADDITIONAL CONDITIONS FOR E&M WORKS

1. CPWD General Specifications for Electrical Works (Part I for Internal) - 2023, (Part II for External) - 2023, (Part III for Lift & Escalators) - 2003, (Part IV for Sub Station) - 2013, (Part V for Wet Riser & Sprinkler System) - 2020, (Part VI for Fire Detection & Alarm System) - 2018, (Part VII for DG Sets) - 2013, (Part VIII for Gas Based Fire Extinguishing System) - 2013 and CPWD General Specifications for HVAC Works – 2017 or latest version of above specifications as issued / amended up to date (hereinafter to be collectively referred to as 'CPWD Specifications') and should also comply with relevant provisions of the Indian Electricity Rules and Acts as applicable. Wherever CPWD Specifications are silent, the latest BIS Codes/Specifications, National Building Code or any other specification shall be followed.
2. The order of preference in case of any discrepancy as indicated in condition No. 8.1 under "Conditions of Contract" given in standard CPWD Contract form may be read as the following:
 - i) Description of Schedule of Quantities for E&M Works
 - ii) Additional & special Conditions for E&M Works
 - iii) Standard General Conditions of Contract
 - iv) Drawings.
 - v) CPWD Specifications with up-to-date Correction slips
 - vi) BIS Specifications/Provisions
 - vii) National Building Code
 - viii) National electrical code of India
 - ix) Manufacturers specifications.
 - x) Sound Engineering practices or well-established local construction practices as decided by the Engineer-in-charge.
3. A reference made to any Indian Standard Specifications in these documents, shall imply reference to the latest version of that standard, including such revisions/amendments as issued by the Bureau of Indian Standards up to last date of receipt of tenders. The contractor shall keep at his own cost all such publications of relevant Indian Standards applicable to the work at site.
4. The main contractor shall engage appropriate OEM of approved make for specialized works of electrical work. The main contractor shall not indulge in procurement of electrical items and getting the work done on labour contract with the OEM/electrical contractor. The whole electrical component shall be executed by the eligible electrical contractor/ OEM on a turnkey basis i.e. procurement of material & engaging labour. The associate electrical contractor shall submit the completion certificate of electrical work executed by him along with necessary test reports, completion plan etc.
5. The contractor shall take all safety precautions to avoid accidents by exhibiting caution boards, red flags, red lights and by providing necessary barriers and all other measures required from time to time. The contractor shall be responsible for all damages and accidents due to negligence on his part.
6. The contractor shall give due notices to Municipality, Police and/or other authorities that may be required under the law/rules under force and obtain all requisite permissions/licenses for temporary obstructions/enclosures and pay all charges which may be livable on account of his

execution of the work under the agreement. Nothing extra shall be payable on this account.

7. The contractor shall leave such recesses, holes, openings, etc., as may be required for the electric, air-conditioning and other related works. (For this purpose, any required inserts, sleeves, brackets, conduits, base plates, insert plates, clamps etc. shall be arranged by the contractor and fix the same at the time of casting of concrete, stone work & brick work, if required, and nothing extra shall be payable on this account.
8. The contractor shall give a trial run of the equipment and machinery for establishing its capability to achieve the specifications within laid down tolerances to the satisfaction of the Engineer-in-charge before commencement of work.
9. The work will be carried out in close coordination with the building work and other agencies. Conduits will be laid in the slab within the specified time and it will have to be ensured that the casting of slabs is not delayed for want of laying of conduits. The conduits will also be laid in walls before the Plaster work is undertaken so as to avoid breaking cutting of plaster while making chase for laying of conduits subsequently. The contractor will have to employ adequate labour for carrying out the work. No claim regarding the idle labour for any reason will be entertained by the Department.
10. No tools and plants including special T&P etc. shall be supplied by the department and the contractor will have to make his own arrangements at his expenses.
11. All tools, plant and machinery provided by the contractor shall, when brought at the site, be deemed to be exclusively intended for the construction and completion of this work and the contractor shall not remove the same or any part thereof (save for the purpose of moving it from one part of the site to another) without the consent of the Engineer-in-charge.
12. All materials shall be got checked & approved by the Engineer-in-charge on receipt of the same at site before use and rejected material is to be removed from the site immediately.
13. No foreign exchange shall be made available by the department for the purchase of equipment, plants, machinery, materials of any kind or any other items required to be carried out in execution of work.
14. The contractor shall carry out his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor (s) or by the Engineer-in-charge and shall as far as possible arrange his work and shall place and dispose of the materials being used or removed, so as not to interfere with the operations of other contractors, or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the entire satisfaction of Engineer-in-charge.
15. All items which are not covered while carrying out electrical work shall be removed and shall be cleared by the contractors as soon as the work is completed.
16. The contractor shall give the Engineer-in-charge in every fortnight, a progress report of the work done during the previous fortnight. The progress of work will be reviewed periodically by the Engineer-in-charge with the contractor and shortfalls, if any, sorted out. The contractor shall thereupon take such action as may be necessary to bring back his work to schedule without any additional cost to the department.
17. It shall be responsibility of the main contractor to sort out any dispute involved with the associated contractor without any time and cost overrun to the department. The main contractor shall be solely responsible for settling the dispute/litigation arising out of his agreement with the associate contractor. The contractor shall ensure that the work shall not suffer on this account.
18. The contractor shall quote his rates considering the specifications, terms & conditions and

particular specifications and special conditions etc. and nothing extra shall be payable whatsoever unless otherwise specified.

19. The main contractor shall be responsible for coordinating the activities of all works and essential progress of works as per milestone and laid down program.
20. The contractor shall be responsible for the watch and ward of the site/property/material provided by him and materials issued by the department against pilferage and breakage during the period of execution and thereafter till the work is completed and physically handed over to the department.
21. Samples of all materials, fittings and other materials/articles required for execution of the work shall be got approved from the Engineer-in-charge. Materials/articles manufactured by the firms of repute as indicated in tender documents and approved by the Engineer-in-charge shall only be used.
22. The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material or work beyond set out tolerance limits shall be summarily rejected by the Engineer-in-charge.
23. The contractor shall be required to make a sample flat for each type at the earliest opportunity using all approved materials for approval of Engineer in charge before mass scale finishing works are taken up.
24. Even ISI marked materials shall be subjected to quality test at the discretion of the Engineer-in-charge besides testing of other materials as per the specifications described for the item/material. Whenever ISI marked materials are brought to the site of work; the contractor shall, if required by the Engineer-in-charge, furnish manufacturers test certificates to establish that the materials procured by the contractor for incorporation in the work satisfy the provisions of IS codes relevant to the material and/or the work done.
25. The contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipment to execute the work.
26. The firm shall use only electrically operated chase cutting machine for cutting the chases in the wall for recessed conduit wiring.
27. The contractor will have to make his own arrangement for storage of materials. No storage space shall be provided by department.
28. The contractor will have to make his own arrangement for water and power supply for execution of works.
29. The contractor will have to ensure that the skilled labour i.e. wireman etc., Engaged in the execution of the work must possess valid electrical license, otherwise he will not be permitted to execute the work.
30. The associate contractors executing the electrical works must possess the valid electrical contractor license otherwise they will not be permitted to execute the electrical works.
31. The contractor shall be responsible for removal of all defects in the work during the guarantee/warranty period. The department shall carry out routine maintenance only. However, if any failure is noticed during this period which is attributable to poor quality of material and bad workmanship, the contractor will be required to rectify the same at his own cost, failure of which the department will be at liberty to get the defects rectified at the risk & cost of the contractor. The contractor will also be required to carry out his own inspection/testing during the guarantee/warranty period and attend to any defect taking place during this period.
32. Priority to arrange the material shall be decided by the department. However, material required for

the work shall be brought at site only at the appropriate time keeping in view the progress of building works as well as Electrical & Mechanical works. Decision of Engineer-in -charge in this regard shall be final.

33. The contractor has to intimate his authorized representative, who will be receiving instructions in his absence. The contractor /his authorized representative is bound to sign the site order book as and when required by the Engineer-in-charge and to comply with the instructions therein.
34. Suitable back plates providing for fixing the wall brackets and ceiling flush fittings shall be supplied by the contractor free of cost.
35. It shall be responsibility of contractor to provide polythene/PVC plastic cover for all SDBs/meter boards/feeder pillars/panels etc. so as to protect them from wear & tear/damage during execution stage. Contractor shall provide the covers for the materials if any being supplied departmentally also. Nothing extra shall be paid on this account.
36. Contractor is fully responsible for any kind of damage to the LT/HT cable during execution of work.
37. A suitable brass/tinned copper neutral link shall be fixed at suitable place in the Metallic outlet boxes of all sizes to terminate neutral wire properly. Nothing extra shall be paid on this account.
38. Colour coding shall have to be adopted in the wiring system as per specification.
39. Suitable crimping tools shall be used for crimping the lugs/thimbles/ferrules. Nothing extra shall be paid on this account. The lugs/thimbles/ferrules pressed by conventional/ordinary pliers shall not be accepted.
40. A suitable brass/tinned copper neutral link shall be fixed at suitable place in the Metallic outlet boxes of all sizes to terminate neutral wire properly. Nothing extra shall be paid on this account.
41. An earth termination with earth stud of brass/tinned copper i/c 2 No. metallic washers or suitable earth bar of Brass/tinned copper with tinned copper thimbles/ferrules/lugs should be suitably fixed at suitable place in the Metallic outlet box for termination of protective earth conductor. Nothing extra shall be paid on this account.
42. In the outlet boxes, phase from one switch to other switch shall be looped with suitable size of solid copper conductor. Nothing extra shall be paid on this account. Stranded conductor shall not be accepted.
43. Only required number of knockouts should be removed from Metallic outlet boxes for entry of conduits. If more than required number of knockouts are removed, the Metallic outlet box shall not be accepted.
44. Separate G.I. boxes shall be used for staircase light switches and bell push. Nothing extra shall be paid on this account.
45. Metal sheath of Co-axial T.V. cable shall be terminated using 'U' shape thimble/lugs/ferrules. Nothing extra shall be paid on this account.
46. To facilitate drawing of wires 16/18 SWG GI fish wire be provided along with laying of recessed conduit. Nothing extra shall be paid on this account.
47. Cable connection to switch gear is deemed to be included in the item of end termination. No extra payment shall be made for that.
48. The contractor is advised to visit the site of work to have an idea of the execution of the work; failure to do so shall not absolve their responsibility to do the work as specified in agreement.
49. All DB's shall have MCB/MCCB in incomer along with RCCB's in all outgoing phases.

50. **Rates:**

50.1. The work shall be treated as on works contract basis and the rates tendered shall be for complete items of work (except the materials, if any, stipulated for supply by the department) inclusive of all taxes (including works contract tax, if any), duties, and levies etc. and all charges for items contingent to the work, such as packing, forwarding, insurance, freight and delivery at site for the materials to be supplied by the contractor, watch and ward of all materials (including those supplied by the department, if any) for the work at site etc.

50.2. Prices quoted shall be firm.

51. **Taxes and Duties:**

51.1. Rates are inclusive of GST and all other Taxes, duties, levies and royalties and nothing extra shall be payable to the contractor on account of this.

51.2. The GST shall be deducted from the bills of the contractor as applicable in at the time of payments.

52. **Completeness of Tender:**

All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.

53. **Works to be done by the contractor:**

Unless and otherwise mentioned in the tender documents, the following works shall be done by the contractor, and therefore their cost shall be deemed to be included in their tendered cost:-

- (i) Foundations for equipment and components where required, including foundations bolts.
- (ii) Cutting and making good all damages caused during installation and restoring the same to their original finish.
- (iii) Sealing of all floor openings provided by him for pipes and cables, from fire safety point of view, after laying of the same.
- (iv) Painting at site of all exposed metal surfaces of the installation other than pre-painted items like fittings, fans, switchgear/distribution gear items, cubical switchboard etc. Damages to finished surfaces of these items while handling and erection, shall however be rectified to the satisfaction of the Engineer-in-Charge.
- (v) Testing and commissioning of completed installation.
- (vi) Storage space for all equipment, components and materials for the work

54. **Storage and Custody of Materials:**

The contractor has to make his own arrangement for the storage of the material at site & necessary watch and ward of the electrical installation during the execution of work till the same is handed over to the department. No extra payment will be made on this account. The storage space shall however be arranged by the department at site, if available.

The main contractor shall arrange for proper storage of the electrical fans and fittings at site and that double lock system shall be arranged for the fans and fittings after receipt at site until the time they are taken for installation. The contractor shall however be responsible for proper storage and safe custody of the same till their installation and handing over to the department.

55. **Electric Power Supply and Water Supply:**

Power and water supply will be arranged by the contractor at the site for installation purpose.

However, for final testing purpose after complete installation of the electrical items, electricity supply will be made available free of cost to the contractor. Contractor will take due care to ensure safety of electrical installation during execution of work.

56. Tools for handling and Erecting:

All tools and tackles required for handling of equipment and materials at site of work as well as for their assembly and erection and also necessary test instruments shall be the responsibility of the contractor.

57. Payment Terms:

Payment shall be made as per the relevant clauses of form PWD 7/8 forming part of the tender documents.

58. Co-ordination with other agencies:

The contractor shall co-ordinate with all other agencies involved in the building work so that the building work is not hampered due to delay in his work. Recessed conduit and other works, which directly affect the progress of building work, should be given priority.

59. Care of buildings:

Care shall be taken by the contractor to avoid damage to the building during execution of his part of the work. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove, at his costs, all unwanted and waste materials arising out of his work, from the site.

60. Structural Alterations to Buildings:

- (i) No structural member in the building shall be damaged/altered, without prior approval from the competent authority through the Engineer-in-charge.
- (ii) Structural provisions like openings, cutouts, if any, provided by the department for the work, shall be used. Where these required modifications, or fresh provisions are required to be made, such contingent works shall be carried out by the contractor at his cost.
- (iii) All such openings in floors provided by the department shall be closed by the contractor after installing the cables/conduits/rising mains etc. as the case may be, by any suitable means as approved by the Engineer-in-charge without any extra payment.
- (iv) All chases required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

61. Addition to an installation:

Any addition, temporary or permanent, to the existing/ Proposed electrical installation shall not be made without a properly worked out scheme/design by a qualified Electrical Engineer to ensure that such addition does not lead to overloading, safety violation of the existing/ Proposed system.

62. Work in occupied buildings:

- (i) When work is executed in occupied buildings, there would be minimum of inconvenience to the occupants. The work shall be programmed in consultation with the Engineer-in-charge and the occupying department. If so required, the work may have to be done even before and after the office hours.
- (ii) The contractor shall be responsible to abide by the regulations or restrictions set in regard to entry into, and movement within the premises.
- (iii) The contractor shall not tamper with any of the existing installations including their switching operations or connections there to without specific approval from the Engineer-in-charge.

63. Drawings:

- (i) The work shall be carried out in accordance with the drawings and the tender documents and also in accordance with modification thereto from time to time as approved by the Engineer-in-charge.
- (ii) All wiring diagrams shall be deemed to be 'Drawings' within the meaning of the term as used in Clause 11 of the conditions of contract (PWD 7 or PWD 8). They shall indicate the main switch board, the distribution boards (with circuit numbers controlled by them), the runs of various mains and sub mains and the position of all points with their controls.
- (iii) After award of the work, the firm will be required to submit the drawings for the proposed work including layout plan, conduit routes showing location of points and height etc. Work will be carried out as per the approved drawings before start of work.
- (iv) After approval of drawings, agency shall submit 04 copies of drawings to Engineer-in-charge.
- (v) As built drawings shall also be submitted by agency in 04 sets.

64. List of Specialized works: -

- (i) SITC of smart energy meter. (Minimum turn over of OEM 100 cr)
- (ii) SITC of Solar Power Generation. (Minimum turn over of OEM 500 cr)
- (iii) SITC of EV - Charger. (Minimum turn over of OEM 500 cr)
- (iv) SITC of Gas suppression system for panels. (Minimum turn over of OEM 30 cr)

64.1. Specialized work shall be executed by specialized agency. Specialized agency shall be approve as per terms and conditions of CPWD specifications/ manuals etc and as per approval of Engineer-in-charge of component.

65. Conformity to IE Act, IE Rules, and standards:

65.1. All electrical works shall be carried out in accordance with the provisions of Indian Electricity Act, 1910 and Indian Electricity Rules, 1956 amended up to date (Date of call of tender unless specified otherwise). List of rules of particular importance to electrical installations under these General Specifications is given in Appendix C for reference.

66. General requirements of components:

66.1. Quality of material: All materials and equipment supplied by the contractor shall be new. They shall be of such design, size and materials as to satisfactorily function under the rated conditions of operation and to withstand the environmental conditions at site.

67. Inspection of materials and equipment:

67.1. Materials and equipment to be used in the work shall be inspected by the departmental officers. Such inspection will be of following categories:

- (i) Inspection of materials / equipment to be witnessed at the Manufacturer's premises in accordance with relevant BIS /Agreement Inspection Procedure.
- (ii) To receive materials at site with Manufacturer's Test Certificate(s)
- (iii) To inspect materials at the authorized dealer's go downs to ensure delivery of genuine materials at site.
- (iv) To receive materials after physical inspection at site.

67.2. Adequate care to ensure that only tested and genuine materials of proper quality are used in work shall be ensured by firm. The firm shall ensure that:

- (i) Material will be ordered & delivered at site only with the prior approval of the department to

ensure timely delivery.

- (ii) As and when the order is placed for the fittings/ fixtures, cables, switchgears, poles, rising main, other main items etc., its copy shall be endorsed to the CPWD Engineer-in-charge.
- (iii) The firm will be required to procure material like exhaust fans, MCB's & DB's, switches & sockets, wires & cables, conduits and switchgears etc directly from the manufacturer/ authorized dealers to ensure genuineness & quality and as per the approved makes only. Proof in this regard shall be submitted by the contractor before installation at site to the department.
- (iv) Inspection at factory or at godown of the manufacturer, as required, shall be arranged by the firm for a mutually agreed date. Certificate for genuineness of the fittings shall have to provided duly signed by the manufacturer's officer not below the rank of Regional Manager.
- (v) Delivery of material shall be taken up only with the consent of department, after clearance of the material.
- (vi) Department shall reserve the right to waive inspection in lieu of suitable test certificate, at its discretion.

67.3. Similarly, for fabricated equipment, the contractor will first submit dimensional detailed drawings for approval before fabrication is taken up in the factory. Suitable stage inspection at factory also will be made to ensure proper use of materials, workmanship and quality control.

68. Ratings of components:

- 68.1. All components in a wiring installation shall be of appropriate ratings of voltage, current and frequency, as required at the respective sections of the electrical installations in which they are used.
- 68.2. All conductors, switches and accessories shall be of such size as to be capable of carrying the maximum current, which will normally flow through them, without their respective ratings being exceeded.

69. Conformity to standards:

- 69.1. All components shall confirm to relevant Indian Standard Specifications wherever existing. Materials with ISI certification mark shall be preferred.
- 69.2. Relevant Indian Standards including amendments or revisions thereof up to the date of tender acceptance shall be applicable in the respective contracts for respective items, firm to ensure its compliance.

70. Inter-changeability:

Similar parts of all switches, lamp holders, distribution fuse boards, Switch gears, ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

71. Workmanship:

- 71.1. Good workmanship is an essential requirement to be complied with. The entire work of manufacture/fabrication, assembly and installation shall confirm to sound engineering practice.
- 71.2. Proper supervision/skilled workmen: The contractor shall be a licensed electrical contractor of appropriate class suitable for execution of the electrical work. He shall engage suitably skilled/licensed workmen of various categories for execution of work supervised by supervisors / Engineer of appropriate qualification and experience to ensure proper execution of work. They will carry out instruction of Engineer-in-charge and other senior officers of the Department during the progress of work.

- 71.3. Use of quality materials: Only quality materials of reputed make as specified in the tender will be used in work.
- 71.4. Fabrication in reputed workshop: Switch boards and LT panels shall be fabricated in a factory/workshop having modern facilities like quality fabrication, seven tank process, powder/epoxy paint plant, proper testing facilities, manned by qualified technical personnel. These shall be as per make / item approved.

72. **Testing:**

All testes prescribed in this General Specification, to be done before, during and after installation, shall be carried out, and the test results shall be submitted to the Engineer-in-charge in prescribed Performa, forming part of the Completion Certificate.

73. **Commissioning on completion:**

After the work is completed, it shall be ensured that the installation is tested and commissioned.

74. **Completion plan and completion certificate:**

- 74.1. For all works completion certificate after completion of work shall be submitted to the Engineer-in-charge.
- 74.2. Completion plan drawn to a suitable scale in A2 Sheet (It shall be laminated if desired by the Site-in-Charge) indicating the following, and three copies of the same shall also be submitted.
- (i) General layout of the building.
 - (ii) Locations of main switchboard and distribution boards, indicating the circuit numbers controlled by them.
 - (iii) Position of all points and their controls.
 - (iv) Types of fittings, viz. fluorescent, pendants, brackets, bulk head, fans, exhaust fans etc.
 - (v) Name of work, job number, tender reference, actual date of completion, names of Division/ Sub-division and name of the firm who executed the work with their signature.
 - (vi) Cable layout showing general distribution diagram along with position of cable joints, if any.

75. **Guarantees**

The installation will be handed over to the department after necessary testing and commissioning. The installation will be guaranteed against any defective design/workmanship. Similarly, the materials supplied by the contractor will be guaranteed against any manufacturing defect, inferior quality. The guarantee period will be for a period of 5 years for all LED fittings and 36 months for other equipments counted from the date of completion of work. Contractor has to submit warantee certificate from manufacturer/OEM. Installation/ equipment or components thereof shall be rectified/ repaired to the satisfaction of the Engineer-in-charge. The firm will be required to submit guarantee of material from the manufacturer to the department.

76. **INDEMNITY :**

The successful tenderer shall at all times indemnify the department, consequent on this works contract. The successful tenderer shall be liable, in accordance with the Indian Law and Regulations for any accident occurring due to any cause and the department shall not be responsible for any accident or damage incurred or claims arising there from during the period of erection, construction and putting into operation the equipment's and ancillary equipment's under the supervision of the successful tenderer in so far as the latter is responsible. The successful tenderer shall also provide all insurance including third party insurance as may be necessary to cover the risk. No extra payment would be made to the tenderer due to the above.

77. **Approval from CFO :**

The Contractor shall be required to obtain NOC from for net metering from concerned authority. However, all liasoning work / arranging inspection of concerned authority for net metering shall be the responsibility of contractor.

78. CPWD General Specification for Electrical Works shall be read as mentioned below (wherever mentioned in NIT documents)

Note: -(Part I for Internal) - 2023, (Part II for External) - 2023, (Part III for Lift & Escalators) - 2003, (Part IV for Sub Station) - 2013, (Part V for Wet Riser & Sprinkler System) - 2020, (Part VI for Fire Detection & Alarm System) - 2018, (Part VII for DG Sets) - 2013, (Part VIII for Gas Based Fire Extinguishing System) - 2013 and CPWD General Specifications for HVAC Works - 2017 or latest version of above specifications as issued / amended up to date.

79. Note: -In case of any ambiguity/ Scope of work/ Specification, superior shall be followed as per approval of engineer-in-charge.

D2. SCOPE & MINIMUM REQUIREMENT FOR E&M WORKS

1.0 SCOPE FOR E&M WORK:

1.1. Electrical & Mechanical Services of the Residential/non residential Building along with required Services are to be planned & executed as per the guidelines of latest NBC (With All Amendments up to Date of Submission of Tender), CPWD Specifications, IS Code, ASHRAE, NEC 2023 etc. amended up to date. Scope of work includes following services:

- (i) SITC of single-phase smart energy meters.
- (ii) SITC of EV charger.
- (iii) SITC of solar PV plant of total 100 KWp capacity.
- (iv) SITC of split AC.
- (v) SITC of Boom barrier.
- (vi) SITC of Electric geyser.
- (vii) SITC of UPS.
- (viii) SITC of Gas suppression system for panels

Note: Complete electrical SLD to be submitted by the vendor in the designing stage.

2.0 MINIMUM REQUIREMENT OF E&M SERVICES

- 2.1. Provision of minimum 100 KWp. Grid interactive solar PV generation system with the online recording and management system complete with software and required hardware including computer is in the scope of this work. Planning and design comprising of preparation of BOQ, distribution system for solar PV generation system, Preparation of SLD, submission of data sheet and catalogue of the various equipment in support of their design etc are also in the scope of this work. The system should be connected and synchronized with the existing power supply system.
- 2.2. Supply, Installation, Testing and Commissioning of single phase energy meter of total 198 nos including DLC, network switch, communication cable, AMR complete as required.
- 2.3. Supply, Installation, Testing and Commissioning of 10 nos 1.5 TR and 10 nos 2.0 TR split Ac.
- 2.4. Supply, Installation, Testing and Commissioning of 8 nos of 22 KW AC type - 2 charger and 12 nos 30 KW DC CCS-2 charger along with panel, cable, cable tray etc complete as required.

D3. SPECIFICATIONS FOR E&M WORKS

D3.1 GENERAL

- 1.1. Except for the items, for which Particular Specifications are given herein or where it is specifically mentioned otherwise in this bid document, the work shall generally be carried out in accordance with the CPWD Specifications. Wherever CPWD Specifications are silent, the latest BIS Codes/Specifications, National Building Code-2016, Manufacturers Specifications, Sound Engineering practices or well-established local construction practices as decided by the Engineer-in-charge shall be followed.
- 1.2. A reference made to any Indian Standard Specifications in the document, shall imply to the latest version of that standard, including such revisions / amendments as issued by the Bureau of Indian Standards up to last date of receipt of tenders. The Contractor shall keep at his own cost all such publications of relevant Indian Standard applicable to the work at site.
- 1.3. All hardware items such as screws, thimbles, connectors, earth/neutral terminals, wires etc. which are essentially required for completing any item as per specifications will be deemed to have been included in the item even when the same have not been specifically mentioned.
- 1.4. All hardware material such as nuts/bolts/screws/washers etc. to be used in the work shall be zinc/cadmium plated iron. The galvanized boxes of modular switch/sockets etc. shall be of the same make as of switch/socket etc.
- 1.5. While laying conduit, suitable minimum number of junction boxes shall be left for pulling the wires. These shall be placed in such a way that the same do not remain noticeable.
- 1.6. Any conduit which is not be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently. Nothing extra shall be paid for the same.
- 1.7. Multi stranded FRLS PVC insulated copper conductor wires are to be used in the work. Termination of multi-stranded conductors shall be done using crimping type copper thimbles at both the ends. Nothing extra shall be paid for the same.
- 1.8. The contractor shall follow the shortest route for circuits, sub-main, point wiring etc.
- 1.9. The connections of switches, sensors, earthing conductors & interconnections cables shall be made by adequate rating thimbles of approved standard makes only and nothing extra on this account shall be paid.
- 1.10. Check nuts shall be provided while terminating the M.S. conduits in switch board boxes for which nothing extra shall be paid.
- 1.11. All distribution boards shall be marked with circuits controlling the rooms/area/SDB controlled
- 1.12. Material to be used in the work shall be ISI marked. The makes of materials have been indicated in the list of acceptable makes. No other make will be acceptable. The material to be used in the work shall be got approved from the Engineer-in-charge before its use at site. The Engineer-in-charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not as per specifications
- 1.13. While deciding the size of switch boxes for light points/fan point, exhaust fan point items, extra two modules will be provided for each fan point for fixing of regulator(s) (fan regulator is to be provided under different item). Wherever extra modules are available, the same shall be provided with blanking plates without any extra cost.
- 1.14. Modular type switches/sockets/telephone outlets/TV sockets are to be provided wherever indicated

in the items. The same shall be of only one make. The modular plates of switches, sockets, telephone & TV sockets etc. shall be in two parts i.e. plates with frames with in quoted rates.

- 1.15. The building shall be provided with false ceiling in various areas. In order to avoid maintenance problem, the contractor will not provide any ceiling rose/connector/looping box etc. above the false ceiling. The point wiring in that case will be extended up to the fitting/fan etc. directly without provisions of any termination arrangement in between. The wire from the end point up to the fixture shall be considered to be included in the point wiring. Nothing extra shall be paid for the same.
- 1.16. Wherever it is not possible to provide rigid conduits, flexible conduit pipe shall be provided for drawing/running the wires. However, such arrangement has to be kept to the barest minimum and only with the prior approval of Engineer-in-charge.
- 1.17. Earthing and all hidden items of work shall be carried out in the presence of the Engineer-in-charge or his authorized representative.
- 1.18. The fan box cover shall be made from 3mm thick phenolic laminated sheet as per CPWD specification.
- 1.19. The contractor shall provide only metallic junction boxes/looping boxes with cover of required sizes even in PVC conduit and such boxes shall be measured as a part of conduit/wiring without any extra payment.
- 1.20. The metallic junction boxes & looping boxes shall be covered with approved makes of phenolic laminated sheet. For telephone, television & fire alarm system shall be provided at all the floors within scope of work without any extra cost as per requirement & layout approved by Engineer-in-charge.
- 1.21. The firm has to go through the site order book kept with the Junior Engineer (E) regularly and has to sign the same and carryout the instructions recorded therein by various officers of the department.
- 1.22. The quantities of various items may vary from the quantities given in schedule of work. The agency shall bring the various items & materials as per actual requirement at site at the time of execution of work. Excess quantities shall not be accepted & paid by the department.
- 1.23. The ceiling roses wherever required to be provided are included in the scope of work without extra payment and the same shall also be of modular type & of the same make as that of switches & sockets along with earthing provision.
- 1.24. The MCB should be of same make as that of MCB DBs.
- 1.25. The MCB distribution boards shall be factory fabricated in the works of the manufacturer of the MCB's of any of the makes specified and the same shall be duly pre-wired in the works. The board shall be brought to site in ready for installation condition. The MCBs and the MCB distribution board shall be of the same make.
- 1.26. Microprocessor type MCCB should have centrally adjustable overload setting & short circuit setting as per OEM standards. All MCCB should be ICS=ICU.
- 1.27. Suitable crimping tools shall be used for crimping the lugs/thimbles/ferrules. Nothing extra shall be paid on this account. The lugs/thimbles/ferrules pressed by conventional/ordinary pliers shall not be accepted.
- 1.28. All the equipments shall be delivered with (i) Manufacturer's test certificate, (ii) Manufacturer's technical catalogues and Installation / Instruction (O&M) manuals.
- 1.29. The work shall be carried out according to approved drawing/details which shall be subsequently issued to the successfully qualified bided bidder for execution, in stages as per instruction of the Engineer-in-Charge who will have the right to change the layout as per requirement at site and the

contractor shall not have any claim due to change in layout.

- 1.30. The bad workmanship will not be accepted and defects shall be rectified at contractor's cost to the satisfaction of the Engineer-in-Charge. The program of electrical works is to be coordinated in accordance with the building work.
- 1.31. The contractor or his engineer is bound to sign the site order book as and when required by the Engineer-in-Charge and to comply with the remarks therein.
- 1.32. The contractor has to make his own arrangements for stores and watch & ward. No extra claim for this will be entertained.
- 1.33. The contractor shall make his own arrangements for electrical power supply for the construction activities. No extra payments for the same will be made.
- 1.34. The wiring and conduit route shall be marked by the contractor in the drawing first, and shall be got approved from the Engineer-in-charge.
- 1.35. The connection inter connection, earthing and inter earthing shall be done by the contractor wherever required and nothing extra shall be paid on this account.
- 1.36. All the sub main and circuits wiring includes loose wire for connections inside switch boxes and MCB DBs. No payment for these loose wires shall be made.
- 1.37. All PVC/ MS conduits accessories shall be of the same make as conduits and shall be ISI marked. The conduits shall be terminated as switch boxes/metallic junction boxes with suitable glands/check nuts.
- 1.38. Site Location: **Faridabad**. Outdoor Design Conditions: Outdoor Design Conditions for Faridabad based on Weather data compiled.

D3.2 INTERNAL ELECTRICAL INSTALLATIONS

1.0 SCOPE OF WORK

- 1.1. The scope of work covers planning, designing, preparation of drawings, obtaining approvals from the Department, supply, installation, testing and commissioning of complete Internal and External Electrical Works which includes Point wiring/circuit wiring with 1.5 Sq.mm, circuit wiring with 2.5 Sq.mm modular switch, sockets (Light and power sockets) & UPS point with 4.0 Sq.mm, Geyser/AC point wiring with 6.0 Sq.mm FRLS PVC insulated copper conductor single core cable in Medium class PVC conduit, type tested Pre wired DBs as per IEC-61439, LT switchgear, Rising Mains, tap off boxes, raceways, cable trays, earthing, lightening arrestor, cable TV wiring, streetlight, compound light and landscape lights, associated Electrical Panel for Distribution of power, Pumps for water supply, etc. as required. If any item required to make the building/scheme habitable, is not specifically mentioned in the scope of services, the same is deemed to be included within the scope of this tender and nothing extra shall be paid on this account.

2.0 GENERAL

- 2.1. The work will be carried out in recessed ISI marked Medium class PVC conduit wiring system with ISI marked FRLS copper cables in accordance of CPWD General Specifications for Electrical Works Part-I (Internal)-2013 and Part-II (External)-1994 and "CPWD Manual on Accessible Built Environment" available on CPWD website, "Harmonised Guidelines and Space Standards for Barrier Free Built Environment for Persons with Disability and Elderly Persons" issued by Ministry of Urban Development, Govt. Of India corrected up to the last date of submission of tenders and the governing specifications, which are mandatory including makes for some of the important materials to be used in the work. In case of ambiguity between the two, the governing specifications shall prevail. All the accessories of Medium class PVC conduit should also be ISI marked.
- 2.2. FRLS PVC insulated Copper conductor wires in Medium class PVC conduits will be used for points, circuit & sub- main wiring.
- 2.3. The contractor shall execute the work after obtaining necessary approval of the layout for internal electrification of various rooms, houses, common areas and staircases from Engineer-in-charge. The staircase lighting shall be in group control system.
- 2.4. Anti-Bacterial Modular type switches, sockets and stepped type electronic fan regulators, bell push, blanking plate along with matching mounting boxes of same make shall be used.
- 2.5. Only antibacterial cover plates are to be used for switches, sockets, LAN outlets etc. in the Hospital Building and Glass finish Switch/Sockets are to be used.
- 2.6. All mounting boxes for plate type accessories shall be of the same make as that of the plate type switches and accessories.
- 2.7. The wires used for the point wiring and power wiring shall be of 650/ 1100 Volts grade FRLS PVC insulated multi stranded copper conductor single core cables.
- 2.8. *All works will be carried out as per provisions in CPWD Specifications, NBC 2016 (with all amendments up to date of submission of tender), NEC 2023, GRIHA & GREEN BUILDING RATING Rules ,ECBC Guidelines. IS Codes etc. as amended up to the date of tender. If there is any discrepancy between them then the stringent provisions among them will be followed & the firm has to execute the same without any extra cost. Common language used in NBC 2016 (With All Amendments up to Date of Submission of Tender) for mandatory provisions is by use of word "recommended". Therefore, if in NBC whenever recommended word is used, it is to be treated as a mandatory provision. In case for any part of the work specification is not available in the*

aforesaid mentioned documents then part of the work will be carried out in accordance with sound engineering practice and as per directions of Engineer-in-charge.

- 2.9. Lighting Design should be carried out as per National Lighting Code 2010/NBC/ECBC guidelines. Wherever range of illumination for space is mentioned, higher side of Lux level must be taken for design purpose.
- 2.10. LED mirror light to be provided above each wash basin.
- 2.11. Arrangement of luminaries in various areas of buildings shall be done on the basis of National Lighting code 2010 and NBC 2016 (with all amendments up to date of submission of tender).
- 2.12. Required illumination level for general lighting shall be achieved on the basis of required lux level in various areas, light power density as per CPWD specification. The dialux report in this regard should be submitted from OEM of Light Fittings.
- 2.13. Ceiling fans will also be provided everywhere except stairs/toilets / Bath rooms irrespective of provision of air conditioners. Only BLDC type ceiling fans of size 1400/1200 mm with ISI marked / 5 Star rated with electronic regulator shall be used. Optimum size and number of ceiling fans for rooms of different size shall be as per provision laid down in CPWD specifications for internal E.I. work – 2013 and NBC 2016. Minimum air delivery and service value shall be as per ECBC norms.
- 2.14. ISI marked pedestal fans /wall fans shall be used only in areas where using ceiling fans is not possible. These fans will be highest star rated and with wide oscillation with manual and remote control as per availability in the market.
- 2.15. There shall be separate shafts for Electrical works, Firefighting works etc.
- 2.16. To facilitate drawing of wires, 18 SWG GI fish wire shall be provided along with laying of recessed conduit for which no extra payment shall be made. Conduits laid for other services, like Fire alarm system, PA, etc., where wiring is not done along with IEI work, fish wire shall be invariably drawn.
- 2.17. The connection between incoming switch/isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.
- 2.18. All hardware items such as screws, thimbles, GI wire etc. which are essentially required for completing an item as per specification will be deemed to be included in the item even when the same have not been specifically mentioned.
- 2.19. All hardware items such as nuts/bolts/screws/washers etc. to be used in work shall be zinc/cadmium plated iron.
- 2.20. **All Distribution Boards (DB) shall be 1.6mm sheet and prewired as per direction of Engineer -in-charge.**
- 2.21. The size of DBs at one location shall be same irrespective of number of circuits connected from the DBs. It shall be powder coated with dust/dirt repellent white colour (Powder coating thickness shall be minimum 40 to 70 micron on all the plane surfaces) after seven tank process.
- 2.22. The wiring and conduit route plan/drawings shall be submitted by the contractor and shall be got approved from the Engineer-in-charge.
- 2.23. To facilitate drawing of wires, 18 SWG GI fish wire shall be provided in recessed conduit. Conduits laid for other services, like fire alarm, PA system etc., where wiring is not done along IEI works, fish wire shall be invariably drawn.
- 2.24. The connection to incoming switch / isolator / bus bar / MCB / Switch shall be made with suitable size of thimble and cable.
- 2.25. Size of distribution board shall be as per number of light / power circuits. All distribution boards shall be double door type. MCB/MCCB of suitable rating shall be provided as main incomer in all DBs. Loose wire box shall be provided as per requirement.

- 2.26. In vertical DBs used for power distribution main incomer shall be minimum 35/36 kA rating breaking capacity.
- 2.27. Minimum Two rows of steel wire cable trays of size 30x50 mm and two rows of DLP trunking size 150mmx50 mm shall be installed in corridors of all floors of Hospital Block
- 2.28. In parking areas, staircase areas, corridors, big halls etc. no switch for individual light control is to be provided all such point shall be executed on looping basis and shall be group controlled by MCB/switch from DB. In these areas Light controls shall be provided in such a manner to switch ON/OFF general lighting as per requirement /bay or section wise.
- 2.29. All Cables in Parking area, Electrical Room, Panel room, Shafts shall be laid on cable trays and approx. 25% capacity of all such cable trays shall remain unused as future provision. Minimum width of cable try shall not be less than 150 mm
- 2.30. Such cable tray on Parking area, Electrical Room, Panel Rooms, area shall be hot dipped GI as per direction of E-in-C. Proper factory-made TEE, Bend, elbows, cross, joints and other accessories shall be used.
- 2.31. Cable trays above false ceiling on all other places shall be Perforated Hot Dipped Galvanised Iron (galvanization thickness i.e average mass of Zinc coating shall not be less than 65 microns for 2 mm thick & 50 microns for 1.6 mm thick as per IS standard) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc. as required. Suitable size as per site conditions shall be used with thickness 1.6 mm for cable trays with width ≤ 300 mm & thickness 2 mm for cable trays with width > 300mm.
- 2.32. GI Metal trunking (Race ways) for drawing LAN cables /power cables shall be done for all computer outlets. GI Metal trunking shall have separator in between power cable & LAN cables. and approx. 25% capacity of all such cable trays shall remain unused as future provision.
- 2.33. Floor trunking shall be made up of minimum 1.6 mm thick Pre-Galvanised / Hot dipped G.I sheet (minimum 275 GSM) including junction box of suitable size, Couplers, Jointing sleeves, floor fixing supports complete as required. Size of the same shall be as per requirement as per approval of engineer in charge.
- 2.34. Drinking water pumps: Drinking water pumps / submersible pumps to be provide with one standby after designing as per the requirement in the building/campus.
- 2.35. In parking areas, staircase areas, corridors, big halls etc. no switch for individual light control is to be provided all such point shall be executed on looping basis and shall be group controlled by MCB/switch from DB. In these areas Light controls shall be provided in such a manner to switch ON/OFF general lighting as per requirement /bay or section wise.
- 2.36. Heavy duty Metallic Exhaust fan with louvers as per the requirements of ventilation shall be provided in each individual toilet
- 2.37. Electrical Distribution Panels (For Incomers 400 A and above panel should be Type Tested as per IEC 61439, For Others Panels should be CPRI approved and of approved makes) shall be cubicle type with IP 42 protection class and fabricated from approved fabricator as per accepted list attached and shall be equipped with digital type measuring instruments like multi- function meter etc. as per drawing approved by Engineer-in-charge.
- 2.38. Each floor Panel shall be fabricated from 2 mm thick M.S. sheet powder coated with 7 tank process and shall be equipped with 4 pole MCCBs, MCBs, Bus bar, digital multifunction meter, LED indicating lamp extended rotary handle and all accessories as required.
- 2.39. MCCB, if used as incomer then it should have in-built earth fault protection and time delay.
- 2.40. Inside the lift shaft, Electrical & ELV Shafts and in all vertical shafts there shall be arrangement of one light point at each floor level and one light point at overhead, one light point in lift pit. All light

points shall be in group controlled and wired with 2.5 sq mm FRLS copper conductor cable. 15/5 amp power plug shall be provided at each floor. Wiring of these power plugs shall be done with 4 sq mm FRLS copper wires. LED Bulk head fittings of suitable rating to provide minimum 100 lux shall be connected with each point of lift shaft.

- 2.41. The breaking capacity of MCCB for all types of panel boards except DBs shall be as per fault level of that location. The rated service breaking capacity should be equal to rated ultimate breaking capacities ($I_{cs}=I_{cu}=100\%$). Where I_{cs} is service breaking capacity and I_{cu} is ultimate breaking capacity and they should be of approved make. MCCBs above 200A of 35 /36 KA breaking capacity rating shall be provided with microprocessor release with suitable fault level with LSIG protection and up to 250A with Thermal Magnetic release of suitable fault level having adjustable settings for O/L and Fixed S/C.
- 2.42. All types of panels shall be fabricated from approved firms and strictly as per CPWD specifications. The drawing of panel boards must be got approved from Engineer – in – charge before fabrication work. The panel board shall consist of MCCB as incomer and outgoing, copper bus bar, digital type ammeter, voltmeter OR multi-function meter, selector switches, LED type indication lamps etc as per standard sound engineering practice.
- 2.43. Floor Panels in building shall be provided for essential and non-essential supply. Incomer of essential panel shall be connected with DG set supply with changeover switching (ATS) and the incomer of non-essential panel shall be connected with main/primary supply. Incomer, outgoing, bus bar, indicating instruments, etc shall be designed as per maximum load and shall be got approved from Engineer-in-charge.
- 2.44. Rising mains: Upward transmission of power inside the buildings shall be done with the sandwiched compact type rising mains with Aluminium bus-bar i/c all accessories i.e adapter box, cable end box, tap-off box, reducers with MCCB. Rising mains shall be provided separately for essential, non-essential & UPS. AHU's shall be fed from essential rising mains. Rating of rising mains shall be decided as per maximum load of the building and future expansion and as approved by Engineer – in -Charge. Rising mains shall be conforming to IEC 61439 as amendment up to date. Design of rising main shall be as per ECBC 2017.
- 2.45. While laying conduits for fire alarm system, sufficient junction outlets are to be provided as per the direction of the Engineer-in-Charge for detectors as required.
- 2.46. Cable size shall be decided as per maximum load of the building and 25% future expansion and shall got approved by Engineer – in -Charge
- 2.47. The breaking capacity of MCBs shall not be less than 10 kA.
- 2.48. All LT and HT cables laid outside the building portion in open area shall be either laid in RCC HUME pipes or in ground with Sand cushioning and brick protection with route marker or in RCC trench or in DWC pipes or in cable tray as per CPWD Specification and direction of Engineer-in-Charge.
- 2.49. Power Distribution Scheme
 - a) Supply from Main LT Panel & DG Set shall be received in Non Essential and Essential Panels in Electrical Room at Ground Floor
 - b) The power distribution from Ground Floor to Terrace floor in the building shall be done using rising mains.
 - c) The Sandwiched type rising mains should be suitable for use on 3 Phase, 4 Wire, 415 Volts, 50 Hz AC supply with metal clad enclosures made of 1.6 mm thick steel sheet duly powder coated with 4 Nos. Aluminium bus bars (100% neutral), necessary joints, elbow joints and, expansion joints, Continuous earthing with two nos. Al strip of suitable size (one on each side)

including GI clamping brackets, suspenders, angle iron brackets, steel fasteners, connecting to earthing system.

- d) All the major distribution of power and data to be done at floor level. The details of data distribution have been elaborated in relevant sub head
 - e) Suitable capacity Sandwich type rising mains with Al busbars for electrical supply (Light & Power) to various floors shall be provided.
 - f) From each Light & Power rising main suitable capacity tap off box shall be provided to connect the floor panels with incomer of suitable size MCCB through XLPE Cable. 1 no. tap off box of suitable capacity shall connect to the lighting & power floor panel and 1 no. tap off box shall of equal capacity shall be spare.
 - g) The supply from the floor panels shall be connected to different TPDBs at different locations for further distribution to the circuits through MCBs with suitable size Cu/Al conductor cables in MS conduit. RCCB of 100 mA sensitivity shall be used in the outgoing of all phases for all DBs (other than vertical TPDBs). MCB of required rating (matching with the load current) shall be provided for protection of each circuit. At least 25% outgoing MCBs shall be kept spare.
 - h) Size and Current rating of LT cable shall be minimum 25% above the required current.
 - i) At each location there will be three types of DBs i.e. UPS DB, Non Essential (Raw Power) DB & Essential/Light DB. Light DB shall be provided with surge protection device.
- 2.50.** The laying of LT power cables and control cables shall be done in RCC cable trenches or/and in DWC pipes wherever required shall be laid underground at depth not less than 120 cm from finished level or as recommended by OEM of DWC pipes whichever is more. The DWC pipes shall be at least 50% vacant for future provision, hence the number of runs shall be appropriate to accommodate the same. The excavation, refilling, compaction and restoring the site to its original condition for trenching and laying of DWC pipe is included in the scope of contractor. The pipes shall be compatible with IS 16205 part 24, 2017 and wherever required 1 Nos additional DWC pipe shall be laid in the same route to accommodate communication cables. The DWC pipes used shall not be less than SN-8. The DWC pipes shall be confirming to IS 16205 part 24, 2017.
- 2.51.** Decision of laying LT cable in RCC cable trench, DWC, surface, cable tray, RCC hume pipe etc shall be on complete discretion of Engineer-In-charge and same shall be binding, hence bidders are requested to quote accordingly.
- 2.52.** For routes carrying both power and communication cables, it is required to lay both the pipes using spacers of not less than 600mm at spacing of 6 meters to ensure the separation in both lines and disturbance shall not be there in communication cables.
- 2.53.** The energy meters for monitoring as per GRIHA norms are required to be with IBMS compatibility and shall be having provision of meter reading by RS485 communication port which shall be communicating required parameters to a required DCU or gateway feeding the IBMS software. The energy meters of each panel shall be looped with RS 485 ports, and the communication shall be done by laying CAT 6A cables which will be terminating to the GATEWAY required for wireless/wired communication. Near every panel where communication via RS 485 is required, a LAN port shall be provided for ethernet connectivity to gateways.
- a) The load at each phase shall be balanced and in order to achieve the same each phase shall be equally loaded.
 - b) All the VTPN DBs in the shaft shall have same dimensions for same type of supply.
 - c) Floor DBs installed in clusters, in common areas and electrical shaft, shall be of the same dimension and size as of each other.
 - d) All wiring shall be done as per CPWD specifications
- 2.54.** Lightning arresters shall be provided for building as per IS; 2309-1989 as amended up to date and

CPWD specifications for internal work.

- 2.55. Earthing: Chemical Earthing system comprising of earth electrode of minimum size 88 mm dia GI pipe and 3 mtr. length, completely filled with super conductive crystalline compound sealed at the bottom with solid conical GI base, fitted with 2 G.I. strips of size 65 X 6X 3000 mm As per IS:3043-2018, earth conductor, earth bus, protective conductor etc for building shall be as per provision laid down. Earthing system should be designed such as to maintain earth resistance as specified in CPWD specifications. Earth resistance shall be checked / tested in harsh climatic conditions. Grid/Mat earthing can also be used.
- 2.56. The LED light luminaries/electrical light fixtures provided under the contract shall be guaranteed for a period of 05 years from the date of completion/ handing over whichever is later. In this regard contractor shall furnish an undertaking and bond for Guarantee/Warranty of 05 years.
- 2.57. The guarantee for LED fittings shall be submitted from the manufacturer in addition to the guarantee from the contractor. The manufacturer shall give undertaking that in case of discontinuation of model and non-availability of spares, they have to replace the fittings with equivalent/ high end model in case of manufacturing defect during the warranty period of 5 years.
- 2.58. Defect Liability Period: All the installations other than LED fittings shall be guaranteed for a period of 36 months from the date of completion. LED fittings shall be guaranteed for at least 5 years. Any defective materials and equipment shall be replaced free of cost at the direction of the Engineer-in-Charge.
- 2.59. At the time of Final Bill in addition to the 2.5% Security Deposit 5% of the price of LED Fittings shall be deducted in lieu of the Guarantee for LED fittings. The same shall be released year wise proportionally after completion of defect liability period of Three years.
- 2.60. Minimum size of copper conductor for power wiring shall be 4 Sq mm and that for light and fan points wiring shall be 1.5 sq mm. as per CWPD specification Internal-I.
- 2.61. The wiring and conduit route plan/drawings shall be submitted by the contractor and shall be got approved from the Engineer-in-charge.
- 2.62. After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2013 & Indian Electricity Rules 1956, shall be recorded and submitted to the department and the results shall be in the permissible limits. Test report forms duly signed by authorized person.
- 2.63. Lightning arresters shall be provided for all buildings irrespective of height as per IS2309-1989 as amended up to date and CPWD specifications for internal work -2013.
- 2.64. Lighting luminaries (LED type) in all buildings shall be decided as per functional requirement, design and drawing approved.
- 2.65. In each building, wherever lift is provided, power supply to DBs located in Lift shaft at suitable location as approved by Engineer-in-charge shall be done using suitable XLPE insulated armored cable. Supply of cable shall be in the scope of work.
- 2.66. For accommodating various size of cable incoming to the building, NP2 pipes for road crossing and entry to electrical room /DWC in electrical room and sub-station/Trench of suitable size shall be provided. 100% vacant pipes must be provided for future expansion.
- 2.67. All equipment shall be guaranteed for a period of **Three years** (except LED fittings which shall be guaranteed for minimum 05 years), from the date of taking over the installation by the department, against unsatisfactory performance and/or break down due to defective design, workmanship or material. The equipment or components, or any part thereof, so found defective during guarantee period shall be forthwith repaired or replaced free of cost, to the satisfaction of the Engineer-in-Charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. The

decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.

2.68. Voltage drop shall not be more than 8 volt from Main panel to load point (switch board/ sockets etc).

2.69. Luminaries:

LED lighting fixtures shall be provided with inbuilt Harmonic suppression system in all areas and buildings to achieve the illumination levels conforming to latest IS Code, NBC 2016 (with all amendments up to date of submission of tender), ECBC latest up to date. Lighting Power Density (LPD) shall be achieved for various buildings/ areas as per lighting simulation requirements as per ECBC norms. Design for Lighting shall be as per illumination requirement. The Minimum technical Specifications of LED Fixtures shall be as per Schedule attached; supplemented by CPWD specifications, ECBC & NBC.

Note: For areas where UGR<13 or 9 is to be attained the fittings shall be selected accordingly. Nothing extra shall be payable for this.

Note:

- The complete layout has to be approved by Engineer-in-charge. For all LED fittings CCT (5700K - 6500K or 4000K or 3000K) shall be chosen based on final design, aesthetics, functionality and as per direction of E-in-C. If any fitting is not available in specific make, Technical and aesthetically Similar shall be installed as per the direction of E-in-C.
- Manufacturer should have in house Lab approved by NABL, LM 79 & LM 80 report need to be submitted from a NABL/UL accredited lab to verify the technical parameters of the LED fittings.
- Both Fixtures and Drivers should have separate BIS approval.
- All light fixtures shall be LED having LM79 and LM80 certification from NABL accredited laboratory and relevant approved IES files for Dialux. Before dispatch of approved light fixtures, third party test shall be carried out by NABL accredited lab and the test reports shall be submitted.
- The fixture should comply with the parameters as per IS10322. The LED driver should comply to IEC61000-3-2 ed.3.2, 2009 for Harmonics, IEC61347 -2 -13, 2006 in Conjunction with IEC61347-1 ed.2.0, 2007 for Electrical Safety, IEC62384 ed.1.1, 2011 for performance and IEC61547 ed.2.0, 2009, CISPR-15 for EMI.
- Operating Voltage Range 140-270V
- Service Life of the fixture including driver/control gear should be minimum 50,000 burning hours.
- The housing of the indoor fixtures should be extruded aluminium/CRCA.
- For outdoor fixtures the housing shall be of high pressure diecast aluminium.
- The IP category should be IP40 or higher for indoor applications and IP65/IK08 or higher for outdoor applications.
- The IP category of light fixtures used in Kitchen in Admin & Residential Buildings should be IP65 or higher.
- The Surge Protection to be provided conforming to relevant IS standards/IEC61643-II Class-2 & EN61643-II Type-2.
- The manufacturer's name/logo should be engraved/embossed on the housing/body or Name/Logo on aluminium plate labels or Name/logo printed on housing/body
- The warranty period on complete Luminaries including driver/control gear, LED, all accessories should be 5 years from the actual date of completion of work.

- All Items except LED bulb/LED fitting shall be guaranteed for a period of Three year.
- All light fixtures (internal/external) and drivers shall be BIS certified. The manufacturer shall submit BIS certificates with respective R codes for each fitting and driver for approval before execution.
- Before execution, the contractor should get Illumination Lux level, minimum Glare calculations from the supplier after selection of fixtures. The design levels shall be strictly as per National Lighting Code/NBC/CPWD specifications.
- The fixtures shall be selected as required as per Reflected Ceiling Plan
- All suspended light fittings shall use suspension GI wire and assembly either supplied by Light fitting manufacturer or by their recommended OEM/OEA.

2.70. Internal Electrification, LV & Allied works:

- a) Following works shall be carried out in coordination with the civil work within the buildings complete in all respects as per latest IS Codes and CPWD Specifications.
 - Wiring & Conduiting (MS) for internal electrification and GI raceways for LV & Allied works.
 - LED Light fixtures, Fans (Ceiling & Wall) .
 - 6A Light Point /UPS Modular Switch & Socket Outlets.
 - 16A/ 20A Power/UPS Modular Switch & Socket Outlets
 - L.T. Cables and Sub main wiring, circuit wiring.
 - Steel Cable Tray.
 - Floor Panels, Distribution Boards & VTPNDBs.
 - Earthing - Chemical as per IS:3043-2018
- b) Following points shall be generally followed for internal and external electrification of various areas:
 - The Internal Electrification work shall be carried out in recessed/surface mounted MS conduits in accordance with CPWD General Specifications for Electrical Works Part-I (Internal) and Part-II (External) with up to date amendments.
 - MS Conduits shall be surface mounted or laid on steel wire/channels with suitable company made hanging supports in areas wherever there is false ceiling provision. In case there is no provision for false ceiling, MS Conduits shall be concealed in concrete during slab casting. Wiring for lighting/ power shall be generally done in MS Conduits whereas wiring for LV works shall be generally done in GI raceways unless stated otherwise.
 - FRLS PVC insulated Copper conductor wires will be used for points, circuit & sub-main wiring conforming to relevant IS-Codes.
 - Agency shall execute the work after obtaining necessary approval of the layout for internal electrification of the buildings, common areas and staircases. The staircase lighting shall be in group control system.
 - Laying of DWC HDPE / Hume pipes for road crossing or in pucca portion & CC path and for bringing these services from the outside the campus etc for electric/ telephone/ LAN/ street lighting cables etc. complete with adequate number of cable chambers at minimum length of 15 mtr. Cable & at every turn shall be provided by the agency. 100% vacant pipes must be provided for future expansion.

- After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2013& Indian Electricity Rules 2005 amended up to date, shall be recorded and submitted. The results shall be within the permissible limits.
- GI Raceways of 1.6mm thick, with accessories, shall be provided on floors of various buildings as per requirements. The cover plate of raceways' junction boxes shall be stainless steel (SS 304) of minimum 2mm thick.
- **Power Points, LAN points, Telephone Point (with telephone instrument as required) shall be provided for all counters like registration, reception, attendant call station etc.**

2.71. Earthing Systems:

- a) Earthing with Maintenance free Chemical earthing/ grid earthing/ mat earthing system as required, shall be provided by the EPC Contractor for earthing sub stations equipment, Electrical Panel boards, UPS and other Equipment /installations in each building. Earthing shall be in conformity with provisions of rule 32,61,61, 67 & 68 of Indian Electricity Rules 1956 & as per IS-3043 as amended up to date. Copper/GI earth strips shall be used for connecting the Electrical equipment with Earth pits as required. Earth Leakage circuit breakers shall be provided in the DBs for individual units.
- b) In addition, a system of earth stations will be established to provide an earth grid as the main Protective Earth System. The earth grid also connects the above dedicated earth terminal stations to establish a composite earth grid. The system earth will be maintained at 1.0 ohm or less. Earth bars are provided at each equipment location for equipment earthing.
- c) Earthing should be done in presence of Engineer in charge or his representative.
- d) Clean earth for Server, EPABX, AV & UPS will consist of insulated copper cable/ strips connected eventually to the main earth grid so as to achieve earth resistance 1.0 ohm or less.
- e) Separate earthing should be done for lightning system
- f) Unless otherwise indicated, earth plates shall be 600 mm x 600 mm minimum, of solid or lattice copper not less than 3.15mm thick and of GI not less than 6.3mm.
- g) Earthing system shall comprise of earth electrode near sub-station. Test link boxes shall be provided at each electrode for periodical resistance measurement. All such earth electrodes shall be interconnected forming a main grid.
- h) Where the earth electrodes are formed with tape, the tape shall be to relevant IS, of the size, length, depth below ground level and layout as indicated.
- i) If due to vary hard rock plate earthing will not be possible as per direction of E-I-C copper bounded rod will be executed. It shall consist Supply, Installation & testing of Earthing Station, consist of 3Mtr Copper Bonded Rod of minimum 17.2mm diameter. with minimum 25Kg Resistance lowering compound Earthing. Copper Bonded Earth Rod made from high tensile low carbon steel and each rod should molecularly bonding 99.9% pure electrolytic copper to the low carbon steel core in accordance with national and international standards such as BS6651, BS7430 and UL467. Comprises specifically selected compounds, which possess excellent electrical conductivity. The earth electrode shall be provided in 100 mm diameter boaring, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. complete as required.
- j) Conductors:
 - Earthing conductors, main earthing bars and main equi-potential bonding conductors shall be of the type, size and conductor material as indicated and shall comply with the following clauses.

- Tapes shall comply with relevant IS. Where used to interconnect copper electrodes the tape may be bare, but for interconnecting pipe electrodes and for all other purposes the tape shall have an extruded PVC sheath.
 - Main earthing bars shall comply with IS3043 and shall be bare.
 - Cables shall comply with IS3043, withouts heath, unless otherwise indicated.
- k) JOINTS AND CONNECTIONS: Joints in conductors shall be kept to a minimum. All contact surfaces shall be thoroughly cleaned and coated with an anti-corrosive electrical jointing compound suitable for the conductor materials. For bi-metallic joints, a separate abrasive shall be used to clean each metal.
- l) Connections shall be made as follows:
- To main earthing bars by phosphor bronze sets crew sand nuts;
 - To earthr ods by bronze, gun metal or copper clamps with phosphor bronze. Edges of clamps shall be rounded;
 - To earth pipes by phosphor bronze bolts and nuts, direct to the flange of the pipe;
 - To earth plates by bolting, riveting or welding.
- m) Termination of cables shall be by connectors jointed to the cable conductor by the thermit welding processor by compression joints complying with BS4579.
- Joints which are indicated as test points shall be bolted or clamped. Joints in tape, other than at test points shall be made by the riveting and sweating. Overlap of conductors shall be not less than 100 mm.
 - Joints and connections shall be protected by a coating which will form a seal and exclude moisture in all weather conditions. At connections to earth electrodes, the coating shall cover all exposed conductors and in the case of earth pipes, to top surface of the flanges. Protective coatings shall be of a waterproof, inert, tenacious material and of one of the following forms:
 - a) solvent cutback thixotropic corrosion preventative forming a film of resilient matt petroleum wax;
 - b) a fast drying durable rubber is edsprayed coating;
 - c) a heat shrink clears heating
 - Screws, nuts, washers and rivets for copper conductors shall be of phosphor bronze, naval brass or copper silicon; for aluminium conductors, they shall be of stainless steel.The minimum provision shall be as follows:
 - a) for flat strip two M8 bolts or four 5mm diameter rivets;
 - b) for sheet metal-two M8 bolts; where the sheet metal is less than 2mm thick, it shall be backed for an area of at least 1000 mm.
- n) INSPECTION PITS:
- Unless otherwise indicated, connection between an earth conductor and its associated earth electrode system shall be in an enclosure.
 - The enclosure shall have are movable top cover which shall be flush with finished ground level. The enclosure shall be a purpose made concrete in section pit, a galvanized steel inspection pit embedded in concrete, an earthenware pipe or similar, as indicated. The earth electrode connection shall be just below the lid of the in section pit with adequate access for testing purposes.

o) Supports And Fixings:

- Cables shall be supported and fixed in accordance with Section Cable laying.
- Tapes and bars shall be fixed by spacer bar saddles which shall be of non-metallic material or corrosion resistant alloy compatible with the conductors. Fixing of saddles shall comply with relevant clauses in Cable Laying section. The maximum spacing off fixings shall not exceed 600mm unless otherwise indicated.
- Main earthing bars shall be supported on insulators; they shall be not less than 25mm clear of the building fabric.
- For general areas inside buildings, screws and nuts shall be of cadmium electro plated steel or stainless steel; outside buildings, in plant rooms or other locations as indicated, they shall be of stainless steel.
- No shot firing shall be used and no drilling or welding structural steel work shall be done without the approval of the Engineer-in-Charge.

p) Installation:

- Electrodes shall be installed in undisturbed ground. The distance between any two electrodes shall be not less than 1.25 times the depth of the longer electrode.
- Excavations shall be carried out in accordance with BS 6031 and shall comply with the construction (General Provisions) Regulations, 1961. Excavations shall be kept free of water and protected against damage or collapse. The safety of persons and the protection of structures, buildings, roads, sewers and services from damage shall be ensured; all necessary sheeting, timbering, strutting and shoring shall be supplied, erected and subsequently removed.
- Trenches shall be back filled in layers and each layer shall be rammed. The first two layers shall be 100 mm deep and rammed by hand the remaining layers shall be not more than 200 mm deep and power ramming may be used. Warning tapes and covers shall be included as specified in relevant clauses in Cable laying section. Where applicable, top soil and turf shall be replaced and the final level shall be level with or not more than 25mm above the adjacent ground level.
- The earth resistance should be less than 2.00ohms. Earth Pits shall be treated with salt, charcoal /chemicals to be achieve the required result.

2.72. LT Cables: The scope of this section covers the supply, laying, testing , commissioning and handing over of overhead and underground LT cables:

- a)** Cables shall be XLPE insulated cables and shall be of 650/1100 volts grade or as specified and shall have been manufactured confirming to BS 6346 and Indian Standard Specifications IS-694 and IS-1554 as applicable. These shall be of approved types accepted by the Fire Insurance Association of India for use in Industrial risks and to the following specifications. The contractor shall submit the Manufacturer's catalogues giving electrical characteristics of the cables. **Contractor shall keep 0.5- 0.75 meter wire and 1.5 -2 meters cable extra loop for maintenance purpose at each termination point as per direction of E-I-C.**
- b)** The fire retardant low smoke (FRLS) cables shall be 650/1100V grade multi core having annealed tinned copper wires, insulated with special polymeric material suitable to withstand 150 degree for 30 minutes, cores laid up melinex taped, special low halogen and low smoke elastomeric material inner sheathed black, armoured with G.I. Wires/cast steel strips, melinex taped outer sheathed with special low halogen and low smoke elastomeric material unless otherwise specified.
- c) Multi-core cables:** These shall be as specified and shall comprise of plain, circular, solid/

stranded Al conductors. PVC insulated and having an inner sheath of PVC compound, galvanized flat steel tape or round steel wire, armouring and XLPE sheathed overall and shall comply with IS: 1554- 1961.

- d) **Flexible cables:** Twin flexible cables used for pendants and connections to other lighting fixtures shall have cross-section area or should be of 0.001sq. Inch (equivalent to 23/0.0076) or larger and be insulated in accordance with relevant IS specifications. The metric equivalent size for 23/0.0076 wherever mentioned may be noted as 23/0.20mm. All wires and cable shall be of FRLS type.

e) **Jointing and Terminating Cables:**

- As far as possible Joints in cable should be avoided. Contractor shall use full length cable for end to end connection. If cable joints are essential he will take prior approval of E-I-C
- Joints and terminations shall comply with the following clauses as appropriate to the type of cable. The Engineer-in-Charge shall be informed where it is proposed to install joints that are not indicated.
- The Engineer-in-Charge shall be given evidence that the joint or termination manufacturer has stated the materials to be employed are suitable for the type of cable to be jointed or terminated.
- Cable shall not be cut until the jointing or terminating commences and the work shall precede continuity until it is completed. All necessary precautions shall be taken to prevent damage and ingress of moisture and impurities; cable ends shall be free from moisture before jointing commences. Where circumstances prevent, completion the cable ends shall be sealed. In the case of lead sheathed cables this shall be by plumbing and for aluminium sheathed cables by hermetically sealing.
- The Contractor shall employ for this work, staff who is fully qualified and competent or the types of joints and terminations to be made.
- Core identification shall be matched at each joint without twisting or crossing of the cores. Where numbered cores are jointed to coloured, all cable runs and on sites with existing installations consistent with the system already in use.
- For joints in armoured cables, a bonding conductor shall be connected across the armouring. A split ferrule shall be placed under the armouring to prevent deformation of the cable by the clamp.
- At terminations, armouring and metal sheaths shall be connected directly to the external earthing terminal of the equipment by a bonding conductor. For LV cables the bonding conductor shall have a cross sectional area in accordance with Table 54P of IEE wiring Regulations. Metal sheaths of single core cables shall be bonded and earthed at one point only, as indicated, insulated glands shall be used at the open- circuit end or ends.
- At terminations, cable tails shall be formed by separating and bringing out the cores. Each tail shall be long enough to connect to the terminals of the equipment.
- At the terminations of single core cables, gland plates shall comply with relevant clause. For three phase circuits the phase conductors shall be arranged, if possible, in trefoil formation where they pass through the enclosure of equipment
- Core identification at terminations shall be by coloured or numbered plastic stretch or shrink ferrules.
- Continuity of spare cores shall be maintained at joints and at terminations, the cores shall be connected to spare terminals.

- Solder shall be used only for connecting or terminating paper- insulated cables. All other connections and terminations shall be by means of compression fittings or mechanical clamps.
- Compression connectors and associated dies for compression tools shall be of correct type and size. Tools shall be so designed that the correct compression must be applied before it can be released.

f) Cable Identification:

- For multi core cables, PVC ferrule type indicators or tags shall be provided at both ends for core identification. For phase identification of 2/3/3.5/4 core cables, coloured PVC tapes shall be used at both ends.
- All cables shall be provided with aluminium/Copper tags of approved design, spaced not less than 7.5 meters. Apart and these shall contain the following: Feeder No.Size, No.of Cores.
- Sleeves shall be of the shrink type applied cold by mechanical device or by the use of heat, they shall provide a sufficient thickness of insulation to suit the particular application. Insulating tapes used in joints and terminations shall be compatible with and have a temperature rating and insulating property not less than the cable insulation. They shall be complying with BS 3925.
- Impregnated cotton tapes shall be double selvedge.
- All tapes shall be stored in sealed containers until required.
- Resin filling should be, as far as is reasonably practicable, safe and without risk to health. Each pack shall include warnings as to any hazards in its use, e.g., dermatic or toxic properties with details of precautions, which the user must take to minimize these.
- Hot pouring sealing compound shall be hard setting and comply with BS 1858:1973 (1986). Selection of the compound shall take account of the ambient temperature of installation as well as characteristics of the joint.
- Care shall be taken to prevent voids occurring in consequence of too rapid cooling.
- Resin filling shall be used with PVC/ XLPE type cables and hot poured compound shall be used with paper insulated lead covered cables.

g) Cable Supports:

- Unless otherwise indicated the type of cable supports used shall be selected by the Contractor to suit the circumstances of the installation, but they shall comply with this specification and the following preferences shall be taken into account:

-For Horizontal runs: Cable Tray

-For vertical runs Clabber Cleats

Where marshalling of cables occurs e.g. at switch boards Cable Racks.

- Unless otherwise indicated all ferrous metal for cable tray, cable racks, and cable ladder, cable hangers and their fixings and suspensions shall have a galvanized finish.
- For general use inside buildings the galvanized finish shall be a coating equivalent to and not less than type G275 to BS 2989, but manufacturer's standard finishes will be accepted for slotted angles. All metal exposed during fabrication shall be given a coat of zinc-rich paint, brushed on or finished to match the manufacturer's finish.
- Metal cable tray shall be used unless otherwise indicated and it shall comply with these

specifications where cables are laid in the cable tray they shall be secured by ties, each tie securing the cables of only one circuit. The ties shall be of proprietary type not requiring screws or bolts for fixing the use of wire or similar material will not be permitted. Ties shall be spaced at not greater than 600 mm along each cable and within 100 mm of each bend or set.

- Where cable tray is installed in the veritable plane, cables shall be supported by cable cleats. The spacing of cable cleats shall comply with the IEE Wiring Regulations. At bends in the cable, cleats shall be located immediately on each side. Cable cleats shall be made from materials, which are resistant to corrosion without the need for treatment of special finish.
 - Cable tray shall be fixed at regular intervals not exceeding 1200 mm and at 225 mm from bends and intersections. A minimum clear space of 20 mm shall be left behind all cable trays.
- h) **Cable Racks:** Cable racks shall comply with these specifications and shall be constructed from proprietary systems using channel sections with return lips and compatible fixing accessories, factory formed cable ladder may also be used Cable shall be fixed to the racks and ladders by cable cleats.
- i) **Cable Hangers:** Cable hangers shall be used only where indicated. They shall be made from mild steel flat bar complying with these specifications.
- j) **Suspensions and Fixings:**
- It is preferred that proprietary suspension systems comprising channel sections with return lips and compatible fixing accessories or slotted angles should be used, Where necessary fixing may be fabricated from mild steel flat bar. Metal arc welding shall comply with BS 5135.
 - Unless otherwise indicated fixing to the building fabric shall comply with table below: No shot firing shall be used and no drilling or welding of structural steel shall be done without approval of the Engineer-in-Charge.
 - Suspensions and fixings shall be complying with relevant clause.
 - Bolts, nuts, washers and screws shall be cadmium or zinc Electroplated or passivity.
- k) **Bonding:** Supplementary bonding shall be installed between component parts of cable trays, racks or ladders where the method of mechanical connection does not provide permanent and reliable metal to metal joints of negligible impedance.
- l) **Cable Installation:**
- Unless the routes of cables are indicated on drawings, they shall be determined by the contractor and approved by the Engineer-in- Charge before work is started.
 - Cable installation on the surface shall be parallel with the lines of building construction and properly aligned.
 - A minimum clearance of 150mm shall be allowed from any equipment, pipe work or duct work. The distance shall be measured from external surface of any lagging.
 - In the event of difficulty in achieving these requirements, Engineer- in-Charge shall be informed.
 - Spacing between cables shall comply with relevant table, but where indicated account must be taken of any grouping necessary to maintain the current carrying capacities of cables.

- Space shall be allowed along cables routes for future additions where indicated and cable supports shall be of adequate size for the ultimate load.
- Adequate space shall be left between cable runs, the building fabrics and other services to allow for future removal or installation of cables.
- Cables shall be adequately supported by one of the methods specified in clause 9.8 throughout cable ducts or are buried direct in the ground. Fixing direct to building fabric by cable cleats may be adopted for single runs subject to the approval of Engineer-in-Charge, and where indicated.
- Cables shall be supported within 30mm of their termination at equipment; the weight of the cable shall not be carried by the terminal box gland.
- Where cables cross expansion and settlement joints in the building structure, they shall be fixed 300 mm each side of the joint and sufficient slack left between to allow for movement. Where the cables are buried in the building fabric suitable provision shall be made to allow for movement of the structure. The contractor shall submit his proposals for approval of Engineer-in-Charge.

m) Marking of cables:

- Cables located in switch rooms, ducts and spaces designated solely for electrical services or have orange over sheaths, they shall be identified by adhesive bands coloured orange, complying with BS 1711. The bands shall not be less than 100 mm long, located at least once within each separate compartment through which the cables pass at intervals not exceeding 12 m.
- Except where cables are buried or enclosed in conduit, trunking or ducting, they shall be permanently identified by discs. Discs shall be of laminated plastic materials with black characters on white: characters shall be not less than 3 mm high. The inscription shall indicate nominal voltage, designation of load, number and cross-sectional area of cores and rated voltage of cable.
- Cable identification discs shall be attached to the cables with ties. Discs shall be located within 500 mm of terminations and joints, at least once within each separate compartment through which cables pass and at intervals not exceeding 24 m, they shall coincide with the colour bands.

n) Laying Cables in Ground:

- Cables shall be laid by skilled experienced workmen using adequate rollers to minimize stretching of the cables. The cable drums shall be placed on jacks before unwinding the cable. With great care it shall be unrolled on over wooden rollers placed in trenches at intervals not exceeding 2 meters. Cables shall be laid at depth of 0.75 meters below ground level. The Bricks and a cushion of sand total of 250mm shall be provided both above and below the cable, joint boxes and other accessories. Cable shall not be laid in the same trench or alongside a water main.
- The cable shall be laid in excavated trench over 80mm layer of sand cushion. The relative position of the cables, laid in the same trench shall be preserved. At all changes in direction in horizontal and vertical planes, the cables shall be bent smooth with a radius of bent not less than 12 times the diameter of cables. Minimum 3 meter long loop shall be provided at both end of cable.

o) Laying in Pipes/ Closed Ducts:

- The size of the pipe shall be decided by the Engineer-in-Charge and shall not be less than 10 cm, in diameter for a single cable and not less than 15 cm for more than one cable. These pipes shall be laid directly in ground without any special bed except for SW pipe which shall be laid over 10 cm, thick cement concrete 1:5:10 (1 cement : 5 coarse sand:10 graded stone aggregate of 40 mm nominal size) bed. No sand cushioning or tiles need be used in such situations. Unless otherwise specified, the top surface of pipes shall be at a minimum depth of 1m from the ground level when laid under roads, pavements etc.
- Where steel pipes are employed for protection of single core cables feeding A.C. load, the pipe should be large enough to contain both cables in the case of single phase system and all cables in the case of poly phase system.
- The pipes on road crossings shall preferably be on the skew to reduce the angle of bend as the cable enters and leaves the crossing. This is particularly important for high voltage cables.
- Manholes of adequate size as decided by the Engineer-in-Charge shall be provided to facilitate feeding/drawing in of cables and to provide working space for persons. They shall be covered by suitable manhole covers with frame of proper design.
- Pipes shall be continuous and clear of debris or concrete before cable is drawn. Sharp edges at ends shall be smoothened to prevent injury to cable insulation or sheathing.
- Pipe for cable entries to the building shall sloped down wards from the building and suitably sealed to prevent entry of water inside the building. Further the mouth of the pipes at the building end shall be suitably sealed to avoid entry of water.
- All chases and passages necessary for the laying of service cable connections to buildings shall be cut as required and made good to the original finish and to the satisfaction of the Engineer-in-Charge.
- Cable grips/draw wires and winches etc. may be employed for drawing cables through pipes/closed ducts etc.

p) Laying in Open Ducts:

- Open ducts with suitable removable covers shall be preferred in sub- stations, switch rooms, plant rooms, workshops etc.
- The cable ducts should be of suitable dimensions so that the cables can be conveniently laid. If necessary, cables may be fixed with clamps on the walls of the duct or taken in troughs in duct. The duct should be covered with removable slabs or chequered plates of adequate thickness and size.
- Ducts may be filled with dry sand after the cable is laid and covered as above or finished with cement plaster specially in high voltage applications.
- Splices or joints of any types shall not be permitted inside the ducts.
- As far as possible laying of cables with different voltage ratings in the same duct shall be avoided.
- Where considered necessary, hooks or racks shall be provided for supporting the cables in masonry / concrete cable ducts, cable troughs. Otherwise cables shall be laid direct in the trench or trough etc. While deciding the layout of cables in such ducts, care should be exercised to ensure that unnecessary crossing of cables is avoided.

- q) Protection of Cables:** The cables shall be protected by bricks laid on the top layer of the sand for the full length of underground cable. Where more than one cables is laid in the same trench, the bricks shall cover all the cables and shall protect minimum of approximately 80mm on either side of the cables. Cable under road crossings and any other places subject to heavy traffic shall be protected by running them through Hume Pipes of suitable size.

2.73. APPLICABLE IS STANDARDS: Various codes for electrical works shall be as below:

- | | |
|---|------------------|
| 1. METERS (MEASURING) FOR ANALOG METERS | IS:1248-1986 |
| 2. INSTALLATION AND MAINTENANCE OF SWITCH GEARS | IS:3072-197 |
| 3. CODE OF PRACTICE FOR EARTHING | IS:3043 |
| 4. H.D. AIR BREAKER, SWITCH GEARS AND FUSES FOR VOLTAGE
NOT EXCEEDING 1000 VOLTS | IS:4047-1977 |
| 5. SELECTION, INSTALLATION AND MAINTENANCE OF FUSES
UP TO 650 VOLTS | IS:8106-1966 |
| 6. GENERAL REQUIREMENTS FOR SWITCH GEAR AND
GEAR FOR VOLTAGE NOT EXCEEDING 1000 VOLTS | IS:4237-1967 |
| 7. DEGREE OF PROTECTION PROVIDED BY EXTERNAL / | |
| 8. LANDSCAPE LIGHTING ENCLOSURES FOR LV S/GEARS | IS:2147-1962 |
| 9. INSULATED CONDUCTOR RATING | IS:8084-1972 |
| 10. ENCLOSED DISTRIBUTION FUSE BOARDS AND CUT-OUTS
FOR VOLTAGE NOT EXCEEDING 1000 VOLTS | IS:2675-1983 |
| 11. MINIATURE CIRCUIT BREAKER | IS:8828-1978 |
| 12. FUSE WIRE USED IN RE-WEARABLE TYPE ELECTRIC FUSES
UP TO 650 VOLTS | IS:9926-1981 |
| 13. PVC INSULATED ELECTRIC CABLES HEAVY DUTY | IS:1554 (PART I) |
| 14. RECOMMENDED CURRENT RATING FOR CABLES | IS:3961(PART II) |
| 15. COPPER CONDUCTOR IN INSULATED CABLES AND CORES | IS:2982 |
| 16. CONDUCTOR FOR INSULATED ELECTRIC CABLES AND
FLEXIBLE CORDS | IS:8130 |
| 17. MILD STEEL WIRES, STRIPS AND TAPES FOR ARMOURING CABLES | IS:3975 |
| 18. PVC INSULATION AND SHEATH OF ELECTRIC CABLES | IS:5831 |
| 19. ALUMINIUM CONDUCTOR FOR INSULATED CABLES | IS:1753 |
| 20. PVC INSULATED AND PVC SHEATHED SOLID ALUMINIUM CONDUCTOR
CABLES OF VOLTAGE RATING NOT EXCEEDING 1100 VOLTS | IS:4288 |
| 21. RECOMMENDED CURRENT RATING FOR CABLE | IS: 961 |
| 22. CODE OF PRACTICE FOR ELECTRICAL WIRING INSTALLATION
SYSTEM VOLTAGE NOT EXCEEDING 650 VOLTS | IS: 732 |

23. CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS	
GENERAL ELECTRICAL INSTALLATION	IS: 1646
24. RIGID Medium class PVC conduitS FOR ELECTRICAL WIRING	IS:1653
25. FITTINGS FOR RIGID Medium class PVC conduitS FOR ELECTRICAL WIRING	IS:2667
26. FLEXIBLE Medium class PVC conduit FOR ELECTRICAL WIRING	IS:3480
27. ACCESSORIES FOR RIGID Medium class PVC conduitS FOR ELECTRICAL WIRING	IS:3837
28. PVC INSULATED CABLES (WIRES)	IS:694
29. FLEXIBLE (PLAYABLE) NON-METALLIC CONDUITS FOR ELECTRICAL INSTALLATION	IS:6946
30. THREE PIN PLUGS AND SOCKETS	IS:1293
31. CONDUCTORS FOR INSULATED ELECTRICAL CABLES AND FLEXIBLE CODES	IS:8180
32. SPECIFICATION FOR CONDUIT FOR ELECTRICAL INSTALLATION	IS:9537-1980
33. ACCESSORIES FOR NON-METALLIC CONDUITS FOR ELECTRICAL WIRING	IS:3419
34. SWITCHES	IS:3854
35. PLUGS	IS:6538
36. SHUNT CAPACITORS FOR POWER SYSTEMS	IS:2834-1954
37. HRC CARTRIDGE FUSES AND LINKS UP TO 660 VOLTS	IS:2208
38. GENERAL AND SAFETY REQUIREMENT FOR LIGHTING FITTINGS	IS:1913-1969
39. CODE OF PRACTICE FOR LIGHTING PUBLIC THOROUGH FARES	IS:2944-1981
40. WATERPROOF ELECTRIC LIGHTING FITTINGS	IS:3528
41. WATER TIGHT ELECTRIC LIGHTING FITTING	IS:3553-1966
42. MILD STEEL TUBULAR AND OTHER WROUGHT STEEL PIPE FITTING	IS:1239-1958
43. LUMINARIES FOR STREET LIGHT	IS:2149-1970
44. HRC FUSES HAVING RUPTURING CAPACITY OF 90 KA	IS:9224
45. EXHAUST FAN	IS:2312-1967
46. ELECTRIC CEILING FAN	IS:374-2019
47. DANGER NOTICE BOARDS	IS: 2551

NOTE: All codes and standards shall mean the latest where not specified otherwise the installation shall generally follow the Indian Standard codes of practice or relevant British Standard Codes of Practice in the absence of corresponding Indian Standards.

D 3.3 **GAS SUPPRESSION SYSTEM:**

1. Gas suppression system shall be installed for Class C hazard. Gas based fire extinguishing installation shall be provided where water cannot be used for fire extinguishing because of the special nature of the contents of the buildings/area to be protected. Gas Suppression system shall be provided in:

- **LT/HT Panels, APFC Panel& All Electrical Panels with Incomer of 400 A or above.**

2. **Scope of Tender:** This section includes provision of Automatic Linear Pneumatic Heat Detection Tube gas suppression system of approved clean gases agent having global warming potential (GWP) 1. zero ozone depletion potential (ODP) and atmospheric life time less than 10 days complying NFPA-2001 (latest edition). Letter of OEM authorization is compulsory for supply required by the contractor. Fire suppression system is fire detection and quenching system. This is proposed for flooding entire room with Environment friendly clean gas FK-5-1-12. The Valve Assembly and Electric Solenoid must be UL/FM/VDS approved and cylinder must be Seamless CCOE & BIS 7285 approved.

3. **Standard & code:**

Following Indian/International standard specifications, codes of practice etc. updated shall apply to the work covered by the scope of this contract.

NFPA 2001	Standard on clean agent fire extinguishing system
GCR 2016	Gas Cylinder Rules 2016

4. **System Details:**

- The amount of FK-5-1-12 to be provided shall be the amount required to obtain a uniform (minimum) design concentration Class 4.5% required to extinguish the fire at minimum anticipated temperature with the risk and as required by NFPA 2001, 2015 Edition with a hold time for 10 minutes. The system design shall not exceed 10% for normally occupied areas, adjusted for maximum area temperature anticipated with provision for room evacuation before agent release.
- Necessary warning signs shall be displayed in and near such risk (entry and exit) envisaged for clean agent Gas suppression.
- The Pipe used should be MS, Seamless ASTM Schedule 40.
- Each cylinder shall have pressure gauge and low-pressure switch to provide visual and electrical supervision of the cylinder pressure. The low-pressure switch shall be wired to the control panel to provide audible and visual trouble alarm in the event of drop of pressure. The pressure gauge shall be colour coded to provide an easy, visual indication of cylinder pressure.
- Furnish a welded steel bracket with each cylinder assembly for holding the cylinders in a saddle with a front bracket plate that secures the cylinders depending on installation requirements.
- The cylinder shall have pressure relief provisions that automatically operate before the internal nominal pressure exceeds desired 60-100 Bar.

5. **Extinguishing Agent: FK-5-12 (Dodecafluoro-2-Methylpentan-3** **One** **–**
AEE(E) EE&SM(E) AE(C) EE&SM(C)

CF2CF2C(I)CF(CF3)2. The Agent shall not contain any Hydro fluorocarbons (HFC).The Agent must be UL/FM approved. Comply with requirements of the authorities having jurisdiction. Filling facility should be CCOE approved.

6. Design Criteria:

Standard Code	NFPA-2001 (Latest Addition)
Temperature of Risk	20oC to 27oC
Design Concentration	4.5%
Flooding Factor	As per Manufacturer
Discharge Time	10 Seconds
Cylinder Capacity	34 Ltr., 80 Ltr., 120 Ltr., 150 Ltr, 180 Ltr.
Nozzle Type	360o / 180oC made of Brass
Altitude correction factor	As per Manufacturer
Hold Period	9 minutes

7. Submittals: The Contractor must submit mechanical Working Drawing showing Pipe, Pipe Size, Bends, Reducer, Splits, Tee Connection, Valves, Fittings, supports etc which should be supported with Hydraulic Flow Calculation.

8. Sequence of Operation:

- Activation of the First Smoke Detector (the crossed-zoned laser detector)
- Illuminate the respective circuit lamp on the control unit.
- Energize a pre-alarm audible alarm bell.
- Treatment remote alarm to the building Fire Alarm Panel.
- Activation of the Second Smoke Detector (the cross-zoned laser detector).
- Illuminate the respective circuit lamp on the control unit.
- Energize an evacuation audible alarm horn device.
- Shut down the stand-alone air conditioning units serving the protecting area.
- Closes the supply and exhaust / return dampers serving the protected area.
- Activates a time delay mechanism which delays release of the clean agent for up to 20 seconds from the time the 2nd loop is activated. The Fire Suppression clean agent is released at the end of the time delay interval unless a “dead man” type abort switch is operated between the 1st and 2nd detection loops. A timed-out system discharges upon abort disengagement unless the system is cleared and reset.
- Discharge of the Fire Suppression Clean Agent.
- Operates strobe light outside the protected area.
- The system may be activated by manual discharge switches located in the protected area. Operation of a manual discharge switch causes immediate discharge of the fire suppression agent and causes alarm and shut-down devices to operate the same as if the system had operated automatically operation of a manual discharge switch overrides all time delay and abort system devices in the system.

9. Gas Suppression system for Panel; -

AEE(E)

EE&SM(E)

AE(C)

EE&SM(C)

- In order to detect fire at micro level in electrical panel Direct low pressure Gas suppression system shall be installed inside the electrical panel. Gas Suppression system shall be provided in all floor mounted electrical panel.
- The detail of the system proposed shall be as follows:
- Electrical Panel Protection System: This includes Supply, Installation, Testing and Commissioning of Novec-1230 /FK -5-1-12 gas Suppression system in accordance with the Contract Documents.
- **Scope of Work:**
- Supply, Installation, Testing and Commissioning of clean Agent (Novec 1230) Fire Suppression system designed to provide a uniform concentration within the electrical panels in accordance with NFPA 2001 and requirements of the contract documents).
- Provide all engineering design and materials for a complete agent suppression system including Novec 1230 storage cylinders with steel bracket, extinguishing agent, detection tube, cylinder valve and associated accessories including but not limit to; adaptors, pressure switch, tube fittings etc, required for complete operation of system.
- All necessary safety requirements such as warning signs, discharge alarm shall be part of system.
- The necessary nomenclature such as pressurization level, agent volume, gross/net weight of cylinder shall be clearly marked on cylinder.
- Prior to supply of material at site. Contractor must submit following documents for approval of Engineer-in-charge.
- Drawing in A-4 size, clearly showing the panel, routing of tube inside the panel, location and fixing arrangement of cylinder & system components.
- All doors and holes in the enclosed/equipment's should be closed or sealed to maintain the tightness of enclosure.

10. **System Description:** The detection tube shall be UL approved fixed with cylinder valve at top of cylinder. The tube shall be pressurized with dry nitrogen. In case of reach of pre-determined temperature (100- 120 degree C), the tube shall rupture gas shall be released from tube over the protected area. Tube activation temperature 160 Deg. Cel as per UL approved.

- Pressure Gauge Shall be UL approved with dual Pressure Switch points, one for leakage and another for discharge to be provided for automatic signals in case of system pressure falls at 9 bar(leakage) and 5 bar(Discharge) . This system to give output to stand alone hooter cum flasher.
- The Extinguishing Agent shall be stored in cylinder as liquefied compressed gas, super pressurized with dry nitrogen at 15 Bar.
- The cylinder should of 1.6 ltr water capacity for 1 Kg System, 2.7 Ltr water capacity for 2 Kg system & 4.5 Ltr water capacity for 4 Kg system with a test pressure of 53 bar and working pressure of 35bar non ferrous Seamless Cylinder (PESO & UL approved). The cylinder shall be mounted on weight monitoring System and in case o loss of weight the system shall generate alarm in Monitoring & Signaling unit.
- The detection tube shall be installed throughout the compartments of panel. The location and spacing of tube shall be above the hazard, to be protected.
- In case of fire, the tube shall rupture at a point. The rupture of tube shall result in formation of discharge point and release the agent in uniform pattern.
- With system activation, a signal should be generated via Audio Visual Alarm installed at

convenient location as per Engineer-in-Charge.

- The system must be service for minimum of 5 years.

11. System Components:

- The cylinder should of 1.6 ltr water capacity for 1 Kg System, 2.7 Ltr water capacity for 2 Kg system & 4.5 Ltr water capacity for 4 Kg system with a test pressure of 53 bar and working pressure of 35bar non ferrous Seamless Cylinder (PESO & UL approved). The cylinder shall be mounted on weight monitoring System and in case o loss of weight the system shall generate alarm in Monitoring & Signaling unit.. Cylinder shall be provided with a certificate provided by the company who charge with the FK-5-1-12 gas mixture. The certificate shall be secured around the cylinder with chain fastener.
- Pressure Monitoring Device -UL Approved, Each cylinder shall have pressure gauze integrated dual low pressure switch to provide visual and electrical supervision of the cylinder pressure. The low pressure switch shall be wired to the Audio Visual Alarm to provide audible and visual trouble alarm in the event of drop of pressure. The pressure gauze shall be colour coded to provide an easy, visual indication of cylinder pressure.
- Detection Tube - The tube should be multilayer manufactured from a superior polymer material through a drawn extrusion process suitable to be used as pneumatic activated heat sensitive fire detection tube and shall be UL listed. The UV stabilized tube should be specifically suited to withstand tough applications with high resistance to exposure to moisture, UV, zinc salts, chemicals, impact and stress
- Temp : 160 oC as per UL Certificate
 - Internal Diameter : 4 mm +/- 0.2mm
 - External Diameter : 6 mm +/- 0.2mm
- Extinguishing Agent- FK-5-1-12 (Dedecafluoro-2-Methylpentan-3 One – CF₂CF₂C (O) CF (CF₃)₂)
- The agent shall not contain any Hydro fluorocarbons (HFC).
- The ozone depletion potential should be zero.
- The Global warming potential should be equal to or less than 1.
- The Extinguishing Agent should be UL Listed & FM approved.
- The extinguishing agent should be filled in an UL Listed or FM or PESO approved filling station.
- The extinguishing agent must not be in touch with any corrosive metal to avoid corrosion in long run.

12. Installation

- The system shall be installed on basis of approved drawing with no more than 40 meters of tube in one system complying to no more than 10 meter of single largest length of tube end from valve.
- Maximum 4 Tee connections are allowed in one system.
- The installation / final connections shall carry out in direct supervision of representative of Manufacturer/authorized distributors.
- The installation contractor should be a proven source with minimum 5 years of installation of Trace Tube Systems in India.
- Cylinder shall be located so that they are not subjected to mechanical, chemical or other damage.

- All system components shall be capable of withstanding heat of fire and severe weather conditions.
- Detection Tube to be properly secured inside the panel by Clips/Tie etc.
- The Detection Tube outside the panel should be protected in flexible conduit.
- Inspection certificate should be pasted on cylinder clearly marking next due date of inspection

D3.4: SPECIFICATION FOR SINGLR PHASE SMART PREPAID METERING SOLUTION:

Technical Specification:

1. Energy Meter:

Single Source Energy Meter Digital 1 Phase 2 wire, Energy Meter

Frequency:50 Hz,

BIS Approved :IS 13779,

Communications Protocol: RS 485 Port, Compatible For Automatic Meter Reading, Meter shall be capable of online monitoring with AMI (Advanced Metering Infrastructure) & centralized control System

Current Rating:10-60A,

Voltage: Voltage Nominal: 3 x 240 V (L-N) Operating: -40% to +20%

Class 1.0,

Inbuilt Connection/Disconnection Device,

inbuilt required CT's ,

Operations: compatible for prepaid/postpaid metering.

Display: Custom built LCD with back-light 7 digit 7 segment display for parameters

Real time clock: Internally provided with battery backup.

2. Communication Devices:

A. DATA ACQUISITION HUB with RF/RS 485 communication Protocol.

865~868 MHz wireless RF,

Capable to communicate with the meters as per meter's standard communication baud rates (Default 9600bps).

Firmware Upgrade: Firmware Over The Air (FOTA).

Network Security: 128 Bit AES.

Mounting Arrangement : Panel and wall mounting option

Number of meters : Supports aggregation of up to 32 Energy Meters

B. Gateway/DCU

Communication : 865 MHz wireless for Neighbourhood Area Network (NAN) side and 4G fallback to 2G on WAN side for communication with DCP. NAN is a network comprising of group of meters / nodes or any other network elements or all of which that communicates in a two-way mode.

SIM Based: Supports Dual SIM Private APN SIMS(4G fallback 2G)

Firmware Upgrade : Firmware Over The Air (FOTA).

RTC Enabled

Network Security: 128 Bit AES and private APN on WAN with static IP allocation Mounting Arrangement: Panel and wall mounting option

3. Energy Management Software:

Energy Management software with AMR Facility, Recharge Coupons software, Dynamic bill generation for each tenant based on the energy consumption, adjustment of common area charges the software have capability to take in account the data tariff.

4 Layers backend server architecture as per CEA Guidelines. Contains HES and MDMS

Application Server and Web Server along with other related support servers.

Head End System

HES will support the collection and storage of data as per performance level for a defined no. of meters with facility of future expansion as per the requirement.

HES will perform all the requisite functions as per the defined functionalities of AMI and the requisite software and hardware will be provided to achieve the defined functionalities of AMI.

HES will ensure data integrity checks, for example, checksum, time check, pulse, overflow, etc. on all metered data.

HES will be developed on open platform based on distributed architecture for scalability without degradation of the performance using additional hardware.

HES will be responsible for processing the data from the AMR/AMI devices. There are various components in this layer for several data processing activities.

Meter Data Management System (MDMS)

The Meter Data Management System supports storage, archiving, retrieval & analysis of meter data and various other MIS along with validation & verification algorithms. It acts as a central data repository. MDM has capability to import raw or validated data in defined formats and export the processed and validated data to various other systems sources and services in the agreed format. It provides validated data for upstream systems such as billing, consumer Information system, customer care, analytics, reporting, Network planning & analysis, load analysis/forecasting, Peak Load Management, Outage management etc.

- VAPT Certified Solution,
- CMMI level 3 Certified,
- Software security ISO certificate 27001:2013,
- CERT-In Certified
- AMISP Approved
- MEITY approved Cloud

4. Computer System:

Computer System in Facility office with Configuration : System Processor - Intel I7, Operating System - Window 11 or higher version,, RAM - 8-12 GB, HDD / SSD 1 TB with other standard accessories as per requirement, Monitor - 19.5" Colour TFT Monitor with keyboard and mouse.

D3.5 SOLAR POWER GENERATION

TECHNICAL SPECIFICATION SOLAR PANELS	
1	SPECIFICATIONS FOR SOLAR POWER SYSTEM
1.1	SCOPE OF WORK
	The scope of work involves design, supply, installation, testing and commissioning of complete Solar system as per Indicative Items and
1.2	SYSTEM COMPONENTS DESCRIPTION
1.2.1	Basic Components of a Solar PV System
1	Solar panels - The solar panels N-Type TopCon DCR (Domestic Content Requirement) solar cells module, High Energy Efficiency Solar Photovoltaic Module of capacity ≤ 600 Wp or above, manufactured in India, conforming to IS 14286/IEC 61215, IS/IEC 61730- Part-1, IS/IEC 61730-Part-2. Solar Photovoltaic Module conversion efficiency shall not be less than $\leq 22\%$ (photovoltaic or PV modules) convert sunlight to electricity. A number of modules are connected together to increase the electrical power output. The entire bank of modules may be referred to as the solar. Solar EPC vendor must have OEM authorisation to install the solar plant
2	DC Isolator - The DC isolator provides a safe means of disconnecting the solar array from the inverter, for example for periodic maintenance. Some inverters have integrated DC isolators.
3	Inverter - The inverter converts the Direct Current (DC) electricity produced by the solar panels to the Alternating Current (AC) form that is required for connecting to the Grid and for the operation of household electrical appliances. Also, the inverter provides a fail-safe link between the solar generator and the mains electricity network. If there were a problem with the PV system or (more usually) a fault on the electricity network, the inverter would make the system safe. As the electrical output of Solar PV generators is nonlinear due its dependency on solar irradiation and temperature, inverters are equipped with a controller to get the maximum possible power from the solar PV array.
4	Generation meter - The generation meter accurately counts the number of units of electricity generated by the PV system.
5	AC isolator - A main isolator is included to provide a means of disconnecting the solar PV system from the building electricity supply. This may be important if there is an emergency, but (more usually) is needed when maintenance has to be done on the building supply.
6	Connection to LT Panel - The main point of connection of the PV system into the building supply.
7	Net metering - When electricity consumption is more than solar PV system generation (for example during the night), the power shall be drawn from the mains supply. Any electricity you drawn from the grid will be registered on supply meter as normal. If power shall be exported to grid, then meter installed for (Net Metering) will also register the amount of excess production that is fed back
8	The Grid - The mains electricity network which supplies power and excess solar PV production to other consumers with the help of grid.
8.3	AMBIENT CONDITION & SOLAR INSOLATION
	Contractor will seek from relevant database / source, all the data pertaining to the ambient conditions like temperature, humidity, wind load, rain, weather condition and historical solar radiation etc., pertaining to the site location and optimize the design accordingly. All design calculations and installation details should be submitted before execution of work.
8.4	LOCATION OF THE SOLAR EQUIPMENT
	The solar PV modules shall be installed on the roof of the building.
8.5	EQUIPMENT SPECIFICATION
8.5.1	Solar PV Module (Electrical Features)
	Solar PV module array shall be made by utilizing mono/poly crystalline/ N Type Topcon high efficiency Silicon Solar PV cells. Minimum power output guarantee offered for the SPV Module shall not be less than 30 years. Individual solar module rating will not be less than 600 Wp at Standard test conditions. Each Solar PV module offered shall meet following min. requirement.

a.	Efficiency of cell, E_f , c Efficiency of module,
	Note:- I-V curve of each PV module with Sl. Nos. should be submitted along with modules.
	Solar PV modules shall conform to IEC-61215 standards. Minimum following parameters should be provided by the contractor. a. Maximum Power, P_{max} b. Minimum Power, P_{min} c. Open Circuit Voltage, V_{oc} d. Short Circuit Current, I_{sc} e. Voltage at Max Power V_{mp} f. Current at Max power I_{mp} g. Fill Factor, FF h. Efficiency of cell, E_f , c i. Efficiency of module, E_f , m
8.6	SOLAR PV MODULE (MECHANICAL FEATURES)
	Solar PV Module design will conform to following Mechanical requirement
	a. Toughened, anti-reflective, low iron content, high transmissivity front glass. b. Anodized Aluminium Frame c. Ethyl Vinyl Acetate (EVA) encapsulant d. Silicon edge sealant around laminate e. Tedlar / Polyester trillaminate back surface f. ABS plastic terminal box for the module output termination with gasket to prevent water moisture. g. Resistant to water, abrasion, hail impact, humidity & other environment factor for the worst situation at site. h. Bypass diode.
8.7	MODULE MOUNTING STRUCTURE
	Supply, Installation, Testing & Commissioning of roof top solar plant shall be installed by using supporting Hot Dip Galvanized MS structure (mass of zinc coating shall be as per IS4759) having minimum head room clearance of 2.4 meter above the terrace level /ground level. The mounting structure would be designed to sustain wind speed of 150kmph, wind load and seismic parameter of the site of installation. All the structure shall be design as per applicable BIS code and the material shall also confirm the applicable BIS Code. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts should be made wof SS-304 grade. STAAD analysys report should be submitted for proposed Structure design and vetted by the recognized structural consultant.
8.8	JUNCTION BOXES
	The junction boxes shall be dust, vermin and waterproof and made of FRP /Thermo Plastic. The terminals shall be connected to copper bus bar arrangement of proper size. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable marking shall be provided on the bus bar for easy identification and cable ferrules shall be fitted at the cable termination points for identification. The junction boxes shall have suitable arrangement for the following : a. Combine groups of modules into independent charging sub-arrays that shall be wired to the controller. b. Provide arrangement for disconnection for each of the groups. c. Provide a test point for each sub-group for quick fault location. d. To provide group array isolation. e. The rating of the JB's shall be suitable with adequate safety factor to inter connect the Solar PV array. f. Metal oxide varistors shall be provided inside the Array Junction Boxes.
8.9	POWER CONDITIONING UNIT (PCU):

	The PCU is a combination of Solar Charger (MPPT), Inverter, AC Charger and data logger all housed in a single unit. Maximum power point tracker (MPPT) shall be integrated into the PCU to maximize energy drawn from the solar PV array. MPPT shall be microprocessor/micro controller based to minimize power losses and maximize energy utilization. The efficiency of MPPT shall not be less than 94%. PCU shall include self protective and self- diagnostic features to protect itself and the PV array from damage in the event of PCU component failure. Power conditioning unit will comply the following requirements. a. 415V AC + 5% 50Hz, 3 Phase. b. Output wave shape: sine wave with <3% total harmonic distortion (THD). c. Adjust the Voltage and Frequency Levels to suit the Grid (AC power generated shall be stepped up to 11 KV and shall be fed in Supply company's Grid) in normal case.
8.10	MODES OF PCU
8.10.1	STANDBY MODE:
	The control system shall continuously monitor the output of the solar power plant until pre-set value is exceeded and that value to be indicated.
8.10.2	BASIC SYSTEM OPERATION (FULL AUTO MODE):
	The system shall automatically 'wake up' in the morning and begin to export power provided there is sufficient solar energy and the grid voltage and frequency is in range.
8.10.3	MAXIMUM POWER POINT TRACKER (MPPT):
	MPPT control algorithm shall adjust the voltage of the SPV array to optimise solar energy fed into the grid.
8.10.4	SLEEP MODE:
	Automatic 'sleep' mode shall be provided so that unnecessary losses are minimized at night. The power conditioner must also automatically re-enter standby mode when threshold of standby mode reached.
8.10.5	INVERTER
	The inverter output shall always follow the grid in terms of voltage and frequency. This shall be achieved by sensing the grid voltage and phase and feeding this information to the feedback loop of the inverter. Thus control variable then controls the output voltage and frequency of the inverter, so that inverter is always
	Efficiency > 98.3%
	Output frequency 50Hz inverter to follow grid frequency up to +/-2 Hz of the nominal output frequency during normal operation
	Output voltage 433 + - 20% . to be synchronizing automatically for stepping upto 33 KV and then fed to supply company grid
	THD (at point of Less than 3 % (of rated power)
	Ambient temperature -20 to 50 deg C without any derating in nominal inverter Rating and 60 deg C with derating
	Humidity 100 % non- condensing
	Reactive Power Capability Input DC Range 360 to 800 volts
	0.8 (leading) and 0.8 (lagging)
	Maximum Permissible Voltage 1000 V
	Enclosure IP 65 (Outdoor rated)

	The Inverter shall have following features: Auxiliary power consumption shall be < 0.5% of rated power and maximum loss in sleep mode shall be less than 0.02% Sinusoidal current modulation with excellent dynamic response. Unit wise & integrated Data logging. Dedicated Ethernet for networking Protection against Over-under current Over voltage & under voltage, Over and under frequency Sync loss Over temp. Line to line fault Short circuit Protection against lightning Surge voltage induced at output due to external source Set point pre-selection for VAR control Remote control via telephone modem or mini web server Integrated protection in the DC and three phase system Insulation monitoring of the PV array Ground fault detector – which is essential for large PV generators in view of appreciable discharge current with respect to ground. Over voltage protection against atmospheric lightning discharge to the PV array.
8.10.6	COMPUTER AIDED DATA ACQUISITION SYSTEM
	The plant shall be automatically monitored by data acquisition system. There shall be simultaneous data logging (5 minutes Intervals), recording and display system for continuous monitoring of data for different parameters of different sub systems, power supply of the power plant at DC side and AC side. An integrated data acquisition system shall be supplied which should be capable of communicating with all inverters and provide information of the entire Solar PV power plant. Computer Aided Data Acquisition Unit in the form of personal computer (PC) Supporting with competent internal hardware and software shall be a separate & individual system comprising of different transducers to read the different variable parameters, A/D converter, Multiplexer, De-multiplexer, 16 Interfacing Hardware & Software, Industrial Type PC, which will be robust & rugged suitable to operate in the Control Room Environment. Reliable sensors for Solar Radiation, Temperature & other Electrical Parameters are to be supplied with the data logger unit. System shall provide measurement and recording along with instantaneous of 5 minute daily, monthly and annual average of following parameters: Power at grid terminal Ambient temperature near array field. Wind Speed AC and DC side Power of each inverter Solar irradiation/isolation
	Any other parameter considered necessary by supplier based on current prudent practice. System shall provide 5 minute daily, monthly and annual average of following parameters: Exported Energy to grid Energy of each inverter Solar Radiation Temperature. All data shall be recorded chronologically date wise. The data file should be MS Excel compatible. The data logger shall have internal reliable battery backup and data storage capacity to record all sorts of data simultaneously round the clock. All data shall be stored in a common work sheet chronologically. Representation of monitored data in graphics mode or in tabulation form. All instantaneous data can be shown in the Computer Screen. The applicant shall provide compatible software and hardware so data can be transmitted via standard modem must be compatible with Modbus or TCP/IP protocol for communication. Provision shall be available in the PCU for remote monitoring of following parameters DC power input DC input voltage DC current AC power output AC voltage (all the 3 phases and line) AC current (all the 3 phases and line) Power factor In addition to the above, energy values to be displayed the number of PCUs is indicative only. The contractor shall design the system to extract maximum efficiency with inbuilt redundancy
8.10.7	DATA LOGGING
	The solar power plant shall be provided with Data logging system .
8.10.8	DC DISTRIBUTION BOARD/ARRAY JUNCTION BOX

	DC distribution board shall be provided in between solar array and PCU. The junction boxes shall be made of FRP / Thermo Plastic with impact resistant transparent cover, waterproof, dust free, vermin with IP65 protection. The terminals shall be connected to copper bus bar arrangement of proper sizes. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable markings shall be provided on the bus bar for easy identification and cable ferrules shall be fitted at the cable termination points for identification. Array junction box shall have suitable reverse blocking diodes of minimum DC blocking voltage of 800 V with suitable arrangement for its connecting. The array box shall also have suitable surge protection. The junction boxes shall have suitable arrangement for the following: Combine groups of modules into independent charging sub-arrays that shall be wired to the controller. Provide arrangement for disconnection for each of the groups. Provide a test point for each sub-group for quick fault location. To provide group array isolation. The rating of the JB's shall be suitable with adequate safety factor to inter connect the Solar PV array. Bypass Diode Fuses of suitable rating for Overloading protection of array section.
8.10.9	SURGE PROTECTION SYSTEM
	The DIN channel mountable pluggable surge protection shall be installed in a network configuration, consisting of a single block MOV (Metal Oxide Varistor) based surge arrester having nominal surge handling capacity of 15 KA 8/20 μ s & maximum surge handling capacity of 30 KA 8/20 μ s to provide protection between (L+, L-, earth). All surge arresters in these network configurations shall be of same manufacturer. The Protection unit shall be based on Single block High Capacity Metal Oxide Varistors (MOV), capable of handling 15 KA 8/20 surges and shall be able to give an indication in the event module failure and shall be pluggable to facilitate the onsite replacement without disturbing the lines. One extra set of replacement protective device shall be furnished to the job site. Protection should be suitable to withstand a maximum continuous operating voltage of not less than 115% of normal RMS system voltage.
8.11	AC Distribution Board (ACDB)
	AC DB shall be provided in between PCU and loads.
8.12	EARTHING AND PROTECTION
	The array structure of the PV yard shall be grounded properly using adequate number of earthing kits. All metal casing / shielding of the plant shall be thoroughly grounded to ensure safety of the power plant. Earthing shall be in line with Indian Electricity rules. The earthing & grounding shall also meet the requirement of PV module/cell manufacturer. Detailed specifications have been provided in the Earthing section.
8.13	SOLAR POWER PLANT DATA MONITORING SYSTEM
	8.13.1 Computer Aided Data Acquisition Unit shall have features for simultaneous monitoring and recording of various parameters of different sub-systems, power supply of the power plant at the AC side.
	8.13.2 Computer Aided data Acquisition Unit shall be a separate & individual system comprising of different transducers to read the different variable parameters, Interfacing Hardware & Software, Industrial type PC, which will be robust & rugged suitable to operate in the Control Room Environment.
	8.13.3 The PC shall be of Industrial type, rugged & robust in nature of operate in a hostile environment. The PC has minimum Intel Core 2 Duo processor having 2 x 150 GB HDD with 2 GB RAM. The PC shall also have 17 inches Colour monitor, DVD Drive with writer, multimedia kit and UPS backup. The printer shall be of industrial type rugged & robust in nature. The printer shall be equipped for printing.
	8.13.4 The data acquisition system shall perform but not limited to the following operations and Measurement and continuous recording of:- a) Inverter Output. b) System Frequency. c) Energy Delivered to the GRID in KWH. d) Generated Output in KWH.

	8.13.5 The data file should be MS excel compatible. All data shall be stored in a common work sheet chronologically. Representation of monitored data in graphics mode or in tabulation form. All instantaneous data can be shown in the Computer Screen. a) The Bill of Materials associated with the equipment must clearly indicate especially the details about the PC, Modems. Etc. b) Communication interface the entire system can be operated and monitored via several interfaces (RS232/RS485/ MPI/ Profibus/ Telephone
8.13.6	CABLE AND ACCESSORIES
	All the cables shall be supplied conforming to IS 694 & shall be of 650 V/ 1.1 kV grade as per requirement. Only FRLS PVC copper cables shall be used. The size of the cables between array interconnections, array to junction boxes, junction boxes to DCDB, DCDB to PCU etc. shall be so selected to keep the voltage drop and losses to the minimum. Contractor are required to mention each size of cables used and should consider their resistance / impedance in the design optimization. Such calculation should be submitted by the contractor before execution. The contractor shall supply all installation accessories, which are required to install and successfully commission the power plant. The array structure of the PV yard shall be grounded properly using adequate number of earthing kits. All metal casing / shielding of the plant shall be thoroughly grounded to ensure safety of the power plant.
8.13.7	EARTHING PROTECTION
	The array structure of the PV yard shall be grounded properly using adequate number of earthing kits. All metal casing / shielding of the plant shall be thoroughly grounded to ensure safety of the power plant.
8.13.8	SPACE FOR SOLAR ARRAY AND CONTROL ROOM
	The contractor shall give the details of array layout and control room layout before execution for approval. Contractors are advised to visit the site and conduct a survey with prior notice to the CPWD for deciding the most suitable location from the installation & maintenance point of view.
8.13.9	BILL OF MATERIALS
	Solar PV Modules, array junction box, main junction box, cables, PCU, Array mounting structures, etc. shall be provided. The items required for successful installation / commissioning of SPV power plant should be considered to make it operational.
8.13.10	SPARE PARTS
	Contractor shall arrange /supply recommended spares required for day to day operation. They are also required to furnish the availability of essential spares at their nearest service centre.
8.13.11	TYPE TESTS
	Type test reports of all major equipment's (Solar module, PCU) shall be submitted to the Engineer-In-Charge.
8.14	INSTALLATION AND COMMISSIONING
	The contractor will be responsible for arranging all tools & plants for installation and commissioning the complete system. The contractor will also submit the erection, testing & commissioning procedure for approval to the Engineer-In-Charge. These procedures will form integral part of the acceptance report for successful erection and commissioning the system. These reports will be prepared and signed by contractor's representative & the Engineer-In-Charge.
8.15	INSPECTION
	All major equipment like solar PV modules, power conditioning units, batteries, battery rack, ACDB, DCDB, cables should be inspected by Engineer-In-Charge before their dispatch. The contractor will seek Engineer-In-Charge approval of all equipment drawings & data sheet before execution.
8.16	TRAINING & AFTER SALES SERVICE
	The terms and conditions for training and after sales supply and service are to be presented clearly in the Gurantee/Warranty/Manual and the extent and duration of after sales support clearly defined. An explanation of preventative maintenance schedule, plan of operation, scope and implementation of the after sales service is to be defined.
8.17	DOCUMENTATION

	Installation manual / user manual shall be submitted. The manual shall include complete system details such as array layout, schematic of the system, inverter details, working principle etc. Step by step maintenance and troubleshooting procedures shall be given in the manuals. The contractor shall submit all documents including drawings and user manual.
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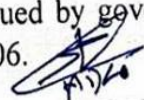
D3.6 ELECTRICAL VEHICLE CHARGER: -

Slow charger shall be installed in basement as well as outdoor. Slow charger shall not be installed in basement. OEM should have compliance as per latest guidelines of (Ministry of Power) MoP for EV chargers(AC as well DC).

I. Private charging stations/points:

- 1) Slow/ Moderate Power charging stations/points shall be allowed only in the parking areas in the building.
- 2) For charging stations/points use of EVSE integrated with Internet of Things (IOT) - based micro controller devices safety devices can be insisted upon.
- 3) Enclosure of charging stations/points shall be made of fire-retardant material with self-extinguishing property and free from halogen.
- 4) It is recommended to provide EV charging points/stations in open/semi open/ non critical area.
- 5) For EV charging stations/points, fire detection, fire alarm, and fire control system shall be provided as per relevant Indian Standards.
- 6) Fire detection, Fire alarm, and control system installation shall be done by a government approved licensed agency & Form-A issued by government-approved licensed agency shall be obtained as per MFP&LS-2006.
- 7) For EV charging stations/points no other service pipe and gas lines shall be taken along the ducts provided for laying power cables and all ducts provided for power cables and other services shall be provided with a fire barrier at each floor crossing.
- 8) Portable Fire Extinguishers: (Numbers and capacity of extinguishers may change case to case basis)

II. Semi-Public charging stations/points :

- 1) For charging stations/points use of EVSE integrated with Internet of Things (IOT) - based micro controller devices safety devices can be insisted upon.
 - 2) Enclosure of charging stations/points shall be made of fire-retardant material with self extinguishing property and free from halogen.
 - 3) It is recommended to provide EV charging points/stations in open/semi open/ non critical area.
 - 4) For EV charging stations/points, fire detection, fire alarm, and fire control system shall be provided as per relevant Indian Standards.
 - 5) Fire detection, Fire alarm, and control system installation shall be done by a government approved licensed agency & Form-A issued by government-approved licensed agency shall be obtained as per MFP&LS-2006.
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General Fire-safety requirement:

1. EV charging stations/points can be permitted in the car parking areas in the first basement with ramps, ground floor, still parking & first podium level/First level car parking floor only, having Cross ventilation/mechanical ventilation from a Fire risk point of view.
2. **EV charging stations/points facility shall not be permitted in any kind of Automated mechanized Car parking system/stacked car parking/Car Parking Towers.**
3. All the EV charging stations/points shall be designed, installed, tested, certified, inspected and connected in accordance with provisions as per prevailing Electricity Act & Rules, guidelines etc. and shall be as per Safety advisory issued time to time by Chief Electrical Inspector, **Department, Haryana.**
4. Power supply cables used in EV charging stations/ points shall conform to IEC 62893-1 and 17505(Part-1) (Standard For Fire Survival Cables) its relevant parts. (Ref: CEA notification dated 28/07/2019).
5. The charging device i.e. charger shall be certified by a nationally recognized testing laboratory such as National Accreditation Board for Testing & Calibration Laboratory (NABL).
6. Premises shall be kept well-ventilated and obstruction free so as to maneuver vehicles in case of emergency.
7. Natural/mechanical ventilation shall be provided to the basements as per norms if EV charging stations are permitted at the 1st level basement with a ramp.
8. Designated EV charging parking shall have adequate space for vehicle parking and EVSE installation.
9. Adequate space should be allowed to maneuver other vehicles around charging vehicles safely when necessary.
10. Storage of any combustible/inflammable substances shall not be allowed near the EV charging stations/points.
11. Adequate numbers of operators depending upon nature of use (private/semi public/public) shall be posted to those who have the knowledge of using fire extinguishers and intimation of Fire Brigade in case of an emergency through Dial-112.

10.4.2 All other buildings (including Group Housing)

Any PCS installed at Public/Private areas or building premises of any category that caters to commercial mode of charging of EVs shall be deemed as a Public Charging Station and shall have to install the minimum requirements of chargers as specified in the Guidelines dated 14.12.2018 of Ministry of Power (refer Annexure IV for MoP Guidelines). However, in order to provide sufficient charging points for the EV share in all vehicles (refer clause 3 of the *Explanatory Note- Annexure III*), ratio of types of chargers is recommended in the table below -

Table 2: Charging Infrastructure requirements for PCS (commercial use)

Building Type	Any building type			
Ownership of Station	Service provider			
Connection and Metering	Commercial Metering and Payment			
Types of Charger	as per min. requirements specified in MoP Guidelines (refer Annexure IV)			
Additional chargers	PCS service providers shall install additional number of kiosk/chargers beyond the minimum specified requirements to meet the ratio of charging points as prescribed below (by the type of vehicles).			
Norms of Provisions for charging points	4Ws 1 SC - each 3 EVs 1 FC - each 10EVs	3Ws 1 SC - each 2 EVs	2Ws 1 SC - each 2 EVs	PV (Buses) 1 FC - each 10 EVs

Note:

- Charging bays shall be planned currently at 20% capacity of all vehicles including 2Ws and PVs(cars)
- Open metering and on-spot payment options to be available for all users.
- Provision of FCB CS and BS shall not be mandatory, and will be at the discretion of the service provider.

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OEM must have own manufacturing plant along with testing simulator to verify AIS 138, Adherence to OCPP 1.5/1.6, & IS 17017 Compliance. The OEM or their partner shall offer inspection and testing at the manufacturer's works before dispatch. The Engineer-in-Charge or his authorized representative shall have the right to inspect and witness the Factory Acceptance Tests. No equipment shall be dispatched without inspection clearance.

Technical Specifications of EV Chargers

10kw Triple industrial socket EV Charger:

Product: 10 kW AC001 Triple socket EV Charger	
INPUT POWER	
Input Voltage (Three Phase)	415±10% V _{ac} ,
Input Frequency	50±3Hz
OUTPUT POWER	
Output Connector	Industrial Socket
Number of outputs	03
Current Output	16A per phase
Output Charging outlet	03 x IEC60309
ENVIRONMENT CONDITION	
Ambient Temperature	-20°C to 55°C
Storage Temperature	-20°C to 85°C
Altitude	<2000 Mt
Humidity	< 95%
Environment	Indoor/outdoor
USER INTERFACE AND CONTROL	
Display	Graphical LCD with push button
Language	English
Push Button	Emergency stop (Mushroom red)
User Authentication	Using mobile application or user interface / QR code/ RFID card
Visual Indication	RGB LEDs
External/Internal communication	4G, Wi-Fi (OCPP v1.6 up-gradable to 2.0)
PROTECTION	
Protection	Over current, under voltage, over voltage, residual current, surge protection, short circuit, ground fault protection, emergency shutdown with alarm
COMMUNICATION	
Connectivity and CMS	OCPP v 1.6 over Wi-Fi, GSM Modem (4G)
Charger and Vehicle	Industrial Socket as per IEC 60309
MECHANICAL	
Cooling	Natural cooled
Ingress Protection	IP54
Mounting	Stand mounted

22kw AC typ2 EV Charger:

Product: 22 kW AC Type 2 Single Gun EV Charger

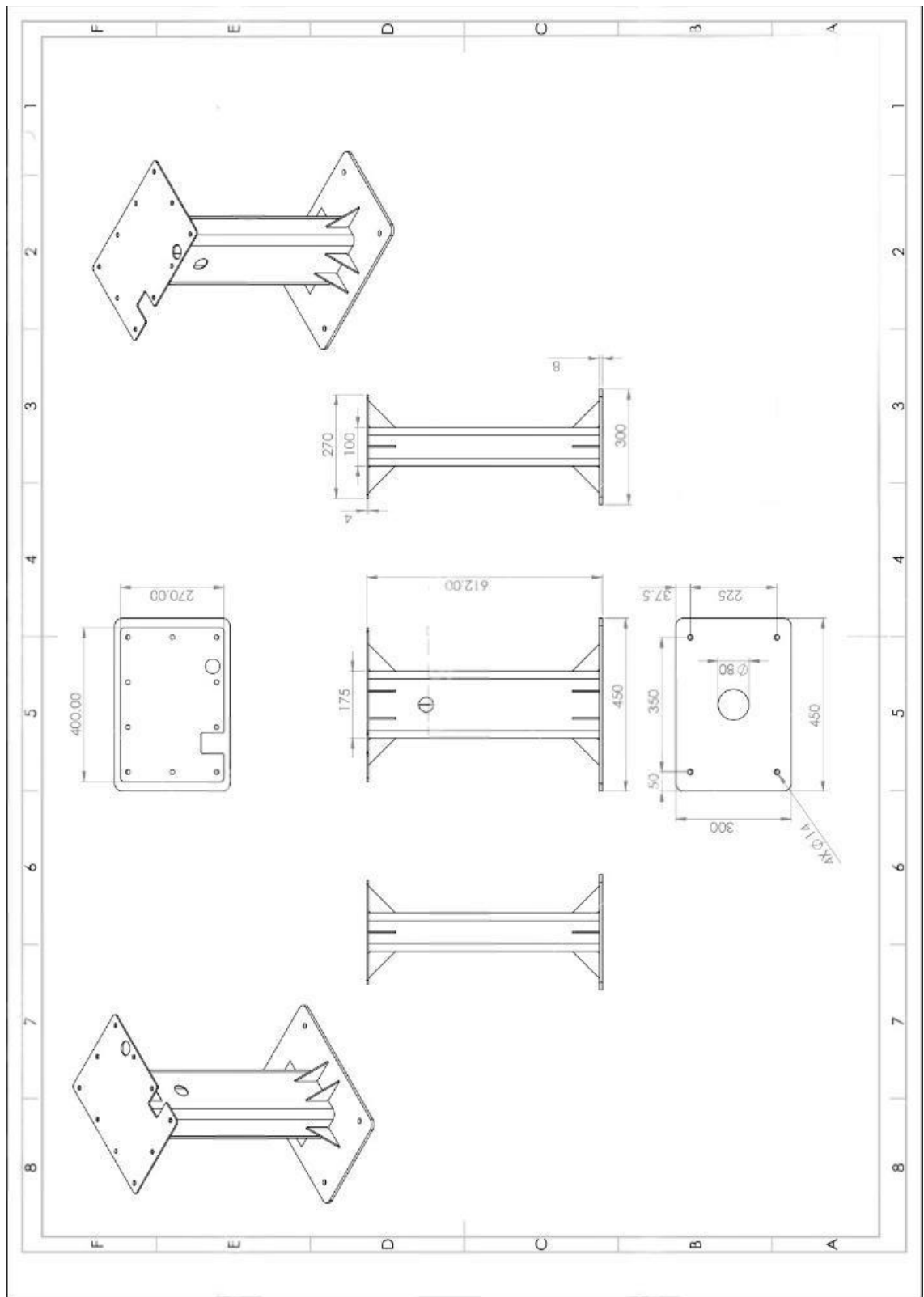
INPUT POWER	
Input Voltage (Three Phase)	415±10% V _{ac} ,
Input Frequency	50±3Hz
OUTPUT POWER	
Output Connector	AC Type 2
Number of outputs	01
Current Output	32A per phase
Output Charging outlet	01 x IEC62196 Type2
ENVIRONMENT CONDITION	
Ambient Temperature	-20°C to 55°C
Storage Temperature	-20°C to 85°C
Altitude	<2000 Mt
Humidity	< 95%
Environment	Indoor/outdoor
USER INTERFACE AND CONTROL	
Display	Graphical LCD with push button
Language	English
Push Button	Emergency stop (Mushroom red)
User Authentication	Using mobile application or user interface / QR code/ RFID card
Visual Indication	RGB LEDs
External/Internal communication	4G, Wi-Fi (OCPP v1.6 upgradable to 2.0)
PROTECTION	
Protection	Over current, under voltage, over voltage, residual current, surge protection, short circuit, ground fault protection, emergency shutdown with alarm
COMMUNICATION	
Connectivity and CMS	OCPP v 1.6 over Wi-Fi, GSM Modem (4G)
Charger and Vehicle	Type 2 AC as per IS 17017
MECHANICAL	
Cooling	Natural cooled
Ingress Protection	IP54
Mounting	Stand mounted

30kW DC CCS2 EV Charger:

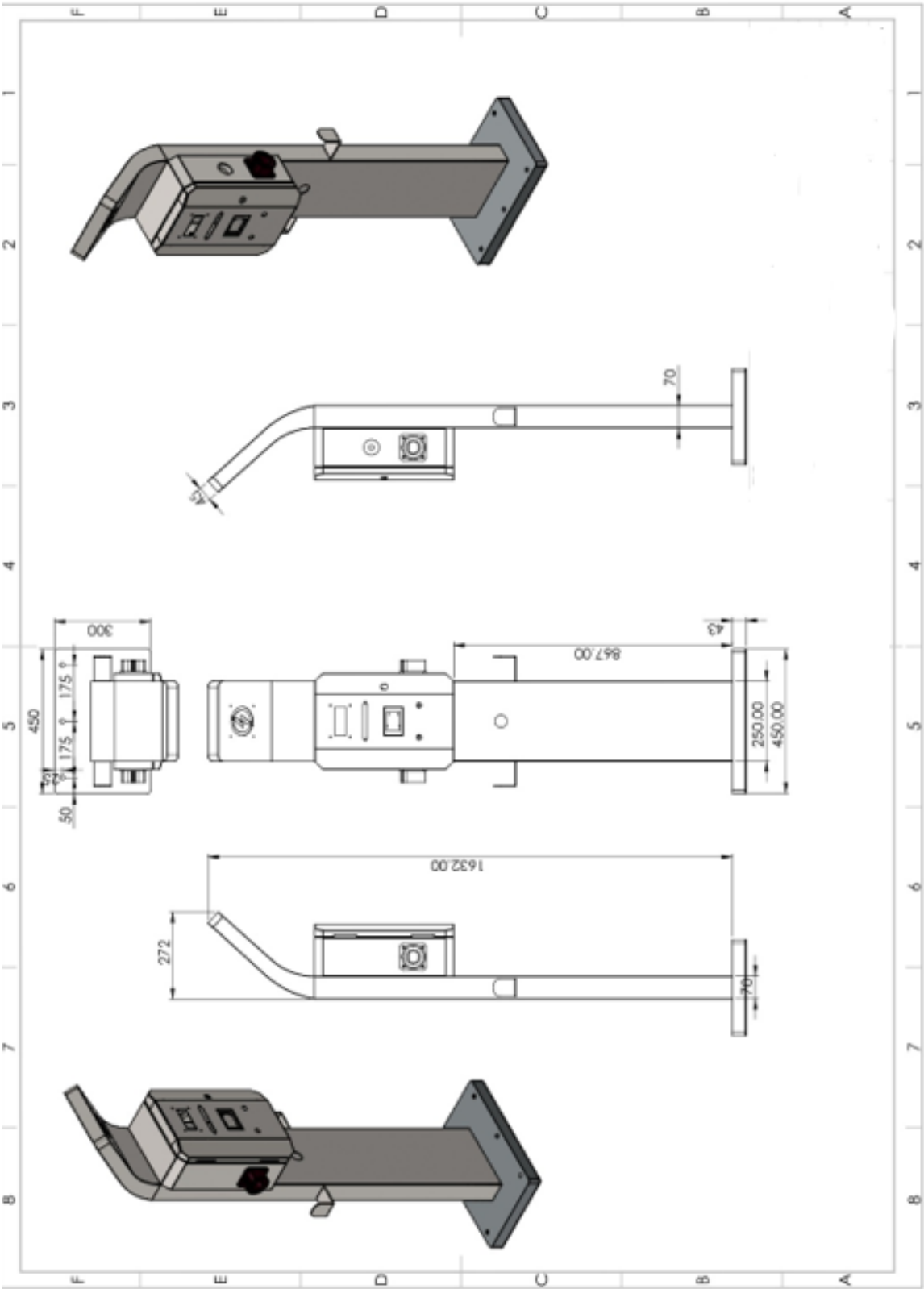
Product: 30kW DC CCS2 Single Gun EV Charger	
INPUT POWER	
Input Voltage (Three Phase)	415±10% V _{ac} ,
Input Frequency	50±3Hz
OUTPUT POWER	

Output Connector	CCS2
Number of outputs	01
Current Output	80A max
Output Charging outlet	01 x CCS2 as per IS 17017
ENVIRONMENTAL CONDITION	
Ambient Temperature	-20°C to 55°C
Storage Temperature	-20°C to 85°C
Altitude	<2000 Mt
Humidity	< 95%
Environment	Indoor/outdoor
USER INTERFACE AND CONTROL	
Display	7" TFT LCD with touch
Language	English
Push Button	Emergency stop (Mushroom red)
User Authentication	Using mobile application or user interface / QR code/ RFID card
Visual Indication	RGB LEDs
External/Internal communication	4G, Wi-Fi, LAN & OCPP v1.6 upgradable to 2.0
PROTECTION	
Protection	Over/Under voltage protection, Overload protection, Short circuit protection, Current leakage protection, Grounding protection, Surge protection, Over/Under temperature Protection
COMMUNICATION	
Connectivity and CMS	OCPP v 1.6 over Wi-Fi, GSM Modem (4G), LAN
MECHANICAL	
Cooling	Forced Air cooling
Ingress Protection	IP55
Mounting	Stand mounted

DC Charger Stand



AC Charger Stand



D3.7 ELECTRIC GEYSER : -

- Supply, installation, testing, and commissioning of electric storage type water heaters (geysers) complete with all accessories, piping connections, electrical connections, and safety devices as required.
- Type of Water Heater: Storage
- Mounting: Vertical / Horizontal wall mounted
- Capacity: Storage Capacity: 25 Litres
- Inner Tank: Heavy gauge steel with glass-lined coating
- Outer Body: CRCA / ABS high-quality corrosion-resistant body
- Insulation: High-density PUF insulation (30-50 mm thickness)
- Heating Element: Type: Copper / Incoloy heating element , Rating: 2 kW , Voltage: 230V $\pm$ 10%, 50 Hz, Single phase
- Temperature Control & Safety: Adjustable thermostat (range: 25°C to 75°C) , Automatic thermal cut-out & Pressure relief / safety valve (multi-function valve)
- Maximum Working Pressure: 6 bar (6-8 bar recommended)
- Heating Time: As per manufacturer standards
- Heat Retention: High efficiency with minimal heat loss
- Star Rating: Minimum 4 Star (as per BEE standards)

Accessories (As per OEM standard)

- Inlet & outlet connections with flexible hoses
- Safety valve
- Mounting brackets
- Power cable with plug top
- Product: Minimum 2 years warranty.

D4. LIST OF PREFERRED MAKES FOR E&M WORKS

Approved makes of materials to be used in the work are as given in the table below. In case of non-availability of these makes, the Engineer-in-charge may allow use of alternative makes after seeking approval of TS authority. Only BIS marked materials shall be generally used in the work. Non-BIS marked materials may be permitted by the Engineer-in-charge only when BIS marked materials are not manufactured.

Some preferred bands names of materials, whichever are applicable for the scope of work are listed below. However preferred equivalent materials of any other specialized firms may be used, in case it is established that the brands specified below are not available in the market or not able to provide the material as per requirement and time and subject to approval of the alternate substantially equivalent brand by the Engineer-in-Charge, (See also conditions of contract or any other manufacturer approved by the Engineer-in-charge.

The Contractor shall obtain prior approval from the Engineer-in-charge before placing order for any specific material or engaging any of the specialized agencies and the brand / make of the material as specified in the specifications and in the list of preferred makes of materials attached in the tender. The Contractor shall make a detailed submittal with catalogue and highlighted proposed specifications, as well as full details of the works proposed to be executed by the specialized agency.

The list given below does not absolve the Executing Agency from their responsibility for using these products. It is only after, they are satisfied about the quality and performance, and the products shall be used. To achieve this, proper check on the quality of the product, actually to be used, should be exercised.

Contractor shall provide samples of makes proposed for each item of work as per the list of preferred makes for the approval of Engineer-in-Charge. If sample is not found conforming to the agreement and/or applicable specifications then the same shall be liable for rejection.

S. No.	Description of Item	Preferred Makes
1.	PVC Insulated FRLS Copper Conductor Wires 1.1 kV Grade (ISI Marked)	Polycab/ Havells/ KEI/ Grandlay / AKG / RR Kabel
2.	Modular Plate/Modular Switch & Socket/GI Boxes/ Fan Regulator/Telephone/ RJ-45 /Bell	Legrand (Myrius)/ ABB (Ivie)/ Honeywell (Blenze Pro)/ Panasonic (Europa)/ Siemens opulenz / Northwest (Venia)
3.	MCB /DB/MCB /Isolator/DB/RCCB/ELCB	Legrand / ABB/ Siemens / Lauritz Knudsen
4.	Telephone Cables / Wires (ISI Marked) / Co-Axial Tv Cables, CAT6,CAT6A, Communicaion cable	Finolex/ Polycab/ Havells/ RR Kabel/ KEI/ legrand
5.	DWC Hdpe Pipe (Isi Marked)	Rex /Duraline/ Trupati/ Gemini
6.	1.1 KV XLPE (Alumium/Cu) Cable (ISIMarked)/ Communication cable	Polycab/ Havells/ KEI/ Grandlay
7.	TTA Panels (All Panels 400A and above incomer rating)	Seimens (Siepan)/ Schneider (Blokset)/ Lauritz Knudsen (Ti)/ ABB (ArTuK) or their authorised Channel Partners. Drawing to be vetted by OEM.

8.	Non-TTA Panels (Only CPRI approved)	Tricolite/ Neptune/ Milestone/ SPC Electrotech/ Application Control Panels Pvt Ltd/ Advance / Precision
9.	ACBs	Lauritz Knudsen/ Siemens / Schneider / ABB/ Legrand - microprocessor release shall be as per tender specification.
10.	MCCBs	Siemens / Schneider / Lauritz Knudsen/ Legrand / ABB
11.	Current Transformers & Potential Transformer	Automatic Electric/ Kappa/ Electro Control System
12.	Digital Indicating Measuring Instruments/ Multifunction Meters/ Digital Energy Meter/ Smart meter	Lauritz Knudsen/ Automatic Electric/ ABB/ Legrand / Neptune
13.	Selector Switch	Lauritz Knudsen/ Kaycee/ Siemens/ ABB/ Schneider / Salzer
14.	Indication Lamp & Push Button/ Relay/ Timer/Contactor/	Lauritz Knudsen/ Kaycee/ Siemens /ABB/ Schneider
15.	Active Harmonic Filter Panel- OEM make	Lauritz Knudsen/ Siemens /Schneider /Legrand/ ABB/ Neptune Ducati
16.	Cable Trays/ GI Raceway/ Floor Box/ Junction Box & Accessories	Venus/ Slotco/ Advance / RM Con
17.	Cable Gland/ Lugs/Thimbles	Commet/ Dowells/ Raychem/ Gripwell Jainson
18.	SMF Batteries	Amaron/ Exide/ Amaraja/ Lumminous
19.	Fire Suppression system	FireTrace/ Tracefire/ Lifeguard/ Firetrex/ Fire chem
20.	Rigid PVC Conduit Pipes & Accessories (ISI Marked)	Norpack/ Finolex/ Supreme/ Astral/ AKG/ Anchor by Panasonic
21.	G.I Pipe	Tata/ Jindal (Hisar)/ SAIL
22.	Transinet Voltage Suppression	Eaton/ Schneider/ Sevlon
23.	M.S. Conduit & Accessories (ISI Marked)	BEC/ AKG/ STEEL KRAFT/ NIC / RM Con
24.	UPVC Trunking/ Pop Box:	Honeywell/ Legrand/ Hager
25.	chemical earthing	JMV, GPI, APS, GLS, Truepower
26.	Industrial Plug & Sockets (IP-44 , IP67), Junction Box (IP-65)	Neptune / Hensel / Obo Betterman
27.	Energy meter, Communication devices, Energy management software	Secure, Radius, L&T
28.	Computer system	Dell, HP, Lenovo

29.	UPS	Schneider, legrand, Apc
30.	Printer	Dell, HP, Canon
31.	Solar Module	Waaree, Jackson, vikram, Adani, Tata
32.	Inverter	Sungrow, Solis, Deye
33.	Module Mounting Structure	HDGI- Tata, GWS, SAIL
34.	DC Cable	RR cables, Finolex, Havells, ,KEI, Polycab
35.	AC Cable	RR cables, Finolex, Havells, KEI, Polycab, Grandlay
36.	Cable Tray	Slotco, BEC, Steelcraft, Legrand, Powersun
37.	PVC Conduit	BEC, AKG, Steel Krafts
38.	Lugs/Gland	Dowel, Comet, Braco
39.	Maintenance free batteries	Exide/ Amron/ Amaraja/ Luminous
40.	Hi Wall Air Conditioners	Voltas. Daikin, Haier, Carrier
41.	EV Charger	ABB, Eaton, Zetwerk, Delta, Panasonic, P2POWER, Labotek, E-FUEL
42.	Signage	CBM, ARP, 3 M , Signexpress
43.	Boom Barrier	Magnetic, FAAC, Neptune, DeltaScientific
44.	Electric Geyser	Havells, Racold, AO Smith, Bajaj

Note:- All products approved by the Chief Engineer-cum-Executive Director, Gurugram, as on the date of publication of the tender, shall also be deemed included for preferred make list.

PART - E

SCHEDULE OF QUANTITIES & PRICE BID

E1 : SCHEDULE OF QUANTITIES (CIVIL WORKS)

Sr. No.	Description	Quantity	Unit	Rate	Amount
1	Providing and fixing wire gauge shutters using galvanized M.S. wire gauge of average width of aperture 1.4 mm in both directions with wire of dia 0.63 mm, for doors, windows and clerestory windows with hinges and necessary screws :				
1.1	35 mm thick shutters				
1.1.1	with ISI marked M.S. pressed butt hinges bright finished of required size				
1.1.1.1	Second class teak wood	930.00	sqm	₹ 4,911.56	₹ 45,67,750.80
2	Providing and fixing special quality chromium plated brass cupboard locks with six levers of approved quality including necessary screws etc. complete.				
2.1	Size 40 mm	1,188.00	each	₹ 323.65	₹ 3,84,502.00
3	Providing and fixing magnetic catcher of approved quality in cupboard / ward robe shutters, including fixing with necessary screws etc. complete.				
3.1	Double strip (horizontal type)	9,504.00	each	₹ 40.18	₹ 3,81,916.00
4	Providing and fixing stainless steel fancy handle of approved make fixed with SS screws etc. complete for kitchen cabinet & wardrobe as per direction of Engineer-in-charge.				
4.1	200 mm	792.00	each	₹ 188.93	₹ 1,49,632.00
5	Providing and fixing stainless steel soft closing spring hinges at 0-degree hinges (hydraulic type) of approved make/brand to cupboard shutters with full threaded steel screws including making necessary recess in board and finished etc. complete as per direction of Engineer-in-charge.	12,672.00	each	₹ 275.32	₹ 34,88,876.00
6	Providing and fixing readymade 304 grade stainless steel Modular kitchen basket and accessories such as right-angle basket (Plain Cup & Saucer, plant, Partition, Bottle rack, Thali, Cutlery) kitchen utensil basket, Dinner set basket, kitchen grain basket, Multipurpose basket as per site	1,980.00	kg	₹ 539.76	₹ 10,68,729.00

	requirement including finishing (wherever required) and fittings. The same shall be fixed with necessary stainless-steel nuts & bolts, Stainless Steel screws & telescopic channel etc. as per direction of Engineer-in-charge. (For payment purpose only weight of Stainless-steel basket shall be considered excluding weight of all fixing accessories such as nuts, bolts, fasteners telescopic basket channels etc. Payment of providing and fixing telescopic channel shall be paid separately)				
7	Providing and fixing 2mm thick 16 to 19mm wide PVC edge binding tape of approved quality for cupboard/wardrobe shutters including necessary synthetic resin hot pressed to edges on binding machine etc. complete as per directions of Engineer- in-charge.	29,700.00	metre	₹ 44.33	₹ 13,16,746.00
		Total for DSR Items			₹ 1,13,57,931.12
8	Providing and fixing 0.80mm thick 16 to 19mm wide PVC edge binding tape of approved quality for wardrobe shutters including necessary synthetic resin hot pressed to edges on binding machine etc. complete as per directions of Engineer- in-charge.	42,768.00	metre	₹ 25.64	₹ 10,96,571.52
9	Providing and fixing factory made modular wardrobe/kitchen cabinets made up of 8mm thick one sides Pre-laminated balancing paper Boilo board with density of approx. 1000kg/cum (make:-action TESA, GREENPANEL, CENTURY) of recommended gradings with resin based standardized glue, treated for fungal/borer/termite resistance and calibrated for environment friendly, jointed together and fixed with stainless steel fittings and fixtures like fully threaded CSK Phillips headed S.S. screws , nails, minifix, ebas corner cleat (wherever required), etc. of required sizes on the backing of racks, drawer, wardrobe, kitchen cabinet,	2,180.00	sqm	₹ 2,259.36	₹ 49,25,404.80

	under kitchen counter, etc. all complete made by authorised OEM as per direction of Engineer-in-charge.				
10	Providing and fixing factory made modular wardrobe/kitchen cabinets made up of 18mm thick both sides Pre-laminated BSB (Both Side Balancing paper) HDHMR board with density of approx. 850kg/m ³ (make:-action TESA, GREENPANEL, CENTURY) of recommended gradings with resin based standardized glue, treated for fungal/borer/termite resistance and calibrated for environment friendly, jointed together and fixed with stainless steel fittings and fixtures like fully threaded CSK phillips headed S.S. screws, nails, minifix, etc. of required sizes on top ,bottom, partition, boxes, shelves, racks, drawer, wardrobe/kitchen cabinet made by authorised OEM as per direction of Engineer-in- charge.	6,800.00	Sqm	₹ 2,664.59	₹1,81,19,212.00
11	Providing and fixing factory made modular wardrobe/kitchen cabinets made up of 18mm thick one side decorative and other side balancing lamination factory pressed HDHMR board with density of approx. 850kg/m ³ (make:-action TESA, GREENPANEL, CENTURY) of recommended gradings with resin based standardized glue, treated for fungal/borer/termite resistance and calibrated for environment friendly, jointed together and fixed with stainless steel fittings and fixtures like auto closing spring loaded hinges (hydraulic type), handles, fully threaded CSK phillips headed S.S. screws, nails, minifix, etc. of required sizes on exposed faces and shutters, etc. of wardrobe/kitchen cabinet made by authorised OEM as per direction of Engineer-in-charge.(Payment for providing and fixing of auto closing hinges,	2,180.00	Sqm	₹ 2,703.84	₹ 58,94,371.20

	handles shall be paid separately)				
12	Providing and fixing stainless steel soft closing heavy type telescopic drawer channels of approved make 400mm to 500 mm long with screws etc. complete as per directions of Engineer- in-charge.	1,584.00	one set	₹ 861.23	₹ 13,64,188.32
13	Providing and fixing SS tower bolt of size 200x10 mm of approved quality in SS 316 grade with including necessary screws etc. for kitchen cabinet and wardrobe complete as per direction of Engineer-in-Charge.	396.00	Each	₹ 492.89	₹ 1,95,184.44
14	Providing and fixing stainless steel in SS 316 grade pipe curtain rods with necessary brackets complete as per direction of engineer-in-charge. (Heavy duty) 25 mm dia	396.00	metre	₹ 520.04	₹ 2,05,935.84
15	Providing and fixing SS tower bolt of size 250x10 mm of approved quality in SS 316 grade with including necessary screws etc. for doors complete as per direction of Engineer-in-Charge.	996.00	Each	₹ 631.32	₹ 6,28,794.72
16	Providing and fixing stainless steel pull handle in palate pattern of SS 316 grade of approved make fixed with SS screws etc. complete as per direction of Engineer-in-charge. 125 mm	996.00	Each	₹ 368.50	₹ 3,67,026.00
TOTAL FOR MR ITEMS					₹3,27,96,688.84
TOTAL FOR DSR AND MR ITEMS					₹ 4,41,54,619.96
TOTAL (say)					₹ 4,41,54,620-/-

E1 : SCHEDULE OF QUANTITIES (E&M WORKS)

SH: A, Solar Power Generation (50 kWp X2 SET SOLAR PV SYSTEM - ON GRID)					
S. NO.	Description of item	Quantity	Unit	Rate	Amount
1.0	Supply, Installation, Testing & Commissioning of solar pv modules 50 kWp consisting of Mono/Poly Crystalline silicon/ N-Type TopCon DCR (Domestic Content Requirement) solar cells module, High Energy Efficiency Solar Photovoltaic Module of capacity 600 Wp or above, manufactured in India, conforming to IS 14286/IEC 61215, IS/IEC 61730-Part-1, IS/IEC 61730-Part-2. Solar Photovoltaic Module conversion efficiency shall not be less than 22.5% at STC with temperature coefficient of Pmax better than -0.30% per 0C. PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 12 years and 80% at the end of 30 years. Solar Modules shall be designed to operate in relative humidity upto 100% with temperature between -10 0C and +85 0C. Further, each PV module used in any solar power project must have Radio frequency identification tag with information such as name of manufacturer, month and year of manufacturing, country of origin (separately for Solar cell and module), I-V curve, Unique Serial No and Model No of the module, Wattage, Im, Vm and FF, name of test lab issuing IEC certificate.	2	Set	25,29,730	50,59,460
2.0	String inverter				
2.1	Supply, Installation, Testing & Commissioning of 50KW Power Conditioning Unit (PCU) of 350-800 V DC Input voltage range and 415 V AC, three phase, 4 wire, 50Hz +/- 2.5 Hz, output voltage suitable to generate AC with a variation of 10% at nominal voltage. Power with efficiency not less than 97%, total harmonic distortion less than 3% and suitable for ambient temperature from 0 to 50 0C, Minimum IP-65 for outdoor and Minimum IP 21 for indoor, Built-in meter and data logger, MPPT, switching devices IGBT/MOSFETs and controller	2	Nos	3,66,627	7,33,254

	Microprocessor /DSP. PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown. The PCU shall be able to withstand unbalanced load conforming to IEC standard with shutdown/standby mode. It must be provided with grid islanding along with manual disconnect pole isolation switch besides automatic disconnection. Minimum protections: Mains Under / Over Voltage, Over current, Over/Under grid frequency, Over temperature, Surge voltage induced at output due to external source, Short-circuit, Lightning, Anti Islanding (for grid synch. Mode) and other protections as per applicable standards. LCD/LED display of minimum parameters: DC input voltage, DC current, AC Voltage and current as per the OEM standard. (all 3 phases, in case of 3 phase), Instantaneous & cumulative AC output power, Daily DC energy produced and other parameters applicable standard. Communication interface RS 485 / RS 232.				
3.0	Module Mounting Structure				
3.1	Supply, Installation, Testing & Commissioning of roof top solar plant shall be installed by using supporting Hot Dip Galvanized MS structure (mass of zinc coating shall be as per IS4759) having minimum head room clearance of 2.4 meter above the terrace level /ground level. The mounting structure would be designed to sustain wind speed of 150kmph , wind load and seismic parameter of the site of installation. All the structure shall be design as per applicable BIS code and the material shall also confirm the applicable BIS Code. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame; its fasteners, nuts and bolts should be made wof SS-304 grade. STAAD analysis report should be submitted for proposed Structure design and vetted by the recognized structural consultant.-50kWp.	2	Lot	6,59,929	13,19,858
4.0	ACDB				

4.1	Supply, Installation, Testing & Commissioning of ACDB with the following - 1 No. 125 Amp FP MCCB I/C cum O/G with 3 phase 440V, 1 No. SPD (type-1+2) including multi-function meter with 125/5Amp cast resin CT, phase indicating lamps, ON/OFF indication, cubicle type totally enclosed free standing type moisture, dust, vermin & weather proof double door distribution box IP55 made out of 2.0 mm thick CRCA sheet complete with following equipment's, indicating lamps, internal wiring with suitable size wires/cable, interconnection, painting, M.S. Angle stand for installation etc. as required. (All MCCBs shall have thermal magnetic release).	2	Nos	87,991	1,75,982
5	DCDB				
5.1	Supply installation, testing and commissioning of DCDB (5 In - 5 out) IP55 Polycarbonate Box with Transparent cover, SPD 1000 V DC - 3 nos, 20 A, 1000 V DC fuse 5 nos and Bracket for Mounting Fuse Box on wall, complete in all respects	2	Nos	51,328	1,02,656
6.0	DC Cables				
6.1	Supply, Laying, termination ,testing and commissioning of 4sqmm DC cable red (+), Black (-) XLPO 1C flexible copper conductor UV stabilized 1.5kv DC volt for interconnection b/w SPV to DCDB to Inverter, includes anchor fasteners wall with suitable clamps, saddles fixing bolts, Suitable thumble & lugs including all accessories -50kWp	2	Lot	73,325	1,46,650
7.0	AC Cables				
7.1	Supply, Laying, termination ,testing and commissioning of following 1.1 KV grade XLPE insulated, PVC inner sheathed and PVC outer sheathed FRLS Aluminium/copper cable as per specification in existing cable trays, clamped includes anchor fasteners wall with suitable clamps, saddles fixing bolts, Suitable thumble & lugs including all accessories. The work involves the following sizes.				
7.2	3.5C X 50 Sq.mm Ar Al XLPE Arm. Cable (ACDB to Main LT Panel)- 2*50kWp	100	RM	1,173	1,17,300
7.3	4C X 35 Sq.mm Cu flexible Cable (Inv to ACDB)- 2*50kWp	20	RM	2,933	58,660

7.4	1 core 16 sq.mm XLPE insulated Cu flexible Cable (Inverter earthing)- 2*50kWp	40	RM	147	5,880
8.0	Earthing System				
8.1	Supply,& Laying of advance maintenance free earthing consisting of 17.2 mm dia and 3-meter length copper bonded earth rod in 150 mm dia. in an augured hole in ground , surrounded by ground enhancement material as per specification. Inspection chamber shall be of 400 x 500 mm with concrete base CI manhole cover with frame painted with bitumastic paint. 2 Nos. of 50 x 6 mm cross section & 300 mm long copper strip to be clamped with copper claded rod electrode have sufficient nos (But not less than 4 Nos.) of 10 mm dia. GI nuts & bolts for connection to the equipment / interconnection to the other pits to form equi-potential bonding .The pH value of ground enhance material shall be 6.9 to 7.2 of 1000gm / lit @ 20 deg.c.The minimum 30 Kg of ground enhancement material shall provided for each electrode. The complete earthing system shall be in accordance with IS 3043 and be provided with required material complete in all respect as per site requirement. - 2*50kWp	4	Sets	36,663	1,46,652
8.2	Providing and laying G.I. tape 25 mm X 3 mm from earth electrode directly in ground as required.(cost of Insulator for GI Strip shall be included)	600	mtr	147	88,200
9.0	Lightning Protection System				
9.1	Supply, Installation, testing & Commissioning of Lightning Arrester as per IEC 62305 with all accessories as required complete in all respects to ensure protection of Solar Plant against the lightning strikes, total no of required lightning arrestors shall be calculated the vendor - 2*50kWp	2	Sets	51,328	1,02,656
10.0	Earthing System				
10.1	Providing and fixing in position the following heavy duty thick 32mm PVC conduits concealed or exposed as called for including all accessories i.e. bends, junction boxes with cover plates of approved make and design.	200	Mtr	117	23,400
11.0	MC4 Connectors				
11.1	UV Resistive Male-Female MC4 Connectors suitable for terminating 4 Sq. mm copper wires	100	Sets	103	10,300

12.0	Any other items required to complete the system fully functional like - Lugs, Thimbles, Hardwares, Wiring and Cabling accessories, Danger stickers, PVC insulated tapes, etc	2	Sets	95,323	1,90,646
13.0	Net metering facility, liasioning with Discom	1	Lot	2,93,302	2,93,302
14.0	Real time online web interfaced Data Monitoring System complete with accessories for various parameters directly from Inverters through the wifi / RS485 modbus communication protocol.	1	Lot	80,658	80,658
TOTAL OF SH: A					₹86,55,514
SH: B, Cables and Cable tray					
S. NO.	Description of item	Quantity	Unit	Rate	Amount
1	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.				
1.1	150 mm width X 50 mm depth X 1.6 mm thickness	300	Meter	803	2,40,900
1.2	225 mm width X 50 mm depth X 1.6 mm thickness	200	Meter	991	1,98,200
2	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "bends" (galvanisation not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.				
2.1	150 mm width X 50 mm depth X 1.6 mm thickness	30	Each	1368	41,040
2.2	225 mm width X 50 mm depth X 1.6 mm thickness	20	Each	1811	36,220
3	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "Tee" (galvanisation not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.				

3.1	150 mm width X 50 mm depth X 1.6 mm thickness	8	Each	1486	11,888
3.2	225 mm width X 50 mm depth X 1.6 mm thickness	6	Each	2097	12,582
4	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "Reducer" (galvanisation not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.				
4.1	225 mm width X 50 mm depth X 1.6 mm thickness	4	Each	2572	10,288
5	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.				
5.1	Upto 35 sq. mm (clamped with 1mm thick saddle)	1100	Meter	53	58,300
5.2	Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	400	Meter	138	55,200
6	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
6.1	4 X 10 sq. mm (25mm)	40	Each	325	13,000
6.2	4 X 35 sq. mm (32mm)	20	Each	438	8,760
6.3	3½ X 120 sq. mm (45mm)	10	Each	710	7,100
6.4	3½ X 240 sq. mm (50mm)	4	Each	1160	4,640
7	Supply of Power Cables, stranded conductor,XLPE Insulated,cores laid up, PVC tape innersheathed, Armoured galvanised steel strip, extruded PVC Type ST2 sheathed,650/1100V grade as per IS 7098(Part 1) 1988				
7.1	3.5 core 35 sqmm	300	Meter	700	2,10,000
7.2	3.5 core 120 sqmm	200	Meter	2109	4,21,800
7.3	3.5 core 240 sqmm	250	Meter	3963	9,90,750
8	Supply of PVC INSULATED MULTICORE FRLS PVC SHEATHED MULTISTRANDED CABLES WITH BRIGHT ANNEALED ELECTROLYTIC BARE COPPER CONDUCTOR FOR VOLTAGE GRADE UPTO 1100 V CONFORMING TO IS-694:2010.				
8.1	4 core 10 sqmm	200	Meter	1341	2,68,200

9	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc.direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
9.1	63 mm dia (OD-63 mm & ID-51 mm nominal)	200	Meter	289	57,800
9.2	120 mm dia (OD-120 mm & ID-103 mm nominal)	100	Meter	417	41,700
10	SITC of 9W LED bulb with E27 base with 2700 K in existing bracket fitting	1300	Each	82	1,06,600
	TOTAL OF SH: B				₹27,94,968
SH: C, Smart Energy Meter					
S. NO.	Description of item	Quantity	Unit	Rate	Amount
1	Supply, installation, testing and commissioning of Digital 1 Phase 2 wire, Energy Meter 50 Hz, BIS Approved IS 13779,Single Source Energy Meter With Rs 485 Port, 10-60A,Class 1.0, With Inbuilt Connection/Disconnection Device,inbuilt required CT's , Compatible For Automatic Meter Reading System and antitamper feature compatible for prepaid/pospaid metering. Meter shall be capable of online monitoring with AMI (Advanced Metering Infrastructure) & centralized control. Display all energy parameters like KWH & KVAH, Load setting.	198	No.s	5866	11,61,468
2	Communication Infrastructure :				
2.1	Data Coordination Bridge / DATA ACQUISITION HUB Hardware having RS485 port and in-built RF Module to communicate with meters and with central monitoring station predefined sequential address Hardware optically isolated with AI / AO port for Pulse acquisition sent by meter with EEPROM, With Inbuilt RF module.	9	No.s	57927	5,21,343
2.2	Smart M2M Gateway Monitors and collects data from the individual data coordination Bridge through appropriate wireless communication(RF), supported by desired rules engines. The Gateway directly communicates with the cloud-based backend IOT platform called the services Delivery platform (SDP) using a 4G-based secured private	2	No.s	81391	1,62,782

	APN.(Private APN, Dual Sim & M2M Based -Mandatory)				
3	Energy Management Software & Backend Server : A) Energy Management Software & Backend Server : Energy Management Software Automatic Meter Reading Software / Billing Software to Communicate with each Coordination Bridge & Gateways and to collect data of each meter on regular intervals with the billing engine and Device Communication layer for fault identification. (VAPT Cerified Solution, Minimum CMMI level 3 Certified, Software security ISO certificate 27001:2013, CERT-In Certified). B) 4 Layers backend server architecture as per CEA Guidelines. Contains HES MDMS Application Server and Web Server along with other related support servers. C) AWS cloud server for Billing engine & storage. AWS Web Application Firewall (WAF) and AWS Shield services which Protects web applications with DDoS attacks and common web vulnerabilities. (Cloud must be MEITY approved)	1	Lot	322632	3,22,632
4	Supply, installation, testing & commissioning of Computer System in Facility office with Configuration : System Processor - Intel I7, Operating System - Window 11 or higher version, RAM - 8-12 GB, HDD / SSD 1 TB with other standard accessories as per requirement, Monitor - 19.5" Colour TFT Monitor with keyboard and mouse.	1	No.s	175981	1,75,981
5	Supply, installation, testing and commissioning of 1000 VA UPS with 30 min backup- Line Interactive UPS 650VA/360W, Micro Processor Based UPS System, an Ideal Power Backup & Protection for Desktop PC	1	No.s	21288	21,288
6	Supply, installation, testing and commissioning of Basic Laser Printer for work station -HP Laser 1008a Printer, Single Function, Print, Hi-Speed USB 2.0, Up to 21 ppm, 150-sheet Input Tray, 100-sheet Output Tray, 10,000-page Duty Cycle, 1-Year Warranty, Black and White	1	No.s	29330	29,330
7	Supply, installation, testing and commissioning of unarmoured Communication Cable 0.5sq mm 2 core Shielded	990	Mtr	81	80,190

8	Supply, installation, testing and commissioning of Digital 1 Phase 2 wire, Energy Meter (Spare)	5	No.s	5537	27,685
9	All inclusive annual Comprehensive Maintenance Charges(AMC) for 1st year for above supplied metering solution after completion of 12 months warranty. AMC will be paid Quaterly Basis.	198	No.s	132	26,136
10	All inclusive annual Comprehensive Maintenance Charges(AMC) for 2nd year for above supplied metering solution after completion of 12 months warranty. AMC will be paid Quaterly Basis.	198	No.s	138	27,324
TOTAL OF SH: C					₹25,56,159
SH: D, EV Charger					
1	EV PANEL :- Supply, installation, testing and commissioning of cubical type Panel, suitable for operation on 415 ±10% volts, 50 Hz AC 3 phase 4 wire supply system fabricated out of Form 4b compartmentized design as per IEC 61439 and covered with CRCA sheet steel of 2mm thick for frame work and doors/ covers, 3mm thick for gland plates, Partition/mounting plate, vertical section shall be of 2.0mm CRCA sheet i/c cleaning & finishing, having extensible type 4P Aluminium bus bars of high conductivity of min. 56-57% of IACs with E-91 grade aluminium, Polymide/FRP bus bar supports, with short circuit with stand capacity as per BOQ for 1 sec., bottom base channel of section not less than ISMC 75mm, fabrication shall be done in transportable sections, entire panel shall have a common copper earth bus bar to switch gears with required size of Alum. bus bars and inter-connection with solid copper conductor wires/ aluminium strips, neutral links, including interlocking & control wiring with 1.5sqmm. PVC insulated FRLS copper conductor Single Core cable for voltage & 2.5sq.mm for current circuits, cable alleys, cable gland plates in two half, danger notice plates, etc. necessary metering protections & indications and mounted with the following switch gears as per drawing and technical specifications etc. complete as required.				

1.1	Panel 1 Incomer :- i) 1 Nos. 800A 4P EDO type ACB incomer with adjustable protection, O/C, S/C & E/F protections a) 6 Nos. Phase indication LED lamps with 2Amp SP MCB, breaker 'ON/OFF' indicating light with 2A MCB b) 2 Sets of Digital flush type class 1 accuracy multifunction meter , showing V, A, PF, Hz, KW, kWH, kVAR, THD etc. and 3 Nos. cast resin current transformers of 400/ 5 Amp ratio, 15 VA Class 1 metering. Outgoings: 2 Nos 250 amp 4P MCCB C Curve '30kA' 2 Nos 320A TPN MCCB C Curve '30kA' 30 Nos. 63 A 4P MCCB C Curve '25kA' with RCD Type B (OR EQUIVALENT) 30MA 10 Nos. 40 amps 4P MCCB C Curve '25kA' with RCD Type B (OR EQUIVALENT) 30MA Bus Bar : 4P aluminium extensible type main bus bars of minimum of 1000 Amp capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bars supports at required intervals complete. All MCCB should be with rotary handle. Note - Panel shall be as per CPWD specification as amendment up to date.	1	Each	5,33,810	5,33,810
1.2	Supply & Installation of 3-Phase, 4-Wire, 415V, 50Hz, Active Harmonic Filter Panel, IP20 rated. Rating: 200A Active Harmonic Filter suitable for EV charging harmonic mitigation, THDi reduction, complete with controller & communication. Including IGBT-based power modules, controller, and HMI. Must reduce THDi to <5%. Installation including necessary steel frames, anchoring, and baseframe preparation complete with SPD protection, income MCCB 250A and control circuit etc complete as required. All MCCB should be with rotary handle. Note - Panel shall be as per CPWD specification as amendment up to date.	1	Each	14,87,041	14,87,041
1.3	Panel 2 Incomer : - i) 1 Nos. 320 Amps. 4P MCCB 35kA with SPD Type II & following	1	Each	4,46,112	4,46,112

	accessories: a) 6 Nos. Phase indication LED lamps with 2Amp SP MCB, breaker 'ON/OFF' indicating light with 2A MCB b) 2 Sets of Digital flush type class 1 accuracy multifunction meter , showing V, A, PF, Hz, KW, kWh, kVAR, THD etc. and 3 Nos. cast resin current transformers of 320/ 5 Amp ratio, 15 VA Class 1 metering. Outgoings: 1 Nos 250 amp 4P MCCB C Curve '50kA' 6 Nos. 63 A 4P MCCB C Curve '25kA' with RCD Type B (OR EQUIVALENT) 30MA 24 Nos. 40 amps 4P MCCB C Curve '25kA' with RCD Type B (OR EQUIVALENT) 30MA Bus Bar : 4P aluminium extensible type main bus bars of minimum of 500 Amp capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bars supports at required intervals complete. All MCCB should be with rotary handle. Note - Panel shall be as per CPWD specification as amendment up to date.				
2.0	Supplying Installation, Testing and Commissioning of EV charging station As per specifications and in Compliance to relevant IS codes etc.				
2.1	EV AC Charger Power : 10 KW (3.3 kWx3Nos Industrial socket), Input power supply: 1phase 230 +10% Volt, output supply: 230 Volt AC, Frequency:50 Hz +/-3%, Operational temperature range : -20 to 55 °C (outdoor), -5 to 55 °C (Indoor)., RH upto 95%, Charging Device as per EV-EVSE Communication: as per relevant IS Codes, Bluetooth Low Energy, three Charge Point Plug/ Socket as per IS-60309, Vehicle Inlet/ Connector As per EV manufacturer, suitable for 2 Wheelers and 4 wheelers. With IP54 protection. Mechanical Strength: protection of the external enclosure against mechanical impact shall be IK10 according to IEC 62262.O/L,S/C protection. Insulation Resistance > 1 M Ω. RCD having a rated residual operating current not exceeding 30 mA; Separate RCD for multiple outputs. Internet connectivity through GSM/wifi, OCPP(Open	8	Each	57,047	4,56,376

	charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevant IS Codes.				
2.2	AC Charger Power Level 2: Normal Power 22 kW, 3 phase 415VAC, (±10%) Frequency:50 Hz , (±3%) output supply: 240Volt AC, Operational temperature range : -20 to 55 °C (outdoor), -5 to 55°C (Indoor), RH upto 95%, Charging Device as per IS-17017-1 EV-EVSE ISO- 15118 for Smart Charging, Infrastructure Socket as per IS-17017-2-2, Vehicle Connector as per IS- 17017-2-2 Vehicle Inlet/ Connector As per EV manufacturer, suitable for 4 wheelers. Indoor use: at least IP42; Outdoor use: at least IP55 Mechanical Strength :protection of the external enclosure against mechanical impact shall be IK10 according to IEC 62262. O/L,S/C protection. Insulation Resistance > 1 M Ω. Cable Length: 7.5m . RCD having a rated residual operating current not exceeding 30 mA; Separate RCD for multiple outputs. Internet connectivity through GSM/wifi OCPP(Open charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevant IS Codes.	18	Each	80,280	14,45,040
2.3	DC Charger (Mode-3) Power Level 3: Normal Power: 30kw, 3 phase 415VAC, (±10%) Frequency:50 Hz, (±3%) output supply: DC 100- 1000 Volt, Operational temperature range : - 25 to 55 0C (outdoor), -5 to 55 0C (Indoor), RH upto 95%, Charging Device as per Device/protocol: IS-17017-23, EV-EVSE Communication as per IS-17017-24, ISO- 15118, Infrastructure Socket as per IS-17017-2-2/3, Vehicle Connector as per IS-17017-2-3 Vehicle Inlet/ Connector As per EV manufacturer, suitable for 4 wheelers. Indoor use: at least IP42; Outdoor use: at least IP54. Mechanical Strength: protection of the external enclosure against mechanical impact shall be IK10 according to IEC 62262. O/L,S/C protection. Insulation Resistance > 1 M Ω. Cable Length: 7.5m . RCD having a rated residual	8	Each	8,47,405	67,79,240

	operating current not exceeding 30 mA; Separate RCD for multiple outputs. Telecommunication port of the EV supply equipment according to IS 13252 (Part 1) : 2010. OCPP(Open charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevant IS Codes.				
3	Supply and installation of signage indicating EV stations & safety signages as per regulatory-compliant (retro reflective signages on 3 MM ACP_ with a size of 450 mm x 200 mm duly clamped on the wall).	75	Each	858	64,350
4	Civil Foundation (M25 grade RCC Base foundation for AC/DC EV Charger installation having L type pipe for cable termination and Anchor bolts and specification as below:)				
4.1	Civil foundation of dimension 500mmX500mmX450mm; 200mm depth under ground, with anchor bolts and L type pipe for AC/DC EV charger installation.	34	Each	21,264	7,22,976
5	EV Charger Stands (Supply and Installation of powder coated CRCA stands having min thickness of 50MM*50MM*2MM along with having dimensions as below)				
5.1	AC EV Charger stands having dimension of 450mmX272mmX1670mm with Fasteners	26	Each	8,799	2,28,774
5.2	DC 30kw EV Charger stands having dimensions 450mmX300mmX615mm with Fasteners	8	Each	10,999	87,992
6	AMC for EV Charger				
6.1	Software for cloud-based monitoring with 3 years subscription	34	Each	16,205	5,50,970
6.2	Comprehensive AMC for first year	34	Each	9,532	3,24,088
6.3	Comprehensive AMC for second year	34	Each	11,439	3,88,926
6.4	Comprehensive AMC for third year	34	Each	13,727	4,66,718
	TOTAL OF SH: D				₹1,39,82,413
SH: E, Earthing Conductors					
1	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 Meter long etc. with charcoal/ coke and salt as required.	26	Set	15004	3,90,104
2	Providing and fixing 25 mm X 5 mm copper strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring,	200	Meter	1638	3,27,600

	washer excavation and re-filling etc. as required.				
3	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	500	Meter	1246	6,23,000
4	SITC of PVC insulated Copper Green Wire 10.0 Sq.mm for EV Charger, solar on existing conduit/ raceway/cable tray/ wall/ open/ surface	150	Meter	312	46,800
5	SITC of PVC insulated Copper Green Wire 6.0 Sq.mm for EV Charger, solar on existing conduit/ raceway/cable tray/ wall/ open/ surface	70	Meter	218	15,260
	TOTAL OF SH: E				₹14,02,764
SH: F, BOOM BARRIER					
1.0	Supply, installation, testing and commissioning of automatic electromechanical boom barrier suitable road width 5-7 mtrs for intensive applications, high speed with 4-6 second opening/closing time with Aluminium housing & aluminium boom with fork rest, IP 67 Protection etc. (for Gate Entry/Exit)	2	Each	2,14,477	4,28,954
2.0	Supply , Installation , Testing and Commissioning of a set of Entry/Exit push buttons for manual open and closing of barriers etc. complete as required.(for Gate Entry/Exit	2	Each	1,906	3,812
3.0	Supply , Installation , Testing and Commissioning of Photocell based safety device to avoid closing of the barrier when a Vehicle is crossing the barrier. (Anti Fall Protection).	2	Each	4,766	9,532
4.0	Supply installation, testing and commissioning of Remote & Receiver.	2	Each	7,149	14,298
5.0	Supply , Installation , Testing and Commissioning of Loop detector for closing of the barrier when a Vehicle crosses the barrier.	2	Each	7,149	14,298
	TOTAL OF SH: F				₹4,70,894
SH: G, ELECTRIC GEYSER					
1.0	SITC of 25-liter storage electric geyser complete with all accessories, piping connections, electrical connections, and safety devices as required. Mounting: Vertical / Horizontal wall mounted, Inner Tank: Heavy gauge steel with glass-lined coating, Outer Body: CRCA / ABS high-quality corrosion-resistant body, Insulation: High-density PUF insulation (30–50 mm thickness), Heating Element: Type: Copper / Incoloy heating element , Rating: 2 kW , Voltage: 230V ±10%, 50 Hz, Single phase,	300	Each	16253	48,75,900

	Temperature Control & Safety: Adjustable thermostat (range: 25°C to 75°C) , Automatic thermal cut-out & Pressure relief / safety valve (multi-function valve), Minimum 4 Star (as per BEE standards).				
	TOTAL OF SH: G				₹48,75,900
SH:H, GAS SUPPRESSION SYSTEM					
1.0	SITC of 2kg capacity FK-5-1-12 with UL & PESO approved Seamless Cylinder, DLP Assembly with automatic valve, push in connector for tube, UL approved 2 Kilogram FK-5-1-12 Gas ref NFPA 2001 FK-5-1-12 , mounting bracket, End of Line adopter, Pressure guage and UL approved low pressure switch for monitoring system activation.	7	Nos.	37,701	2,63,907
2.0	SITC of 4kg capacity FK-5-1-12 with UL & PESO approved Seamless Cylinder, DLP Assembly with automatic valve, push in connector for tube, UL approved 4 Kilogram FK-5-1-12 Gas ref NFPA 2001 FK-5-1-12 , mounting bracket, End of Line adopter, Pressure guage and UL approved low pressure switch for monitoring system activation.	5	Nos.	42,715	2,13,575
3.0	SITC of Linear pneumatic heat Detection Tube :- UL Listed Heat detection Tube, 4mm ID, 6mm OD, detection temprature less than 175 Deg celcius, mutlilayer, Water Absorbtion ≤ 1.5% @ 20oC and 50% RH as tested per ISO62 with fittings and supports.	400	Nos.	848	3,39,200
4.0	SITC of Master Control Unit for controlling each system, complete with pressure switches, buzzers and electronic hooters, including all necessary accessories + electrical wiring to make each entire system functional.	12	Nos.	7,114	85,368
	TOTAL OF SH: H				₹9,02,050
SH: I, HI - WALL SPLIT SYSTEMS					
1	Supplying , Installation, Testing and Commissioning of Air Cooled Hi Wall split type Air conditioners complete with Indoor unit(IDU), Out door unit (ODU), surface / concealed copper Refrigerant piping with insulation (closed cell elastomeric nitrile rubber tubular pipe section) upto 3 Mtr (IDU to ODU), copper power cable upto 3.5 Mtr (IDU to ODU) i/c drain pipe R-32/R-410/ R-407 Green Refrigerant, wireless Remote control, suitable for				

	working between 180- 260V with low & high voltage cutoff and 50 hz ,1 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll / rotary compressor. The system shall be able to deliver 100% of the rated capacity upto 42 0C. Min 5-year Original Equipment Manufacturer (OEM) warranty both compressor and Printed Circuit Board (PCB). Must comply : Electrical cable IS 694 or IS 9968 temperature sensing control IS /International Electrotechnical Commission (IEC) 60730, hermetic compressor IS 10617, heat exchanger IS 11329, capacitor IS 2993 and motor IS 12615. Complete as per CPWD specification and IS : 1391 Part II 2023. The system shall be able to operate up to 50 0C (out door ambient temperature). Inverter Type - Cooling only				
1.1	1.0 TR with 3 Star BEE Rating	6	Each	38,408	2,30,448
1.2	1.5 TR with 3 Star BEE Rating	8	Each	41,768	3,34,144
	TOTAL OF SH:I				₹5,64,592
SH:J, UPS					
1	Online UPS- Input supply: Three Phase, Output supply: Three Phase. Supplying, installation, Testing & Commissioning of following capacity at full load (Unity Power Factor) at operating temperature 0 to 40 0C, Relative humidity 0 to 95%, Online double conversion true sine wave Uninterrupted hot swappable (allow for the replacement or addition of battery modules without shutting down the entire system) modular Power Supply (UPS) system with N+1 modules (N denotes total number of modules required for rated capacity). The UPS shall include a Rectifier, inverter, battery bank suitable for 30 minutes back up (Battery VAH capacity shall not be less than 1600 VAH per KVA of UPS rating per Hour backup time) on full load (Battery shall be VRLA, SMF in ABS Container) and Static Bypass switch along with provision for manual bypass, suitable isolation transformer for additional protection against neutral faults etc. UPS shall have inbuilt phase sequence correction. The UPS systems offered are to be of the latest technology with Digital Control				

	Microprocessor based for reliable operation using Insulated Gate Bipolar Transistor (IGBT)'s both for the rectifier & inverter (3 Level) with PWM (Pulse Width Modulation). The quality of design, manufacturing and inspection process should confirm to the relevant Inter-national standards such as IEC/EN/VDE. The operating efficiency of the UPS systems shall be >96% while operating on battery mode and delivering quality power to the 100% non-linear loads. Current total harmonic effect(ITHD) on the input grid shall be < 5% at 50 %load. (The required LC (inductor (L) and a capacitor (C)) filters shall be included in UPS cost), extreme power factor kit to be included to limit the input power factor (PF) to 0.99 and output power factor shall be unity (i.e. kw rating of the UPS shall be kva rating x 1), however UPS shall be suitable to take load at 0.7 lagging to 0.7 leading power factor loads. UPS shall be suitable for incoming supply AC : 3Phase 400V +/- 20%, 50 Hz +/-5 Hz, AC Output voltage: 3Phase 415 Volt, 50 Hz +/- 0.2Hz, Overload capacity of 120% for 10 mins, Sine wave output. Non condensing, noise level less than 60db at 1 meter distance, protections: Input Under voltage over voltage, abnormal out voltage, battery over charging, output over current, short circuit protection, battery deep discharge protection, 10KV surge. UPS must comply with low voltage electromagnetic compatibility (EMC) achieved as per EN 6204, EN6204 Part I and Part 2, it shall be a Voltage and Frequency Independent (VFI)-type UPS. . Communication RS232/RS485/SNMP port open protocol for BMS integration, all hardware & software for IoT Communication as per approved by Engineering in charge. Required battery racks and interconnecting copper conductor cables of suitable size and connectors and all required accessories are inclusive of the cost). This system must provide a means for logging and alarming of all monitored points plus email notification. Forced air-cooling with integral inbuilt fans with redundancy (if one fan fail UPS should				
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	be able to handle at least 80% of the load, Noise Level 65 DB at 1 meter distance. The system shall be in compliance IEC 62040- 1,2 & 3, IS: 16242 and CPWD Specification. Display Panel (minimum) (In-build 5 inch or more LC Display / LED) to display : a) Input: Voltage, current, Frequency. b) Bypass: Voltage, Frequency. c) Output: Voltage, frequency, Current. d) Battery: Voltage, Capacity. e) Load: KVA, KW, Percentage. f) Temperature: STS, Inverter, PFC. g) Event Logging & Statistical Data (On LCD/LED): UPS should capture and display up to 3000 events like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc. h) Statistical Data: No. of power failures / Transfers to Bypass / Total Running time, etc. i) Mains Mode of Operation /Battery Mode of Operation / Bypass feeding the load / UPS Fault /Battery charging and discharging, overload, battery voltage and battery capacity. j) Audible Alarms : Mains Failure, Battery Low Alarm, UPS Overload, Fault, Shutdown, Input Over, Under Voltage, Output Over, Under Voltage, Battery Over, Under Voltage, Over Load and short circuit, Over Temperature. The UPS should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc				
1.1	20KVA (Each Power module shall be < 10 KVA)	1	Each	208893	208893
	TOTAL OF SH: J				₹2,08,893
	GRAND TOTAL (SH: A to SH: J)				₹3,64,14,147

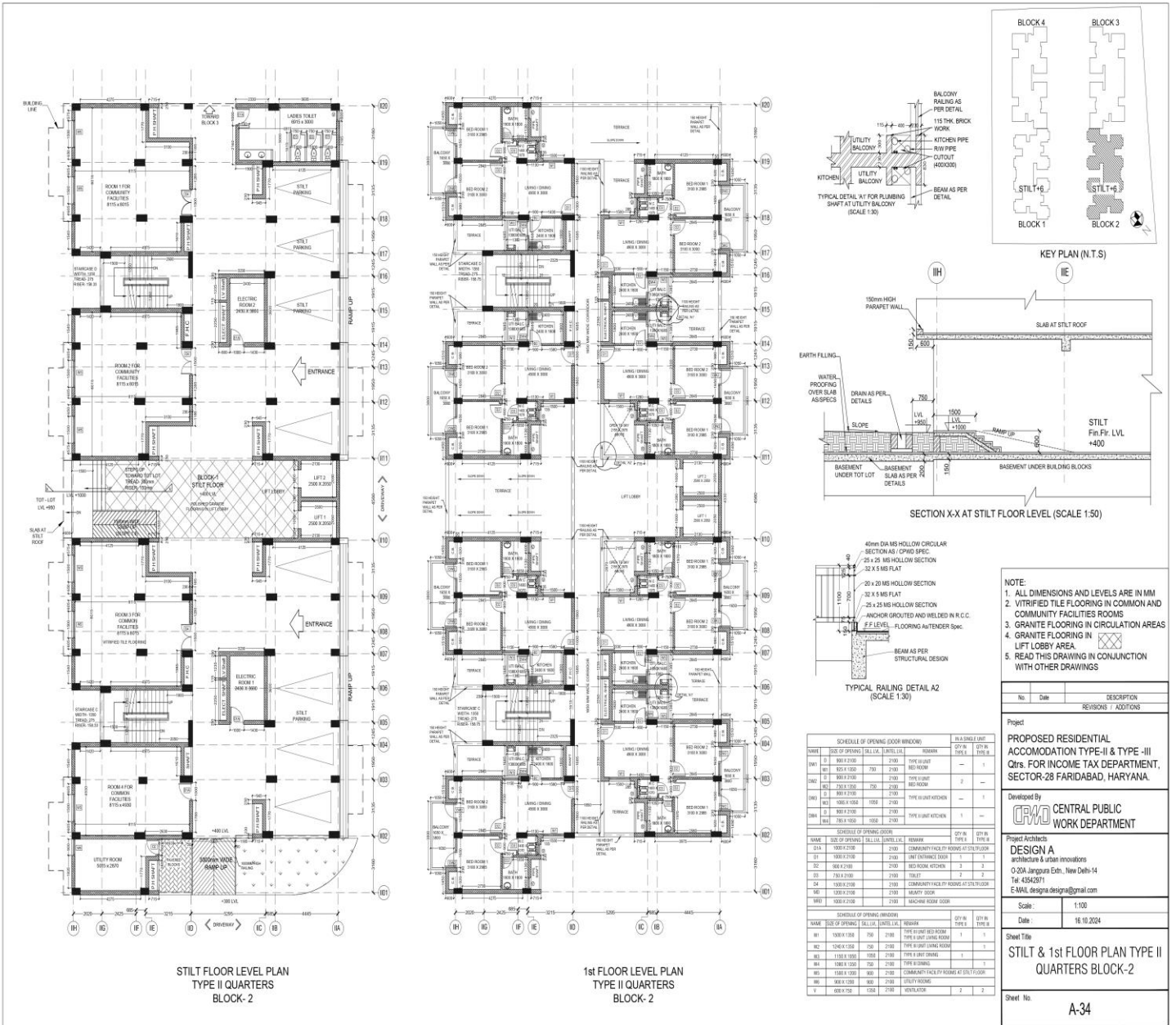
E3 : PRICE BID

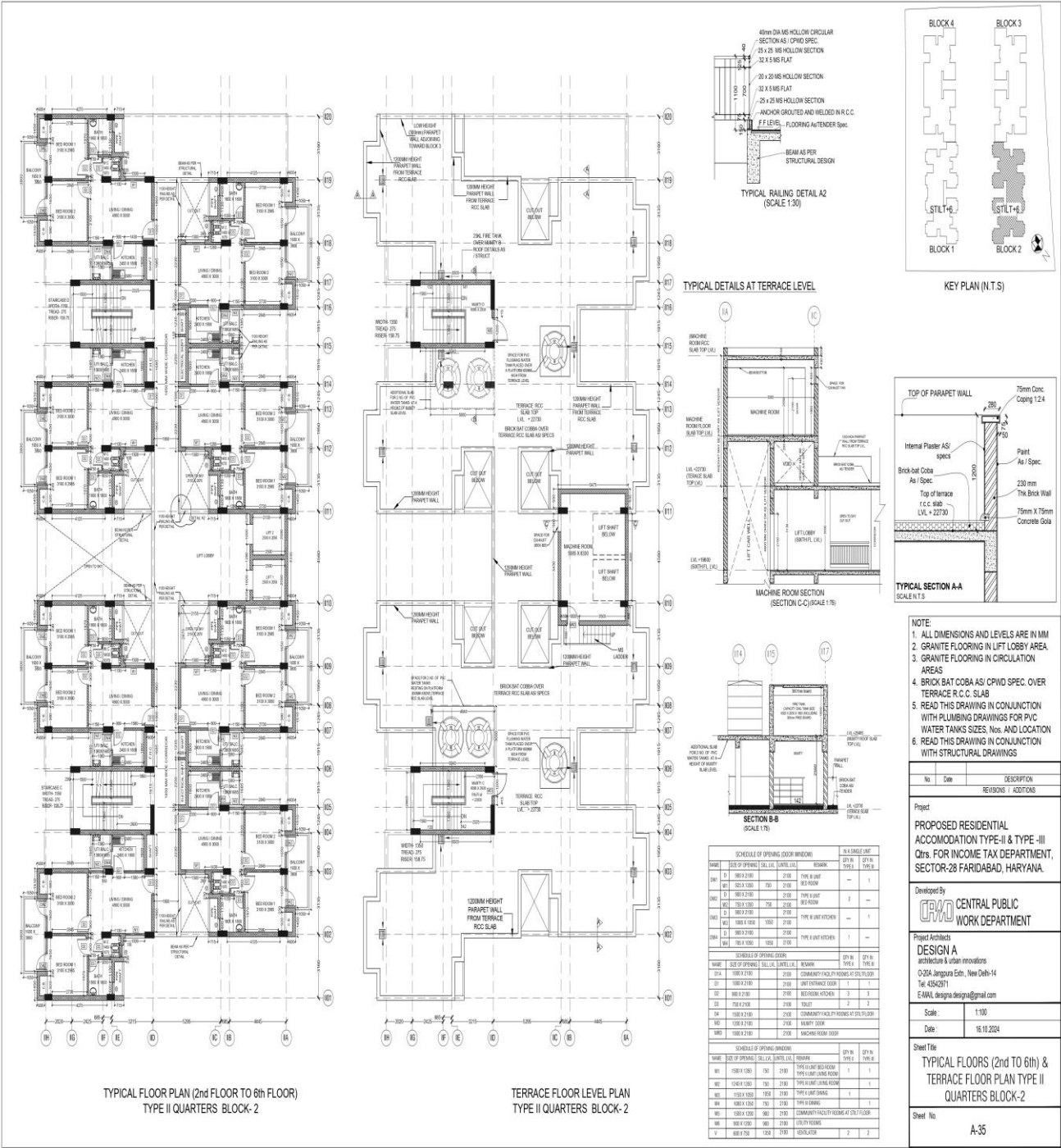
CENTRAL PUBLIC WORKS DEPARTMENT				
NIT No. 05/CE-cum-ED/Gurugram/2026-27				
Name of Work: - Construction of 198 Nos. Staff Residential Quarters Type-II-96 Nos., Type-III-102 Nos. for Income Tax Departments at Sector-28, Faridabad, Haryana. (SH: Providing and fixing wardrobes in bedrooms, modular kitchen cabinets, and miscellaneous works including solar power systems, EV chargers, split ACs, smart energy meters, Electric geysers, UPS systems, boom barriers, and gas suppression systems for panels in 198 staff residential quarters (Type-II: 96 Nos., Type-III: 102 Nos.) at Sector-28, Faridabad, Haryana.				
Name of Contractor:				
S. No.	Component of Work	Estimated Cost (Rs.)	Quoted Percentage (at par/above/below) the Total Estimated Cost	Total Tendered Amount (Rs.)
1.	Civil Works - As per Item No. 1 of Schedule of Qty.	₹ 4,41,54,620.00		
2.	E&M Works - As per Item No. 2 of Schedule of Qty.	₹3,64,14,147.00		
TOTAL ESTIMATED COST		₹ 8,05,68,767.00		

PART – F

Architectural Drawings for Quarters

TYPE-II QUARTER





TYPE-III QUARTER

