

## **INFORMATION & INSTRUCTIONS FOR BIDDERS FOR e-BIDDING**

The Executive Engineer, Civil Engineering Division-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1<sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -560034 ([email- eeecd3ccu-mef@gov.in](mailto:eeecd3ccu-mef@gov.in)) on behalf of President of India invites online Percentage rate bids from CPWD enlisted contractors of appropriate class in Buildings & Roads (erstwhile composite /Building/ Infrastructure) category and firms/contractors of repute in two bid system for the following work:

NIT No.	1/2025-26/CE/CCU/CED-III/AMARAVATI
Name of Work	<b>Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.</b>
Location	Amaravati, Andhra Pradesh
Estimated cost put to bid	Rs. 56,62,55,159/-
Earnest Money	Rs. 66,62,552/-
Period of Completion	18 Months
Last time & date of submission of online bid, copy of receipt of deposition of original EMD and other documents as specified in Notice Inviting e-Tender.	<b>03:00 PM on 07/07/2025</b>
Time date of opening of technical bid	<b>03:30 PM on 07/07/2025</b>
Pre-Bid Conference	Pre-bid conference shall be held on <b>20/06/2025 at 11 AM</b> with the eligible and intending bidders in <b>office of CE, CCU, 7<sup>th</sup> floor CGO Complex, Lodhi Road, New Delhi -110003.</b>

*\*\*To be filled in by the Executive Engineer*

Enlistment of the 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. ***Joint ventures/Consortium and Special Purpose Vehicles are not allowed to tender.***

1. Contractors who fulfill the following requirements shall be eligible to apply [1(b), 1(c) & 1(d) are not applicable for CPWD enlisted contractors of appropriate class. 1(a)(i) and 1(e) is applicable for CPWD enlisted contractors also]:
  - a) Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited-
    - (i) Three similar works each costing not less than **Rs. 22.65 Crores** or two similar works each costing not less than **Rs. 33.97 Crores** or one similar work costing not less than **Rs. 45.30 Crores.**



- (ii) In case, the eligible work has been executed by a Joint Venture through one or more individual firm(s), then cost of completed work shall be distributed among the individual firm(s) in proportion to their share in Joint Venture and that will be considered as work experience for individual firm(s) for pre-qualification in bidding.

“Similar Work” shall mean construction of minimum one multi-storeyed RCC/Composite framed structure building having five storeys or completing balance Construction work of one building (i/c structural work) minimum up to five storeys.

**Note-1:** Machine room and mumty shall not be counted as a storey.

**Note-2:** For this purpose, each basement, stilt constructed in the building shall be considered as a storey.

**Note-3:** Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work.

**Note-4:** For the purpose, “Cost of work” shall mean gross value of the completed work including the cost of materials supplied by the Government/Client, but excluding those supplied free of cost. This should be certified by an officer not below the rank of Executive Engineer / Project Manager or equivalent.

**In case the certificate of work experience has been issued by any Pvt. Firm / Agency / Builder, the bidders will have to submit the documentary proof of the TDS (Form - 26AS) with income tax department to ensure actual value of work done.**

**The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to previous day of last date of submission of tenders.**

- b)** Should have had Average Annual Financial Turnover of Rs. **16.98** Crores on construction works during the last three years ending 31<sup>st</sup> March 2024 (Scanned copy of Certificate from CA with Unique Document Identification Number (UDIN) to be uploaded). The value of annual turnover figures shall be brought to the current value by enhancing the actual turnover figures at simple rate of 7% per annum.
- c)** Should not have incurred any loss (profit after tax should be positive) in more than two years during the available last five consecutive balance sheets (standalone financial statement), ending 31<sup>st</sup> March 2024.
- d)** Should have a Banker's Certificate from a commercial Bank for Rs. **22.65** Crores or Net Worth certificate from CA with Unique Document Identification Number (UDIN) of minimum 10 % amount of ECPT (Scanned copy of original to be uploaded).

- e) Should have bidding capacity equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[AxNx1.5]-B} Where,

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

**Notes:**

- i) The bidder should submit bidding capacity as per Form 'C-2'.
- ii) Bidding capacity is applicable for all the contractors including CPWD enlisted contractors.
- iii) Bidding capacity formula, for CPWD contractors who are enlisted based on rule 6.1.7 of Enlistment Rules-2022 i.e. government retired engineer/ architect for three years from the date of issue of enlistment order, is as follows: -

Bidding Capacity = {[AxNx1.5]-B]

Where,

A = Banker certificate figure as submitted by applicant (i.e. government retired engineer/ architect) at the time of enlistment for first year of enlistment and subsequent fresh bankers certificate for second and third year respectively. Value of A for first year will be mentioned in the enlistment order by the member secretary of advisory committee for enlisting authority.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and on-going works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be bidding capacity. Newly



enlisted entity may like to follow general bidding capacity formula even before period of three years if it so chooses.

- iv) Bidding capacity, for CPWD contractors who are enlisted based on rules 9.6.3 & 9.6.4 of Enlistment Rules-2022 i.e. new entity based on previously enlisted entity for three years from date of issue of enlistment order, is as follows:

Annual turnover of newly enlisted entity shall be in proportion to the shareholding of partners/directors in the original enlisted entity at the time of enlistment of the newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be applicable to it for calculation of bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years, if it so chooses.

Bidding Capacity for newly enlisted entity based on rules 9.6.3 & 9.6.4 enlistment rules -2022 shall be as follows: -

$$\text{Bidding Capacity} = \{[A' \times N \times 1.5] - B\}$$

Where,

A' = Proportionate share of newly enlisted director/partner in originally enlisted company/firm multiplied by the factor A, as given below. Value of A' will be mentioned in the enlistment order by member secretary of Advisory committee for Enlistment Authority, it will remain same for three years.

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum. This value is of originally enlisted entity at the time of enlistment of newly enlisted entity.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

- v) Enlisted entities based on rules 6.1.7, 9.6.3 or 9.6.4 of enlistment rules-2022 can submit MoU from agency having requisite experience for structural system technology if the enlisted entity does not have required experience.



2. 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.
3. This information and Instructions for bidders posted on website shall form part of bid document.
4. The bid document consisting of Plans, Specifications, 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 can be seen and downloaded from website <https://etender.cpwd.gov.in> or [www.cpwd.gov.in](http://www.cpwd.gov.in) free of cost.
5. 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, CCU/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), CCU/CPWD and other documents as specified.
6. Those contractors 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>
7. The intending bidder must have valid class-III 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>.
8. On opening date, the contractor can login and see the bid opening process. After opening of bids, he will receive the competitor bid sheets.
9. Contractor can upload documents in the form of JPG format and PDF format.
10. Certificate of Financial Turn Over: At the time of submission of bid contractor may upload Affidavit/Certificate from CA mentioning Financial Turnover of last 7 years ending 31<sup>st</sup> March 2024 or for the period as specified in the bid document and further details if required may be asked from the contractor after opening of technical bids. There is no need to upload entire voluminous balance sheet.
11. Contractor 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 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 Technical Bid shall be opened first on due date and time as mentioned above. The time and date of opening of financial bid of contractors qualifying the technical bid shall be communicated to them at a later date.
13. Pre-Bid conference shall be held on **20/06/2025 at 11 AM** with the eligible and intending bidders in **office of CE, CCU, 7<sup>th</sup> floor CGO Complex, Lodhi Road, New Delhi -110003** to clear the doubt of intending bidders, if any.
14. The department reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid down criterion.
15. Copy of enlistment order and certificate of work experience and other documents as specified in the tender documents for eligibility shall be scanned and uploaded to the e-tendering website within the period of bid submission.
16. Online bid documents submitted by intending bidders shall be opened only of those bidders, whose deposited EMD and other documents scanned and uploaded are found in order.
17. If any information furnished by the applicant is found incorrect at a later stage, he shall be liable to be debarred from tendering/taking up of works in department. The department reserves the right to verify the particulars furnished by the applicant independently.
18. **List of Documents to be filled in by the tenderers in various forms, to be scanned and uploaded in JPG/PDF format within the period of bid submission:**

**For CPWD enlisted Contractors**

- (i) Copy of enlistment order in appropriate class and category issued by CPWD
- (ii) Copy of original EMD in proper form.
- (iii) Copy of receipt for deposition of original EMD to division office of any EE, CPWD/CCU.
- (iv) GST Registration Certificate, if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following under taking along with 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 CCU, whichever is earlier, failing which I/we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CCU or GST department in this regard".

- (v) Certificate of Financial Turnover from CA (Form 'A').
- (vi) List of projects under execution in Form 'C-1'.
- (vii) Bidding Capacity as per Form- 'C-2'
- (viii) Affidavit for non-execution of eligible similar work(s) through another contractor on back-to-back basis or subletting basis furnished on Rs.100/- non-judicial stamp paper attested by Notary. Undertaking for similar works in Form- 'H'.
- (ix) Affidavit for Non-Black Listing should be furnished on Rs.100/- non-Judicial stamp paper attested by Notary in Form- 'I'.
- (x) Any other document as specified in NIT

**For Non-CPWD Registered Contractors –**

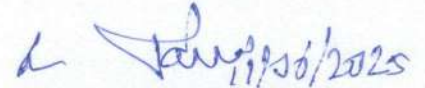
- a. Copy of original EMD in proper form.
- b. Copy of receipt for deposition of original EMD to division office of any EE, CPWD/CCU.
- c. Letter of transmittal
- d. Certificate of Financial Turnover from CA (Form 'A').
- e. Banker's certificate or Networth certificate (Form 'B' and 'B-1').
- f. List of eligible similar nature of works in Form –'C'.
- g. List of projects under execution in Form 'C-1'.
- h. Bidding Capacity as per Form- 'C-2'
- i. Performance report of works (mentioned in Form-C and C-1) in Form – 'D'.
- j. Structure & Organisation (Form 'E')
- k. Affidavit for non-execution of eligible similar work(s) through another contractor on back-to-back basis or subletting basis furnished on Rs.100/- non-judicial stamp paper attested by Notary. Undertaking for similar works in Form- 'H'.
- l. GST Registration Certificate, if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following under taking along with 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 CCU, whichever is earlier, failing which I/we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CCU or GST department in this regard".

m. Any other Document as specified in the bid documents.

**If any required document is not scanned and uploaded while submitting bid, the bid submitted shall become invalid and will not be considered in e-Tendering process and the bid shall be summarily rejected.**



Executive Engineer, CED-III, CCU  
(For and on behalf of the President of India)  
**(For and on behalf of President of India)**





## GOVERNMENT OF INDIA

### Office of Executive Engineer, Civil Construction Unit,

CED- III, MoEF & CC, 1<sup>st</sup> Floor, D Wing

Kendriya Sadan, Koramangala, Bengaluru – 34


Tel: 080-25539464, Tel: 080 - 25539466, E-mail: [eeecd3ccu-mef@gov.in](mailto:eeecd3ccu-mef@gov.in)

No.69 (1)/ CED III / 2025 / 596

Dated: 11 / 06 / 2025

#### Copy to:

- (1) The Director, Zoological Survey of India, Kolkata.
- (2) The Chief Engineer, CCU, New Delhi.
- (3) The Superintending Engineer, CCU, New Delhi.
- (4) The Office in-charge, ZSI, Hyderabad.
- (5) The Assistant Engineer, CESD 1/III, CCU, Bangalore.
- (6) The Assistant Engineer, CESD 3/III, CCU, Coimbatore.
- (7) The Assistant Engineer, CESD 4/III, CCU, Chennai.
- (8) The Assistant Engineer, CESD 5/III, CCU, Amaravathi.
- (9) The Assistant Engineer (E) ,CEESD, CCU, Bangalore
- (10) The AAO, AII/Cashier, CCU, Bengaluru.
- (11) IT Division MoEF & CC, New Delhi for publication on website of MoEF & CC.
- (12) [www.etender.cpwd.gov.in](http://www.etender.cpwd.gov.in).
- (13) Notice Board

  
Executive Engineer,  
CED III, CCU, Bengaluru.

Enquiry Particulars	
Regional Office	EE-CED-III
Office Inviting Bids	EE-CED-III
Tender ID	115698
NIT/RFP NO	1/2025-26/CE/CCU/CED-III/AMARAVATI
Name of Work	Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.
Subwork/Packages	
Time Allowed	18 months
Tender Type	OPEN
Procurement Type	WORKS
Type of Work	Civil Works - Buildings
Category of Tendered	COMPOSITE, NON-CPWD CONTRACTOR
Estimated Cost	56,62,55,159
Bid Type	Percentage
Bid Submission Closing Date & Time	07/07/2025 15:00
Bid Validity Period (In Days)	75
Bid Validity Expiry Date	20/09/2025 15:30 (After Technical cum Eligibility Bid Opening)
Tender Notice Type	Standard Notice Tender
Competitive Bidding Type	NCB

Tender Inviting Authority Particulars	
Office Inviting Bids	EE-CED-III
Designation	Executive Engineer
Address	EE CED III CCU MoEF CC Blr
Contact Details	9902790940
Email	eeced3ccu-mef@gov.in

EMD Details		
EMD(INR)	EMD In Favour Of	Mode of Payment
Rs. 66,62,552	Executive Engineer, CED - III, CCU, MoEF&CC, Bengaluru	DD, FDR, BC, BG

Bid Openers						
Department User Name	Region	Mobile Number	Email	Designation	Certificate serial No	Certificate Expiry
Puthiyakottaram Nizar	EE-CED-III	8547024302	nizarcpwd@gmail.com	Assistant Engineer	1816d5b	16/03/2026 11:39
K.JAGADEESH	EE-CED-III	9902790940	kjagadeeshcpwd@gmail.com	Executive Engineer	168d622	12/03/2026 10:52

Tender Documents				
S.No	File Name	File Description	File Size (in Bytes)	Uploaded Date
1	NIT 01 CE - Tender Notice.pdf	Tender Notice	5431823	11/06/2025 16:57



2	NIT 01 CE PART A.pdf	Tender Document Part A	749803	11/06/2025 17:00
3	NIT 01 CE PART B.pdf	Tender Document Part B	2755557	11/06/2025 17:01
4	NIT 01 CE PART C.pdf	Tender Document Part C	2840638	11/06/2025 17:02
5	NIT 01 FINANCIAL BID.pdf	Tender Document Financial Bid	183902	11/06/2025 17:03
6	Drawings.pdf	Tender Document Drawings	10196255	11/06/2025 17:05

#### Mandatory Documents Details

S.No	Documents Required from Vendor	Document Type
1	For CPWD Enlisted Contractors	Mandatory
2	Copy of enlistment order in appropriate class and category issued by CPWD	Mandatory
3	Copy of original EMD in proper form	Mandatory
4	Copy of receipt for deposition of original EMD to division office of any EE, CPWD / CCU	Mandatory
5	GST Registration Certificate if already obtained by bidder or GST Undertaking as specified in NIT Condition	Mandatory
6	Certificate of Financial Turnover from CA (Form A).	Mandatory
7	List of projects under execution in Form C -1.	Mandatory
8	Bidding Capacity as per Form C- 2.	Mandatory
9	Affidavit for non-execution of eligible similar work(s) through another contractor on back - to - back basis or subletting basis furnished on Rs. 100/- non-judicial stamp paper attested by Notary. Undertaking for similar works in Form - H	Mandatory
10	Affidavit for Non- Black Listing should be furnished on Rs. 100/- non-judicial stamp paper attested by Notary in Form - I.	Mandatory
11	Any other document as specified in NIT	Mandatory
12	For Non CPWD Registered Contractors	Mandatory
13	Copy of Original EMD in proper form.	Mandatory
14	Copy of receipt for deposition of original EMD to division office of any EE , CPWD / CCU	Mandatory
15	Letter of Transmittal	Mandatory
16	Certificate of Financial Turnover from CA (Form A)	Mandatory
17	Bankers certificate or Networth certificate in Form B and B -1	Mandatory
18	List of eligible similar nature of works in Form C	Mandatory
19	List of projects under execution in Form C -1	Mandatory
20	Bidding Capacity as per Form C- 2	Mandatory
21	Performance report of works (mentioned in Form - C and C -1) in Form - D	Mandatory
22	Structure and Organisation (Form E)	Mandatory
23	Affidavit for non- execution of eligible similar work(s) through another contractor on back -to - back basis or subletting basis furnished on Rs.100/- non-judicial stamp paper attested by Notary. Undertaking for similar works in Form- H	Mandatory

24	GST Registration Certificate if already obtained by bidder or GST Undertaking as specified in NIT Condition.	Mandatory
25	Any other document as specified in the bid documents	Mandatory

#### Tender Covers

S.No	Cover Name	Bid Opening date	Dependent Cover Name
1	Technical cum Eligibility Bid	07/07/2025 15:30	
2	Financial Bid	14/07/2025 15:30	Technical cum Eligibility Bid

#### Technical cum Eligibility Bid

S.No	Documents Required from Vendor	Mandatory
1	As per NIT Page No 8, SI No. 18	Mandatory

#### Financial Bid

S.No	File Name	File Size(in Bytes)
1	115698-PercentageComposite1.xls	56832



## **PART B**

### **SPECIAL CONDITIONS, PARTICULAR SPECIFICATION FOR CIVIL AND HORTICULTURE WORK**

## **SPECIAL CONDITIONS**

### **1.0 GENERAL**

- 1.1** The contractors are advised to inspect and examine the site and its surroundings before submission of the bids and satisfy themselves with the nature of site, the means of access to the site, the constraints of space for stacking material / machinery, accommodation of labour etc., constraints put by local regulations (if any), weather conditions at site (rainfall, snowfall, winter and summer temperatures etc.), general ground/subsoil conditions etc. or any other circumstances which may affect or influence their tenders. No claims, whatsoever, shall be entertained at a later date for any errors found, on plea that the information supplied by the department in the tender is insufficient or is at variance with the actual site conditions.
- 1.2** The contractor shall, if required by him, before submission of the tender, study the drawings and tender document carefully. The department shall not bear any responsibility for the lack of knowledge and also the consequences, thereof to the contractor. The information and data shown in the drawings and mentioned in the tender documents have been furnished, in good faith, for general information and guidance only. The Engineer-in-Charge, in no case, shall be held responsible for the accuracy thereof and/or interpretations or conclusions drawn there from by the contractor and all consequences shall be borne by the contractor. It is presumed that the contractor shall satisfy himself for all possible contingencies, incidental charges, wastages, bottlenecks etc. likely during execution of work and acts of coordination which may be required between different agencies. Nothing extra shall be payable on this account.
- 1.3** The work shall be carried out, all in accordance with true intent and meaning of the scope of work, specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings and/or described in the specifications and/or scope of work, provided that the same can be reasonably inferred. There may be several incidental works, which are not mentioned in the contract document but will be necessary to complete the item in all respect. All these incidental works / costs which are not mentioned in specifications, drawings, tender document but are necessary to complete the item shall be deemed to have been included in the rates quoted by the contractor. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation / change in actual detailed working drawings. Also, no adjustment of rates shall be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such works in all respects) on account of the directions of Engineer-in-Charge. **Nothing shall be payable on the account of incidental works.**
- 1.4** The work shall generally be carried out in accordance with the “CPWD Specifications 2019 Vol. I & II” with correction slips up to last date of submission of bid (including any extension in last date of bid submission), additional/particular specifications, architectural and structural drawings and as per instructions of Engineer-in-Charge. Any additional item of work, if taken up subsequently, shall also conform to the relevant specifications mentioned hereinabove.
- 1.5** The several documents forming the tender are to be taken as mutually complementary to each other. Detailed drawings shall be followed in preference to small scale drawings and figured dimensions in preference to scale dimensions. Between two or more clauses of this contract, the provisions of a specific clause relevant to the issue under consideration shall prevail over those in other clauses.
- 1.6** The work shall be carried out in accordance with the architectural drawings and structural drawings, which shall be issued by the Engineer-in-Charge after award of work as per schedule



mentioned in the CPWD6. Before commencement of any item of work, the contractor shall correlate all the relevant architectural, structural and services drawings issued for the work and satisfy himself that the information available there from 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 occurring by the commencement of work on the basis of any erroneous and or incomplete information.

**1.7** Should there be any difference or discrepancy between the description of items or condition of contract or conditions of contract as given in the particular specifications, special conditions, general condition of contract and I.S. Codes, drawings etc., the following order of preference shall be observed-

- a) Description of Schedule of Quantity
- b) Particular specification
- c) Special conditions
- d) Additional Conditions
- e) Architectural drawings /Structural drawings
- f) CPWD Specifications including upto date correction slips.
- g) CPWD General Conditions of Contract 2023 construction works including correction slips issued up to last date of submission of bid including extensions if any.
- h) Indian Standards Specifications of B.I.S.
- i) ASTM, BS, or other foreign origin code mentioned in tender document.
- j) Manufacturer's specifications and as decided by the Engineer-in-Charge.
- k) Sound Engineering practices or well-established local construction practices.

**1.8** In the event of any variation/ discrepancy in the drawings, specifications and tender documents etc. the decision of the Engineer-in-Charge shall be final binding and conclusive and if, the contractor have any doubt, the same should be got clarified immediately from the Engineer-in-charge and no claim of the contractor shall be entertained thereafter. Moreover, the contractor is not allowed to take benefit out of any clerical/ grammatical mistake in the standard clauses/specifications etc. being used in the agreement.

**1.9** The contractor shall give to the local body, police and other authorities all necessary notices etc. that may be required by law and obtain all requisite licenses and/or for temporary obstructions, enclosures etc. and pay all fee, taxes and charges which may be levied on account of these operations in executing the contract. The charges to be paid by contractor are not related to permanent constructed asset as per contract.

**1.10** The contractor shall ensure that there is no damage to adjoining property. If any such untoward incident happens, he shall be entirely responsible for any consequences besides making good any damages to the adjoining property whether public or private. He shall supply and maintain lights either for illumination or for cautioning the public at night.

**1.11** Proper temporary barricading by fencing with G.I. sheets around the construction site, shall be carried out by the contractor at the start of work. It shall be done by providing, erecting, maintaining temporary protective barricading of minimum 6.0 meters in height, made in panels, with each panel having MS frames / MS scaffolding pipes of suitable size and stiffness, with 24-gauge thick GI corrugated sheet or suitably stiffened plain GI sheet fixed on frames. Such panels shall be suitably connected to each other for stability with nuts and bolts, hooks, clamps etc. and fixed firmly to the ground at about 2 meters (or as per design) spacing, for the entire duration till completion of the work. The contractor shall also provide and erect temporary protective barricades within the site as per stipulations/guidelines of statutory authorities. Temporary protective roofing near the Entrance to the building, under

construction, shall be made to protect the visiting officials from getting hurt by falling debris etc. Also, one or more coat of enamel paint of shade as approved and directed by the Engineer-in-Charge shall be applied on the panels and "CCU, MoEF&CC" shall be painted over that in suitable sizes, shapes and numbers as directed by the Engineer-in-Charge. It shall be dismantled and taken away by the contractor after the completion of work at his own cost with the approval of the Engineer-in-Charge. Nothing extra shall be payable on this account. **The contractor shall maintain the site barricading during the complete period of execution and realign it if required, for execution of works. A Recovery of Rs.500/- per day shall be levied for not maintaining the barricading in good condition or breach of any of the above conditions as per the direction of Engineer-in-charge.**

- 1.12** The contractor shall bear all incidental charges for cartage, storage and safe custody, insurance, erection, testing and commissioning of materials issued by department (if any) as well as to those materials arranged by the contractor. The contractor shall also be responsible for the watch and ward / guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the department. No extra payment shall be made on this account.
- 1.13** Wherever any reference to any Indian Standards occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the last date of receipt of tenders (including extended date, if any).
- 1.14** No claim whatsoever on account of any discrepancy between the sub-surface strata conditions shall be entertained.
- 1.15** Any legal or financial implications resulting out of disposal of earth shall be sole responsibility of the contractor. Nothing extra shall be paid on this account.
- 1.16** Wherever required for the execution of work, scaffolding shall be provided and suitably fixed, by the contractor. The contractor shall provide 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. 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. It shall be ensured that damage is not caused to any structure due to the scaffolding.
- 1.17** The contractor shall make his own arrangements to provide for accommodation for labour as per the rules of the local bodies. The Engineer-in-Charge shall in no way be responsible for any delay on this account and no claim, whatsoever, on this account shall be entertained. Nothing extra shall be payable on this account.
- 1.18** No tools and plants including any special T&P etc. shall be supplied by the department and the contractor shall have to make his own arrangements at his own cost. No claim of hindrance (or any other claim) shall be entertained on this account.
- 1.19** The contractor shall take all precautions to abide by the environmental related restrictions imposed by any statutory body having jurisdiction in the state as well as prevent any pollution of streams, ravines, river bed and waterways. All waste or superfluous materials shall be transported by the contractor and disposed off at designated places only. Nothing extra shall be payable on this account.



- 1.20** No claim on account of site constraints mentioned in this document or any other site constraints such as lack of public transport, inadequate availability of skilled, semi-skilled or unskilled workers in the near vicinity, non-availability of construction machinery spare parts etc. or any other constraints not specifically stated here shall be entertained from the contractor. Therefore, the tenderers are advised to visit site and get first-hand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account. Any hindrances claimed by the contractor on this account shall not be considered while action under clause '2' and '5' of General condition of contract amended upto date till last date or extended last date of submission of tender.
- 1.21** Other agencies may also simultaneously execute and install the works of other civil and E&M services for the work. The contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings, trenches etc. as may be required for such related works 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.
- 1.22** The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night. The contractor shall ensure entire necessary precaution during the entire period of work and site related activities to ensure full safety to workers and avoid any kind of accident. In case of any accident of labour's/ contractual staffs or any other human being the entire responsibility will rest on the part of the contractor both legally and financially and any compensation under such circumstances, if becomes payable, shall be entirely borne by the contractor.
- 1.23** Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been included in the contract amount and nothing extra shall be payable for extra cement considered in consumption on this account.

#### **1.24 FACILITIES FOR THE DEPARTMENT**

- (a) **Site Office-** The contractor shall provide 1 No site office accommodations of approximately 200 sqm area (as per layout plan approved by engineer-in-charge) i/c conference hall at location as specified by Engineer in charge, including but not limited to following-
- i) The site office accommodation shall be provided with all necessary furniture, fitted with all electrical items like light, fans, air conditioners, heaters, all office utilities, good quality projector in conference room etc. and complete wiring, water supply, sewerage and drainage etc. The office should have Engineered marble flooring in common areas and vitrified tiles in rooms with UPVC windows and hollow metal doors. The toilet fixtures shall be as per specifications mentioned in this document. The Agency shall provide necessary Air Conditioners, lights and fixtures i/c fan, RO etc.
  - ii) The contractor shall provide the office accommodation within 03 (Three) months from the date of commencement of work failing which the compensation @ **Rs.1,00,000/- per month shall be recovered from the contractor.**
  - iii) The cost of construction, cost of all furniture (of make Godrej/Haworth/Rockworth), fittings/fixtures /electrical fittings etc. and cost of maintenance and the related service charges of the office building is deemed to be included in the quoted rates of

work and nothing extra shall be payable. This site office accommodation shall be maintained properly till completion of work and no claim whatsoever shall be entertained on the ground whether the delay in completion of work has been attributable to the Department or to the contractor.

**(b) Communication and Commuting**

- i) The contractor shall provide one number laptop-cum-tablet (latest surface pro or macbook air models) and two Nos. All-in-one Desktop (window 10) with 3G/4G enabled internet connection for the supervisory staff of Employer. The contractor shall also provide one number color laser printer (A3 Size) to the department. These accessories shall be retained by the department and the quoted rates are deemed to be inclusive of this cost. No additional payment shall be made to the Contractor on this account. The laptop/computer shall be provided with software viz. with MS-project, Primavera, MS office, Auto Cad, STADD etc.
  - ii) The contractor shall make arrangements for one number of inspection vehicles (Innova Crysta Hybrid or equivalent model) not older than January 2025, from start to completion of entire work, at disposal of Engineer-in-Charge to facilitate work inspection, quality control, coordination with multiple agencies and liasoning. This facility will be provided till six months after the actual date of completion of work. The average mileage of each inspection vehicle shall be approximately 3000 Km/month. The inspection vehicle shall be made available for 12 hours per day on daily basis including holidays as per the direction of Employer. All expenses of this inspection vehicle including running and maintenance, fuel charges, driver's salary, toll tax, parking charges etc. shall be borne by the contractor. **Recovery @ Rs. 5000/- per day per Inspection vehicles shall be made, if contractor fails to provide Inspection vehicles within 15 days of letter of award/acceptance. Recovery @ Rs. 5000/- per day per Inspection vehicles shall be made, in case of occurrence of a default i.e. non-availability of vehicle, breakdown of vehicle etc.**
- (c) The contractor shall make arrangement for Helmets and leather shoes (meant of construction work at sites) for all field staff of the department during the entire period of construction for safety reasons. One helmet and two pairs of shoes per staff member (maximum ten members) of the departments per year shall be arranged by the contractor.
- (d) **IP Based CCTV:** The contractor shall provide IP Based CCTV (in sufficient number to capture/monitor whole site) with all requisite software, hardware and accessories. A monitoring room with digital screens shall be made in site office.

## **1.25 NUISANCE PREVENTION AND POLLUTION CONTROL**

The contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupants of the adjacent properties and to the public in general. The contractor shall take all care, as not to damage any other adjacent property or other services running adjacent to the plot. If any damage is done, the same shall be made good by the contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. The contractor shall use such methodology and equipment's for execution of the work, so as to cause minimum environmental pollution of any kind during construction, to have minimum construction time and minimum inconvenience to road users and to the occupants of the buildings on the site/adjacent plot and public in general, etc. He shall make good at his own

cost and to the entire satisfaction of the Engineer in Charge any damage to roads, paths, cross drainage works or public or private property whatsoever caused, due to the execution of the work or by traffic brought thereon, by the contractor. Further, the contractor shall take all precautions to prevent any pollution of streams and waterways. All waste or superfluous materials shall be carted away by the contractor, entirely to the satisfaction of the Engineer-in-Charge.

- 1.26** The site of work has limited availability of space left out for stores, field office, batching plant etc. The contractor may be allowed to erect site office, stores, field office, batching plant within site/plot subject to availability of space and without disturbing the construction area. However, the contractor shall make his own arrangements to provide for additional requirement (in addition to available area at site), as per the rules of the local bodies. Before tendering, he shall visit the site and assess the manner in which he is able to arrange the above facilities. The Engineer-in-Charge shall in no way be responsible for any delay on this account and no claim, whatsoever, on this account shall be entertained.
- 1.27** 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. The contractor shall be fully responsible for any damage to the govt. property and the work for which 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. Nothing extra shall be payable on this account. Also, no claims for hindrance shall be entertained on this account.
- 1.28** Royalty at the prevalent rates shall be paid by the contractor or by RMC supplier as per the terms of supply between them on all materials such as boulders, metals, sand and bajri etc. collected by him for the execution of the work, directly to the revenue authority of the state government concerned. Nothing extra shall be payable on this account.
- 1.29** The contractor shall keep himself fully informed of all acts/laws of the Central/State/Local Governments, orders of central/state/local government, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed and anything related to carrying out the work. All the rules & regulations and bye-laws laid down by Collector / Municipal Corporation of area (where site is located) and any other statutory bodies shall be adhered to, by the contractor, during the execution of work. The contractor shall also adhere to all traffic restrictions notified by the national/state/local authorities. The contractor shall abide and ensure compliances to terms and conditions of various approvals obtained for the project. He shall protect and indemnify the department and it's officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself or by his employees or his authorized representatives. The contractor shall indemnify the department against all claims in respect of patent rights, royalties, design, trademarks- of name or other protected rights, damages to adjacent buildings, roads or members of public, in course of execution of work or any other reasons whatsoever, and shall himself defend all actions arising from such claims and shall indemnify the department in all respect from such actions, costs and expenses. Nothing extra shall be payable on this account.
- 1.30** The fee payable to statutory authorities for obtaining the various permanent service connections and occupancy certificate for the building shall be borne by the department.
- 1.31** The earth work under this work will be treated as earth work for major works under CPWD Specifications Volume 1, 2019 (as applicable). No extra payment will be made for maintaining



water level low enough so as to execute the work and not to cause any harm to work done inclusive of pumping out or bailing out water, if required.

### **1.32 SETTING OUT**

- (i) The contractor shall carry out survey of the work area, setting out the layout and fixing of alignment of the building as per architectural and Structural drawings in consultation with the Engineer-in-Charge and proceed further ensuring full structural continuity and integrated/monolithic construction. Any discrepancy between the architectural drawings and actual layout at site shall be brought to the notice of the Engineer-in-charge. It shall be responsibility of the contractor to ensure correct setting out of alignment/layout using total station instrument. Nothing extra shall be payable on this account.
- (ii) The initial levels shown in the layout plan are indicative and the actual ground levels may vary. Though the site levels are indicated in the drawings the Contractor shall ascertain and confirm the site levels with respect to benchmark from the concerned authorities. No claim due to difference in ground levels as per layout plan and as per actual on ground shall be entertained.
- (iii) The contractor shall establish, maintain and assume responsibility for grades, lines, levels and benchmarks. He shall report any errors or inconsistencies regarding grades, lines, levels, dimensions etc. 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.
- (iv) If at any time, any error appears due to grades, lines, levels and benchmarks 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.
- (v) The contractor shall protect and maintain temporary/ permanent benchmarks at the site of work throughout the execution of work. These benchmarks shall be got checked by the Engineer-in-Charge or his authorized representatives. The work at different stages shall be checked with reference to bench marks maintained for the said purpose.
- (vi) The approval by the Engineer-in-Charge, of the setting out by the contractor, shall not relieve the contractor of any of his responsibilities and obligation to rectify the errors/ defects, if any, which may be found at any stage during the progress of the work or after the completion of the work.
- (vii) The contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignments, 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 entire satisfaction of the Engineer- in-Charge.

**1.33** The contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the site so as to achieve early completion. The contractor shall deploy adequate equipment, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also, ancillary facilities shall be provided by contractor commensurate with requirement to complete the entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/sets of equipment in working condition, along with adequate stand-by arrangements, shall be deployed during entire

construction period. It shall be ensured by the contractor that all the equipment/tools & plants, machineries etc. provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all the construction tools, plants, equipment and machineries provided by the contractor, on site of work or his workshop for this work, shall be exclusively intended for use in the construction of this work and they shall not be shifted/ removed from site without the permission of the Engineer-in-Charge.

- 1.34** The Engineer-in-Charge shall not be responsible for any claims for injuries to person/workmen or for structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the contractor or of his representatives, during the execution of the work. The compensation, if any, shall be paid directly to the Department / authority / persons concerned, by the contractor at his own cost.

### **1.35 PRESERVATION AND CONSERVATION MEASURES**

- (i) Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services, if any, encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. Even in case of accidental damage, the responsibility of repair / replacement including removal of leaked/spilled water sewage etc. will be on the contractor at his own cost.
- (ii) Existing services shall not be diverted permanently until they are interfering directly with the layout. Notwithstanding anything to the contrary contained herein, the contractor shall ensure that the respective entities owning the existing roads, right of way, level crossings, structures, or utilities on, under or above the site are enabled by it to keep them in continuous satisfactory use, if necessary, by providing suitable temporary diversions with the authority of the controlling body of that road, right of way or utility. All temporary supports and other measures required to protect and maintain the services during construction period as per direction of Employer, shall be deemed to be included in the quoted rate / amount of the contractor and nothing extra shall be paid on this account. In case the same are to be removed and diverted, expenditure incurred in doing so shall be payable to the contractor. The contractor shall work out the cost, get the same approved by Engineer-in-Charge before taking up actual execution. 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.
- (iii) All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on project location during excavation/construction shall be the property of the Government, and shall be dealt with as per provisions of the relevant legislation. The contractor will take reasonable precaution to prevent his work men or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the Engineer-in-charge of such discovery and carry out the official instructions of Engineer-in- charge for dealing with the same, till then all work shall be carried out in a way so as not to disturb/damage such article or thing.

- 1.36** A site laboratory with the minimum equipment's as specified in CPWD specifications/in this tender document shall be established, made functional and maintained within three months from the commencement date or date of start without any extra cost to the department. In case of noncompliance / delay in compliance of this condition, a recovery @ Rs. 5000/- per day will be imposed which will be recovered from the immediate next R/A Bill of the Contractor.

### **1.37 CO-OPERATION WITH SPECIALIZED AGENCIES/ SUB-CONTRACTORS**

- (i) The contractor shall cooperate with and provide the facilities to the sub-contractors and other agencies working at site for smooth execution of the work. The contractor shall indemnify the department against any claim(s) arising out of such disputes. The contractor shall:
  - a) Allow use of toilets, sheds etc.
  - b) Properly co-ordinate their work with the work of other contractors.
  - c) Provide control lines and benchmarks to his sub-contractors and the other contractors.
  - d) Provide electricity and water at mutually agreed rates.
  - e) Provide hoist and crane facilities for lifting material at mutually agreed rates.
  - f) Co-ordinate with other contractors for leaving inserts, making chases, alignment of services etc. at site.
  - g) Adjust work schedule and site activities in consultation with the Engineer-in- Charge and other contractors to suit the overall schedule completion.
  - h) Resolve the disputes with other contractors/ sub-contractors amicably and the Engineer-in-Charge shall not be made intermediary or arbitrator
- (ii) The work should be planned in a systematic manner so as to ensure proper co-ordination of various disciplines e.g. sanitary & water supply, drainage, rainwater harvesting, electrical, firefighting, information technology, communication & electronics and any other services.
- (iii) The contractor shall conduct 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 possibly arrange his work and shall place and dispose of the materials being used or removed so as not to interfere with the operations of another contractor. The contractor shall arrange his work with that of the others, in an acceptable, and in a proper coordinated manner and shall perform it in proper sequence to the complete satisfaction of others

### **1.38 RATES**

- i. The rates quoted by the contractor are deemed to be inclusive of site clearance, setting out work, creating profile, establishment of reference bench mark(s), installing various signage, taking spot levels, survey with total station, construction of all safety and protection devices, compulsory use of helmet and safety shoes, and other appropriate safety gadgets by workers, imparting continuous training for all the workers, barriers, preparatory works, working during monsoon or odd season, working beyond normal hours, working at all depths, height, lead, lift, levels and location, implementation of green building norms to achieve desired GRIHA/GHAR rating etc. and any other unforeseen but essential incidental works required to complete this work. Nothing extra shall be payable on this.
- ii. The rates quoted by the tenderer, shall be firm and inclusive of all taxes and levies.



- iii. 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.
- iv. Ancillary and incidental facilities required for execution of work like labour accommodations, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level (if any), temporary structure for plants and machineries, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc., protection works, testing facilities / laboratory at site of work, facilities for all field tests and 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. Before start of the work, the contractor shall submit to the Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement and other storage, steel fabrication yard, site laboratory, water tank, etc.
- v. For completing the work in time, the contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account.
- vi. 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.

### 1.39 SAFETY PRACTICES

- i. **WARNING/ CAUTION BOARDS:** All temporary warning / caution boards / glow signage display such as "Construction Work in Progress", "Keep Away", "No Parking", Diversions & protective Barricades, barricading as required from environmental protection view as per NGT etc. shall be provided and displayed by the Contractor, wherever required. These glow signage and red lights shall be suitably illuminated during night also. The contractor shall be solely responsible for damage and accident caused, if any, due to negligence on his part. Also, he shall ensure that no hindrance, as far as possible, is caused to general traffic during execution of the work. Nothing extra shall be payable on this account. If the contractor fails to provide the warning /caution boards within 7 days of written direction of Engineer In charge or his authorized representative, **recovery of Rs. 1000/- on per day basis shall be made.**
- ii. **SIGN BOARDS:** The Contractor shall provide and erect a display board of size and shape as required and paint over it, in a legible and workman like manner, the details about the salient features of the project, as required by the Engineer-in-Charge. The contractor shall fabricate and put up a sign board in an approved location and to an approved design indicating name of the project, Client/Owner, Engineer-in-charges, structural consultants, department etc. besides providing space for names of other contractors, sub-contractors and specialized agencies within 15 days from issuance of letter of acceptance. Nothing extra shall be payable on this account. In case of noncompliance/delay in compliance, a **recovery @ Rs. 500/- per day will be imposed which will be recovered from the immediate next R/A Bill of the Contractor.**

- iii. Necessary protective and safety equipment's shall be provided to the site engineer, supervisory staff, labour and technical staff by the contractor at his own cost.
- iv. All signage shall be dismantled and taken away by the contractor after completion of the work with the approval of engineer in charge. No payment shall be made on this account.
- v. No inflammable materials including P.O.L shall be allowed to be stored in huge quantity at site. Only limited quantity of P.O.L may be allowed to be stored at site subject to the compliance of all rules / instructions issued by the relevant authorities and as per the direction of Engineer -in- Charge in this regard. Also, all precautions and safety measures shall be taken by the contractor for safe handling of the P.O.L products stored at site. All consequences on account of unsafe handling of P.O.L shall be borne by the contractor.

#### 1.40 QUALITY ASSURANCE

- i. 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 like exposed finish form work, specialized flooring work, Oxysulphide sealant and backer rod fixing in structural glazing works, factory made door- window shutters, proper slope maintaining in toilet units, sanitary- water supply installation, water proofing treatment will specially require engagement of skilled workers having experience particularly in execution of such items.
- ii. 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 & contractor shall be bound to replace / remove such sub-standard / defective work immediately. 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.
- iii. The contractor/ associated agency shall extend full cooperation to **Third Party Quality Assurance Agencies** engaged by the department for the project during their field visits.
- iv. In addition to the supervision of work by engineer- in-charge or his representatives, the consultants deployed by the department shall also be carrying out regular and periodic inspection of the ongoing activities in the work and deficiencies, shortcomings, inferior workmanship pointed out by them shall be communicated by Engineer- in-charge or his representatives to the contractor. Upon receipt of instructions from engineer in charge, the work so pointed out shall be made good by necessary improvement, rectification, replacement upto his complete satisfaction. Special attention shall be paid towards line and level of internal and external plastering, exposed smooth surface of RCC members by providing fresh shuttering plates, rubberized linings to all the shuttering joints, accurate joinery work in wooden doors and windows, thinnest joints in stone/ tiling / cladding work, non-hollowness in floor and dado tiles work, protection from scratches over flooring by impounding layer of plaster of paris, water tight pipe linings, absence of hollow vertical joints in brick masonry, proper compaction of filled up earth etc. to achieve an facility of international standards.
- v. The contractor shall submit immediately after the issuance of letter of acceptance within 20 days, Minimum Quality Assurance Plan (a detailed and complete method statement for the execution, testing and quality assurance plan/procedures for basic materials and

such items, to be followed during the execution of the work), for approval of the Engineer-in-Charge. All the materials to be used in the work, to give the finished work complete in all respects, shall comply with the requirements of the specifications and shall pass all the tests required as per specifications as applicable or such specifications / standards as directed by the Engineer-in-Charge. Further, **a recovery of Rs. 1000/- shall be made on per day basis in case of delay in submission of the Minimum Quality Assurance Plan.**

- vi. All materials and fittings brought by the contractor to the site for use shall conform to the samples approved by the engineer-in-charge which shall be preserved till the completion of the work. If a particular brand of material is specified in the particular specification, the same shall be used after getting the same approved from Engineer-In-Charge. Wherever brand / quality of materials are not specified in the particular specifications; the contractor shall submit the sample as per list of preferred make given in tender documents. 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 of Engineer-In-Charge.
- vii. The contractor shall procure and provide all the materials from the manufacturers / suppliers as per the item description/particular specifications for the work. The equivalent brand other than brand / make mentioned in particular specification for any item, shall be permitted to be used in the work, only when the specified make is not available subject to documentary evidence produced by the contractor for non-availability of the brand specified and also subject to independent verification by the Engineer-in-Charge. In exceptional cases, where such approval is required, the decision of Engineer-in-Charge as regards to the equivalent make of the material shall be final and binding on the contractor. the material shall be procured only after written approval of the Engineer-in-Charge. No claim, whatsoever, of any kind shall be entertained from the contractor on this account. Nothing extra shall be payable on this account.
- viii. All materials whether obtained from government stores or otherwise shall be got checked by the Engineer-in-Charge or his authorized supervisory staff on receipt of the same at site before use.
- ix. The tests, as necessary, shall be conducted in the laboratory approved by the Engineer-in-Charge. The samples shall be taken for carrying out all or any of the tests stipulated in the particular specifications, minimum quality assurance plan, and as directed by the Engineer-in-Charge or his authorized representative.
- x. All the registers of tests (carried out at construction site or in outside laboratories) and all material at site (MAS) registers including cement register shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-charge. 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/AEE/EE. Contractor shall be responsible for safe custody of all the registers.
- xi. The contractor shall at his own risk and cost make all arrangements and shall provide all such facilities including material and labour, the Engineer-in-Charge may require for collecting, preparing, forwarding the required number of samples for testing as per the frequency of test stipulated in the contract specifications or as considered necessary by the Engineer-in-Charge, at such time and to such places, as directed by the Engineer-in-Charge. Nothing extra shall be payable for the above.



- xii. 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 result of such tests and consequences thereon shall be binding on the contractor. The contractor or his authorized representative shall remain in contact with the Engineer-in-Charge or his authorized representative associated for all such operations.
- xiii. Unless specified otherwise, all the testing charges shall be borne by contractor.
- xiv. All the hidden items such as water supply lines, drainage pipes, electrical conduits, sewers etc. are to be properly tested as per the design conditions before covering.
- xv. Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to byelaws and municipal body / corporation where CPWD specifications are not available. The contractor should engage licensed plumbers for the work and get the materials (fixtures/fittings) tested by the Municipal Body/Corporation authorities wherever required at his own cost.
- xvi. The contractor shall give performance test of the entire installation(s) as per the standing specifications before the work is finally accepted.
- xvii. The contractor shall arrange electricity at his own cost for testing of the various electrical installations as directed by Engineer-in-Charge and for the consumption by the contractor for executing the work. Also, all the water required for testing various electrical installations, fire pumps, wet riser / firefighting equipment's, fire sprinklers etc. and also testing water supply, sanitary and drainage lines, water proofing of underground sump, overhead tanks, water proofing treatment etc. shall be arranged by the contractor at his own cost.
- xviii. The contractor shall make available, on request from the department, the copies of challan, cash memos, receipts and other certificates, if any, vouchers towards the quantity and quality of various materials procured for the work. The contractor shall also provide information and necessary documentation on the name of the manufacturer, manufacturer's product identification, manufacturer's instructions, warning, date of manufacturing and test certificates (from manufacturers for the product for each consignment delivered at site), shelf life, if any etc., for the department to ensure that the material have been procured from the approved source and is of the approved quality, as directed by the Engineer-in-Charge. Wherever specified, day-to-day account of receipt of such material shall be maintained at site of work.
- xix. If the Contractor does not provide adequate supporting staff or labour or both for carrying out field tests or collecting and forwarding samples to outside laboratory or for maintaining test records, Engineer in charge may carry out field tests or collect and forward sample to outside laboratory or appoint any person to maintain the registers at risk and cost of contractor. The charges so incurred shall be entirely borne by contractor and shall be deducted from running or final bill of contractor. Further, **recovery of Rs. 2000/- for each default shall be levied to contractor.**
- xx. In case there is any discrepancy in frequency of testing as given in list of mandatory tests and that in individual sub-heads of work as per CPWD Specifications, higher of the two frequencies of testing shall be followed and nothing extra shall be payable on this account.

## **1.41 SUBMISSION AND DOCUMENTATION**

The contractor shall render all help and assistance in documenting the total sequences of this project by way of photography, slides, audio / video recording etc. The original films shall be the property of the department. No copy shall be prepared without the prior approval of the Engineer- in – Charge.

- (i) 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. He should also keep at site at least one set of BIS Codes and other relevant codes and produce the same if asked for by engineer-in-charge. In case of noncompliance, these codes will be purchased from the Market and actual cost of purchase will be recovered from the next RA Bill of the contractor.
- (ii) The contractor shall make available five (05) sets of “AS BUILT” architectural, structural, all services (internal & external) drawings (including soft copy of the same), along with literatures, maintenance manuals, warranty certificates etc. of various installed fittings, fixtures and equipment for the completed projects. This shall be the prerequisite for payment of final bill.
- (iii) The contractor shall make available four (04) sets of computerized Standard Measurement Books (SMBs) having measurement of all the permanent standing.
- (iv) The performance guarantee shall not be released to the contractor until the aforesaid drawings are submitted to the Engineer-in-Charge.
- (v) The contractor shall comply the conditions of various NOC, clearance obtained for the project and submit the necessary document mentioned in these statutory NOC / Clearance.

## **1.42 PROGRAM /SCHEDULE**

The contractor shall prepare an integrated program chart including civil, electrical & mechanical, horticulture, landscaping activities 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 completion of the work within the stipulated period and submit the same for approval of the Engineer-In-Charge within fifteen days of the issuance of letter of acceptance. The integrated program chart so submitted should not have any discrepancy with the physical/financial milestones specified in this tender documents. The program chart should include the following: -

- i) Descriptive note explaining sequence of various activities.
- ii) Construction program prepared on PRIMAVERA/ M.S. Project etc. Software, which will indicate resources in terms of materials, manpower and specialized equipment for every important stage.
- iii) Program for procurement of materials by the contractor.
- iv) Program for arranging and deployment of manpower both skilled and unskilled so as to achieve targeted progress.

- v) Program of procurement of machinery/equipment having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor.
- vi) In case of noncompliance/delay in compliance, a recovery @ Rs. 5000/- per week or part thereof will be imposed which will be recovered from the immediate next R/A Bill of the contractor.
- vii) If at any time, it appears to the Engineer-In-Charge that the actual progress of work does not conform to the approved program referred above, the contractor shall produce a revised program showing the modifications to the approved program by additional inputs to ensure completion of the work within the stipulated time.
- viii) The submission for approval by the Engineer-In-Charge of such program or the furnishing of such particulars shall not relieve the contractor of any of his 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 contract.

#### **1.43 SUBMISSION OF PROGRESS REPORT:**

Apart from the above integrated program chart, the contractor shall be required to submit fortnightly progress report of the work in a computerized form on 5th and 20th of every month. The progress report shall contain the following -

- a) Construction schedule of the various components of the work through a bar chart for the next two fortnights (or as may be specified), showing the micro-milestone/milestones, targeted tasks (including material and labour requirement) and up to date progress. At least 20 digital photographs showing all the parts of construction site along with at least 10 minutes video of executions of different items in soft copy has to be submitted in every fortnightly progress report.
- b) Comparative progress chart of the various components of the work that were planned and achieved, for the fortnight, with reason for deviations, if any in a tabular format.
- c) Plant and machinery statement, indicating those deployed in the work.
- d) Man-power statement indicating:
  - Individually the names of all the staff deployed on the work, along with their designations.
  - No. of skilled workers (trade wise) and total no. of unskilled workers deployed on the work and their location of deployment within site.
- e) Financial statement, indicating the broad details of all the running account payment received up to date, such as gross value of work done, advances taken, recoveries effected, amount withheld, net payments details of cheque payment received, extra/substituted/deviation items if any, etc.
- f) In case of noncompliance / delay in compliance in submission of fortnightly progress report, a recovery @ Rs. 2000/- per report will be imposed which will be recovered from the immediate next R/A Bill of the Contractor.



#### **1.44 TEMPORARY WATER/ ELECTRICITY/ TELEPHONE CONNECTION**

- (i) Arrangement of temporary connection for telephone, water and electricity etc. by him, shall be made by the contractor at his own cost and also necessary permissions shall be obtained by him directly from concerned authorities, under intimation to the department. Also, all initial cost, running charges, and security deposit, if any, in this regard shall be borne by him. The contractor shall abide by all the rules/ bye laws applicable in this regard and he shall be solely responsible for any penalty on account of violation of any of the rules / byelaws in this regard. The contractor may bring water from outside through tankers from authorized sources.
- (ii) The contractor shall be responsible for maintenance and watch and ward of the complete installation and water / electricity meter. The contractor shall also be responsible for any pilferage, theft, damage, penalty etc. in this regard. The contractor shall indemnify the department against any claim arising out of pilferage, theft, damage, penalty etc. whatsoever on this account. Security deposit for the work shall be released only after No Dues Certificates are obtained from the local Authorities from whom temporary electric/ water / telephone connection have been obtained by the contractor.
- (iii) The department shall in no way be responsible for either any delay in getting electric and/or water and/or telephone connections for carrying out the work or not getting connections at all. Also, contingency arrangement of stand-by water & electric supply shall be made by the contractor for commencement and smooth progress of the work so that work does not suffer on account of power failure or disconnection or not getting connection at all. No claim of delay of any kind whatsoever shall be entertained on this account from the contractor.

#### **1.45 CLEANLINESS OF SITE**

- i. The contractor shall not stack building material / malba / muck on the land or road of the local development authority or on the land owned by the others, as the case may be. So, the muck, rubbish etc. shall be removed periodically, from the site of work to the approved dumping grounds as per the local byelaws and regulations of the concerned authorities and all necessary permissions in this regard from the local bodies shall be obtained by the contractor. In case, the contractor is found stacking the building material / malba as stated above, the contractor shall be liable to pay the stacking charges / penalty as may be levied by the local body or any other authority and also to face penal action as per the rules, regulations and bye-laws of such body or authority. The engineer-in-charge shall be at liberty to recover, such sums due but not paid to the concerned authorities on the above counts, from any sums due to the contractor including amount of the security deposit and performance guarantee in respect of this contract.
- ii. The contractor shall take instructions from the engineer-in-charge regarding collection and stacking of materials at any place within the site. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, services or any development works are to be constructed/carried out.
- iii. The site of work shall always be kept clean due to constraints of space and to avoid any nuisance to the users of buildings in the adjacent plots. The contractor shall take all care to prevent any water- logging at site. The wastewater, slush etc. shall not be allowed to be collected at site. For discharge into public drainage system, necessary permission shall be obtained by the contractor from relevant authorities after paying the necessary charges,

if any, directly to the authorities. The work shall be carried out in such a way that the area is kept clean and tidy. All the fees/charges in this regard shall be borne by the contractor.

- iv. It is the responsibility of contractor to keep building neat and clean. The contractor shall spray the chemicals fumigate site area to check the mosquitoes at frequent interval or as directed by the engineer in charge. The contractor shall also make lighting and temporary ventilation arrangement in basement. The contractor shall provide submersible pumps with automatic on/off system in each sump in basement to bail out the water accumulated. The contractor shall quote rates after considering the above sated conditions and nothing extra shall be paid on this account.
- v. The contractor shall not wash the drum of TM (transit mixture) at site and shall avoid the spread of leachate / cement slurry at the site of work and all care shall be taken to keep the site neat and clean at his own cost.

#### **1.46 INSPECTION OF WORK**

- (i) In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by senior officers of department & the representative of the consultants. 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 representative duly accredited in writing, to be present for that purpose.
  - a) The consultant and third-party quality assurance agency appointed by department shall be inspecting the works including workshops and fabrication factory to ensure that the works are in general being executed according to the design, drawings and specifications laid down in the contract. Their observations shall be communicated by department to contractor and compliance shall be reported to department by the contractor.
  - b) Senior officers of department, dignitaries from central ministry / department, shall be inspecting the on-going work at site at any time with or without prior intimation. The contractor shall, therefore, keep updated the following requirements and detailing.
    - i) Display board showing detail of work, weekly progress achieved with respect to targets, reason of shortfall, status of manpower, wages being paid for different categories of workers.
    - ii) Keep entrance and surrounding area clean.
    - iii) Display layout plan, key plan, building drawings including plans, elevations and sections.
    - iv) Upto date displays of progress of work in form of Bar chart, CPM and PERT etc.
    - v) Keep details of quantities executed, balance quantities to be executed, deviations, possible Extra item, etc.
    - vi) Keep plastic / cloth mounted one sets of building drawings.

- vii) Set of helmets and safety shoes for exclusive use for officers/dignitaries visiting at site.

#### **1.47 PRODUCT DELIVERY, STORAGE AND HANDLING OF CHEMICALS**

- (i) The contractor shall construct storage space for chemicals to ensure that the storage conditions are as recommended by the manufactures.
- (ii) All the chemical shall be procured and delivered in sealed containers with labels legible and intact.
- (iii) All the chemicals (polymers, epoxy, water proofing compound, plasticizer, Polysulphide, SBR based elastomeric, all exterior and interior paints, polish etc.) shall be procured in convenient packings (say 20 litres/Kgs.) with packing capacity as approved by the Engineer-in-Charge, and not in bigger capacity containers, say 200 litre (Kgs.) drums unless otherwise specifically permitted by the Engineer-in-Charge. One sample from each lot of the chemicals procured by the contractor shall be tested in a laboratory approved by the Engineer-in-charge.
- (iv) All chemicals required for the execution of the work shall be got approved, procured and deposited with the departmental supervisory staff. The chemicals shall be kept in joint custody of the contractor and the department. The watch and ward of such material shall, however, remain to be the responsibility of the contractor and no claim, whatsoever, on this account shall be entertained. Different containers of each chemical shall be serially numbered on packing and also consumed in that order. Day-to-Day account of receipt, issue and balance shall be regulated by the department and proper account shall be maintained at site of work in the prescribed form as per the standard practice.
- (v) All the chemicals shall be procured by the contractor directly from the manufacturer. In exceptional circumstances, the contractor may be allowed to procure the materials from the authorized dealers of the manufacturers, if specifically permitted by the Engineer-in-Charge.
- (vi) The original copies of challan/cash memos towards the quantity of various chemicals procured shall be made available by the contractor to Engineer-in- Charge and a copy of the same shall be kept in record.
- (vii) The name of manufacturers, manufacturer's product identification, manufacturer's mixing instructions, warning for handling and toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of each container.
- (viii) The contractor shall submit for the chemicals procured, manufacturer's and / or authorized dealer's certificate regarding supplying and verifying conformance to the material specifications, as specified.
- (ix) All filled containers shall be handled in safe manner and in a way to avoid breaking container seals.
- (x) Empty containers of the chemicals should not be removed from site till the completion of work and shall be removed only with the written approval of the Engineer-in-Charge.
- (xi) All arrangements for measuring, dosing and mixing of material / chemicals at site have to be made by the contractor.

- (xii) Contractor shall suitably advise his site engineer and all the workers as regards safe handling of chemicals. Necessary protective and safety equipment's in form of hand gloves, goggles etc. shall be provided by the contractor and be also used at site.
- (xiii) All incidental charges of any kind including cartage, storage and wastage and safe custody of material/chemical etc. shall be borne by the contractor and no claim, whatsoever, shall be entertained on this account.
- (xiv) The chemicals shall be tested at the frequency as specified in an independent laboratory as approved by the Engineer-in-charge. If required, more samples may have to be tested as per the directions of the Engineer-in-Charge. Nothing extra shall be payable on this account.

#### **1.48 DE-WATERING**

- i. 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. Such scheme shall be modified / augmented as the work proceeds based on fresh information discovered during the progress of work. At all times during the construction work, efficient drainage of the site shall be carried out by the contractor and especially during the laying of plain cement concrete, taking levels etc. The contractor shall also ensure that there is no danger to the nearby properties and installations on account of such lowering of water table. If needed, suitable precautionary measures shall be taken by the contractor. Also, the scheme of dewatering adopted shall have adequate built-in arrangement to serve as stand-by to attend to repair of pumps etc. and disruption of power / fuel supply. Nothing extra shall be payable on this account.
- ii. 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.
- iii. The contractor shall be responsible for taking necessary approval from the concerned authority for the discharge of the water. Nothing extra shall be payable on this account.

#### **1.49 INSURANCE POLICIES**

Before commencing the execution of work, the contractor shall, without in any way limiting his obligations and liabilities, insure at his own cost and expense against any damage or loss or injury, which may be caused to any person or property, at site of work. The contractor shall obtain and submit to the Engineer-in-Charge proper Contractor All Risk Insurance Policy for an amount 1.25 times the contract amount for this work, with Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the contractor (who shall be second beneficiary). Also, he shall indemnify the department from any liability during the execution of the work. Further, he shall obtain and submit to the Engineer-in-Charge, a third-party insurance policy for maximum Rs.10 lakh for each accident, with the Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the contractor (who shall be second beneficiary). The contractor shall, from time to time, provide documentary evidence as regards payment of premium for all the insurance policies for keeping them valid till the completion of the work. The contractor shall ensure that insurance policies are also taken for the workers of his sub-



contractors / specialized agencies also. Without prejudice to any of its obligations and responsibilities specified above, the contractor shall within 10 days from the date of letter of acceptance of the tender and thereafter at the end of each quarter submit a report to the department giving details of the insurance policies along with certificate of these insurance policies being valid, along with documentary evidences as required by the Engineer-in-Charge. No work shall be commenced by the contractor unless he obtains the insurance policies as mentioned above. Also, no payment shall be made to the contractor on expiry of insurance policies unless renewed by the contractor. Nothing extra shall be payable on this account. No claim of hindrance (or any other claim) shall be entertained from the contractor on these accounts.

#### **1.50 PRESERVE AND PROTECT LANDSCAPE DURING CONSTRUCTION**

- (a) The contractor shall ensure that no trees, existing or otherwise, shall be harmed and damage to roots should be prevented during trenching, placing backfill, driving or parking heavy equipment, dumping of trash, oil, paint, and other materials detrimental to plant health. These activities should be restricted to the areas outside of the canopy of the tree, or, from a safe distance from the tree/plant by means of barricading. Trees will not be used for support; their trunks shall not be damaged by cutting and carving or by nailing posters, advertisements or other material. Lighting of fires or carrying out heat or gas emitting construction activity within the ground, covered by canopy of the tree is not to be permitted.
- (b) The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.
- (c) Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer in Charge.
- (d) The contractor shall avoid cut and fill in the root zones, through delineating and fencing the drip line (the spread limit of a canopy projected on the ground) of all the trees or group of trees. Separate the zones of movement of heavy equipment, parking, or excessive foot traffic from the fenced plant protection zones.
- (e) The contractor shall ensure that maintenance activities during construction period shall be performed as needed to ensure that the vegetation remains healthy.

#### **1.51 PREPARATION OF SAMPLE (MOCK UP)**

The contractor shall prepare one sample/Mock-Up for typical units (e.g. Room, office cabin, Lobby, Corridor of minimum 10m length, complete male, female, Handicap toilet unit, external development work etc.). Samples of representative units shall be prepared by the contractor well in advance before taking up the mass execution at the appropriate time as per mile stones. The contractor shall invariably prepare the samples units with 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 works only after getting the samples of these items approved in writing from Engineer-in-charge.

#### **1.52 SPECIALIZED AGENCIES**

- (i) The contractor shall engage specialized agency for carrying out specialized item such as Structural Glazing, Expansion Joint Works, Waterproofing and insulation work, Water supply & Plumbing work, Fire check Doors, Furniture Work, Anti-termite treatment, etc.

Before engaging such agency, the contractor shall submit the name of the agency along with their working experience, presentation on method statement and materials being used for execution of such items etc. to Engineer-in-charge for approval. Contractor shall submit the proposal (along with work experience certificate issued by competent authority) of only those specialized agencies who have work experience of satisfactorily completion of similar works as per following criteria during last seven years –

Three works each costing not less than 40% of estimated cost for concerned similar work

Or

Two works each costing not less than 60% of estimated cost for concerned similar work

Or

One work costing not less than 80% of estimated cost for concerned similar work item.

- (ii) Estimated cost of the specialized item/work for various items/schemes shall be as per schedule of quantity or as determined by engineer-in-charge. Unless specified otherwise, the contractor shall be fully responsible for and shall guarantee proper design and performance of specialized works for a period of 10 years from the date of completion of work. All the guarantees shall be submitted before final payment and shall not in any way limit any other rights to correct which the employer may have under the contract. In addition, an amount of 10 % of work done of specialized work, shall be retained in interim/final payment till it reaches the 10 % of estimated cost of such specialized item/work. This amount shall be withheld towards guarantee and shall be in addition to the other amounts to be withheld as mentioned elsewhere in the contract. However, this amount (withheld) would be released after guarantee period if the performance, as required, is found satisfactory. If any defects are noticed during the guarantee period, it shall be rectified by the contractor within seven days of issuance of notice to the contractor, temporarily, to the satisfaction of the department or any other authorized representative of department and permanent rectification of the defects/replacement of defective should be carried out by the contractor within a period of one month after issuance of notice to the contractor. If not attended to, the same shall be got done through other agency at the risk and cost of the contractor and the cost, which shall be final and binding on the contractor, shall be recovered from the amount withheld towards the guarantee as mentioned above or from any other amount due to the contractor. However, the amount withheld as guarantee can be released in full on submission of irrevocable bank guarantee, from a Schedule/Nationalized Banks, of the same amount, for the guarantee period by the contractor. The defects, if any, shall be rectified in a workmanlike manner, retaining the same aesthetics and other functional parameters of the original work.
- (iii) The main contractor shall submit the credential of specialized agency well in advance as per the direction of Engineer-in-charge. After verification of the same, written approval will be conveyed to main contractor in this regard. The main contractor shall not change the specialized agency. However, if the change is warranted, he may do so, with permission of Engineer-in-charge. However, before making any such change, he has to enter into similar agreement as with previous agency & submit the same to Engineer - in – Charge for approval. This shall however be without any change in the accepted rates of the contract agreement and without any cost implications to the Department. If the contractor proposes name of specialized agencies from list of preferred makes, there is no need to comply eligibility criteria mentioned in para (i) above. Also, if the specialized work is carried out by the authorized fabricator/ applicator of the manufacturers then there is no need to comply eligibility criteria mentioned in para (i) above.

- (iv) The main contractor cannot work as a specialized agency unless his name is approved as specialized agency by Engineer-in-charge in accordance with criteria mentioned at sr. No. (i) above.
- (v) Proposal of the specialized agencies for each specialized work shall be obtained from the Engineer-in-Charge within three months of issuance of letter of acceptance even if, such specialized items of work shall be executed by the specialized agencies at later date. The work shall be deemed to be executed by the tenderer for all purposes and the responsibility of the quality of items of works executed etc. shall continue to be that of the tenderer only. It is expressly agreed that the contractor shall, at all times, be responsible and liable for all its obligations under this contract notwithstanding anything contained in the contracts with its sub-contractors or any other contract that may be entered into by the contractor, and no default under any such contract shall excuse the contractor from its obligations or liability hereunder.
- (vi) 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 whatsoever, of any kind, shall be entertained from the contractor on account of delay attributable to the selection/rejection of the specialized agencies or any dispute amongst them.

### **1.53 STRUCTURAL SAFETY**

Following guidelines shall be followed where height of casting of concrete is higher than 3.5 m or where higher loading are coming during casting of concrete or span is more than 5 meter long or special structure like domes, vaults, steel structure etc. are to be constructed:

- I. Centering/scaffolding/staging for casting of these structures should be properly designed by a qualified and experienced person/agency having past experience in design of false work (centering) for concrete structures and should be proof checked by similar experienced person/agency and it should be approved by Engineer-in-Charge. The provisions of relevant Indian standard (IS: 14687) may be referred for design of false work (centering).
- II. A method statement for erection and dismantling of the centering/scaffolding/staging and process of concreting & process of anchor of steel structure shall be prepared by contractor and submitted to Engineer-in-Charge for approval and the work shall be commenced only after approval of method statement by Engineer-in-Charge. The provisions of relevant Indian standard (IS: 14687) may be referred for erection of false work (centering), safety precautions and other site operations, pertaining to false work (centering).
- III. Engineering form watcher shall be engaged during erection, concreting and dismantling for early detection of any movement or instability in the system.
- IV. A detailed programme of field safety inspection of centering, scaffolding, form work of such structures during different stages should be chalked out and strictly followed.

- V. The prime responsibility of safety of false work shall be with contractor.
- VI. Provision of safety net, fall arresting system including other safety gears, for workers, working over these structures shall be used strictly.

#### **1.54 OTHER CONDITIONS W.R.T EXECUTION OF WORK**

- a. The work shall be carried out in accordance with the contract specification/terms, tendered drawings and detailed drawings including revised drawings, if any, issued during execution of work by the Engineer-in-Charge.
- b. Before commencement of any item of work, the contractor shall correlate all the relevant architectural, structural and MEP drawings, and specifications etc. issued for the work and satisfy himself that the information available therefrom is complete and unambiguous. The figure and written dimension of the drawings 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 alone shall be responsible for any loss or damage occurring by the commencement and execution of work based on any erroneous and or incomplete information and no claim whatsoever shall be entertained on this account.
- c. The contractor is required to deploy resources as per availability of site and as per approved programme chart of the work. However, no claims shall be entertained for idle labour, idle machinery, idle technical/no-technical staff, idle T&P etc.
- d. The work of services may be executed simultaneously. The contractor shall minimize the scope of making recesses, holes, opening etc. as the same shall be planned in advance and necessary grooves/niches shall be provided in shuttering of RCC.
- e. Ready mix plaster shall be executed using pneumatic spray machine of reputed make.
- f. Laminates on flush doors shall be machine pressed, preferably in factory. The design and pattern of laminates shall be as approved by engineer in charge.
- g. The aluminium door-windows-framework, lamination and lipping on flush doors shall be factory made.
- h. Unless otherwise specified, wherever mild steel / galvanized iron sections and pipes are provided in the work, priming coat of approved steel primer shall be done after removing rust from section if any and finally finished with low VOC synthetic enamel paint or as mentioned in specification.
- i. Unless otherwise specified, monkey ladder shall be provided for overhead water tanks, mummy and lift machine room doors with frame and steps of 40x40x6 mm angle iron, etc.
- j. Wall mounted door stoppers shall be provided to protect the wall where the door handle would run into it.
- k. For avoiding of scratch marks or damage to the vitrified / ceramic floor tile, the necessary arrangement of hessian cloth with a coat of plaster of paris over it shall be provided. Nothing shall be paid extra on this account.



- l. Fall nets and scaffolding nets for protection from debris / dusts and noise etc. are to be provided during the construction period. Nothing extra shall be paid on this account.
- m. Wherever M.S. grill provided in window, weight of grill in each window should not be less than 12 kg/sqm.
- n. Wherever utility ducts, drains etc. are required, the same shall be provided with precast concrete units made of M-30 grade concrete and reinforcement steel of grade of Fe-500D.
- o. Wherever the doors are required to be fixed to AAC block masonry, the frame shall be fixed in RCC band or concrete block masonry.
- p. No sunken floor slab except floor depression for maintaining slopes. However, camouflaging of water supply and sanitary line of upper floor to be done by false ceiling.

**1.55** It is intended to make our built environment barrier free and accessible to all. Bidders are instructed to strictly adhere to the provision contained in Hand Book on Barrier free and accessibility containing and corresponding provisions of NBC 2016 while incorporating such - features in the building.

**1.56** In case of reduction in scope of work, no claim on account of reduction in value of work, loss of expected profit, consequential overheads etc. shall be entertained.

## **2.0 SPECIAL CONDITIONS FOR GREEN BUILDING**

The building shall confirm to Green Plus rating as per CPWD GHAR 2021 & 4-Star rating as per GRIHA.

### **2.1 Construction Stage-**

- (i) All vehicles, equipment and machinery to be procured for construction shall conform to the relevant Bureau of India Standard (BIS) norms.
- (ii) Emission from the vehicles must conform to environmental norms.
- (iii) Dust produced from the vehicular movement and other site activities shall be mitigated by sprinkling of water.

#### **a) Construction Wastes Disposal**

- (i) The pre-identified dump locations will be a part of solid waste management plan to be prepared by the Contractor in consultation with Engineer -in-charge.
- (ii) Contractor shall get approved the location of disposal site prior to commencement of the excavation on any section of the project location.
- (iii) Contractor shall ensure that any spoils of material will not be disposed off in any municipality solid waste collection bins.

### **2.2 Procurement of Construction Materials**

- i. All vehicles delivering construction materials to the site shall be covered to avoid spillage of materials and maintain cleanliness of the roads.

- ii. Wheel Tyres of all vehicles used by the contractor, or any of his sub-contractor shall be cleaned and washed clear of all dust/mud before leaving the project premises. This shall be done by routing the vehicles through tyre washing tracks.
- iii. Contractor shall arrange for regular water sprinkling at least twice a day (i.e., morning and evening) for dust suppression of the construction site and unpaved roads used by his construction vehicles.

### **2.3 Water Pollution**

- i. The contractor shall take all precautionary measures to prevent accumulation of the wastewater during construction.
- ii. The wastewater arising from the project shall be disposed off in the manner that is acceptable to the Engineer -in-charge.

### **2.4 Air and Noise Pollution**

- i. Contractor shall use dust screens and sprinkle water around the construction site to arrest spreading of dust in the air and surrounding areas.
- ii. Contractor shall ensure that all vehicles, equipment and machinery used for construction are regularly maintained and shall confirm that emission levels comply with environmental emission standards/norms.
- iii. All vehicles and equipment used in construction may be fitted with exhaust silencers.
- iv. Servicing of all construction vehicles and machinery shall be done regularly and during routine servicing operations, the effectiveness of exhaust silencers may be checked and be replaced if, found defective.
- v. Noise emission from compactors (rollers) front loaders, concrete mixers, cranes (movable), vibrators and saws should be less than 75 dB(A).

### **2.5 Personal Safety, Hygiene Measures for Labour**

- i) Contractor may provide the following items for safety of workers employed by contractor and associate agencies:
  - a) Protective footwear and gloves to all workers employed for the work on mixing, cement, lime mortars, concrete etc. and works of water pipeline/sewer line.
  - b) Welder's protective eye-shields to workers who are engaged in welding works.
  - c) Safety helmet and Safety harness/ belt.
  - d) Provide adequate sanitation/safety facilities for construction workers to ensure the health and safety of the workers during construction, with effective provisions for the basic facilities such as sanitation, drinking water and safety equipment's or machinery.
- ii) All the workers should be wearing helmet and shoes all the time on site.
- iii) Masks and gloves should be worn whenever and wherever required.

- iv) Adequate drinking water facility should be provided at site, adequate number of decentralized latrines and urinals to be provided for construction workers.
- v) If allowed and full-time workers are residing on site, then they should be provided with clean and adequate temporary hutment.
- vi) First aid facility should also be provided.
- vii) Overhead lifting of heavy materials should be avoided. Barrow wheel and hand-lift boxes should be used to transport materials onsite.
- viii) Tobacco and cigarette smoking should be prohibited onsite.
- ix) All dangerous parts of machinery are well guarded and all precautions for working on machinery are taken.
- x) Maintain hoists and lifts, lifting machines, chains, ropes and other lifting tackles in good condition. Provide safety net of adequate strength to arrest falling material down below.
- xi) Use of durable and reusable formwork systems to replace timber formwork and ensure that formwork is properly maintained.
- xii) Ensure that walking surfaces or boards at height are of sound construction and are provided with safety rails and belts.
- xiii) Provide measure to prevent fire. Fire extinguisher and buckets of sand may be provided in fire-prone area.
- xiv) Provide sufficient and suitable light for working during night.
- xv) Ensure that the construction firm/division/company should have sound safety policies.
- xvi) Comply with the safety procedure, norms and guidelines (as applicable) as outlined in NBC 2016.
- xvii) Adopt additional best practices and prescribed norms as in NBC 2016

**2.6** Contractor is required to get existing top soil tested for fertility. If test finds it fertile, then top soil preservation is required. For preservation, top layer of soil (150mm- 300mm from the top) must be stripped off the site areas where construction activity will be carried out and kept separately for preservation. The preserved top soil must NOT be mixed with subsoil (soil excavated below 150mm – 300mm depth). The top soil should be preserved from erosion by wind/rain water by planting plants or grass on it. The preserved top soil stack height should not be more than 400mm – 600mm. The area used for preserved top soil should be barricaded from all the sides & nothing should be dumped on it during the construction process. There should be regular water sprinkling on the preserved top soil for its compaction & to maintain its fertility by adding organic manure as per the direction of horticulturist. Top-soil fertility test must be carried out before preservation and post construction to ensure and maintain its fertility. The soil fertility should be enhanced by organic means only if required. Preserved top soil must be spread back to landscaped areas after the construction activity is completed as per the direction of engineer in charge. Top soil fertility test must be done from

an ICAR or NABL accredited laboratory for the following parameters- P.H., Mineral Content, Organic Matter (%), Nitrogen (kg/Hec), Phosphorus (kg/Hec), Potassium (kg/Hec), Free Lime content (%), Iron (ppm), Maganese (ppm), Bauxite (ppm), Copper (ppm), Texture (%), Bulk Density (Mg m3), Particle Density (Mg m3), Maximum Water Holding Capacity (%), Exchangeable Sodium (Mg/100g)

- 2.7** Identify roads on-site that would be used for vehicular traffic. Upgrade vehicular roads (if these are unpaved) by increasing the surface strength by improving particle size, shape and mineral type that make up the surface base. Add surface gravel to reduce source of dust emission. Limit amount of fine particles (smaller than 0.075mm) to 10 -20%. Limit vehicular speed on site 10km/h. Nothing extra will be payable for this.
- 2.8** All material storages should be adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust/particulate emissions.
- 2.9** Spills of dirt or dusty materials shall be cleaned up promptly so the spilled material does not become a source of fugitive dust and also to prevent of seepage of pollutant laden water into the ground aquifers. When cleaning up the spill, ensure that the clean - up process does not generate additional dust. Similarly, spilled concrete slurries or liquid wastes should be contained/cleaned up immediately before they can infiltrate into the soil/ground or runoff in nearby areas.
- 2.10** The contractor shall ensure that water spraying is carried out by wetting the surface by spraying water on:
- (i) Any dusty material.
  - (ii) Areas where demolition work is carried out.
  - (iii) Any unpaved main-haul road and.
  - (iv) Areas where excavation or earth moving activities are to be carried out.
- 2.11** The contractor shall ensure the following:
- i. Cover and enclose the site by providing dust screen, sheeting or netting to scaffold along the perimeter of a building.
  - ii. Covering stockpiles of dusty material with impervious sheeting.
  - iii. Covering dusty load on vehicles by impervious sheeting before they leave the site.
  - iv. Transferring, handling/storing dry loose materials like bulk cement and dry pulverized fly ash inside a totally enclosed system.
  - v. Clear vegetation only from areas where work will start right away.
  - vi. Vegetate/mulch areas where vehicles do not ply.
  - vii. Apply gravel / landscaping rock to the areas where mulching/paving is impractical.
- 2.12** The contractor shall adopt measures to prevent air pollution in the vicinity of the site due to construction activities.



- 2.13** Prior to the commencement of any work, the method of working, plant equipment and air pollution control system to be used on -site should be made available for the inspection and approval of the Engineer -in-Charge to ensure that these are suitable for the project.
- 2.14** The contractor shall employ measures to segregate the waste on-site into inert, chemical or hazardous wastes. The inert waste may be disposed off to Municipal Corporation/local bodies dump yard and landfill sites.
- 2.15** The contractor shall preserve the existing landscape and protect it from degradation during the process of construction. Proper timing for construction activity shall be selected to minimize the disturbance such as soil pollution due to spilling of the construction material and its mixing with rainwater. The construction management plan including soil erosion control management plan shall be prepared accordingly for each month. The application of erosion control measures includes construction of gravel pits and tyre washing bays of approved size and specification for all vehicular site entry/exits, protection of slopes greater than 10%. Existing vegetation shall be preserved and protected by not-disturbing or damaging to specified site areas during construction.
- 2.16** The contractor should follow the construction plans proposed by the Engineer-in-charge / landscape consultant to minimize the site disturbance such as soil pollution due to spilling.
- 2.17** The contractor shall ensure that no construction leachates (e.g., cement slurry) is allowed to percolate into the ground. Temporary drainage channels, perimeter dike/swale, etc. shall be constructed to carry the pollutant -laden water directly to the treatment device or facility (municipal sewer line).
- 2.18** All lighting installed by the contractor around the site and at the labour hutments during construction shall be CFL/ LED bulbs of the appropriate illumination levels.
- 2.19** All the building materials and systems used on site must be as per the specifications and approved makes by the Engineer-in-Charge.
- 2.20** All required certificates explaining the properties of the building material/system needs to be obtained from the manufacturer/vendor as required by the green building rating authority. The purchase orders of all the materials made with the manufacturers / authorized vendors should be maintained and shall be provided for the process with due diligence upon request.
- 2.21** All paints, adhesives and sealants should comply with the VOC limits prescribed by **GRIHA/GHAR**.
- 2.22** Water saving measures need to be followed on site. If bore well water is used for construction, it must be metered. For waste water use in construction, record must be maintained of all tankers used at site. All sources of water use during construction must be regularly monitored.
- 2.23** The contractor / subcontractor shall prepare and submit a Site Management Plan (SMP) within 10 days of commencement date, for approval by the Engineer -in-charge. This SMP shall indicate the locations of go down, stockpiles, barricading, waste storage, offices, vehicular movement routes etc. In short this SMP would comprehensively represent how the site activities shall be managed conforming to GRIHA/GHAR guidelines. **Contractor will be penalized @ Rs. 500 per day** of delay on non-submission of SMP beyond due date which shall be recovered from next RA bill.

- 2.24** Any other site management measures suggested by the Engineer-in-charge shall be followed on site.
- 2.25** The contractor & his team shall put adequate efforts to minimize construction waste generation at site. This shall include collection and segregation of all construction waste at site like broken bricks, tiles, glass, pavers, Steel scrap, Concrete debris, Plastic bags, drums, packaging cardboard, Timber scrap, Cement bags etc.
- 2.26** The contractor must keep record of all the construction waste being recycled or reused at site and also maintain receipts/records of waste sold from site. The contractor must ensure that no waste from the site is sent to landfill sites, either all waste is reused within the site or sent for recycling. Track the waste sent off the site to its final destination. Contractor must keep record as gate passes / challans for all the waste material sent out for selling.
- 2.27** The contractor shall submit to the Engineer -in-Charge after completion of the buildings, a detailed as built quantification of the following within 10 days of recording of completion. Contractor will be penalized @ Rs. 500 per day of delay on non-submission beyond due date which shall be recovered from the Final bill:
- (i) Total materials used
  - (ii) Total waste generated,
  - (iii) Total waste reused,
  - (iv) Total water used,
  - (v) Total electricity consumed, and
  - (vi) Total diesel consumed.
- 2.28** Evidence for the implementation of the all the above required measures shall be provided in the form of photographs and templates as required for the submission to the green building rating authority (GRIHA/GHAR).
- 2.29** The contractor shall provide potable water for all workers. The contractor shall provide the minimum level of sanitation and safety facilities for the workers at site. The contractor shall ensure cleanliness of workplace with regard to the disposal of waste and effluent; provide clean drinking water, latrines and urinals as per applicable standard. Adequate toilet facilities shall be provided for the workman within easy access of their place of work. The total no. of toilets to be provided shall not be less than 1 per 30 employees in any one shift. Toilet facilities shall be provided from the start of building operations, and connection to a sewer shall be made as soon as practicable. Every toilet shall be so constructed that the occupant is sheltered from view and protected from the weather and falling objects. Toilet facilities shall be maintained in a sanitary condition. A Sufficient quantity of disinfectant shall be provided. Natural or artificial illumination shall be provided.
- 2.30 In compliance to the Hon'ble National Green Tribunal (NGT) and Office Memorandum no. DG/SE/CM/CON/Misc./02 dated 16.03.2016 following preventive/corrective measures to be taken at site in order to control Air pollution from construction and demolition activity: –**
- (i) The contractor shall not store/dump construction material or debris on metalled road.
  - (ii) 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.

- (iii) 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.
- (iv) The contractor shall ensure that all the trucks or vehicles of any kind which are used for construction purposes/or are carrying construction material like cement, sand and other allied material are fully covered. The contractor shall take every necessary precaution 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.
- (v) 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.
- (vi) The contractor shall provide all medical help, investigation and treatment to the workers involved in the construction.
- (vii) The contractor shall ensure that C&D waste is transported to the C&D Waste site only and due record shall be maintained by the contractor.
- (viii) The contractor shall compulsorily use of wet jet in grinding and stone cutting.
- (ix) The contractor shall comply all the preventive and protective environmental steps as stated in the MoEF guidelines, 2010.
- (x) The contractor shall carry out on-Road-Inspection for black smoke generating machinery. The contractor shall use cleaner fuel.
- (xi) The contractor shall ensure that all DG sets comply emission norms notified by MoEF.
- (xii) 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.
- (xiii) 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.
- (xiv) 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.

**2.31** In case of non-availability of the C& D waste Material / Product, the contractor shall make arrangement of substitute materials/Products without any cost adjustment.

- 2.32** Any Penalty imposed by Civic bodies/ NGT for Non-Compliance of their guidelines issued by them from time to time shall be borne by the contractor.
- 2.33** The contractor shall comply with the safety procedures, norms and guidelines (as applicable) as outlined in the Part 7 of National Building code 2016 of India, Bureau of Indian Standards. A copy of all pertinent regulations and notices concerning accidents, injury and first-aid shall be prominently exhibited at the work site. Depending upon the scope & nature of work, a person qualified in first-aid shall be available at work site to render and direct first-aid to wounded/causalities. A telephone may be provided to first-aid assistant with telephone numbers of the hospitals. Complete reports of all accidents and action taken thereon shall be forwarded to the competent authorities.
- 2.34** The contractor shall preferably select materials / vendors, harvested and manufactured regionally, within a 800-km radius of the project site. Contractor shall collect & submit the relevant material certificates for materials with high recycled (both post-industrial and post-consumer) content, including materials like RMC mix with fly-ash, glass with recycled content, calcium silicate boards etc.
- 2.35** The contractor shall ensure that a flush out of all internal spaces is conducted prior to handover. This shall comprise an opening of all doors and windows for 14 days to vent out any toxic fumes due to paints, varnishes, polishes, etc.
- 2.36** Wherever required, Contractor shall meet and carry out all activities on site, supplement information, and submittals.

## **2.37 CONSTRUCTION WASTE**

- 2.37.1** Contractor shall ensure that wastage of construction material is within 3%. Subject to the suitability, all construction debris shall be used for road preparation, back filling, etc., as per the instructions of the Engineer in Charge, with necessary activities of sorting, crushing, etc. No construction debris shall be taken away from the site, without the prior approval of the Engineer in Charge. If and when construction debris is taken out of the site, after prior permissions from the Engineer in Charge, then the contractor shall ensure the safe disposal of all wastes and will only dispose of any such construction waste in approved dumping sites.
- 2.37.2** Contractor shall collect all construction waste generated on site. Segregate these wastes based on their utility and examine means of sending such waste to manufacturing units which use them as raw material or other site which require it for specific purpose. All construction debris generated during construction shall be carefully segregated and stored in a demarcated waste yard. Clear, identifiable areas shall be provided for each waste type. Typical construction debris could be broken bricks, steel bars, broken tiles, spilled concrete and mortar etc.
- 2.37.3** Water spray, through a simple hose for small projects, to keep dust under control. Fine mists should be used to control fine particulate. However, this should be done with care so as not to waste water. Heavy watering can also create mud, which when tracked onto paved public roadways, must be promptly removed. Also, there must be an adequate supply of clean water nearby to ensure that spray nozzles don't get plugged.
- 2.37.4** Contractor shall be required to provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics, and metals. He shall coordinate the size and functionality of the recycling areas with the anticipated collections



services for glass, plastic, office paper, newspaper, cardboard, and organic wastes to maximize the effectiveness of the dedicated areas.

- 2.37.5 Staging (dividing a construction area into two or more areas to minimize the area of soil that will be exposed at any given time) should be done to separate undisturbed land from land disturbed by construction activity and material storage.
- 2.37.6 The storage of material shall be as per standard good practices as specified in Part 7, Section 2 in Storage, Stacking and Handling practices, NBC 2016 and shall be to the satisfaction of the Engineer in Charge to ensure minimum wastage and to prevent any misuse, damage, inconvenience or accident. There should be a proper planning of the layout for stacking and storage of different materials, components and equipment's with proper access and proper manoeuvrability of the vehicles carrying the materials. While planning the layout, the requirements of various materials, components and equipment's at different stages of construction shall be considered.
- 2.37.7 The contractor shall provide for adequate number of garbage bins around the construction site and the workers facilities and will be responsible for the proper utilization of these bins for any solid waste generated during the construction. The contractor shall ensure that the site and the workers facilities are kept litter free. Separate bins should be provided for plastic, glass, metal, biological and paper waste and labelled in both Hindi and English with suitable symbols.
- 2.37.8 The Contractor shall remove from site all rubbish and debris generated by the Works and keep Works clean and tidy throughout the Contract Period. All the serviceable and non-serviceable (malba) material shall be segregated and stored separately. The malba obtained during construction shall be collected in well-formed heaps at properly selected places, keeping in a view safe condition for workmen in the area. Materials which are likely to cause dust nuisance or undue environmental pollution in any other way, shall be removed from the site at the earliest and till then they shall be suitable covered. Glass & steel should be dumped or buried separately to prevent injury. The work of removal of debris should be carried out during day. In case of poor visibility artificial light may be provided.

## **2.38 DOCUMENTATION:**

- (a) The contractor shall submit to the Engineer in Charge, before the start of construction, a site plan along with a narrative to demarcate areas on site from which top soil has to be gathered, designate area where it will be stored, measures adopted for top soil preservation and indicate areas where it will be reapplied after construction is complete.
- (b) The contractor shall, during the entire tenure of the construction phase, maintain the following records and submit to the Engineer in Charge on demand:
- (i) Water consumption in litres
  - (ii) Electricity consumption in 'kwh' units
  - (iii) Diesel consumption in litres
  - (iv) Quantum of waste (volumetric/weight basis) generated at site and the segregated waste types divided into inert, chemical and hazardous wastes.
  - (v) Digital photo documentation to demonstrate compliance of safety guidelines as

specified herein.

- (vi) Quantities of material brought into the site, including the material issued to the contractor by the Engineer in charge.
- (vii) Quantities of construction debris (if at all) taken out of the site
- (viii) Digital photographs of the works at site, the workers facilities, the waste and other material storage yards, pre-fabrication works, etc.
- (c) The contractor shall submit to the Engineer in Charge, following information, for all material brought to site for construction purposes, including manufacturer's certifications, and test data, but not limited to:
  - i) Source of products: Supplier details and location of the supplier.
  - ii) Recycled Content: Submit information regarding product post-industrial recycled and post-consumer recycled content.
  - iii) Product Recyclability: Submit information regarding product and product's component's recyclability including potential sources accepting recyclable materials wherever applicable.
- (d) The contractor shall provide total support to Engineer in Charge and Green Building Consultants appointed by the Engineer in charge in completing all Green Building Rating related formalities, including signing of forms, providing signed letters in the contractor's letterhead whenever required.
- (e) The contractor is expected to go through all other conditions of the GHAR/GRIHA rating stipulations. Failure to adhere to any of the above-mentioned conditions, without approval of the Engineer in Charge, shall be deemed as a violation of contract and the contractor shall be held liable for penalty as per terms of the agreement.

### **3.0 Special condition for Cement**

- 3.1** Unless otherwise specified in this document, PPC cement shall be used. The contractor shall procure PPC conforming to IS: 1489 (Part 1) as required in the work from cement manufacturers mentioned in the list of Preferred makes for civil works or from any other reputed cement manufacturer having a production capacity not less than 1 million tons per annum as approved by competent authority of CCU. Uses of GGBS /Fly ash with OPC is permitted as per norms.
- 3.2** The supply of cement shall be taken in 50 kg. bags bearing manufacturer's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-charge and got tested in accordance with provisions of relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected, and it shall be removed from the site by the contractor at his own cost within a weeks time of written order from the Engineer- in-charge to do so. Supply of cement shall be taken in 50-kg bags bearing manufacturer's name, or his registered trademarks if any and grade and type of cement as well as ISI marking.
- 3.3** The cement shall be brought at site in bulk supply of approximately 40 tons or as decided by the Engineer-in-charge on the basis of requirement of work in progress. The cement godown of

Minimum 1000 bags capacity to store the cement shall be constructed by the Contractor at site of work for which no extra payment shall be made.

- 3.4** 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 authorised representative and the keys of other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of cement godown. The contractor shall facilitate the inspection of cement godown by the Engineer-in-charge at any time.
- 3.5** 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.
- 3.6** The actual issue and consumption of cement on work shall be regulated and proper accounts shall be maintained. The theoretical consumption of cement shall be worked out. In case the cement consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption, no cost adjustment shall be made.
- 3.7** The cement brought to the 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.
- 3.8** 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 3 days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the Contractor.

#### **4.0 Special Conditions for Steel Reinforcement**

- 4.1** The Contractor shall/procure ISI marked TMT bars of various grades from the Steel Manufacturers mentioned in preferred make list for civil works or their authorized dealers/ authorized distributors/channel partners.
- 4.2** Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the reinforcement 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.
- 4.3** The steel reinforcement bars shall be brought to the site in bulk supply of 25 tonnes or more, or as decided by the Engineer-in-charge.
- 4.4** The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their 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.
- 4.5** For checking nominal mass, tensile strength, bend test, re-bend test etc. specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below:

<b>Size of bar</b>	<b>For consignment below 100ton</b>	<b>For consignment above 100ton</b>
Under 10 mm dia bars	One sample for each 25 tonnes or part there of	One sample for each 40 tonnes or part there of

10 mm to 16mm dia bars	One sample for each 35 tonnes or part there of	One sample for each 45 tonnes or part there of
Over 16mm dia bars	One sample for each 45 tonnes or part there of	One sample for each 50 tonnes or part there of

- 4.6** The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories.
- 4.7** The actual issue and consumption of steel on work shall be regulated and proper accounts maintained. The theoretical consumption of steel shall be worked out. In case the consumption is less than theoretical consumption including permissible variations, recovery at the rate so prescribed shall be made. In case of excess consumption, no adjustment needs to be made.
- 4.8** The Steel brought to site and remaining unused shall not be removed from site without the written permission of Engineer-in-Charge.
- 4.9** The standard sectional weights referred to shall be as given in Table 5.4 in para 5.3.4 in CPWD Specification 2019 Vol.-I and will be considered for conversion of length of various sizes of TMT Bars in to standard weight. Record of actual sectional weights shall also be kept diameter and 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. If the derived weight is less than the standard weight, then the Derived Actual Weight shall be accepted if it is within the following tolerances specified in IS:1786-2008, otherwise whole lot will be rejected. However, deductions shall be made for the difference in derived actual weight and standard weight at the rate determined by engineer-in-charge. If the derived actual weight is found more than the standard weight, then nothing shall be paid extra for the difference in derived actual weight and standard weight.
- 4.10** The contractor shall submit original vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be used in the work. All consignment received at the work site shall be inspected by the Site staff along with the relevant documents before acceptance. The contractor shall obtain original vouchers and copy of test certificates and furnish the same to the Engineer-in-Charge in respect of all the lots of steel brought by him from approved supplier to the site of work. The original vouchers and copy of test certificates shall be defaced by the site staff and kept on record in the site office.
- 4.11** The reinforcement steel brought to site of work shall be stored on brick / timber platform of 30/40-cm height, nothing extra shall be paid on this account.



## **PARTICULAR SPECIFICATIONS FOR CIVIL WORKS**

### **1.0 General:**

- (i) CPWD Specifications Vol. I & vol II as amended from time to time shall be applicable for all the items to be executed as per contract.
- (ii) Provision contained in the harmonized guidelines & standard for universal Accessibility in India 2021 (Available on CPWD website) of Ministry of Housing and urban affairs, Government of India shall be complied with while executing the works.
- (iii) C& D waste products and recycled aggregates to the extent provided in IS codes shall be used as per extant provisions of the green building measures. Only potable water shall be used in the work

### **2.0 Earthwork, Foundation and Plinth:**

- (i) Excavation (surface excavation, over area, foundation, trenches etc.) in all kind of soil shall be carried out upto desired level as per good for construction structural drawings.
- (ii) Earth required for filling in all works like trenches, foundations, plinth, around building, road work and other development works shall be of good quality useful for filling as per CPWD specifications.
- (iii) The available excavated earth suitable for filling shall be used by the contractor.
- (iv) Surplus excavated earth after filling as per site conditions shall be disposed outside the campus after remittance of due royalty to concerned authority, as applicable, by taking required permission from concerned Government authority.
- (v) Appropriate ground improvement or soil stabilization measures recommended as per the soil investigation report and structural design, if any, shall be carried out.
- (vi) Appropriate foundation system including isolated footing/combined footing/ raft/ pile and possible combination of these as per the recommendations of the soil investigation report containing borehole data, seasonal variation of subsoil water table, and as per structural design conforming to relevant Indian standard codes shall be provided.
- (vii) Anti-termite treatment as per the necessity of soil at site shall be carried out as per relevant Indian standard codes/CPWD specifications.
- (viii) Structural grade slab shall be designed & provided accordingly.
- (ix) Damp proof course shall be provided wherever required as per CPWD specification.
- (x) Drainage and plinth protection along the perimeter of the buildings may be provided, wherever required, as per CPWD specifications or as per specific functional requirement.
- (xi) All the excavated earth/soil shall be levelled & neatly dressed. Sand filling of minimum 150mm thickness, with river sand, wherever required, shall be done under floor.

### **3.0 Superstructure:**

- (i) Expansion joints/seismic separation joints shall be provided as per the good for construction structural drawing and shall be treated/covered as per CPWD specifications / manufacturer specifications.
- (ii) The exposed structural steel shall be made fire resistant (as per NBC 2016) by using vermiculite coating as per manufacturer's specifications and by applicators authorized by them.

### **4.0 Concrete Works:**

All concrete works shall be carried out in general as per CPWD Specifications 2019, Volume-I & II with upto date revisions, amendments, correction slips issued till last date (including any extension, if any) of submission of bid.

### **5.0 RCC WORKS:**

Foundation (isolated/combined, strip, raft, pile etc.) shall be with RCC using specified grade of concrete. RCC retaining/breast wall shall be provided as per good for construction drawings and site condition.

### **6.0 Design Mix Concrete (from Batch Mix Plant or from RMC Plant)**

- 6.1** Design mix shall be carried out as per IS 10262, IS 456, IS 4926, and other relevant IS codes / CPWD Specifications amended upto last date (including extended date, if any) of submission of bid. The contractor shall carry out design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting requirements specified. The cement shall be actually weighed as presumption of each bag having 50 kg shall not be allowed. In case of use of admixture, the mix shall be designed with these ingredients as well. All the ingredient shall confirm to relevant Indian standard as well as the CPWD specification.
- 6.2** The contractor may install fully automatic Batch Mix Plant at site (if space is available and permitted by user department) or in nearby area wherever permissible. All permissions/NOCs (including payment/fee if any stipulated) from the concerned authorities shall be obtained by the contractor and no claim of hindrance on account of delay in installation of batching plant shall be admissible. Contractor may arrange concrete from RMC (Ready Mix Concrete) producing plants with prior approval from Engineer-in-charge. Nothing extra shall be payable for sourcing concrete from RMC plant. For all purposes, the contractor shall carry out fully, the responsibilities of the “placement Contractor” and the “manufacturer of concrete”.
- 6.3** The Engineer-in-Charge will reserve the right to inspect at any stage and reject the concrete if he is not satisfied about quality of product at the user’s end.
- 6.4** The Engineer-in-charge reserves the right to exercise control over the: -
  - i) Ingredients, water and admixtures purchased, stored and to be used in the concrete including conducting tests for checking quality of materials, recording of test results and declaring the materials fit or unfit for use in production of mix.
  - ii) Calibration checks of the Fully Automatic Batching plant /RMC.

- iii) Weight and quantity check on the ingredients, e.g. cement, aggregates, water and admixtures added for batch mixing.
- iv) Time of mixing of concrete.
- v) Testing of fresh concrete, recordings of results and declaring the mix fit or unfit for use. This will include continuous control on the workability during production and taking corrective action, if required.

**6.5** All stone aggregate and stone ballast shall be of hard stone variety to be obtained from approved quarries. Coarse sand should be obtained from approved sources. The same shall be clean and sharp angular grit type. The coarse sand shall be screened before using, if required. If the sand brought to site is dirty, it must be washed in clean water to bring the sand to the required specifications. Nothing extra shall be payable on this account.

**6.6** For exercising such control, the Engineer-in-charge shall periodically depute his authorized representative at the fully automatic batching plant/ RMC plant. It shall be responsibility of the contractor to ensure that all necessary equipment, manpower & facilities are made available for inspections/checking to Engineer-in-Charge and/or his authorized representative at fully automatic batching plant/ RMC plant.

**6.7** All relevant records of produced and used concrete shall be made available to the Engineer-in-Charge or his authorized representative. Engineer-in-Charge shall, as required, specify guidelines & additional procedures for quality control & other parameters in respect of materials, production & transportation of concrete mix which shall be binding on the contractor. Concrete as per design mix approved by Engineer-in-Charge shall be produced and transported to the site.

**6.8** The terms machine batched, machine mixed and machine vibrated concrete used elsewhere in contract 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.

**6.9** The concrete mix design with and without admixture will be carried out by the contractor, at his own cost, through one of the laboratories/Test houses to be approved by Engineer-in-charge.

#### **6.10 Ultrasonic Pulse Velocity Method of Test for RCC**

- a) The underlying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in terms of density, homogeneity and uniformly is good. In case of poorer quality lower velocities are obtained. If there are cracks, voids or flaws inside the concrete which come in the way of transmission of pulse, lower velocities are obtained.
- b) The quality of concrete in terms of uniformity, incidence or absence of internal flaws, cracks and segregation etc. are indicative of the level of workmanship employed, can thus be assessed using the guidance given in table below, which have been evolved for characterizing the quality of concrete in structure in term of the ultrasonic pulse velocity.

### Velocity criterion for Concrete Quality Grading

S.N.	Pulse Velocity by Cross Probing (Km/Sec)	Concrete Quality grading
1	Above 4.5	Excellent
2	4.5 to 3.5	Good
3	3.5 to 3.0	Medium
4	Below 3.0	Doubtful

- c) Ultrasonic Pulse velocity method of testing of concrete is to be conducted for works as a routine test. The acceptance criteria as per the above table will be applicable which is as per IS 13311 (Part-1):1992. From the above “Good” and “Excellent” grading are acceptable and the grading “Medium” and “Doubtful” will not be acceptable.
- d) Atleast **5%** of the total number of RCC members in each category i.e. beam, column, slab and footing may be tested by Ultrasonic Pulse velocity test method for establishing quality of concrete. It is suggested that test may be conducted on RCC beam near joint with column, on RCC column near joint with beam, on RCC footings and rafts. On RCC rafts a suitable grid can be worked out for determining number of tests. In addition, doubtful areas such as honeycombed locations, locations, where continuous seepage is observed, construction joints and visible loose pockets may also be tested.
- e) The test results shall be examined in view of the above acceptance criteria “Good” and “Excellent” and wherever concrete is found with less than required quality as per acceptance criteria, repairs to concrete will be made. Honeycombed areas and loose pockets will be repaired by grouting using Portland Cement Mortar/Polymer Modified Cement Mortar /Epoxy Mortar, after chipping loose concrete in appropriate manner. In areas where concrete is found below acceptance criteria and defects are not apparently visible on surface, injecting approved grout in appropriate proportion using epoxy grout /acrylic polymer modified cements slurry made with shrinkage compensating cement / plain cement slurry etc. shall be resorted to for repairs (refer relevant chapters from CPWD Hand Book on Repairs and Rehabilitation of RCC Buildings). Repair to concrete shall be done till satisfactory results are obtained as per the acceptance criteria by retesting of the repaired area. If satisfactory results are not obtained dismantling and relaying of concrete will be done at the cost of contractor.

**6.11** Standard of acceptance shall be same as specified in clause 16 of IS 456-2000. In case of rejection of concrete on account of unacceptable compressive strength, the work for which samples have failed shall be redone at the cost of contractor. However, the Engineer in charge may order for additional tests (like cutting cores, ultrasonic pulse velocity test, load test on structure or part of structure etc.) to be carried out at the cost of contractor to ascertain if the portion of structure wherein concrete represented by the sample has been used, can be retained on the basis of results of individual or combination of these tests. The contractor shall take remedial measures necessary to retain the structure as approved by the Engineer in charge without any extra cost.

**6.12 COVER/SPACER BLOCK-** The contractor shall provide approved type of support for maintaining the bars in position and ensuring required spacing and correct cover of concrete to reinforcement as called for in the drawings, by providing spacer blocks of required shape and size. Chairs and spacer bars shall be used in order to ensure accurate positioning of



reinforcement. Only factory-made cover blocks shall be used. Pre-cast cement mortar/concrete blocks/blocks of polymer shall not be used as spacer blocks unless specially approved by the Engineer-in-charge.

## **7.0 SHUTTERING/FORMWORK:**

- 7.1** The work shall be done in general as per CPWD Specifications 2019, Volume-I & II with date revisions, amendments, correction slips issued upto last date of submission of bid.
- 7.2** Double steel scaffolding having two sets of vertical supports shall be provided for external wall finish, cladding etc. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding platform shall be fixed. Scaffolding shall have steel staircase for inspection of works at upper levels.
- 7.3** In order to keep the floor finish as per architectural drawings and to provide required thickness of the flooring as per specifications, the level of top surface of R.C.C. shall be accordingly adjusted at the time of its centering, shuttering and casting for which nothing extra shall be paid to the contractor.
- 7.4** As per general engineering practice, level of floors in toilet / bath, balconies, shall be kept lower than general floors as required from waterproofing point of view. Shuttering should be adjusted accordingly. Nothing extra is payable on this account.
- 7.5** Dented, broken, cracked, twisted or rusted shuttering shall not be allowed to be used on the work.
- 7.6** The shuttering shall be cleaned properly with electrically driven sanders to remove any cement slurry or cement mortar or rust. Proper shuttering oil or de-bonding compound shall be applied on the surface of the shuttering in the requisite quantity before laying of steel reinforcement.
- 7.7** For the execution of centering and shuttering, the contractor shall use propriety shuttering oil as approved by Engineer-in-Charge and nothing extra shall be paid on this account.
- 7.8** All existing formwork that fails to meet the specifications mentioned above or do not qualify to meet the minimum standards in the view of Engineer-in-Charge shall have to be removed and stacked.

## **8.0 REINFORCEMENT:**

- 8.1** The reinforcement work shall be done as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any).
- 8.2** Reinforcement work includes all operations including straightening, cutting, bending, welding, binding with annealed steel or welding and placing in position at all the floors with all leads and lift complete as per CPWD Specifications.
- 8.3** The contractor shall provide approved type of support for maintaining the bars in position and ensuring required spacing and correct cover of concrete to reinforcement as mentioned in the drawings. Spacer blocks of required shape and size, chairs and spacer bars shall be used in order to ensure accurate positioning of reinforcement. To ensure proper cover, factory made round / rectangular type cover blocks will be used to avoid displacement of bars in any. Couplers shall be used for splicing of reinforcement bars.
- 8.4** Reinforcement TMT bars, to be used for the work, shall be corrosion resistance TMT bars of

grade Fe 500D or more.

- 8.5 Bar Bending Schedule:** The agency shall prepare bar bending schedule as per structural drawings and submit to Engineer-in-Charge in advance for approval. The bar bending schedule shall conform to Indian Standard IS 2502-Code of Practice for Bending and Fixing of bars for Concrete Reinforcement. Before execution of work, two copies of these bar bending schedules including revision, will be submitted to Engineer-in-Charge for approval.

## **9.0 MASONRY WORK:**

The masonry work shall be done as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any). In case of conflict or contradiction between detailing shown in drawings and specification mentioned herein under this subhead, the specification mentioned herein under this subhead shall be followed.

- 9.1** Adequate (of 300 mm width either side of joint) Chicken mesh 85gsm or fibre mesh of good quality shall be provided in plaster at the junction of Masonry and RCC or CC Member/band.
- 9.2** For masonry work above plinth level, RCC band at sill level and lintel level shall be provided. This thickness of the band shall preferably be 100 mm or as approved by the Engineer-in-Charge.
- 9.3** All opening on masonry wall shall be provided with RCC lintels, RCC bands/ lintel over top of parapet wall at corridors, balconies etc. may be provided.
- 9.4** Fly ash brick masonry of class designation 7.5, with cement mortar 1:6 (1 cement: 6 coarse sand), shall be done in wet areas. FPS bricks of class designation 7.5 in cement mortar 1:6 (1 Cement: 6 Coarse Sand) shall be used in brick work in foundation upto plinth level. All the walls of corridors shall be of full brick thick wall or with 200mm thick AAC blocks.
- 9.5** AAC blocks masonry shall be of Grade I and of oven dry density 551-650 kg/cum with polymer modified adhesive mortar above plinth level except wet areas. The polymer modified adhesive (of make pidilite, ardex endura, weber) mortar shall be provided @ 30 kg per cum. AAC Block confirming the IS Code – 2185 (Part-3) 1984 (Reaffirmed 2005) shall be used.
- a) Dimensions & Tolerances: Autoclave Aerated Concrete Block shall be made in sizes and shapes to fit different needs.
  - b) The maximum variation in the length of the Autoclave Aerated Concrete Block shall not be more than plus/minus 5mm and maximum variation in the height and width of Autoclave Aerated Concrete Block, not more than plus/minus 3mm.
  - c) The faces of Autoclave Aerated Concrete Block shall be flat & rectangular, opposite faces shall be parallel and all arises shall be square. The bedding surfaces shall be at right angle to the face of the Blocks. The Autoclave Aerated Concrete Block with special faces shall be manufactured and supplied if so required.
  - d) The autoclaved aerated concrete block shall be classified in two grades according to their compressive strength as indicated in table below:

S.N.	Density in Oven dry Condition (Kg/m3)	Compressive Strength (N/mm2)		Thermal Conductivity in air dry condition (W/m.k)
		Grade I	Grade II	

1	451 to 550	2.00	1.50	0.21
2	551 to 650	4.00	3.00	0.24
3	651 to 750	5.00	4.00	0.30
4	751 to 850	6.00	5.00	0.37
5	851 to 1000	7.00	6.00	0.42

- e) All autoclave aerated concrete Block shall be sound, free of cracks or other defects which interfere with the proper placing of block units and impair the strength or performance of the construction. The face or faces that are to be exposed shall be free of chips, cracks or other imperfections except that if not more than 5% of a consignment contains slight cracks or small chippings not larger than 25mm, this shall not be deemed grounds for rejection.
- f) **Block Density** – The Block density shall conform to the requirements specified in above table, when tested accordance with IS 6441 (Part-1) -1972.
- g) **Compressive Strength** – The minimum compressive strength being the average of twelve block units shall be as prescribed in above table, when tested accordance with accordance with IS 6441 (Part-5) -1972.
- h) **Thermal Conductivity** – The thermal conductivity shall not exceed the values specified in above table when tested in accordance with IS 3346 -1980.
- i) **Drying Shrinkage** – The drying shrinkage shall be not more than 0 .05% for grade –1 block and 0.10% for grade-2 block when tested in accordance with IS 6441 (Part-2) - 1972.
- j) **Number of tests:** A sample of 24 blocks shall be selected at random. All the 24 Blocks shall be checked for dimensions and inspected for visual defects. Out of the 24 blocks, 12 blocks shall be subjected to the test for compressive strength, 3 blocks to the test for density, 3 blocks to the test for thermal conductivity and 3 blocks to the test for drying shrinkage. The remaining 3 blocks shall be reserved for re-test for drying shrinkage if a need arises.
- k) The samples of AAC blocks (each sample consisting of 6 specimen) shall be chosen randomly from the lot procured and tested for various parameters specified as above. One samples shall be tested for every **200 cum** or part thereof. However, minimum one sample shall be tested from each lot received at site if the quantity procured in the lot is less than 200 cum. If required, Engineer-in-Charge or his authorized representative shall inspect the factory during production of the material for this work and also collect samples (of materials used for making AAC blocks and precast AAC blocks) from the factory itself. The contractor shall consider this contingency also while placing the order with one of the approved firms. Nothing extra shall be payable on this account.
- l) **Criteria for conformity:** The number of blocks with dimensions outside the tolerance limit and or with visual defects, among those inspected, shall not be more than two. For density, the mean value shall be within the range as specified in above Table. For compressive strength, the mean value, say X shall be determined. The test results shall be grouped into groups of 4, individual values of ranges shall be determined, the average range a calculated from these values and shall satisfy the following condition:  $X - 0.6 R > \text{minimum value specified in above Table}$ . For thermal conductivity, the

mean value shall be equal to or less than the value specified in above Table. For drying shrinkage, all the test specimens shall satisfy the requirements of the test. If one or more specimens fail to satisfy the requirements, the remaining 3 blocks shall be subjected to these tests. All these blocks shall satisfy the requirements.

- m) **Manufacturer's Certificate:** The manufacturer shall satisfy himself that the masonry units conform to the requirements of these specification and, if requested, shall supply a certificate to this effect to the purchaser or his representative.
- n) **Marking:** Each lot of concrete masonry units manufactured in accordance with these specification shall preferably be marked with information-
  - o The identification of the manufacture
  - o The grade and block density of the unit
  - o The month and year of manufacturing

## **10.0 DOOR/WINDOW WORK:**

The door/window work in general shall be carried out as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any). In case of conflict or contradiction between detailing shown in drawings and specification mentioned herein under this subhead, the specification mentioned herein under this subhead shall be followed. Before taking up any procurement/construction activity, shop drawings (for fixing of all kind of doors, showing all hardwares) shall be prepared (on the basis of specification laid herein) and submitted by contractor for obtaining approval from Engineer-in-Charge.

- 10.1** Windows along with glazing shall be designed for wind loads applicable to the area/location as per relevant IS codes.
- 10.2** The samples of species of timber to be used, shall be deposited by the contractor with the Engineer-in-Charge before commencement of the work. The contractor shall produce cash vouchers and certificates from standard kiln seasoning plant operator about the timber to be used on the work having been kiln seasoned by them, failing which it would not be accepted as kiln seasoned. Specified timber shall be of good quality and well-seasoned. It shall have uniform colour, reasonably straight grains and shall be free from dead knots, cracks and sapwood.
- 10.3** Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer-in-Charge. All portion of timber including architrave abutting against masonry concrete stone or embedded in ground shall be painted with approved wood preservative or with boiling coal tar.
- 10.4 Toilet Cubical-** Toilet Cubical shall be provided for all the internal doors of wet areas having more than one unit of W/C, bathroom, change rooms etc. in all buildings.
- 10.5** Glazed Doors: All the glazed doors (non-fire rated) shall be made in Aluminum door frames, shutters of suitable section, (with powder coating in required shade and colour of not less than 50 microns), toughened glass with necessary fittings and fixtures of stainless steel (SS 304) required to make the door operational and function smoothly, complete as per directions of Engineer-in-charge. Necessary shop drawings should be prepared by the contractor and work shall be executed after obtaining approval from Engineer-in-charge. The thickness of glazing should not be less than 8 mm.



**10.6** Roller Blinds, wherever required, shall be provided of approved make and approved shades having 0.40mm thickness in 100% polyester material with 100% degree of opacity & having weight of 375gm/Sqm to 450gm/Sqm in all sizes and for all heights complete as per the direction of Engineer in Charge.

**10.7** All fittings and fixtures shall be procured well in advance and the approved samples shall be kept at site till completion of the work.

#### **11.0 FIRE CHECK/RATED DOOR:**

CPWD Specification 2019 Vol. I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions, if any), National Building Code (NBC) 2016 and manufacturer's specification shall be followed. Fire Check doors shall be provided in buildings wherever necessary and required as per National Building Code 2016. Unless otherwise specified elsewhere in tender document, all fire check doors should be fire rated for 120 minute and doors of fire exit corridor should meet the requirement of fire exit corridor specified in NBC 2016. Before taking up any procurement/construction activity, shop drawings (for fixing of all kind of doors, showing all hardware) shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

**11.1** The fire check/rated door should not collapse during the rated period of the fire under specified fire conditions. The fire door should not allow the passage of hot gases or the flames through the rebate or the gap between the door frame and shutter. The integrity or smoke sealing function is achieved by fire door by incorporating an "Intumescent Seal". This intumescent seal in the form of a strip under fire conditions expands many times its original size and forms a hard char which has high insulation properties and does not permit the smoke or flames to escape through the gap between the shutter and frame.

**11.2** Observation, if any, made by the fire officer on the fire check/rated doors, shall be incorporated suitably.

**11.3** Execution of Fire Check Doors shall be carried out through the specialized agencies having sufficient work experience in the same field and shall be got approved from the Engineer-in-Charge well in advance. Specialized firm shall furnish all materials, labour, accessories, equipment, tool and plant and incidentals required for providing and installing the fire check/rated doors. Contractor has to select one specialized agency from list of preferred makes/brands and specialized agencies.

**11.4** Fire resistance and smoke check doors shall be made of proper sizes and section as per the available opening at the site. Before proceeding with manufacturing, the contractor shall prepare and submit complete manufacture and installation drawing for approval of the Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.

**11.5** The term "Fire Rating" referred in tender documents means fire rating of complete assembly of fire check door e.g. frames, shutter, vision panel, glass, hinges and other hardware. Doors will be approved only after door passes the required tests from fire testing lab approved by the Engineer-in-Charge. Cost of sample door and testing shall be borne by contractor.

**11.6** Doors shall be fabricated to size in factory. Fabricated material shall be protected against any damage during transportation. Loading and unloading shall be carried out with utmost care. On receipt of material at site it shall be carefully examined to detect any damaged units/members. Arrangements shall be made for expeditious replacement of damage units or members. Materials found acceptable on inspection shall be repacked in crates and stored safely.

**11.7** Just prior to installation, the doors shall be uncartered and stacked on edge on level bars and supported evenly. The frame shall be fixed into position true to line and level using adequate number of fasteners of approved size and manufacture and in an approved manner. The holes in concrete /masonry member for housing anchor bolts shall be drilled with an electric drilling machine only.

**11.8** Stainless steel ball bearing hinges, panic bars, door trims, fire rated hydraulic door closers, handles, tower bolts, lock and other fittings shall be provided as per requirement and shall be got approved from Engineer-in-Charge. All hardware's should have a minimum 02 Years of manufacturer warrantee from the date of supply. Hardware should be "CE" / "UL" certified with required fire ratings and relevant documents to this effect shall be produced at the time of approval of samples.

**11.9** The design of fire check/rated doors and material to be used in their construction have to be such that the doors shall be capable of providing an effective barrier of desired rating.

## **12.0 ALUMINIUM WORK:**

(a) Before taking up any procurement/construction activity, shop drawings (for fixing of all kind of Aluminum Works, showing all hardware) shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

(b) Minimum weight of aluminum section for door, windows and ventilators shall be as per relevant standards.

(c) Kiln seasoned hard wood shall be filled inside door frames on hinged side and top of frames wherever hydraulic door closers are to be provided.

(d) Frames shall be fixed with dash fastener of minimum size 10 x 100 mm as per approved shop drawings.

(e) Gap between aluminum frame / uPVC window and adjacent RCC / masonry work shall be filled by providing weather silicon sealant over backer rod of approved quality as per direction of Engineer-in-Charge.

(f) The material for the work shall be procured from the approved manufacturer as per list of preferred make for materials in this contract. The Contractor shall procure and submit samples of various materials to be used in the work for the approval of Engineer-in-Charge and no work shall commence before such samples are approved. Samples of un-anodized as well as polyester powder coated aluminum sections, microwave cured EPDM gaskets, glass, stainless steel screws, anchor fasteners, hardware and any other material or components requiring approval of samples, in opinion of Engineer-in-Charge, shall be submitted for the approval as mentioned above. The above samples shall be retained as standards of materials and workmanship.

(g) Aluminum sections to be used for various works shall be appropriate to meet technical, structural, functional and aesthetic considerations. Aluminum work for doors, windows, ventilators and partitions etc. shall be carried out with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285 as applicable, fixing with dash fasteners of required diameter and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminum sections shall be smooth, rust

free, straight, mitered and jointed mechanically wherever required including cleat angle, Aluminum snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per good for construction drawings and as per the directions of Engineer-in-charge. Polyester powder coated aluminum (minimum thickness of polyester powder coating 50 micron) section shall be used. Hinges/ pivots, provision for fixing of fittings, EPDM rubber / neoprene gasket shall be provided wherever required. The polyester powder coating shall be carried out in a factory / workshop approved by engineer-in-charge.

- (h) Glass in Windows/Ventilators: Glazing in windows, ventilators etc. shall be Double glazed hermetically sealed with 6 mm thick toughened glass both sides, having 12 mm air gap, including providing EPDM gasket, perforated aluminum spacers, desiccants, sealant (both primary and secondary sealant) etc. as per specifications, drawings and direction of Engineer-in-charge complete. The DGU unit shall have visible Light transmittance (VLT) of minimum 65%, Light reflection internal - less than or equal to 23%, Light reflection external - less than or equal to 23 %, SHGC- less than or equal to 0.6 and U value - less than or equal to 2.5 W/m<sup>2</sup> degree K.
- (i) Fabrication: The factory for fabrication and coating of windows/doors/frameworks shall be got approved from Engineer-charge.
- (j) All joints shall be accurately fabricated and be hairline in appearance. The finished surface shall be free from visible defects. All the windows, ventilators, doors shall be factory made and shall be brought to site for assembly and fixing.
- (k) All hardware used shall conform to the relevant specifications. Design, quality, type, number and fixing of hardware shall be generally in accordance with shop drawings and as approved by the Engineer-in-Charge before use.
- (l) All doors, windows, ventilators and glazing etc. shall be made water tight with microwave cured EPDM gaskets and weather silicone sealants to the satisfaction of the Engineer-in-Charge.
- (m) The corners of the frame being fabricated to the true right angles. Both the fixed frames and openable shutter frames shall be fabricated out of sections cut to required length, mitred and mechanically jointed for satisfactory performance. All members shall be accurately machine milled and fitted to form hairline joints. The jointing accessories such as aluminum cleats, stainless steel screws etc. shall not to cause any bi-metallic reaction by providing separators, wherever required. Vertical members of the aluminum frame work shall be embedded in the floors, wherever required, by cutting and making good of the floor.

**(n) FIXING OF ALUMINIUM FRAME WORK**

- i. The screws used for fixing fixed aluminum frames of the aluminum windows to masonry walls / RCC members and aluminum members to other aluminum members shall be of stainless steel of approved make and quality and of stainless-steel grade 304. Threads of machine screws used shall conform to requirement of I.S. 4218.
- ii. For the aluminum windows, the gap between the aluminum frames and the R.C.C / Masonry and also any gaps in the various sections shall be filled with weather silicone sealant DC 795 of Dow Corning or equivalent in the required bite size, to ensure water tightness including providing and fixing backer rod, wherever required. The

weather silicone sealant shall be of such approved colour and composition that it would not stain or streak the masonry / R.C.C. work. It should not sag or flow and shall not set hard or dry out under any conditions of weather and shall be tooled properly. The weather silicone sealant shall be used as per the manufacturer's specifications and shall be of approved colour and shade. Any excess sealant shall be removed / cleared.

- iii. Fixing of glass panes shall be designed in such a way that replacing damaged / broken glass pans is easily possible without having to remove or damage any members or interior finishing materials.

#### **(o) PROTECTIONS AND CLEANING**

- i) All glass pans shall be retained within aluminum framing by use of exterior grade microwave cured EPDM gaskets. Use of glazing or caulking compounds around the perimeter of glass will not be permitted. There shall be no whistling or rattling. Before installation of glass, Contractor shall ensure the following:
  - All glazing rebates shall be square, to plumb, true to plane, dry and free from dust.
  - Glass edge shall be clean and cut to exact size and grounded.
- ii) Glass of specified thickness in doors, windows, ventilators and fixed glazing etc. shall be of approved make and standard quality conforming to C.P.W.D. Specifications.

### **13.0 FLOORING, MARBLE, CLADDING WORK:**

All flooring work and cladding work in Granite, Tile, Marble, Stones, Wooden, PVC, Vinyl etc. in general shall be carried out as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any). The tiles, stones shall be of approved colours and shades and will be laid in pattern as per approved architectural drawings or shop drawings. Nothing extra shall be paid for laying tiles, different stones in specific design/pattern. The tiles shall be of first quality of approved make and nothing extra shall be paid for use of cut/sawn tiles in the work. Before taking up any procurement/construction activity, shop drawings shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

- 13.1** Proper gradient shall be given to flooring for toilets, verandah, kitchen, courtyard, corridors etc. so that the wash water flows towards the direction of floor trap. Any reverse slope if found, these shall be made good by the contractor by ripping open the floor/grading concrete and nothing shall be paid for such rectifications.
- 13.2** Samples of flooring material are to be deposited well in advance to the Engineer-in-Charge for approval. Approved samples should be kept at site with the Engineer-in-Charge and the same shall not be removed except with the written permission of Engineer-in-Charge.
- 13.3** The samples shall be submitted along with the following details:
  - a) Three representative samples for each type of flooring/cladding specified.
  - b) Details of physical characteristics such as dimensional tolerances (within the specified limits), water absorption, compressive strength, Mohs Hardness, Specific gravity with reference to IS or International standards.
  - c) Source of supply and confirmation of availability in full quantity and uniformity of colour, tone and textures.



d) Company profile of Suppliers.

- 13.4** The Engineer-in-Charge or his representative may, if required, visit the source of supply of the various materials (Granite/Stones/Marble/Tiles/Cladding etc.) to assess the quality as well as availability of the material in the required quantities.
- 13.5** The entire supply for each type of granite/stone slabs shall be procured preferably from one location (in one quarry), and supplied preferably, in one lot to keep variations to the minimum. The Contractor shall also segregate and sort the slabs according to colour, shade, texture and size of grains etc. to keep variation(s) in stones used at any one floor to the minimum. Any slab with variation in the colour, shade, texture and size of grains etc., not acceptable to the Engineer-in-Charge, shall not be used in the work and shall be removed and replaced by the Contractor. Nothing extra shall be payable on these accounts.
- 13.6** Based on the samples approved by the Engineer-in-Charge for various flooring and dado / cladding materials as specified hereinafter, the contractor shall prepare mock up(s) at site of work for approval of quality of workmanship and material specified. If the quality of the workmanship and the material is as per the required standards and approved by the Engineer-in-Charge, the mock up shall be allowed as part of the work. Otherwise, it shall be dismantled by the contractor as directed by the Engineer-in-Charge and taken away from the site of the work at his own cost. The mock up(s) so made shall be kept till completion of respective works for reference.
- 13.7** The material (Granite, Stones, Marble, Tiles, Cladding etc.) shall be transported to site well packed in boxes or otherwise. These shall be handled carefully to prevent any damage. Granite stone slabs shall be individually packed in cardboard paper. The various types of stones and tiles, procured shall be free of any surface defect or any edge damage. The damaged (Stones, Marble, Tiles, Cladding etc.) shall not be allowed to be used in the work. So, the contractor shall procure additional quantity of the stone and tiles to cover such contingencies. The stone slabs shall not be waxed or touched up with dyes / colours.
- 13.8** The following tolerances shall be allowed in the dimension of granite stone slab:
- a) Length  $\pm$  1mm
  - b) Width  $\pm$  1mm
  - c) Thickness - 1mm
  - d) Angularity at corners  $\pm$  0.25%

The stone (slab and tiles) not meeting the above tolerance limits shall be rejected and not permitted to be used in the work. Nothing extra shall be payable on this account.

- 13.9** Stone slabs shall have uniform thicknesses within the tolerance limits and linear items like treads, sills and jambs, coping, risers, urinal partitions, kitchen and wash basin platforms, vanity counters, facias and other similar locations etc. shall have edge polished calibrated thickness i.e. exposed edges shall have edge polished uniform thickness throughout the length of the work.
- 13.10** The flooring work shall be carried out as per the architectural drawings in design and pattern (geometric, abstract etc.) and in linear and / or curvilinear portions and in combination with stones of different colour and shade and ceramic tiles etc. For the flooring portions curved in plan, the stone slabs (at the edge) shall be cut to the required profile and shape as per the architectural drawings. Nothing extra shall be payable on this account and any consequent wastages and incidental charges on such accounts shall be deemed to be included in the cost.

- 13.11** The granite slabs used for providing and fixing in the sills, soffits and jambs of doors, windows, ventilators and similar locations shall be in single piece unless otherwise directed by the Engineer-in-Charge. Wherever stone slab other than in single piece is allowed to be fixed, the joints shall be provided as per the architectural drawings and as per the directions of the Engineer-in-Charge. In the cabin areas, the joints in sills shall preferably be provided in line with the partition wall. Depending on the number of joints, as far as possible, the stone slabs shall be procured and fixed in slabs of equal lengths as per the architectural drawings and as directed by Engineer-in-Charge.
- 13.12** The specifications for dressing, laying, curing, finishing etc. for the granite stone flooring shall be same as that of works for the Marble flooring, skirting and risers of steps under Flooring Sub Head of the CPWD Specifications. The wall lining / veneer work with granite stone shall be as per the CPWD Specifications for Marble work Sub Head.
- 13.13** For flooring work, the joints between the different types of flooring shall be located as per the architectural drawings. Also, the contractor shall maintain the uniform level of the finished flooring of the different types unless specifically mentioned on the architectural drawings.
- 13.14** All the flooring works specified under this sub-head shall be adequately protected by a layer of plaster of paris which shall be laid over a 400 micron PVC film. POP protection layer shall be laid on all finished floors for protection from damage during execution of other items of work in that area which shall be removed and cleaned just before handing over of the premises.
- 13.15** One piece Granite stone for treads / risers in staircase shall be used including rounding of nose.
- 13.16** For the skirting in the enclosures with curvilinear profiles, the (Stones, Marble, Tiles, Cladding etc.) shall be cut to the required size and the shape to match the profile and/ or the joints as per the architectural drawings. Similarly, the skirting shall be fixed in a manner as to flush or project from the finished face of the wall as per the architectural drawings and as directed by the Engineer – in– Charge. Any chasing of the masonry works required for such fixing is deemed to be included in the cost of masonry.
- 13.17** Granite stone tiles and slabs shall be pre polished (mirror polished), eggshell polished, flame finished or given any other surface treatment as specified in architectural drawings and as directed by the Engineer-in-Charge.
- 13.18** Machine polishing and cutting to required size shall be done with water (as lubricant) only. Sawing shall also be done preferably with water as lubricant but as a special case, the Engineer-in-Charge may permit, at his discretion, oil or kerosene as lubricant subject to all kerosene or oil in the body and surface of tiles / slabs being thoroughly dried in ovens. Tiles / slabs with stains or patches due to the use of oil or otherwise, either before or after installation, shall be rejected and shall be replaced by the contractor at his own cost.
- 13.19** The exposed cut edges of the kota stone slab in risers and treads along its width (sides of the risers and treads of the steps i.e. along the shorter dimensions of the kota stone slab for the risers and treads) shall be polished in a workmanlike manner. The top exposed edge of the kota stone skirting shall also be polished in a workmanlike manner.
- 13.20** Nosing / edge moulding shall be provided to the front edge of the kota stone slab treads along its length i.e. along the longer dimensions of the kota stone slab, as per the architectural drawings.

- 13.21** At the time of handing over, flooring & dado / cladding shall be free of any scratches, stains etc. The flooring & dado / cladding shall be properly cleaned before handing over. However, abrasive cleaners shall not be used to clean the marks and other scratches.

#### **14.0 ROOFING WORK:**

All roofing work in general shall be carried out as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any). Before taking up any procurement/construction activity, shop drawings shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

- 14.1** At inlet mouth of rain water pipe, cast iron grating 15 cm diameter and weighing not less than 440 grams shall be provided.

#### **15.0 FINISHING WORK:**

- 15.1** Necessary drip course shall be provided in Chajja, Balcony, Projecting Roof, Beams etc.
- 15.2** All the internal surfaces including exposed ceiling (non false ceiling areas) shall be finished with 2 mm thick POP, one coat of cement primer and two or more coats of paints.
- 15.3** Application of paints shall be done with mechanical equipment. Mechanical sanding machine (for scrubbing & preparation of surface) shall be used by the contractor.
- 15.4** All the steel work shall be applied two or more coats of synthetic enamel paint over a coat of suitable primer of approved brand and manufacture with ready mixed red oxide zinc chromatic on steel / iron works having VOC content less than 250 grams/litre.
- 15.5** Water repellant coat: Two to three coats of Silicone based water repellant, anti-algal paint of approved shade, complete as per manufacturer's specifications, shall be applied on stone cladding.

#### **16.0 STAINLESS STEEL WORK:**

Stainless steel of grade SS 316 grade Aluminum Mild steel/GI railings and grills shall be provided as per architectural design in Balconies, staircases, steps, Ramp's corridors and in other common circulation area as indicated in drawings and in accordance with provisions of NBC 2016.

Unless otherwise specified, stainless steel generally shall be of SS 316. Lower grades shall not be used. Before taking up any procurement/construction activity, shop drawings shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

Factory-made stainless-steel railing shall be provided with SS 316 grade stainless steel with adequate rods parallel to handrail, balusters, flanges, end caps, newel posts with caps etc. complete as per approved drawings and direction of Engineer-in-charge.

Surface finish of all the stainless-steel materials will be in 240 grit satin finish / matt finish. All stainless-steel material will have to be coated by a solution of Inox to avoid finger prints and avoidance of settlement of environment / atmospheric dust. Stainless steel railing, both sides in staircase and external ramp with double handrail shall be used for barrier free accessibility requirements with adequate SS balusters, runners etc as per approved

architectural drawing. Fixing shall be done by stainless steel expansion bolts of approved size and make as per Engineer-in-Charge and welding to be done by using organ welding rods and the surface being duly finished and cleaned by K2 passivation, which is nitric acid plus florid acid solution treatment by which the chances of corrosion will be eliminated and any burn out makes on the metal will also be eliminated.

## **17.0 WATER PROOFING & INSULATION WORK:**

For waterproofing of works below plinth/ground/road level complete envelope/box shall be ensured. All the RCC works shall be given waterproofing treatment by adding the cementitious integral crystalline admixture of make KRYTONE, PENETRON, XYPEX @ 0.80% (minimum) to the weight of cement content per cubic meter of concrete or higher as recommended by the manufacturer's specification in reinforced cement concrete at site of work. The product performance shall carry guarantee for 10 years against any leakage.

## **18.0 ROAD WORK:**

- 18.1** All roads will be cement concrete roads, as per MORTH specifications (Latest edition), laid over sub grade (duly prepared with power roller) of required thickness as per design. Irrespective of whether shown in drawings or mentioned in tender document, all the drainage, signages (Informative, Mandatory, Regulatory etc.) other works associated with road works shall be provided as per relevant standards and specification MORTH Specifications for Road and bridge work (Latest edition).

## **19.0 SIGNAGES:**

Signages inside/outside buildings shall be as per NBC 2016 guidelines and of approved design and make with LED backlit. Each room shall be provided with Name Boards, Numbering of rooms, Signages etc. The contractor shall prepare the detailed shop drawing in compliance to the NBC 2016 guidelines and Harmonized Guidelines & Standards for Universal Accessibility in India 2021 (available on CPWD Website) of Ministry of Housing and Urban Affairs, Government of India.

Signage works include providing and fixing Building Entrance signage, Tactile Layout, Emergency Evacuation Layout on the wall or with any other required structure. Each signboard shall be fixed strictly as per the Harmonised Guidelines & Space Standards for Barrier Free Built Environment for persons with Disability, issued By MOUD, Govt. of India, and as as per approved drawings and complete as per the directions of Engineer - In - Charge.

## **20.0 Sanitary Installations and Water Supply:**

All the work in general shall be carried out as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of submission of bid. The work shall be in conformity with the bye-laws, regulations and standards of the local authorities concerned. The contractor shall be responsible for the protection of the sanitary and water supply fittings, other fittings and fixtures against pilferage and breakage during the period of installation and thereafter until the building/work is handed over.

- a) All Storm pipes/ NP2 RCC pipes shall be complete with fittings.
- b) All concealed work shall include cutting chases and making good the walls etc.

- c) In toilets and other waste water disposal areas sanitary pipe lines shall be suspended from the floor slabs i.e. the floor slabs should not be depressed on account of accommodating sanitary lines. These overhanging sanitary lines shall be camouflaged by moisture resistant false ceiling.
- d) Plumbing system shall be designed and provided as per the functional requirements of the buildings.
- e) Double stack system shall be followed. All sewerage to be connected to one stack and all drainage to be connected to other stack.
- f) Water supply and sanitary fittings shall be provided as per the functional and architectural requirements.
- g) Pipes shall be duly fixed to the wall by bracket. All pipes shall be fixed with clamps at maximum 1.00 m spacing.
- h) All drainage in balconies shall have their inlets in plan. All drainage through balconies shall be connected to Rain Water Harvesting.
- i) Utility balcony drainage shall be suitably treated and shall be not connected to Rain Water Harvesting System.
- j) For buildings, the stacks shall be provided in shafts which shall be covered with weather proof doors and accessible for maintenance.
- k) **Soil, Waste, Vent & Rainwater Pipes & Fittings:** Two pipe system as recommended in code of practice for soil and waste pipes as per (IS: 5329). Separate vertical stacks for **Soil pipes** (to carry the wastes from WC's & urinals) and **Waste pipes** (to carry the wastes from waste appliances e.g. showers, lavatory basins, kitchen sinks etc.) shall be provided.
- l) The soil, waste, vent pipes system shall include horizontal soil, waste and vent pipes, and all fittings, joints, clamps, connections to fixtures, floor and urinal traps, cleanout plugs, inlet fittings, UPVC rain water pipes, testing of all pipe lines.
- m) All sanitary ware & C.P brass fittings shall be low flow rate fixtures to meet the green rating requirement. Water closets with concealed dual flushing cistern shall be provided. Wash basin shall be over counter / wall hung type as shown in drawings. Single lever basin mixer shall be provided with all wash basins. Urinal shall be provided with automatic sensor based flushing system.
- n) Contractor shall furnish without cost all such accessories and fixing devices that are necessary and required but not supplied along with the plumbing fixtures & CP fittings by the manufacturers as a part of the original and standard supply. All fittings and fixtures shall be fixed in a neat workmanlike manner true to level and heights shown on the drawings and in accordance with the manufacturer's recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished floor, tiling or terrace shall be made good at Contractor's cost. Fixing screws shall be half round head



chromium plated brass screws with C.P. washers where necessary. Contractor shall seal all fixtures fixed near wall, marble and edges. With an approved type of polysulphide sealant appropriate for its application.

- o) Piping and drainage works shall be tested as specified under the relevant clauses of the specifications. Tests shall be performed in presence of the Engineer in charge. Entire drainage system shall be tested for water tightness and smoke tightness during and after completion of the installation. No portion of the system shall remain untested. Contractor must have adequate number of expandable rubber bellow plugs, manometers, smoke testing machines, pipe and fitting work test benches and any other equipment necessary and required to conduct the tests. All materials and equipment found defective shall be replaced at contractor's cost and whole work shall be tested to meet the requirements of the specifications. Contractor shall perform all such tests as may be necessary and required by the local authorities to meet municipal or other bye-laws in force. All water supply system shall be tested to hydrostatic pressure test of at least one and a half (1.5) times the maximum pressure but not less than 10Kg/Sq.cm for a period of not less than 8 hours. All leaks and defects in joints revealed during the testing shall be rectified and got approved at site by retest. Piping required subsequent to the above pressure test shall be retested in the same manner. System may be tested in sections and such sections shall be entirely retested on completion. In addition to the sectional testing carried out during the construction, contractor shall test the entire installation after connections to the overhead tanks or pumping system or mains. He shall rectify all leakages and shall replace all defective materials in the system. Any damage done due to carelessness, open or burst pipes or failure of fittings, to the building, furniture and fixtures shall be made good by the contractor during the defect liability period without any cost. After commissioning of the water supply system, contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently. Valves which do not effectively operate shall be replaced by new ones at no extra cost and the same shall be tested as above.
- p) Fittings shall conform to the same Indian Standard as for pipes. Pipes and fittings must be of matching IS Specification. Interchange of pipes of one standard with fittings on the other standard will not be permitted. Fittings shall be of the required degree of curvature with or without access door. Access door shall be made up with 3 mm thick insertion rubber washer and white lead. The bolts shall be lubricated with grease or white lead for easy removal later. The fixing shall be air and water tight. All vertical pipes shall be fixed by Galvanised clamps and galvanised angle brackets. Branch pipes shall be connected to the stack at the same angle as that of the fittings. No collars shall be used on vertical stacks. Each stack shall be terminated at top with a cowl (terminal guard). Horizontal pipes running along ceiling shall be fixed on galvanised structural adjustable clamps of special design shown on the drawings or as directed by engineer-in-charge. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on them.
- q) All pipe clamps, supports and hangers shall be galvanised. Factory made pre-fabricated clamps shall be preferred. Contractor may fabricate the clamps of special nature and galvanise them after fabrication but before installation. All nuts, bolts, washers and other fasteners shall be factory galvanised. Clamps shall be of approved designs and fabricated from GI flats (which shall be galvanised after fabrication) of

thickness and sizes as per drawings or contractor's shop drawings. Clamps shall be fixed in accordance to manufacturer's details/shop drawings to be submitted by the contractors. When required to be fixed on RCC columns, walls or beam they shall be fixed with approved type of galvanised expansion anchor fasteners (Dash fasteners) of approved design and size according to load. Structural clamps e.g. trapeze or cluster hangers shall be fabricated by electro-welding from M.S. Structural members e.g. rods, angles, channels flats as per contractors shop drawing shall be galvanised after fabrication. All nuts, bolts and washers shall be galvanised. Galvanised slotted angle/channel supports on walls shall be provided wherever shown on drawings. Angles/channels shall be of sizes shown on drawings or specified in scope of work. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with anchor fasteners mentioned above. The spacing of support bolts on support members fixed horizontally shall not exceed 1 m.

**21.0 Drainage (External Water-Supply/Sewerage/Storm Water Drainage/Rain Water Harvesting System):** Inspection chambers/manholes/ gullies chambers/ valves and other accessories of approved specifications and make shall be provided considering all the site conditions and reduced level as per design parameters. As far as possible green and recyclable materials shall be preferred.

- a) All drainage work shall be done in accordance with the local municipal bye-laws. Location of all manholes, etc. shall be got approved from the engineer in charge. No drains or sewers shall be laid in the middle of road unless otherwise specifically shown on the drawings or directed by the Engineer in charge.
- b) The contractor shall design the rain water harvesting system and construct the same for entire campus in holistic manner. Rainwater harvesting system shall be designed and provided as appropriate to the site and as per municipal byelaws and Central Ground Water Board norms.
- c) Unless otherwise specified, minimum & maximum velocity of sewer pipe shall be 0.75 m/sec & 2.0 m/sec respectively. Unless otherwise specified, minimum & maximum velocity of Storm water pipe shall be 0.6 m/sec & 2.0 m/sec respectively.
- d) Manhole shall be built in brick masonry with common burnt clay F.P.S. (Non-modular) bricks class designation 7.5 with cover and frame (SFRC) or as specified/shown in drawings. Size and depth of manholes shall be as per NBC 2016 / CPWD specifications.
- e) Gully traps: Gully traps shall be fixed in cement concrete mix and a brick masonry chamber 30x30 cms inside in cement mortar 1:5 with 15x15 cms grating inside and 30x30 cms C.I sealed cover and frame weighing not less than 7.0 kg (approx.) to be constructed as per detailed drawing.

## **22.0 Façade Work:**

This specification covers the general requirements of external facade work (e.g. Structural Glazing, Curtain Wall, GRC Panel, ACP, Aluminum composite/Puff/sandwich Panels, Exterior Grade HPL etc.) including engineering design involving structural stability of system as a whole e.g. supply, fabrication, installation, testing, ensuring water tightness and maintenance etc. Work under this section shall be performed by specialized agency, who is regularly engaged in the engineering, fabrication, finishing and installation of façade work including glazing and sealing of glass etc. and having experience in similar works. Only after

written approval of engineer in charge, the contractor will engage such specialized agency.

## **22.1 SCOPE OF WORK:**

- a) The scope of work includes all labour, material, equipment and services as required for the complete design, engineering, testing, and fabrication, assembly, delivery, anchorage, installation and water tightness of the façade system. The scope of work also includes complete design, engineering, testing, fabrication, assembly, delivery, anchorage and installation of a suitable gondola/jib system for cleaning of the vertical glass, stone, GRC facade.
- b) The contract documents define only the design intent and general performance requirements. The contractor is fully responsible for detailed design, structural calculations, shop drawings, procurement of materials, fabrication, installation, warranties, certifications and related documentation. The entire work shall be carried out strictly in accordance with the true intent and meaning of the specification and drawings taken together regardless of whether the same may or may not be shown particularly on the drawings or described in the specification provided that the same can be reasonably inferred.
- c) Only suggestive sizes and details are proposed by the Engineer-in-charge that has a visual impact on facade. Contractor's fabrication / shop drawing will seek these suggestions and design the final construction details. The complete design of façade system will be submitted by contractor to engineer- in-charge for approval.
- d) The facade shall be designed, fabricated at works, supplied, delivered and installed in accordance with the shop drawings and samples of materials approved by the Engineer-in-charge and shall be constructed to meet the performance requirements and standards.
- e) In general, the façade system should be designed to suit the aesthetics and performance requirements, taking into consideration the necessary factors to suit fabrication and the site conditions for erection.
- f) The contractor shall strictly follow, at all stages of work, the stipulations contained in the Indian standard safety code and the provisions of the safety rules for ensuring safety of men and material. The successful bidder shall submit a safety plan for approval of the Employer. On approval of the same, the same shall be followed during the currency of the contract.
- g) The contractor must comply with all applicable local-building regulations and all the safety guidelines particularly specified for facade work as per relevant I.S codes.
- h) Shop and field materials and workmanship shall be subject to inspection of the Engineer-in-charge and his authorized representative at all time. Such inspections do not relieve the contractor from obligations to provide materials conforming to all requirements of the contract documents and industry standards for material quality.
- i) All approvals, instructions, permission, checking, review etc. whatsoever by the Engineer-in-charge shall not relieve the contractor of his responsibility and obligation regarding adequacy, correctness, completeness, safety, strength, quality, workmanship etc. of the facade system.
- j) Testing will be done as per nomenclature of the DSR item of typical DGU Panel of approved size in factory and in field through an approved testing agency.

## 22.2 Façade System Description

- a) The contractor shall devise a suitable framing system for vertical/roof façade application keeping in view the performance characteristics and aesthetics requirements.
- b) The vertical/roof structural glazing system shall be fully unitized / Toggle based curtain wall or Semi-unitised and shall be designed to suit sealed insulated glass units (hereafter referred to as "IG unit"). Aesthetically the design of the glazing system shall provide a filtering envelope to the building/structure and provide a uniform appearance. The glazing system shall have flush glazed exterior joints both horizontal and vertical. The structural glazing system shall be designed to receive fixed glazing as well as structurally glazed openable vents with protection of the glass edges. The contractor shall take adequate measures to ensure the thermal performance of the glazing system under the increased solar radiation prevalent in the region. No onsite sealant application will be permitted except for weather sealant in case of unitized system. The system shall comprise of factory prefabricated glazed vision and spandrel panels. The system should preferably permit re-glazing of vision panels from outside the building. The contractor should choose an approved system also keeping in view the various requirements arising during future maintenance during the life span of the glazing system.
- c) The structural glazing system shall be designed to allow for three-dimensional adjustments due to dead load, live load, wind load, seismic load and thermal movement. The framing system must be designed to provide adequate support for the IG units to prevent transfer of loads to the glazing below and to provide uniform support to both lites of the IG unit. Intermediate mullions should be of same size as that of outer mullions.
- d) The structural aspects of the structural glazing system must be carefully integrated with the glazing rabbet and drainage details to ensure proper performance. The structural glazing system shall be designed on the rain screen principle with provision for pressure equalization.
- e) The structural silicon sealant to be used in this structural glazing system shall be of such quality & designed to transfer wind, seismic, live and dead loads from the glass to the framed structure of the structural glazing.
- f) The façade system shall have floor-to-floor noise isolators, fire and smoke stops between the floor slabs and sill flashing etc. as per the NBC of India and also of the best international practices.
- g) The façade system shall have spandrel panel (over solid surfaces e.g. columns, masonry wall etc.) of Aluminium composite panel or toughened glass backed by shadow box (made of Al assembly).

## 22.3 PERFORMANCE REQUIREMENTS FOR FAÇADE SYSTEM

### (i) Façade System design parameters:

- a. The façade system and its components shall be designed to withstand dead loads and live loads caused by positive and negative wind loads acting normal to the plane of the façade system. Design wind loads shall be 1.74 Kpa and proof load of 2.61 KPa. The contractor is required to submit the design calculation and weight of aluminium per meter. The system shall also be designed to withstand seismic

forces as calculated in accordance with IS: 1893 (latest revision) under seismic zone classification applicable to the site.

- b. Apart from the above, the glass and the glazing system should also be designed to withstand a concentrated load of 100kg applied at any location so as to produce the maximum stresses in the glazing components. This load is envisaged to- be encountered during cleaning of the glass facade.
- c. The stress on structural sealant shall not exceed 20 psi under any circumstances. Thermal breaks shall be considered unable to transfer shear stress for composite action of flexural members. Assume elements joined by thermal breaks to act separately.

(ii) **Deflection:**

- a. The deflection of any structural member in the plane normal to the glass surface when subjected to the specified loads shall not exceed  $L/175$  of its clear span and shall be fully recoverable on withdrawal of the specified loads. Deflection of any framing member shall not exceed 19mm within any glass panel.
- b. Parallel to façade plane, deflection of a framing member when carrying full design load shall not exceed an amount reducing the glazing unit bite below 75% of the design dimension. It shall also not reduce the edge clearance to less than 3mm nor shall it damage or impair the function of any joint seals.
- c. The deflection of the horizontal member due to the weight of the glass shall be limited to 3mm or 25% of the design edge clearance of the glass or panel below whichever is less.
- d. Twisting or rotation of the horizontal member under dead load of glass shall be limited to  $1^\circ$  by calculation from the horizontal plane.
- e. There shall be no in plane raking.
- f. In case either lite of the IG unit develops crack, the remaining lite should be capable of supporting the entire load. The overall strength and deflection behaviour shall be calculated on the basis of the weakest lite.

(iii) **System assembly:**

The system assembly should accommodate the following without damage to the system, components or deterioration of seals.

- Movement within the system
- Movement between system and perimeter framing components.
- Dynamic loading and release of loads
- Deflection of structural support framing
- Tolerance of supporting components
- Shortening of building concrete structural columns
- Creep of concrete structural members
- Inter story drift
- A mid span slab edge deflection: of 25mm
- Accommodate building construction tolerance of +30mm. These tolerances are not cumulative.



(iv) **Water Tightness:**

Water penetration shall be defined as the appearance of uncontrolled water on inside face of any part of the structural glazing. No water leakage will be permitted when tested in accordance with ASTM E331. The test shall be carried out for duration of 15 minutes with a test pressure difference of 20% of design pressure with a minimum differential of 137 N / mm<sup>2</sup> and a maximum of 575 N / mm<sup>2</sup>. The minimum uniform water flow rate of 3.4L/m<sup>2</sup>/min.

## **22.4 LABORATORY TESTS FOR WATER INFILTRATION:**

(i) Tests:

- a) TESTS FOR WATER INFILTRATION: Static Pressure Test: No water infiltration shall occur when the mock-up is tested accordance with ASTM E-331 with the static pressure differential and the total time as specified.
- b) Dynamic Pressure Test: No water infiltration shall occur when the mock-up is tested in accordance with AAMA 501.1 with the dynamic pressure differential and the total time as specified.

(ii) FILED MOCK – UP:

In the presence of representatives of Owner, Engineer-in-charge, Contractor, Installer and Manufacturers, the Testing Agency shall conduct field tests on each of the installed Mock-Ups in accordance with methods described in AAMA 501.2 "Filed Check of Metal Curtain Walls for Water Leakage" using the loads specified in "performance Criteria". Notice for testing to allow for witnessing test shall be given several weeks before. Approximately 50% of each Field Mock-Up shall be field water tested. All interior finishes including trims should be left off to allow for clear viewing.

(iii) REMEDIAL WORK:

If the Field test of any Mock-Up reveals leakage, points of entry and paths of flow of water shall be identified, analyzed, and necessary remedial work shall be established, subject to Engineer-in-charge's review and comment. Repairs and/or modifications shall be made to the entire mock-up based on these findings and, after adequate curing of all sealants, re-test to successful conclusion. Re-testing after remedial work shall be from 50 percent to 80 percent of the mock-up at the Engineer-in-charge's recommendation. The re-test area designated does not necessarily have to be exactly the same as the original test area of the mock-up.

## **22.5 METHOD STATEMENT FOR HOSE TESTING (ON SHORE) AT SITE: -**

- (i) STANDARD: - AAMA 501.2 — 94 Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage.
- (ii) TEST AREA: - Area (s) to be tested will be selected by the Engineer-in-charge accordance with the standard. The total area will be not more than that can be tested in one day. Testing shall be done at least one area of 100 square feet, in accordance with the test standard, or more, depending on the time, and availability of suitable access to the

exterior. In case of failure the prescribed procedure for a reasonable time but not more than that can be completed on the same day shall be followed. The test will be supervised via two-way radio from the inside.

(iii) **EQUIPMENT:** - Testing equipments generally consists of the following and any other equipments as required for carrying out the test-

- The 'Monarch' nozzle with pressure gauge and valve as prescribed by AAMA and recommended by CWCT.
- Two-way headset radio for communication between engineers and the people in the cradle.

(iv) **Other Requirements:**

- a. (Optional) washing of the area as recommended in Paragraph 7.4 of the CWCT Standard.
- b. Visual checking of test area for snags, visible defects etc.
- c. A cradle or scaffolding on the exterior at the locations (s) of the test specimen (s) with an operator, a person to stabilise the cradle, a person to hold and point the nozzle, technical person to communicate between the people on the exterior and test engineer.
- d. Clean water in a minimum 1/2" supply hose with approximately 4 bar pressure. Note that the pressure given for the test is with the water flowing, much higher actual pressure is necessary. Water pressure drops 1 bar for every 10m rise in height.
- e. Drying of test area and application and removal of tape if necessary to locate leaks.

(v) **TEST CRITERIA:-**

Water will be sprayed at a pressure of 30 —35 psi (2.07-2.41 Bar) in accordance with the test standard. The flow rate will not be monitored. The nozzle will be held 30 cm. from the wall spraying 1.5m lengths back and forth along each joint, successively, for five minutes each, working from the bottom up. Joints are interfaces between materials, and where these are less than 120mm apart are to be considered one joint.

(vi) **TEST PROCEDURE**

- a) The initial area shall be the width of the cradle. The lowest horizontal joint will be wetted first, covering each 1.5m length in five minutes.
- b) Next the cradle will be positioned so that the first 1.5m above the bottom horizontal joint can be reached and each vertical will be sprayed in turn over a period of 5 minutes.
- c) The cradle will then be raised to test the next 1.5m and then the next horizontal and so on.

(vii) **LEAKAGE:**

If there is any leakage the test will be stopped and the procedure described in the

Standard will be followed up to the time allowed. A compliance report suggesting any modification / corrective steps to be taken if any leakage was observed.

- 22.6 Air Infiltration:** When tested in accordance with ASTM E283, air infiltration shall not exceed 0.03 l/s/sqm. Of wall area, measured at a reference differential pressure across assembly of 200 Pa.
- 22.7 System internal drainage:** Water entering joints, condensation occurring in glazing channels, or route moisture occurring within the system is drained to the exterior by a weep drainage network. The system shall be designed such that water being drained in the system shall not cause any damage to the permanent works. The system shall not be face sealed and shall not rely on wet seals.
- 22.8 Expansion/Contraction:** The system shall provide for expansion and contraction within system components caused by a cyclical temperature range of 80<sup>0</sup> cover a 12hour period without causing any detrimental effect to the system components.
- 22.9 Test for structural performance:** When tested in accordance with; ASTM E330, the glazing system shall conform to the performance requirements.
- 22.10 Special instructions:** Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of the system will not be permitted.
- 22.11 HEAT SOAKING OF GLASS:** To minimize nickel sulphide (NIS) fractures at site, heat soaking test is to be conducted within the factory. Minimizing NiS fractures at site is mainly about making sure that fractures happen within the factory rather than at site after installation. Heat soaking tempered glass is the most-common form of ensuring that the chance of NiS infected panes leaving the factory is minimized. The goal during heat soaking is to induce breakage at the factory to avoid on site breakage after installation. It is heating of glass to 280<sup>0</sup> C for 24 to 48 hours over temperature gradients to induce fracture. Due to inherent safety and security benefits it is highly recommended for tempered glass to be heat-soaked.

## **22.12 PRODUCTS/MATERIALS**

(i) Glass: Standard certification requirements are as under :

- a) Float glass : ASTM C 1036
- b) Tempered/ Toughened Glass: Toughened / Tempered glass shall be examined by the glass manufacturer to detect and discard any glass which exceed the following tolerance: 1.5mm bow in 600mm; 3mm bow in 1500mm; 6mm bow in 3000mm; 9mm bow in 4500mm. Where, the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.13mm, and the difference between adjacent peaks shall not exceed 0.13mm. Where bow tolerance and wave tolerance differ, the stricter requirements shall govern. Direction of ripples shall be consistent and in conformance with architectural design. Following test shall be carried out by the glass processor at his own cost as per following provisions and the test report shall be submitted.

Thickness	Impact strength	Fragmentation	Surface Compression	Bending Strength
IS 2835-1987	IS-2553-PART-I	IS-2553-PART-1	ASTM C-1048-90	DIN 1249-PART:12

- c) Laminated glass: (ASTM C 1172) : The laminated glass shall comprise of two glasses of equal thickness as per design and bonded with a poly vinyl butyral (PVB) interlayer, meeting criteria of ANSI Z97.1 for safety glazing. The PVB interlayer shall be minimum 0.38mm thick. No deviation will be accepted with respect to the PVB interlayer. Laminated Glass Units shall comply to EN12543.
- d) General Requirements for all types of Glass: All base supply float/coated glass are to comply with the requirement of BS EN 572 parts 1, 2 and 3 or ASTM C1036 and assessed for optical and visual faults as described in BS EN 572-2. Spot faults shall not be no worse than category C. There will be no linear / extended faults. Optical faults shall be within the limits set in BS EN 572-2.
- e) Fully Toughened / Heat Strengthened Glass: It shall comply with the requirements of EN12150 or ASTM 1048 or EN 1863 -1 for heat treated Soda Lime Silicate Safety Glass. The residual surface compressive stress in the heat strengthened glass shall be below 52N/mm<sup>2</sup> when measured by GASP in accordance with ASTM F218-95 (2000) or > 69 N/mm<sup>2</sup> for Fully Toughened glass.
- f) Insulating glazed units: Hermetically sealed insulated glazed unit shall comply with BS5713 or EN 1279. Primary seal shall be of poly-isobutylene located between glass and spacer (Lisec / Alupro/ Profil glass or equivalent) providing a continuous vapor proof barrier of a minimum width of 2mm and a secondary two-part silicone sealant of approved make extending around the perimeter of the unit. The insulating glass unit shall be certified under a program approved by the sealed insulating glass manufacturer's association (SIGMA) providing third party validation of compliance to ASTM E 773 & E 774. All glass quality shall be glazing as per relevant ASTM standards.
- g) Coating: Method of coating shall be of vacuum (sputtering) deposition. This coating is applied to control the solar heat gain and enhance the energy performance and comfort level of the building. The coating shall meet the requirements of ASTM C 1376-97 or EN 1096 part 2 and satisfy the thermal performance of the facade.
- h) Performance requirements: Probability of breakage of glass shall not exceed 8/1000 for vertical glass upon first application of design pressures or due to anticipated thermal stresses.
- (ii) Openable panel (IGU), side hung or top hung, shall be provided as per extant guidelines of NBC, Indian standards and local bodies. These panels shall be installed with all accessories and hardware for the openable panels as specified/required and of approved make such as heavy-duty stainless-steel friction hinges, minimum 4 point cremone locking sets with stainless steel plates, handles, buffers etc. including necessary stainless steel screw, nuts, fasteners, bolts, washers etc.

(iii) Sealant:

- a) The insulated glass unit shall have poly-Iso-butylene as primary sealant with low moisture vapour transmission rate and a structural silicone sealant for secondary seal. The secondary edge sealant shall conform to ASTM C 1369-97. The contractor shall indicate the classification of the edge sealant as per clause 5.0 of the ASTM C 1369. Structural flush glazed joints shall be a neutral cure high performance silicone sealant applied in accordance with the sealant manufacturer's instructions. Weather seal joints shall be a neutral cure medium modulus silicone sealant applied in accordance with the sealant manufacturer's instructions. Sealants shall be black color. Unexposed, low movement flashing joints shall be non-drying, non-skimming, non-oxidizing, non-bleeding glazing sealant meeting MMA 809.2. The sealant proposed by the contractor shall not bleed or stain under any circumstances. Contractor shall identify the sealant to be used along with the structural glazing system and submit detailed technical parameters of the sealant by way of the sealant manufacturer's printed data sheets. The Contractor will be responsible to carry out all the compatibility tests as listed below but not restricted to the following, with respect to the particular sealant from a laboratory approved by the engineer-in-charge. The following tests shall be carried out with respect to the sealant:
- ASTM C 794 Peel test
  - ASTM C1135 -Test method for determining Tensile-Adhesion Properties of elastomeric sealant
  - ASTM C-719 -Test method for adhesion and cohesion of elastomeric joint sealant under cyclic movement
  - ASTM C-1087 -Compatibility test between the proposed structural silicone sealant and the finished aluminium extrusions (mullions and transom)
- b) For all sealant proposed to be used for this project, the contractor shall submit a letter of certification from the sealant manufacturer stating that the sealant has been tested for adhesion and compatibility on production of samples of metals, glass and other glazing components and that all sealant details and application procedures shown on the shop drawings are acceptable for use.
- c) To prevent excessive shelf life and facilitate the correlation of batches of sealant with panel production, silicone sealant generally shall be used in the sequence of their manufacture.
- d) The structural glazing contractor shall obtain from the manufacturer and the supplier written confirmation of that the material has not been subjected to temperatures in excess of 27 degree centigrade between manufacture and delivery to the contractor's factory. The contractor shall store all silicone sealant at or below 27 degrees centigrade up to the day of its application.
- e) Silicones which cure by different chemical reactions or which release different chemical by-products, e.g. acetic acid, alcohols, amines etc. during cure, should not come in contact to each other during fabrication, assembly and erection of the glazing system.
- f) All adjoining surfaces not to receive sealant's shall be protected against staining by masking tape.

(iv) Other materials:



- a) The aluminium extrusions shall be 6063 alloy T6 temper conforming to ASTM 8221 or equivalent. They shall be clean, straight, with sharply defined edges and free from distortion and defects impairing appearance, strength and durability. It shall be of suitable wall thickness and profile for strength with respect to tension, shear and bending stresses, and lateral stability. The aluminum extrusions shall be coated with minimum 70% Kynar 500 based PVDF fluoropolymer resin coating (minimum 35 micron thick) of approved color and shade to comply with AAMA 605.2-1980.
  - b) Fixing bolts, screws and nuts, where in contact with aluminium, will be of stainless steel 304.
  - c) All dissimilar metal surfaces shall be isolated to prevent anti galvanic action. Materials used for this purpose shall be non absorptive. Metal surfaces shall be separated in such a manner that metal does not move on metal.
  - d) Aluminium surface in contact with mortar, concrete fireproofing, plaster, masonry and absorptive materials shall be coated with anti-galvanic moisture-barrier material and nothing extra will be paid for this.
- (v) Accessories:
- a) Extruded gaskets, weather stripping, extruded seals and spacers which do not come into contact with structural silicone sealant shall be of ethylene propylene diene monomer (EPDM). Where in parallel contact with structural silicone sealant, all gaskets, setting blocks and spacers other than foam glazing tapes shall be of heat-cured silicone rubber, chemically compatible with the silicone sealant and suitable for the specific purpose intended. All extruded gaskets, weather stripping and spacers other than foam glazing tapes shall have continuous mechanical engagement to framing members; any adhesive attachment is not acceptable. Unless otherwise approved, gaskets, weather stripping, extruded seals and spacers shall have a hardness of 40+5 durometer Shore A.
  - b) The cladding system shall be constructed with (and shall maintain during Its design life) a standard of seal which shall not result in any reduction of sound insulation performance. Gaskets, weather stripping and seals used to achieve the required weatherproofing and/or air tightness shall be selected to accommodate fully the range of dimensional tolerances associated with fabrication and installation of the cladding system. Gaskets, weather stripping and seals shall be formed from materials capable of retaining their elastic qualities, dimensions and resistance to physical and chemical attack sufficient to maintain the full water tightness, air tightness and acoustic performance for the design life of the structural glazing system.
  - c) Extruded gaskets, weather stripping, seals and spacers mechanically engaged by flutes or pockets extruded in framing member shall be installed without residual tension or extension. Dry lubricants may be used to reduce drag during installation of synthetic rubber extrusions and to induce compression so as to prevent gradual elastic shrinkage and retraction from their ends. Wet lubricants containing detergent shall not be used in any location from which spillage onto glass and aluminum surfaces cannot be immediately and completely removed at the factory. Concentrated detergents shall not be used for any purpose which may bring the liquid into contact with the coated surfaces of vision and spandrel glass.
  - d) Setting blocks shall be dense heat-cured silicone rubber with a hardness of 80 to 90

durometer Shore A. Side blocks and anti-walking blocks shall be dense heat-cured silicone rubber with a hardness of 60 to 70 durometer Shore A.

- (vi) Flashing: To prevent leakage, flashing shall be formed from either stainless steel or aluminium or sheer neoprene of 1.5mm thickness with joints tapped and sealed 150mm minimum. Flashing shall be provided on all sides of glazing where external glazing terminates and wherever else required to provide a completely watertight installation. Wherever visible, it shall have the matching finish of Aluminium.
- (vii) Column closers: The Contractor shall supply and install suitable closer section to seal up the gap between columns and / or walls, which abuts the line of the external glazing. The principal function of the closer piece shall be to provide a neat connection with the external glazing as well as a means of cutting off stray artificial light from the outer face of the column / wall. The column closer shall be installed in such a way as to provide a flexible connection to allow for tolerances, external glazing movements and dimensional differences between the external glazing and the column and / or wall face. The column closer shall also be designed in such a way as to allow the following:
  - Easy removal for maintenance.
  - Installation after finishes are applied to the column / wall.
  - Easy removal of internal glazing units for cleaning/ maintenance replacement.
  - Compatibility with the requirements of the fire safety requirements.
- (viii) Fire Stop: At each floor edge, the required fire protection is to be maintained between elements of structure by using fire stop insulation to give a minimum of 2 hours fire protection between floors including in front of columns or blank walls. The fire stop material is to be installed to completely seal up the void between the face of the structure and the glazing and shall fully comply with local Codes and Regulations. The fire stop material must be flexible to allow movement between the structure and the external glazing. The fire stop material shall be located and held in position in such a way so as to ensure integrity of the fire protection as well as preventing accidental damage or loss of materials. The contractor is required to provide full details of all fire stop material including fire test certificates and confirmation of local fire service approved material status. Shop drawings shall also be submitted for approval showing the full details of fire stops.
- (ix) Finishes: All exposed framing members shall be free of scratches and other blemishes. All aluminium surfaces shall be electrostatic powder coated in stainless steel colour or as approved by the Engineer-in-charge. The anodic coating shall conform to IS:1868 - 1968 / IS- 5523:1983 and shall be of AC25 grade with minimum thickness of 20 microns when measured as per IS: 660/2-1970 and density shall be at least 32 Mg/sqm. The anodic coating shall be tested in an approved laboratory by eddy current method as per IS:6012 for thickness. Sulphuric acid shall be used as the electrolyte for the anodic process. Prior to anodizing, all aluminium shall be rendered uniform in appearance free from disfiguring scratches, stains or other blemishes and etched in caustic soda solution. Requisite tests shall also be carried out at the site as required by the Employer and the contractor shall arrange all assistance and equipment required for the purpose.

**22.13 PROGRAMME OF WORK:** The contractor shall submit a detailed program of work along with time schedule indicating the various items of work pertaining to the structural glazing work as below-

- Design and approval
- Shop drawings
- Submission of samples

- Mock-up
- Test reports
- Material co-ordination, ordering and delivery
- Fabrication
- Installation
- Inspection and remedial measures.

#### **22.14 DESIGN CALCULATIONS:**

- a. The contractor shall be responsible' for the design of the facade system including all its various components like glass, sealant, framing system, gaskets, fixing and anchorages proposed by respective specialists. The contractor shall submit structural design calculations prepared in accordance with relevant Indian/International codes and standards as applicable. The design shall be carried out under the direct supervision of a professional engineer experienced in design of this type of work and licensed at the place where the project is located. Structural design shall include, but not limited to, computations for the justification of external facade sections and connections including fasteners, welds and anchorage assemblies.
- b. The contractor shall submit for Engineer-in-charge's approval all structural calculations with reference to structural properties and physical characteristics and dimensional limitations of the framing members of the facade system. The contractor shall also submit design calculations for all connections, the dimensions of all extrusions and complete data to be used for the project. Approval of structural calculations shall not relieve the contractor from any of the responsibilities and requirements specified therein.
- c. The contractor shall submit the, glass manufacturer's wind pressure analysis, seismic load analysis and thermal analysis showing that the specified maximum deflections and probabilities of breakage are not exceeded.

#### **22.15 SHOP DRAWINGS**

- a. The contractor shall submit shop drawings showing clearly the relationship of the structural glazing facade to the building structure, Mechanical and electrical systems, floor slabs and any other related works. They shall show the arrangement of components, instructions and explanatory details for the sequence of fabrication, assembly, erection and installation of all materials including the glass and de-glazing procedures. They shall include the following:
  - i. Plan, elevation and details required to fully describe the structural glazing system.
  - ii. System dimensions, framed opening requirements and tolerances for squareness, corner offset and bows.
  - iii. Dimensional position of glass edge/face relative to the aluminium framing, full size junction details between mullion and transom and end details.
  - iv. Isometric drawings of flashing, joints between transom and mullions, end details etc.
  - v. Expansion and contraction joint location and details.
  - vi. Weep and condensation drainage network
  - vii. Full size details including isometric drawing of sealing, flashing and jointing Methods
  - viii. Materials, type, size, location, spacing of all screws, bolts, weld; anchoring devices and all accessories.
  - ix. The drawings for, all gaskets, extrusions

- x. Relationship of edge members with architectural stone/ wall finish and flashing at joints.
- b. The contractor shall submit a fully detailed program for the presentation of shop drawings to the Engineer-in-charge for approval, and in no case shall the contractor proceed with any of these works without approved shop drawings.
- c. The contractor shall review and submit all shop drawings in a sequence consistent with the sequence of erection, installation and assembly of the various elements of the work. He shall be deemed to have determined and verified all materials, site measurements and construction criteria related thereto and to have checked the shop drawings for complete dimensional accuracy.
- d. Any approval by the Engineer-in-charge of the shop drawings shall not relieve the contractor of his responsibility for any deviation from the requirements of the contract unless he has specifically informed the engineer in writing of such deviation at the time of submission and the Engineer-in-charge has given written approval to the specific deviation.

## **22.16 SAMPLES**

The contractor shall submit all samples at his own cost. Samples shall be submitted for approval well in advance of the date, on which the particular work involving the use of materials for which samples are submitted, is scheduled to begin. The work shall be carried out in accordance with the approved samples. The following shall be submitted:

- a) 2 samples of 600mm x 600mm in size illustrating pre-coated aluminium mullion and transom junction detail complete with glass skin and glazing materials illustrating edge and corner.
- b) 4 nos. 12" x 12" samples of each type of glass.
- c) 4 nos. 6" long samples of principal extrusions.
- d) 4 nos. manufacturer's samples of each type of aluminium finish.
- e) 4 nos. manufacturer's samples of each type of sealant
- f) 2 nos. manufacturer's samples of all accessories and hardware envisaged to be used for the structural glazing system.

**22.17 MOCKUP:** The contractor shall construct a mockup including intermediate and edge mullion, vision and spandrel panel. The mockup should illustrate component assembly including framing, glass, glazing materials, weep drainage system, attachments, anchors and perimeter sealant. Location for mockup will be at site approved in advance. Mockup will not remain as part of the work.

**22.18 TEST REPORTS:** The contractor shall arrange for all testing required with regard to this work at his own cost, at such test laboratories in India or abroad as approved by the Engineer-in-charge. Apart from the tests carried out, the contractor shall substantiate engineering data and provide test results of previous tests, which purport to meet performance criteria and any other supportive data.

**22.19 SOURCES:** The contractor shall submit the name of the suppliers for the following items of work along with the shop drawings and samples.

- a. All components of the structural glazing system
- b. Aluminium extrusions

- c. Anodizing paint from manufacturer I authorized applicator
- d. Sealant
- e. Glass
- f. Hardware
- g. Gaskets
- h. Fasteners
- i. Anchorages

**22.20 SUBMITTALS:** The contractor shall submit 4(four) copies of the following documents pertaining to the engineering of the structural glazing using structural glazing system to the engineer for approval, review etc.

- a. Shop drawings
- b. Structural design calculations for aluminium framing, glass thickness and sealant byte sizes
- c. Calculations for deflection
- d. Test reports as per the performance requirements
- e. Special installation requirements, special procedures, safety precautions and perimeter conditions requiring special attention as stated by the manufacturer.
- f. Samples
- g. As-built drawings

**22.21 ORDERING AND DELIVERY:** Before commencement of any fabrication or ordering of any materials, goods or works, the contractor shall be required to submit shop drawings, samples etc. with all relevant details as to materials, sizes, manufacturer's printed specifications and all other details and information as desired by the engineer in charge. Mockup shall have to be approved by engineer-in-charge before placing final order for delivery of the approved products.

**22.22 PRODUCT HANDLING:** Handling of glass and aluminium frame, to be incorporated in to the facade system, shall be done with utmost care to avoid any damage or surface scratch. Field cutting of anodized components shall not be permitted.

**22.23 LIGHTNING PROTECTION:** Each complete frame shall be provided with a single bolt, to which the bonding conductor may be connected by the electrical contractor on site. The bolt shall be high tensile, size MB stainless steel, and shall be securely fastened to and in sound electrical connection with the frame. The bolt shall be supplied with two plain washers and locking washers and nuts, by which the bonding conductor will be connected to the bolt. The bolt shall be supplied and fixed at works before delivery to site.

**22.24 FABRICATION & INSTALLATION:** The façade work shall be fabricated and installed by experienced workmen having specialized skill in façade work/ structural glazing and strictly in accordance with the approved shop drawings. All welding shall be done by the heliarc process and all exposed welds ground to minimum 100 grit finish.

**22.25 PROTECTION:**

- a) The contractor shall be responsible for all materials against damage from mechanical abuse and foreign matter during installation. A layer of clear transparent laquer based methacrylates or cellulose butyrate shall be applied on anodized members before they are brought to site. The laquer shall be removed on completion of erection. On virtual completion and receiving instruction from the Engineer-in-charge, the contractor shall remove all protective coverings, manufacturer's seals, labels etc. The contractor shall thoroughly clear the internal and external glazing area and members with cleaning solution recommended by the respective manufacturers. The contractor shall ensure



that the highest possible standards of material protection are maintained both in the fabrication and installation of the external glazing system. The contractor shall ensure that all materials and completed panels are delivered to site without damage and that all components are fully protected. In this respect a method statement will be required describing the protection measures to be adopted when transporting material to site and hoisting it into the floors for final installation. Panels awaiting installation are to be stacked on pallets to a height to be stored separately on site for possible fabrication in-situ.

- b) All materials stored at site are to be protected in such a manner as to prevent damage from falling objects, dust, water and dirt. The material must be safe from mishandling or damage by any contractor, agency, sub-agency either in the pursuit or their own works or by their personnel.
- c) During installation, the contractor shall provide protection to the external glazing to prevent the ingress of water from either rain or any other reasons. This protection shall be strong enough to withstand adverse wind conditions, and shall provide complete protection at the top level of the installation necessary to prevent the ingress of water into or behind the cladding.
- d) The external glazing shall be screened from weld splatter, spray-on fire proofing, concrete, alkaline masonry washes, paint and other deleterious substances. Any such soiling shall be promptly and completely removed. The design of protective screening shall be such as to provide adequate ventilation of the space between the glass and the protective screen and not induce thermal stresses in the glass. In no case shall the protective screening be placed in contact with the glass.
- e) The contractor shall provide at each completed floor an internal protection of 1000 gauge heavy polyethylene sheet suspended from the top of the external glazing at slab soffit and extending to the floor. These drop sheets must be maintained until all wet trades are completed on each floor.
- f) The fixing method for sheets is to be indicated in shop drawings and a sample approved by the Engineer-in-charge.

## **22.26 CLEANING**

- a. The contractor shall ensure that all actions are taken during Installation to eliminate the effects of corrosive substances on the finishes of the external glazing.
- b. The contractor shall clean both internal and external surfaces to remove corrosive substances. The internal surfaces of glass and aluminium frame are to be cleaned with compatible cleaning agents prior to the installation of the internal protective sheeting.
- c. The contractor shall provide written verification that cleaning agents are compatible with aluminium, stainless steel, glass coatings, granite, glazing materials and sealants. In no case shall alkaline or abrasive agent be used to clean the surface. Care shall be taken during cleaning to avoid scratching of the surface by dirt particles.
- d. Prior to snagging inspections the contractor shall remove the internal protection sheets and carry out a thorough cleaning of all glass, aluminium and spandrel panels as per the direction of Engineer-in-charge.

- e. The protective sheeting shall then be removed permanently provided that no other wet works or services work are required in the immediate vicinity of the external glazing. The contractor shall also make good any physical drainage to the wall including scratches, cents, abrasions, pittings, etc., to the satisfaction of the Engineer-in-charge.
- f. Manufacturer's delivery or job marking on glass and adhesive for manufacturers cables shall be either a neutral or slightly acidic material and in no case shall such material be alkaline. Any staining of glass by alkaline material will be cause to rejection of the glass.
- g. After the installation of each panel of glass all markings and labels shall be carefully and completely removed from the panes. Thereafter, no markings or labels of any sort shall be placed on the glass.
- h. Glazed openings shall be identified by suitable warning tapes or flags attached with a non-staining adhesive or other suitable means to the framing of the opening. Tapes or flags shall not be in contact with glass.
- i. Prior to the handing over of each floor to the Engineer-in-charge, the contractor shall carry out a final cleaning of the external glazing. As soon as it is practically possible after the issuance of the occupation certificate for the building, the contractor shall carry out a complete cleaning of the external face of the external glazing

**22.27 REMOVAL OF IMPROPER WORK AND MATERIALS:** Any materials/or works which, in the opinion of the Employer, are not in accordance with the specification, shop drawings and instructions shall be removed from the site immediately.

**22.28 PERFORMANCE GUARANTEE:** The contractor shall be solely responsible for the design including shop drawings and performance of the installed façade system. The installations shall be guaranteed by the contractor for materials used, workmanship, water tightness (wherever specified), structural design, performance requirements and other requirements as given in the specifications. The contractor shall submit in the enclosed format a written guarantee for the same for a period of 10 years from the date of completion of the work.

**22.29 MAINTENANCE MANUAL:** On completion of the works, the contractor shall prepare a detailed maintenance manual for the structural glazing system. The manual should cover the following:

- a) Complete and detailed explanation of operating principles of the structural glazing system  
Description of all the various components of the glazing system,
- b) Recommended Inspection schedule and periodic inspection procedure,
- c) Complete parts list,
- d) Instructions for proper cleaning procedures and routine maintenance of the facade including frequency,
- e) Cleaning products and their source
- f) Method statement for reglazing and replacement of component parts with appropriate drawings;

**23.0 HORTICULTURE & LANDSCAPE WORK:** Contractor shall furnish all materials, labour etc. terms necessary to complete the work indicated on drawing and specified here in.

**23.1 MATERIALS:**

a) **Plant materials:**

- (i) All plant materials shall be healthy, sound, and vigorous, free from plant disease, insect pests or their eggs, and shall have healthy, well-developed root systems.
- (ii) All plants shall be hardy under climatic conditions similar to those in the locality of the project. No plant material will be accepted if branches are damaged or broken. All material must be protected from the sun and weather until planted.
- (iii) Any nursery stock shall have been inspected and approved by the Engineer-in-Charge.
- (iv) Plants shall be delivered with legible identification labels.

b) **Topsoil:** Topsoil or good earth shall be a friable loam, typical of cultivated topsoil of the locality containing at least 2% of decayed organic matter (humus). It shall be taken from a well-drained arable site. It shall be free of subsoil, stones, earth clods, sticks, roots or other objectionable extraneous matter or debris. It shall contain no toxic material. No topsoil shall be delivered in a muddy condition. Good earth shall have PH range 6.5 to 7.5

c) **Manure (as locally available):** Dry farm yard manure shall be used. It shall be free from extraneous matter, harmful bacteria insects or chemicals.

d) **Root System:** The root system shall be conducive to successful transplantation. Where necessary, the root-ball shall be preserved by support with hessian or other suitable material. On soils where retention of a good ball is not possible, the roots should be suitably protected in some other way which should not cause any damage to roots.

e) **Condition:** Trees and shrubs shall be substantially free from pests and diseases, and shall be materially undamaged. Torn or lacerated roots shall be pruned before dispatch. No roots shall be subjected to adverse conditions, such as prolonged exposure to drying winds or subjection to water-logging, between lifting and delivery.

f) **Supply and substitution:** Upon submission of evidence that certain materials including plant materials are not available, the contractor shall be permitted to substitute other material and plants, with an equitable adjustment of price. All substitutions shall be of the nearest equivalent species and variety to the original specified and shall be subject to the approval of the engineer-in-charge.

g) **Packaging:** Packaging shall be adequate for the protection of the plants and such as to avoid heating or drying out.

h) **Marking:** Each specimen of tree and shrub, or each bundle, shall be legibly labelled with the name of the supplier and the date of dispatch from the nursery, unless otherwise agreed.

**23.2 TREES, ORNAMENTAL PLANTS & PALMS PLANTING:**

- a. Trees should be supplied with adequate protection as approved. After delivery, if planting is not to be carried out immediately, balled plants should be placed cheek to cheek and the ball covered with sand to prevent drying out. Bare-rooted plants can be heeled in by placing the roots in a prepared trench and covering them with earth which should be watered into avoid air pockets round the roots.
- b. **Digging of Pits:** Tree pits shall be dug a minimum of three weeks prior to backfilling. The pit sizes shall be as specified further herein. It shall be replaced with soil mixture as specified further herein. While digging the pits, the top soil up to a depth of 30 cm may be kept aside, if found good (depending upon site conditions) and mixed with the rest of the soil. If the soil is bad below, it shall be replaced with the soil mixture as specified further herein. The bottom of the pit shall be forked to break up the sub-soil.
- c. **Backfilling:** If the excavated soil is normal, it shall be mixed with manure. River sand shall be added to the soil if it is heavy. However, if the soil is bad, the pit shall be refilled with imported good garden soil mixed with manure 2:1 by volume (2 parts of stacked volume of earth after 20% reduction: 1 part of stacked volume of manure after 8% reduction). The soil backfilled has to be watered through and gently pressed down a day previous to planting to make sure that it may not further settle down after planting. The rest 100mm shall be filled with manure. The soil shall be pressed down firmly by treading it down, leaving a shallow depression all around for watering.
- d. **Planting:** No tree pits shall be dug until final tree positions have been pegged out for approval. Care shall be taken that the plant sapling when planted is not buried deeper than in the nursery, or in the pot. Planting should not be carried out in water logged soil. Plant trees at the original soil depth; the soil marks on the stem are an indication of this and it should be maintained on the finished level, allowing for setting of the soil after planting. All plastic and other imperishable containers should be removed before planting. Any broken or damaged roots should be cut back to sound growth. The bottom of the planting pit should be covered with 50mm to 75mm of soil. Bare roots should be spread evenly in the planting pit; and small mound in the center of the pits on which the roots are placed will aid an even spread. Soil should be placed around the roots, gently shaking the tree to allow the soil particles to sift into the root system to ensure close contact with all roots and to prevent air pockets. Backfill soil should be firmed as filling proceeds, layer by layer, care being taken to avoid to avoid damaging the roots, as follows:
  - Chlorpyrifos emulsifiable concentrate 0.2% shall be applied on walls of pit, and initially pit shall be filled to 200 depths with earth mixed Chlorpyrifos emulsifiable concentrate 0.2%. The balance earth shall be filled in with manure in proportion as specified further herein. Chlorpyrifos emulsifiable concentrate 0.2% shall be applied every 15 days.
- e. **Staking:** Newly planted trees must be held firmly although not rigidly by staking to prevent a pocket forming around the stem and newly formed fibrous roots being broken by mechanical pulling as the tree rocks.
- f. **Methods:** The main methods of staking shall be:
  - i) A single vertical stake, 900mm longer than the clear stem of the tree, driven 600mm to 900mm into the soil.

- ii) Two stakes as above driven firmly on either side of the tree with a cross-bar to which the stem is attached. Suitable for bare-rooted or balled material.
  - iii) A single stake driven in at an angle at 45° and leaning towards the prevailing wind, the stem just below the lowest branch being attached to the stake. Suitable for small bare-rooted or balled material.
  - iv) For plant material 3m to 4.50 m high with a single stem a three-wire adjustable guy system may be used in exposed situations.
  - v) The end of stake should be pointed and the lower 1.0m to 1.20m should be coated with a non-injurious wood preservative allowing at least 150mm above ground level.
- g. **Tying:** Each tree should be firmly secured to the stake so as to prevent excessive movement. Abrasion must be avoided by using a buffer, rubber or hessian, between the tree and stake. The tree should be secured at a point just below its lowest branch, and also just above ground Level; normally two ties should be used for tree. These be adjusted or replaced to allow for growth.
- h. **Watering:** The contractor should allow for the adequate watering in of all newly planted trees and shrubs immediately after planting and he shall during the following growing seasons, keep the plant material well-watered.
- i. **Fertilizing:** Fertilizing shall be carried out by application in rotation of the following fertilizers, every 15 days from the beginning of the monsoon till the end of winter: - sludge of organic well-rotted dry farmyard manure or vermicomposting or approved organic manure as per directions of engineer-in-charge.

### 23.3 SHRUBS, GROUND COVERS, CREEPERS PLANTING IN PLANTERS AND BEDS

- a) All areas to be planted with shrubs shall be excavated, trenched to a depth of 600 mm, refilling it with finely mixed good black garden soil and excavated earth (after breaking the clods and mixing with sludge in the ratio as specified further herein. Backfill soil should be firmed as filling proceeds, layer by layer, care being taken to avoid to avoid damaging the roots, as follows:
  - Chlorpyrifos emulsifiable concentrate 0.2% shall be applied on walls of pit. The balance earth shall be filled in a mixture with manure in proportion as specified further herein. Chlorpyrifos emulsifiable concentrate 0.2% concentration shall be applied every 15 days.
- b) Tall shrubs may need staking, which shall be provided if approved by the engineer-in-charge depending upon the conditions of individual plant specimen.
- c) For planting shrubs and ground cover shrubs in planters, good earth shall be mixed with sludge in the proportion as above and filled in planters.
- d) Positions of shrubs to be planted should be marked out in accordance with the planting plan. When shrubs are set out, precautions should be taken to prevent roots drying. Planting holes (of sizes as specified further herein) should be excavated for longer shrubs. Polythene and other non-perishable containers should be removed and any badly damaged roots carefully pruned. The shrubs should then be set in holes so that the soil level, after settlement, will be at the original soil mark on the stem of the shrub. The hole should be backfilled to half pots depth and firmed by treading. The remainder of the soil can then be returned and again firmed by treading.



#### **23.4 GRASS AREAS:**

- a. Mixing earth and manure in proportion 8:1 and spreading to a thickness of 200mm.
- b. Fine dressing the ground (to levels specified).
- c. Grassing with selection No. 1 grass including watering and maintenance of the lawn for 60 days or more till the grass forms a thick lawn, free from weeds and fit for mowing including supplying good earth, if needed.
- d. In rows 5 cm apart in both directions
- e. Flooding the ground with water including making kiaries and dismantling the same.

#### **23.5 GROUND COVER AND HERBAL PLANTS**

- a) Pit Preparation: Preparing planting beds for ground covers planting by excavating and refilling the same with sweet earth mixed with manure 8:1 by volume (8 parts of stacked volume of earth after 20 % reduction: 1 part of stacked volume of manure after 8 % reduction), flooding with water, dressing including removal of rubbish and surplus earth if any with all leads and lifts; excluding cost of earth and manure. Unless otherwise specified, pit size shall be 0.15m x 0.15m x 0.30 m.
- b) Supply and plantation: Planting best quality ground covers of species and height as specified. All ground covers to be planted should be best quality pot-grown healthy ground covers inclusive of preparation and cultivation of ground cover beds as specified. All plants to be approved before planting.

#### **23.6 CREEPERS**

- a) Pit Preparation: Preparing planting beds for creepers planting by excavating and refilling the same with sweet earth mixed with manure 8:1 by volume (8 parts of stacked volume of earth after 20 % reduction: 1 part of stacked volume of manure after 8 % reduction), flooding with water, dressing including removal of rubbish and surplus earth if any with all leads and lifts; excluding cost of earth and manure. Unless otherwise specified, the pit size shall be 0.6m x 0.6m x 0.6m.
- b) Supply and plantation: Planting best quality creepers of species and height as specified. All ground covers to be planted should be best quality pot-grown healthy ground covers inclusive of preparation and cultivation of creeper beds as specified. All plants to be approved before planting.

#### **24.0 BORED CAST-IN-SITU PILES:**

**24.1** The definition of terminology shall be as per (IS-2911 Part I/Section 2 of latest edition).

**24.2** The construction of bored cast-in-situ concrete piles shall be carried out in all respects as per the provision stipulated in the agreement, as per IS-2911 Part- I/Section-2 (latest edition) and as per direction of Engineer-in-Charge.

**24.3** The piles shall be bored cast-in-situ concrete piles and shall carry a safe load as mentioned against the item for piling work in the schedule.

**24.4** The permissible positional deviation from the true position of pile: -

- (i) No pile shall be more than 75 mm out of the true position as shown in the approved plan/drawing at the level of bottom of pile cap. In case the pile is displaced by more than

75 mm from its true position, the contractor shall be required to submit modified design based on actual displacement for approval of the Department. Any extra cost in the work involved on account of such modification shall be borne by the contractor.

- (ii) No error in verticality of the pile exceeding 1.5% (One decimal Five percent) from the true vertical shall be permitted. In case the deviation in verticality exceeds this limit, the pile shall be liable for rejection. The contractor in such case may be permitted to re-design the pile as a battered pile or he may provide extra pile/piles to satisfy structural requirements at his own risk and cost.
- (iii) The contractor shall be responsible for any adverse effect due to providing such extra pile on other piles.
- (iv) The distance between center to center of piles shall not normally be less than 2.75 to 3 times the diameter of the pile and 2.5 times under exceptional cases. In case different sizes of piles are used the diameter of biggest pile shall be the guiding factor.

**24.5** A minimum length of one meter of temporary casing shall be inserted in each bored pile. Boring shall be done by rotary type drilling rigs/machine using direct mud circulation method. No auger or cutter boring will be permitted. Stabilization of edges shall be done by use of bentonite solution having specific gravity. 1.1 to 1.2 and conforming to Specification detailed in, Appendix A of IS 2911 (Part-I/Section-2) 1979 or latest edition. The specific gravity of the mud suspension near about the bottom of the hole shall whenever practicable be determined by suitable slurry sampler in a first few piles and at suitable intervals of piles and recorded. Consistency of the drilling mud suspension shall be controlled throughout the boring as well as concreting operation in order to keep the hole stabilized as well as to avoid concrete getting mixed up with thicker suspension of the mud. The bentonite solution shall be used at least from the level of subsoil water and hole shall then be always kept almost full with bentonite solution, which shall preferably be kept in motion. Where the Engineer-in-Charge is satisfied that it is necessary to do so, he can permit the contractor to use a suitable casing, which may not be left, in place. Such permission shall be given only on the application of the contractor and after the other methods have failed to produce satisfactory results. The bottom of the boreholes shall be cleaned of the spoils and sediments before placing of concrete and after placing of cage reinforcement so that the base of the pile shall be free from loose material.

**24.6** In case of boring with casing, the casing shall be used at least from the level of subsoil water. The casing shall be kept ahead of boring in case where there is danger of caving due to subsoil water entering into the borehole or where the soil is loose. While boring below subsoil water level, precaution shall be taken so that no boiling at the bottom of the hole occurs due to difference of hydrostatic head.

**24.7** Concreting: -

- (i) Concreting of boreholes shall start as soon as possible after its completion. Should a borehole, which is not cased, be left unconcreted for more than two hours, it shall be cleaned thoroughly before concreting. The concreting under water shall be done in one operation. Where concreting under water, a temporary casing should be installed to the full depth of the borehole or 2 metres into the non-collapsible stratum, so that fragments of ground cannot drop from the sides of the hole into the concrete as it is placed.
- (ii) Concrete shall be placed by means of a tremie pipe (Sec. IS 456-2000, Para 14-2-4a). It shall be ensured that concrete entering the tremie pipe does not get mixed up with the slurry. One of the methods of achieving this is by pouring  $\frac{1}{4}$  Kg, of granulated

vermiculite in the tremie pipe before pouring concrete. The vermiculite granules will form a plug separating concrete from the fluid below. Any other approved method of plugging may also be adopted. The tremie pipe shall extend up to the bottom of the bore hole at the start and may be withdrawn in sections as the level of concrete rises in the bore holes, but the discharge end shall at all times be kept at a level below the top of concrete in the bore holes to a minimum depth of one metre. The placing of concrete should be continuous and the tremie pipe should be held concentric in the hole.

**24.8 Withdrawal of Casing: -**

- (i) Extraction of casing (if used) shall be done in such a way that no knocking or shearing of the concrete in the shaft takes place. Care should be taken to ensure that water does not enter the tremie pipe. At all times, after concreting is started, the lower end of the casing pipe shall remain below the tremie pipe at least 60 cm, till concreting is completed.
- (ii) During the extraction of casing, slumping of concrete shall be observed and when required, additional quantity of concrete shall be poured so that the pile is formed, above the cut off level as per Clause 7.7 and 7.8 of IS – 2911 (Part-I/ Sec. 2) 1979 or latest edition for which nothing extra shall be paid. During extraction of the casing, special slump records shall be maintained. The slump in any case shall not exceed the permissible limit as laid down in IS-2911 (Part-I/Sec 2)/1979 with amendments or latest edition.

**24.9 Splicing of Reinforcement of Piles: -**The longitudinal reinforcement and spiral/ rings of the piles should be provided in pile (as per drawing.) for entire length of piles. The splicing of longitudinal reinforcement should have full development length/bond length.

**24.10 Initial Load Test: -**Contractor shall carry out such load test before execution of the main piling work outside the pile layout as per the direction of the Engineer-in-Charge. The rate for initial load test shall include the construction of test cap and cost of all items of works necessary for testing and dismantling the test cap after the test is completed.

**24.11 Routine Load Test: -**Routine load test shall be carried out on any particular pile or group of piles in the pile layout, selected by the Engineer-in-Charge. The rate of routine load test shall include construction of test cap and all items of works necessary for testing and dismantling the test cap after the test is completed.

**24.12** All the records of load test data as per agreement item and quantities should be submitted to the Engineer-in-charge as soon as the tests are completed. The related structural drawings shall be released for execution in phased manner after 3 weeks from the date of respective tests reports i.e., pile layout details after receipt of initial load test reports and details of pile cap after receipt of routine load test reports. The time specified in clause-5 of schedule “F” for execution of work is inclusive of the aforesaid time schedule for issue of structural drawings.

**24.13** The load test on pile/piles of standard length shall not be carried out earlier than 4(four) weeks from the time of casting of the piles. Initial load test and routine load test shall be carried out as per IS 2911 (Part-IV) of latest edition. For the purpose of load test, the pile shall be kept free from any lateral contact with the soil upto a depth of 2000 mm below the ground level/formation level i.e., approximately upto cut off level. The test cap for such tests shall be so constructed that even when the pile had settled fully under load test, the cap would not touch the ground surface below it. The Engineer-in-Charge will have the liberty to direct the contractor to conduct the load test at any stage of piling work.

- 24.14** Rate for testing shall include the extra length of pile required to be constructed for carrying out the tests and any other work considered necessary for that test and the Department will not incur any expenditure in this regard.
- 24.15** Before any load test is carried out the proposed apparatus and loading structure to be used for the load test shall be got approved by the Engineer-in- Charge. The dial gauges and pressure gauge shall be got calibrated. The calibration certificate in original should be submitted to the Engineer-In-Charge which shall be returned after verification.
- 24.16** The contractor shall arrange the necessary kentledge and RSJ's etc. for applying the load in the load test and shall remove the kentledge, RSJ and bags of ballast etc. from the site after the test is completed to the satisfaction of the Engineer- in-Charge. Rate quoted for testing shall include the cost of all the items of the work necessary for such test and submission of the test report as per the direction of Engineer- in-Charge.
- 24.17** Determination of safe load carrying capacity of piles shall be governed by the provision of IS 2911 (Part-IV) latest edition.
- 24.18** The contractor shall be paid for the load tests at his quoted rates. If the results of such tests are found to be erratic and inconclusive, the contractor will be required to carry out additional tests at his own cost to prove the satisfactory performance of the piles.
- 24.19** If the safe load bearing capacity of the piles based on the load test data is found to be lower than the designated load capacity specified in tender, the design shall be modified foundation system by increasing the length of the pile or by increasing the numbers of pile or by combination of both for which necessary load, moments etc., of the columns.
- 24.20** Testing of piles of different categories shall be done in presence of Engineer- in-Charge or his authorized representative.
- 24.21** The agency has to make the full arrangement for nondestructive integrity testing of piles (NDT) as per IS 14893:2001 and it shall be carried out on selected piles atleast on 5% of total piles or as decided by the Engineer-in-Charge, in case of doubt regarding soundness of cement concrete work (RCC work) on piles as per direction of Engineer-in-Charge and his decision shall be final and binding.
- 25.0 MISCELLANEOUS:** Following miscellaneous works shall be executed wherever required as per below mentioned specifications:
- 25.1** Anti-Termite Chemical Treatment: Post Constructional anti-termite treatment, if required, shall be with Chloropyriphos/ lindane emulsifiable concentrate 20% with 1% concentration as per CPWD specification.

**LIST OF PREFERRED MAKE / MANUFACTURERS FOR DIFFERENT MATERIALS TO BE USED IN THIS PROJECT FOR CIVIL & HORTICULTURE WORKS**

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
1	ANTI TERMITE PESTICIDES	BAYER, FMC INDIA, HINDUSTAN INSECTICIDES
2	STEEL (TMT FE-500D)	TATA., RINL, JINDAL STEEL & POWER LTD, JSW STEEL LTD., SAIL
3	STRUCTURAL STEEL SECTIONS	TATA, JINDAL, SAIL, RINL
4	CEMENT [OPC/PPC]	ACC, AMBUJA, ULTRATECH, WONDER
5	READY MIXED CEMENT CONCRETE	ACC, ULTRA TECH, AFCON
6	WHITE CEMENT	BIRLA WHITE, J.K. WHITE, ULTRATECH
7	VITRIFIED TILES (DOUBLE CHARGED / FULL BODY/ULTRA SLIM /ANTISKID / ACID-ALKALI RESISTANT)- (ALL TILES SHALL BE PROCURED FROM FULLY OWNED FACTORY OF THE MANUFACTURER AND NOT FROM JV / OUTSOURCED)	SOMANY, KAJARIA, NITCO
8	CERAMIC GLAZED TILES	SOMANY, KAJARIA, NITCO
9	WATER-PROOF CEMENT PAINT, SYNTHETIC ENAMEL PAINT, PLASTIC EMULSION PAINT, DISTEMPER/ACRYLIC EMULSION PAINT, TEXTURED PAINT, STEEL PRIMER, WOOD PRIMER, EXTERIOR WATERPROOFING PAINT, WOOD FINISH (MELAMINE & PU POLISH)	ASIAN PAINT, NEROLAC, ICICI, BERGER
10	PLY BOARD, PLYWOOD (PINE BOARD), LAMINATE, FLUSH DOOR (ALL FLUSH DOORS SHALL BE PROCURED FROM FULLY OWNED FACTORY OF THE MANUFACTURER AND NOT FROM JV / OUTSOURCED), PRELAMINATED PARTICLE BOARD	GREEN, MERINO, CENTURY, DURO
11	SELF LEVELLING COMPOUND	MAPAI, ARDEX ENDURA, BIZZAR
12	EPDM GASKET	HANU, ANAND, VICTOR
13	WOOD ADHESIVE	FEVICOL, 3M, ARAOLDITE, SIKA
14	FIRE SEALANT	HILTI, 3M, MCCOY
15	TILE ADHESIVE, STONE ADHESIVE, EPOXY GROUTING COMPOUND	PIDILITE, ARDEX ENDURA, WEBER,
16	DASH, ANCHORING FASTENERS	HILTI, FISCHER, CANON
17	ALUMINIUM COMPOSITE PANEL	ALUCOBOND, REYNOBOND
18	READY MIX GYPSUM PLASTER	SAINT GOBAIN, USG BORAL, ULTRATECH
19	READY MIX CEMENT PLASTER	WEBER, ULTRATECH, BIRLA WHILTE
20	SILICON SEALANT	GE, DOW CORNING, PIDILITE



S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
21	GYPSUM BOARD	USG BORAL, LAFAGE, SAINT GOBAIN, KNAUF DANOLINE
22	FLOAT GLASS, REFLECTIVE GLASS, TINTED GLASS, HIGH PERFORMANCE GLASS, LOOKING GLASS / MIRROR LACQUERED GLASS, HIGH PERFORMANCE GLASS, FIRE RESISTANT GLASS	MODI GLASS, SAINT GOBAIN GLASS
23	MECHANICAL COUPERS	USHA MARTIN, DEXTRA, HALFEN
24	CRYSTALLIANE CEMENTITIOUS WATERPROOFING COMPOUND	XYPEX CONSTRUCTION CHEMICAL, KRYTONE,
25	BITUMEN MEMBRANE FOR WATERPROOFING, HDPE MEMBRANE FOR WATERPROOFING, POLYUREA MEMBRANE FOR WATERPROOFING	SIKA, SAINT GOBAIN, SOPREMA, FOSROC PIDILITE
26	HOLLOW METAL PRESSED DOORS (METAL DOORS)	NAVAIR, TATA PRAVESH, SHAKTI HORMANN
27	ROLLER BLIND	VISTA, MAC, HUNTER DOUGLUS
28	HYDRAULIC DOOR CLOSER, FLOOR SPRING, DOOR AUTOMATION, HARDWARES FOR FIRE RATED DOORS, STAINLESS STEEL FITTINGS/HARDWARE FOR WOODEN/METAL/GLAZED/STEEL DOOR & WINDOWS, FRICTION STAY HINGES, HARDWARE FITTINGS FOR ALUMINIUM WINDOWS & DOORS	DORMA, GEZE, EBCO, HAFELE, HORMANN
29	ADHESIVE TAPE	3M, NORTON, TESA
30	HIGH PERFORMANCE EPOXY BASED RESIN ANCHOR SYSTEM	HILTI, FOSROC, CICO, SIKA
31	EPOXY MORTAR	FOSROC, SIKA, MYK LATICRETE, CICO
32	ALUMINIUM SECTIONS FOR DOORS & WINDOWS ETC.	JINDAL, HINDALCO, BHORUKA
33	FABRICATOR FOR ALUMINUM WORK AND STRUCTURAL GLAZING WORK	SAPA, KALCO, TECHNAL
34	MS SECTIONS (PIPES, BOXES CHANNELS)	JINDAL HISAR, TATA,
35	S.S. MATERIAL/HADRAILS/RAILINGS	JINDAL STAINLESS STEEL LTD., TATA STEEL, SAIL
36	WALL PUTTY	JK, BIRLA, ASAIN PAINT
37	FLOOR HARDENER, POLYSULPHIDE SEALANT, WATERPROOFING COMPOUND, ADMIXTURES/CURING COUMPOUND	SIKA, FORSROC, PIDILITE, SOPREMA, DR FIXIT
38	EXPANSION JOINT	MIGUA, CS, CAMEO
39	METAL/ALUMINUM FALSE CEILING	SAINT GOBAIN, HUNTER DOUGLUS, ARMSTRONG
40	WPC (WOOD POLYMER COMPOSITE)	GREENPLY, CENTURY, RAJSHREE
41	AAC BLOCK ADHESIVE	ARDEX ENDURA, PIDILITE, WEBER
42	UPVC WINDOWS	FENESTA, ALUPLAST, KOENMERLING
43	VINYL / CONDUCTIVE FLOORING, DADO SKIRTING	FORBO, TARAKETT, ARMSTRONG, GERFLOOR

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
44	CALCIUM SILICATE TILES FALSE CEILING	AEROLITE, RAMCO, HILUX
45	FIRE CHECK DOORS (METAL/ROLLING/GLAZED)	NAVAIR, TATA PRAVESH, SHAKTI HORMANN, 4C FIRE PROTECTION PVT LTD
46	ACOUSTIC SEAL / DOOR SEAL	LORIENT, RAVEN, DORMA, 3M, HAFELE
47	INTUMESCENT FIRE / SMOKESEAL	ASTRO FLAME, RAVEN, SEALZ, LORIENT
48	CALCIUM SILICATE BOARD FOR FIRE DOOR	PROMOTECH, PROMINA, RAMCO
49	POLYCARBONATE SHEET	DANPALON, SOLALITE, DPI SYSTEM, EVERLITE, CPI
50	GI PIPES	JINDAL HISAR, TATA
51	GI FITTINGS	UNIK, TATA
52	CPVC PIPES	ASTRAL, PRINCE, SFMC
53	HDPE PIPES	SUPREME, FINOLEX, ASTRAL, RELIANCE,
54	SOIL, WASTE, VENT PIPES & FITTINGS	ASTRAL, PRINCE, SFMC
55	C.P. BRASS FITTING AND ACESSORIES	JAQUAR, ROCA, KOHLER, KEROVIT
56	SS SINK	NILKANTH, NIRALI, JAYNA
57	SANITARY WARE (URINAL, WASH BASIN, WC ETC.)	JAQUAR, GROHE, KOHLER, KEROVIT
58	GLASS MOSAIC TILE	ITALIA, CORAL, KAJARIA
59	FAÇADE AND WINDOW SYSTEM	SCHUCO, ALUK, REYNAERS, GUTMANN
60	FIRE STOP IN CURTAIN WALL SYSTEM	HILTI, 3M, FISCHER, LORIENT
61	POP OUT VENT FOR FAÇADE AND SYSTEM WINDOW HARDWARE	COTSWOLD, SCHUCO, ALUK, REYNAERS
62	ALUMINIUM OPERABLE LOUVER	TECHNAL, DOMAL, YOGI GLAZE, SCHUCO
63	AIR TRANSFER GRILL	RUSKIN, SYSTEM AIR, TROX, TREMCO
64	ENGINEERED WOODEN FLOORING AND SKIRTING	MIKASA (GREENLAM), TARKETT, HAVWOODS, PARADOR (HIL), PERGO, KAHRS
65	ENGINEERED MARBLE	HR JOHNSON, KALINGA STONE, NITCO, ASIAN
66	SS TACTILE	EMINENT, FERROTECH, SUNDARAM, JINDAL
67	BAMBOO DECKING, ROOFING & CLADDING	ECO GREEN FLOORING, EPITOME BAMBOOWOOD, LAMIWOOD
68	OUTDOOR SIGNAGES	3M, AVERY DENNISON, VEDAAANSHI SIGNS
69	ACOUSTIC PANELS	ARMSTRONG, USG BORAL, ANUTONE
70	WEATHER/STRUCTURE SILICON SEALANT	WACKER, MCCOY, DOW CORNING
71	BACKER ROD	SUPREME/SYSTRANS

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
72	POLYSTRENE BOARD	SUPREME, DOW CORNING, TEXAS, PIDILITE
73	DUCTILE IRON PIPES	ELECTROSTEEL, KESORAM, TISCO
74	STAINLESS STEEL PIPES AND FITTINGS	JINDAL STAINLESS STEEL, J-PRESS ALFA PRESS
75	SLUICE VALVES, GATE / BALL VALVES	ZOLOTO, KIRLOSKAR, LEADER
76	FURNITURE (CHAIRS/WORKSTATIONS, STORAGE UNITS ETC.)	HERMAN-MILLER, HAYWORTH, STTEL CASE, ROCKWORTH, GODREJ,

**Note: - The articles / materials which are not mentioned in the above said list shall be approved by the Engineer-in-Charge before execution of work.**

**GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION OF SPECILAISED WORKS**

The agreement made this..... day of ..... (Two Thousand----- only) ..... 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 (Hereinafter called the Contract) dated ..... and made between the GUARANTOR OF THE ONE PART AND the Government of the other part whereby the contractor inter alia undertook to remove all the defects in .....(name of specialized work) in said contract completely.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain intact without any defect for ..... (No. of years) from the date of completion of the work.

NOW THE GUARANTOR hereby guarantee that the works executed by him will remain intact and full functional without any defects of any kind for .....(No. of years) to be reckoned from the date of completion of work under the contract.

The decision of the Engineer-in-Charge with regard to nature and cause of defects shall be final.

During this period of guarantee, the guarantor shall make good all defects and in case of any defect being found in the .....(name of specialized works) 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 the notice from Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's risk and cost. The decision of the Engineer -in-charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all defects or commits breach there under, then the Guarantor will indemnify Engineer-in-Charge and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and / or cost incurred by the Government, the decision of the Engineer-in-charge will be final and binding on both the parties.

IN WITNESS WHEREOF these 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 the presence of :-

1. .... 2. ....

SIGNED FOR AND BEHALF OF THE PRESIDENT OF INDIA BY ..... in the presence of

1. .... 2. ....

## TENDER DRAWINGS

1	BASEMENT PLAN	0224/SSSPL/EGRC/AMAR/AR-01
2	SITE PLAN WITH GROUND FLOOR PLAN	0224/SSSPL/EGRC/AMAR/AR-02
3	FIRST FLOOR PLAN	0224/SSSPL/EGRC/AMAR/AR-03
4	SECOND FLOOR PLAN	0224/SSSPL/EGRC/AMAR/AR-04
5	THIRD FLOOR PLAN	0224/SSSPL/EGRC/AMAR/AR-05
6	FOURTH FLOOR PLAN	0224/SSSPL/EGRC/AMAR/AR-06
7	TERRACE FLOOR PLAN	0224/SSSPL/EGRC/AMAR/AR-07
8	ROOF PLAN	0224/SSSPL/EGRC/AMAR/AR-08
9	SECTION-A & B'	0224/SSSPL/EGRC/AMAR/AR-10
10	FRONT ELEVATION C & D	0224/SSSPL/EGRC/AMAR/AR-11



# Schedule of Quantity for Civil Work

## SCHEDULE OF QUANTITY

**Name of work: Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.**

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
<b>1.0</b>	<b>EARTH WORK</b>				
1.1	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth for all leads within campus and for all lift, as directed by Engineer-in-charge.				
1.1.1	All kinds of soil.	11,900	Cum	170.20	20,25,380.00
1.2	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, for all lift, including getting out the excavated soil and disposal of surplus excavated soil as directed, for all leads within campus.				
1.2.1	All kinds of soil.	420	Cum	250.75	1,05,315.00
1.3	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, for all depth, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, for all leads within campus :				
1.3.1	All Kind of Soil				
1.3.1.1	Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300 mm dia.	600	Metre	302.70	1,81,620.00
1.4	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, for all leads within campus and for all lift.	1,360.00	Cum	141.50	1,92,440.00
1.5	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.	390.00	Cum	1,649.85	6,43,442.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
1.6	Credit for surplus earth obtained from earth work to be disposed off from site as and when required, by the agency as per the direction of Engineer-in-charge. The surplus earth shall be the property of the agency and removed from the work site at its own cost.	10,960.00	Cum	-62.30	-6,82,808.00
1.7	Supplying at site and banking good earth fit for embankments, roads and external filling, in layers should not exceeding 20 cm including watering, compacting each layer with 1/2 tonne roller, or wooden or steel rammers, and rolling every 3rd and top - most layer with power roller of minimum 8 tonnes capacity and watering, all complete for all leads within campus and lifts as per the directions of Engineer -in - charge. <b>Note:</b> - 1. Payment shall be made as per level calculations.2. The quality of earth to be got approved by the Engineer-in-charge before procuring.3. The rate is inclusive of royalty, transportation for all leads and lifts and all other incidental charges. No additional claims will be admissible.4. The Source of earth is the responsibility of the agency.	8,600.00	Cum	1,011.65	87,00,190.00
	<b>TOTAL EARTH WORK :</b>			<b>Rs.</b>	<b>1,11,65,579.00</b>
2.0	<b>CONCRETE WORK</b>				
2.1	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level :				
2.1.1	1:5:10 (1 Portland Pozzolana Cement : 5 coarse sand (zone-III) derived from natural sources : 10 graded stone aggregate 40 mm nominal size derived from natural sources)	140.00	Cum	5,184.35	7,25,809.00
2.2	Providing and laying cement concrete in Coping, Bed Blocks, plain window sills etc., up to floor five level, excluding the cost of centering, shuttering and finishing:				
2.2.1	1:2:4 (1 Portland Pozzolana Cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 20 mm nominal size derived from natural sources)	8.00	Cum	7,712.10	61,697.00
2.3	Centering and shuttering including strutting, propping etc. and removal of form for:				
2.3.1	Foundations, footings, bases of columns, etc. for mass concrete	150.00	Sqm	333.00	49,950.00
2.3.2	Retaining walls, return walls, walls (any thickness) including attached pilasters, buttresses, plinth and string courses fillets, kerbs and steps etc..	30.00	Sqm	673.00	20,190.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
2.3.3	Moulding as in cornices, window sills, string courses, bands, copings, bed plates, anchor blocks and the like.	70.00	Sqm	751.65	52,616.00
2.4	Providing and laying damp-proof course 40mm thick with cement concrete 1:2:4 (1 Portland Pozzolana Cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 12.5mm nominal size derived from natural sources)	15.00	Sqm	389.00	5,835.00
2.5	Providing & applying a coat of residual petroleum bitumen of grade of VG-10 of approved quality using 1.7kg per square metre on damp proof course after cleaning the surface with brushes and finally with apiece of cloth lightly soaked in kerosene oil.	15.00	Sqm	156.95	2,354.00
2.6	Making plinth protection 50mm thick of cement concrete 1:3:6 (1 Portland Pozzolana Cement : 3 coarse sand (zone-III) derived from natural sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, levelling & dressing & finishing the top smooth.	60.00	Sqm	586.55	35,193.00
2.7	Providing and laying in position ready mixed or site batched design mix cement concrete for plain cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana Cement (PPC), admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering and finishing as per direction of the engineer-in-charge; for the following grades of concrete.				
	<b>Note:</b> Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the minimum specified cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
2.7.1	All works upto plinth level :				
2.7.1.1	Concrete of M10 grade with minimum cement content of 220 kg /cum	1,100.00	Cum	7,105.65	78,16,215.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	<b>TOTAL CONCRETE WORK :</b>			<b>Rs.</b>	<b>87,69,859.00</b>
3.0	<b>REINFORCED CEMENT CONCRETE WORK</b>				
3.1	Reinforced cement concrete work in beams, suspended floors, roofs having slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:2:4 (1 Portland Pozzolana Cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 20 mm nominal size derived from natural sources).	10.00	Cum	8,422.95	84,230.00
3.2	Centering and shuttering including strutting, propping etc. and removal of form for:				
3.2.1	Foundations, footings, bases of columns, etc. for mass concrete	980.00	Sqm	333.00	3,26,340.00
3.2.2	Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.	3,000.00	Sqm	673.00	20,19,000.00
3.2.3	Suspended floors, roofs, landings, balconies and access platform	9,190.00	Sqm	732.80	67,34,432.00
3.2.4	Shelves (Cast in situ)	50.00	Sqm	732.80	36,640.00
3.2.5	Lintels, beams, plinth beams, girders, bressumers and cantilevers	7,870.00	Sqm	589.35	46,38,185.00
3.2.6	Columns, Pillars, Piers, Abutments, Posts and Struts	5,350.00	Sqm	784.40	41,96,540.00
3.2.7	Stairs, (excluding landings) except spiral-staircases	330.00	Sqm	676.80	2,23,344.00
3.2.8	Small lintels not exceeding 1.5 m clear span, moulding as in cornices, window sills, string courses, bands, copings, bed plates, anchor blocks and the like	70.00	Sqm	333.00	23,310.00
3.2.9	Edges of slabs and breaks in floors and walls				
3.2.9.1	Under 20 cm wide	100.00	Metre	173.75	17,375.00
3.2.10	Weather shade, Chajjas, corbels etc., including edges	70.00	Sqm	776.50	54,355.00
3.2.11	Extra for shuttering in circular work (20% of respective centering and shuttering items)	315.00	Sqm	117.85	37,123.00
3.3	Extra for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured).				
3.3.1	Suspended floors, roofs, landing, beams and				



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	balconies (Plan area to be measured)	11,990.00	Sqm	300.30	36,00,597.00
3.4	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level.				
3.4.1	Thermo-Mechanically Treated bars of grade Fe-500D or more.	10,07,000.00	Kg	94.95	9,56,14,650.00
3.5	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.				
3.5.1	Thermo-Mechanically Treated bars of grade Fe-500D or more.	5,45,000.00	Kg	94.95	5,17,47,750.00
3.6	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana cement (PPC), admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge; for the following grades of concrete. <b>Note:</b> Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 1.10 times of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
3.6.1	All works upto plinth level				
3.6.1.1	Concrete of M30 grade with minimum cement content of 350 kg /cum	3,700.00	Cum	7,636.85	2,82,56,345.00
3.6.2	All works above plinth level upto floor V level				
3.6.2.1	Concrete of M30 grade with minimum cement content of 350 kg /cum	2,620.00	Cum	7,982.90	2,09,15,198.00
3.7	Add / deduct for using extra or less cement in the items of design mix over the specified cement content therein.	2,100.00	Quintal	529.05	11,11,005.00
3.8	Extra for R.C.C./ B.M.C/ R.M.C. work above floor V level for each four floors or	700.00	Cum	346.05	2,42,235.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	part thereof.				
3.9	Providing and applying water based curing compound to the newly provided concrete surface. Curing compound of approved make shall be sprayed/ applied as per manufacturer's specification or at the rate of 200 to 300 ml per square meter.	24,020.00	Sqm	30.40	7,30,208.00
	<b>TOTAL REONFORCED CEMENT CONCRETE WORK :</b>			<b>Rs.</b>	<b>22,06,08,862.00</b>
4.0	<b>BRICK WORK</b>				
4.1	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in:				
	Cement mortar 1:6 (1 cement : 6 coarse sand)	260.00	Cum	6,014.40	15,63,744.00
4.2	Brick work with clay flyash F.P.S. (non modular) brick of class designation 7.5 in superstructure above plinth level up to floor five level in :				
	Cement mortar 1 : 6 (1 cement : 6 coarse sand)	670.00	Cum	8,845.55	59,26,519.00
4.3	Providing and laying Autoclaved Aerated concrete (AAC) blocks masonry with 150mm to 300 mm thick with Grade-1 AAC blocks of density 551 to 650 kg/cum conforming to IS:2185 (Part 3) in super structure above plinth level up to floor V level with RCC band at sill level and lintel level with approved block laying polymer modified adhesive mortar all complete as per direction of Engineer-in-Charge. (The payment of RCC band and reinforcement shall be made for seperately).	1,100.00	Cum	6,794.35	74,73,785.00
4.4	Providing and laying concrete in RCC Bands (75mm thick) at sill and lintel level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:2:4 (1 Portland Pozzolana Cement : 2 coarse sand(zone-III) derived from natural sources : 4 graded stone aggregate 20 mm nominal size derived from natural sources) at all floors and levels complete etc., as per the direction of Enginner in charge.	2.00	Cum	7,712.10	15,424.00
4.5	Providing and fixing wire cut, machine moulded, glossy bricks of class designation 10/12.5, size 230 mm x 75mm x 19 mm thick in cladding in the elevation of the building including making horizontal and vertical grooves 10 mm wide & 10 mm deep	1,440.00	Sqm	1,876.40	27,02,016.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	complete in cement mortar 1:4 (1 Portland Pozzolana Cement : 4 coarse sand). (Note: - The Brick cladding work shall be got executed from specialised labour, as per recommendation/ suggestion by the manufacturer of the bricks and as per direction of the Engineer-in-Charge. Rates include all lifts and for working at all levels, and including rates for scaffolding etc. all complete.)				
	<b>TOTAL BRICK WORK:</b>			<b>Rs.</b>	<b>1,76,81,488.00</b>
5.0	<b>CLADDING WORK</b>				
5.1	Providing and laying 18 mm thick gangsaw cut, mirror polished granite stone slabs for Wall Lining and Skirting etc., and similar locations in required design (Simple geometrical, abstract etc.) and in patterns in combination with granite stones of different colours, shades and finished surface texture etc., in linear & curvilinear portions of the building, all complete as per the shades and finished surface texture etc., all complete as per the architectural drawings, with a bed of 6mm thick adhesive in proportion recommended by the manufacturer including pointing with polymer modified grout of matching shade including providing a rough backing to the granite slabs with iron dust using approved adhesives etc. to improve adherence to the base mortar, to be secured to the backing by means of cramps/fasteners etc., all complete as specified and as per the direction of Engineer in charge.	2,250.00	Sqm	3,668.60	82,54,350.00
5.2	Providing & Fixing of Granite edge strip 50 mm wide on top of the cladding (Item No. 5.1) with one edge moulding including machine polishing to edge to give high gloss finish etc. complete as per the direction of Engineer in charge.	1,244.00	Metre	595.05	7,40,242.00
5.3	Providing and fixing 2nd class teak wood plain lining tongued and grooved, including wooden plugs complete with necessary screws and priming coat on unexposed surface.				
5.3.1	12 mm thick	370.00	Sqm	2,247.35	8,31,520.00
5.4	Providing and laying Vitrified Tiles in Wall of minimum sizes 600x1200 (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming	1,650.00	Sqm	1,196.05	19,73,483.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 Portland Pozzolana Cement: 3 coarse sand), jointing with grey cement slurry @ 3.3 kg/sqm including grouting the joint with white cement & matching pigments etc. complete.				
5.5	Designing, fabricating, testing, installing and fixing in position Curtain Wall with Aluminium Composite Panel Cladding, with open grooves for linear as well as curvilinear portions of the building , for all heights and all levels etc. including:	180.00	Sqm	5,698.25	10,25,685.00
	(a) Structural analysis & design and preparation of shop drawings for pressure equalisation or rain screen principle as required, proper drainage of water to make it watertight including checking of all the structural and functional design.				
	(b) Providing, fabricating and supplying and fixing panels of aluminium composite panel cladding in pan shape in metallic colour of approved shades made out of 4mm thick aluminium composite panel material consisting of 3mm thick FR grade mineral core sandwiched between two Aluminium sheets (each 0.5mm thick). The aluminium composite panel cladding sheet shall be coil coated, with Kynar 500 based PVDF / Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc.				
	(c) The fastening brackets of Aluminium alloy 6005 T5 / MS with Hot Dip Galvanised with serrations and serrated washers to arrest the wind load movement, fasteners, SS 316 Pins and anchor bolts of approved make in SS 316, Nylon separators to prevent bi-metallic contacts all complete required to perform as per specification and drawing The item includes cost of all material & labour component, the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working curtain wall with aluminium composite panel cladding, cleaning and protection of the curtain wall with aluminium composite panel cladding till the handing over of the building for occupation. Base frame work for ACP cladding is payable under the relevant aluminium items. The Contractor shall				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	provide curtain wall with aluminium composite panel cladding, having all the performance characteristics all complete, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge. However, for the purpose of payment, only the actual area on the external face of the curtain wall with Aluminum Composite Panel Cladding (including width of groove) shall be measured in sqm. up to two decimal places.				
5.6	Providing and supplying aluminium extruded tubular and other aluminium sections as per the architectural drawings and approved shop drawings , the aluminium quality as per grade 6063 T5 or T6 as per BS 1474,including super durable powder coating of 60-80 microns conforming to AAMA 2604 of required colour and shade as approved by the Engineer-in-Charge. ( The item includes cost of material such as cleats, sleeves, screws etc. necessary for fabrication of extruded aluminium frame work. Nothing extra shall be paid on this account). The weight of aluminium extruded section shall be taken for purpose of payment. (For Item No. 5.6, Base Frame work for ACP)	1,620.00	Kg	403.10	6,53,022.00
	<b>TOTAL CLADDING WORK:</b>			<b>Rs.</b>	<b>1,34,78,302.00</b>
6.0	<b>WOOD WORK</b>				
6.1	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).				
6.1.1	Second class teak wood	5.00	Cum	1,34,112.80	6,70,564.00
6.2	Providing and fixing panelled or panelled and glazed shutters for doors, windows and clerestory windows, fixing with butt hinges of required size with necessary screws, excluding panelling which will be paid for separately, all complete as per direction of Engineer-in-charge. (Note: 1. Butt hinges and necessary screws shall be paid separately. 2. The shutters are to be provided as per the Pattern/ drawing approved by the Engineer in Charge.)				
6.2.1	Second class teak wood				



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
6.2.1.1	50 mm thick shutters	15.00	Sqm	3,723.05	55,846.00
6.3	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured). Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick.				
6.3.1	Second class teak wood	15.00	Sqm	3,072.10	46,082.00
6.4	Providing and fixing ISI marked Factory made flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
6.4.1	35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	240.00	Sqm	2,776.65	6,66,396.00
6.5	Extra for providing vision panel not exceeding 0.1 sqm in all type of flush doors (cost of glass excluded) (overall area of door shutter to be measured):				
6.5.1	Rectangular or square	240.00	Sqm	193.80	46,512.00
6.6	Extra for cutting rebate in flush door shutters (Total area of the shutter to be measured).	150.00	Sqm	103.80	15,570.00
6.7	Providing and fixing Antique finished decorative brass Sliding Door bolts of size 450 x 16mm with necessary nuts and screws etc. complete as per direction of Engineer-in-Charge.	4.00	Each	4,501.75	18,007.00
6.8	Providing and fixing Antique finished decorative brass handles of required size with necessary screws etc. complete as per direction of Engineer-in-Charge. - 450mm x 20mm	16.00	Each	4,713.55	75,417.00
6.9	Providing and fixing bright finished brass tower bolts (barrel type) with necessary screws etc. complete :				
6.9.1	450x10 mm	8.00	Each	427.95	3,424.00
6.10	Providing and fixing bright finished brass hanging type floor door stopper (heavy type) with necessary screws, etc. complete as per direction of Engineer-in-Charge.	4.00	Each	117.90	472.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
6.11	Providing and fixing bright finished brass butt hinges with necessary screws etc. complete :				
6.11.1	125x85x5.5 mm (heavy type)	40.00	Each	256.20	10,248.00
6.12	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid door/window/Clerestory windows & other Frames/Chowkhat comprising of virgin PVC polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) fabricated with miter joints after applying PVC solvent cement and screwed with full body threaded star headed SS screws having minimum frame density of 750 kg/cum, screw withdrawal strength of 2200 N (Face) & 1100 N (Edge), minimum compressive strength of 58 N/mm <sup>2</sup> , modulus of elasticity 900 N/mm <sup>2</sup> and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixed in position with M.S hold fast/lugs/SS dash fasteners of required dia and length complete as per direction of Engineer-In- Charge. (M.S hold fast/lugs or SS dash fasteners shall be paid for separately).				
	Note: For WPC solid door/window frames, minus 5mm tolerance in dimensions i.e depth and width of profile shall be acceptable. Variation in profile dimensions on plus side shall be acceptable but no extra payment on this account shall be made.				
6.12.1	Frame size 50 x 100 mm	255.00	Metre	660.50	1,68,428.00
6.13	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid plain flush door shutter of required size comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) & 900 N (Edge), minimum compressive strength 50 N/mm <sup>2</sup> , modulus of elasticity 850 N/mm <sup>2</sup> and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixing with stainless steel butt hinges of				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In-Charge. (Note: stainless steel butt hinges and necessary S.S screws shall be paid separately)				
6.13.1	30 mm thick	95.00	Sqm	3,543.40	3,36,623.00
6.14	Providing and fixing IS : 12817 marked stainless steel butt hinges (heavy weight) with stainless steel screws etc. complete :				
6.14.1	100x60x2.50 mm	190.00	Each	83.05	15,780.00
6.15	Providing and fixing SS sliding door bolts (316 grade) of required finish from approved make with necessary SS screws etc. complete as per direction of Engineer-in-Charge.				
6.15.1	300x16 mm	120.00	Each	2,367.10	2,84,052.00
6.15.2	250x16 mm	20.00	Each	2,311.80	46,236.00
6.16	Providing and fixing SS tower bolts (316 grade) of required finish from approved make with necessary SS screws etc. complete as per direction of Engineer-in-Charge.				
6.16.1	250x10 mm	160.00	Each	744.75	1,19,160.00
6.16.2	150x10 mm	40.00	Each	606.35	24,254.00
6.17	Providing and fixing SS hanging floor door stopper (316 grade) of required finish from approved make with necessary screws etc. complete as per the direction of Engineer in charge : 125 mm				
6.17.1	Single rubber stopper	50.00	Each	294.85	14,743.00
6.17.2	Twin rubber stopper	90.00	Each	336.40	30,276.00
6.18	Providing and fixing SS Handles made of hollow pipe of 1.5mm thick (316 grade) of required finish and shape from approved make with necessary screws etc. complete as per the direction of Engineer in charge :				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
6.18.1	300 mm long x 19mm dia	224.00	Pair	1,765.00	3,95,360.00
6.18.2	150 mm long x 19mm dia	40.00	Pair	1,142.10	45,684.00
6.19	Providing and fixing aluminium die cast body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 35 kg and door width upto 700 mm), with necessary accessories and screws etc. complete.	120.00	Each	1,069.15	1,28,298.00
6.20	Providing and fixing of ISI marked medium duty hollow metal fire rated doors as per IS 3614: 2021, for 120 min integrity & 30 min. insulation made of pressed galvanized steel confirming to IS 277 with the following specification. Recommended fire door shall be tested as per IS 17518 (Part 1) : 2022 / ISO 3008-1: 2019 from CBRI/TBW/Exova lab and manufactured in ISO 9001: 2015 certified company for quality management. ISI labled fire door shall be provided with fire rated hardware and vision panel all as a complete assembly. Proper label confirming the type of door and the hourly rating is mandatory. The Door frame shall be step rebate grooved profile of size 125 x 75 mm made out of 1.20 mm minimum thick galvanized steel sheet. Frames shall be mitred and field assembled with self tabs. Frames shall have inbuilt grooved sealing system for taking fire rated seals. All provision should be mortised, drilled and tapped for receiving appropriate hardware. Frames should be provided with back plate bracket and anchor fasteners for installation on a finished plastered masonry/concrete wall opening. Frames shall be filled with fire rated puff . Door frame shall be finished with pure polyester powder coating (minimum thickness of 50 micron) and shall have passed minimum 500 hours of salt spray test. The Door leaf shall be of 60 mm thick fully flush double skin step design door, insulated with or without vision panel. Door leaf shall be manufactured from 1.2 mm minimum thick galvanised steel sheet. The internal construction of the door should be rigid reinforcement pads for receiving appropriate hardware. The infill material shall be 120 kg/m3 high density mineral wool insulation material. Intumescent seals 15 x 1.5 mm shall be provided. All doors shall be factory prepared for receiving appropriate hardware and provided with necessary reinforcement for hinges, locks,	200.00	Sqm	8,515.35	17,03,070.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	and door closers. The edges should be interlocked with a bending radius of 1.4mm. For pair of doors integrated astragals has to be provided on the meeting stile for both active and inactive leaf. Vision panel wherever applicable shall be maximum 200 x 300 mm (or max 0.06sq.mt) with clear borosilicate fire rated glass of minimum 6mm thickness. Glass shall be fixed with suitable gasket and with clip-on arrangement. Door Shutter shall be finished Pure Polyester Powder coating (minimum thickness of 50 micron) and shall have passed minimum 500 hours of salt spray test. All Fittings, Vision Glass to be paid separately.				
6.21	Providing and fixing Ball bearing butt hinge, SS 316 grade, of size 100 x 75 x 3mm with necessary accessories and screws etc. complete as per direction of Engineer-in-Charge.	340.00	Each	385.50	1,31,070.00
6.22	Providing & Fixing CE/UL certified Extruded aluminum body Heavy duty Fire Rated Door Closers (Make: DormaTS89, Hormann HDC35, Geze TS5000, Hafele DCL-97) with full body cover as per direction of Engineer-in-Charge. The Door Closers should be spring adjustable type 2-6, Non handed with back check. The door closer shall have 10 years mechanical warranty from the manufacturer and complies with EN 1154- for 50000 cycles + A1: 2002.	90.00	Each	11,870.20	10,68,318.00
6.23	Providing & Fixing Panic bar / latch (Two point or Double point) with vertical rod and top and bottom latch suitable for double doors or inactive leaf of door of make - Hafele - 903.10.625/ Dorma-PHCR/ Geze-8026302 or Hormann XDB5120SV all complete with screws etc. as per direction of Engineer-in-Charge.	90.00	Each	10,348.85	9,31,397.00
6.24	Providing & Fixing of S.S. Lever Handle of approved make and model with necessary accessories and screws etc. all complete as per direction of Engineer-in-Charge.	84.00	Each	6,165.30	5,17,885.00
6.25	Providing & Fixing Fire rated Gasket of 4mm x 13mm, Black colour Complete as per direction of Engineer-in-Charge.	90.00	Metre	315.60	28,404.00
6.26	Providing & Fixing Fire and smoke seal black colour, all complete as per direction of Engineer-in-Charge.	80.00	Metre	447.10	35,768.00



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
6.27	Providing & Fixing 6 mm thick Clear fire rated glass, 120min integrity, of size 200 x 300mm for Vision Panel in fire check door of approved make with necessary accessories and screws etc. complete as per direction of Engineer-in-Charge.	90.00	Nos.	2,557.45	2,30,171.00
6.28	Supply & fixing of 120 min fire rated, anchor fasteners of HILTI/ FISHER/ Equivalent of maximum 80mm length all complete as per the directions of Engineer-in-charge.	340.00	Each	91.40	31,076.00
6.29	Providing and fixing 25 mm thick shutters for cup board etc. :				
6.29.1	Panelled or panelled & glazed shutters:				
6.29.1.1	Second class teak wood including ISI marked anodised aluminium butt hinges with necessary screws	160.00	Sqm	4,058.20	6,49,312.00
6.30	Providing & Fixing Toilet Cubicle made up of 12mm thick compact board with standard height of 1995mm and 600mm door size width (Greenlam (Sturdo)/ Fundermax/ Merino make) made up of thermosetting resin treated high pressure, self-supporting decorative compact laminates with permanently incorporating anti-bacterial agents during manufacturing. Compact board should be Moisture resistant, Impact resistant, termite resistant, Scratch resistant, Weather and climatic shock resistant. Compact board should satisfy criteria of FSC and green guard gold certification. It should be manufactured under IS2046 and EN438-2&3:2005 standard and shall have resistance to water immersion through permissible increase on thickness and mass <0.60% and board density >1.35kg/cm <sup>3</sup> . Finish of compact laminates should be suede finish which includes door, pilasters and intermediate panels finished with approved texture/shades as per IS2046 and fulfilling the criteria of fire retardant under BS-476/97 and EN438-6 with classification of BS1D0 standard. Pilaster may be supported with SS (grade316) adjustable foot and intermediate panels will be attached to the wall with the help of approved SS (grade316) channels and all required hardware, made up of stainless steel as per manufacturer's specification. All required hardware (e.g. Door knob, gravity hinges, Thumb turn locksets with occupancy indicators, coat hooks with door stopper, U channel, top rail with corner connector, adjustable foot/pedestal, Rubber noise deafening tape, screw & wall plugs) shall be approved by Engineer-in-Charge. All screw will be of	35.00	each	38,995.05	13,64,827.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	304 grade in SS with stain finish. All pilasters are supported by SS bottom cladding. The base of the stainless-steel bottom cladding will be anchored to the floor with a clearance height upto 150 mm for European W/C whereas no clearance from floor shall be kept for Indian W/C.				
	<b>TOTAL WOOD WORK :</b>			<b>Rs.</b>	<b>99,08,730.00</b>
7.0	<b>STEEL WORK</b>				
7.1	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	2,760.00	Kg	108.50	2,99,460.00
7.2	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.				
7.2.1	Hot finished welded type tubes	1,960.00	Kg	169.50	3,32,220.00
7.3	Providing and fixing M.S. fan clamp type I or II of 16 mm dia M.S. bar, bent to shape with hooked ends in R.C.C. slabs or beams during laying, including painting the exposed portion of loop, all as per standard design complete.	30.00	Each	193.90	5,817.00
7.4	Providing and fixing circular/ Hexagonal cast iron or M.S. sheet box for ceiling fan clamp, of internal dia 140 mm, 73 mm height, top lid of 1.5 mm thick M.S. sheet with its top surface hacked for proper bonding, top lid shall be screwed into the cast iron/ M.S. sheet box by means of 3.3 mm dia round headed screws, one lock at the corners. Clamp shall be made of 12 mm dia M.S. bar bent to shape as per standard drawing.	170.00	Each	195.80	33,286.00
7.5	Providing and fixing mild steel round holding down bolts with nuts and washer plates complete.	300.00	Kg	90.10	27,030.00
7.6	Providing and fixing bolts including nuts and washers complete.	250.00	Kg	135.25	33,813.00
7.7	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	coat of approved steel primer using structural steel etc. as required.				
7.7.1	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	8,700.00	Kg	145.60	12,66,720.00
7.8	Providing and fixing carbon steel galvanised (minimum coating 5 micron) dash fastener of 10 mm dia double threaded 6.8 grade (yield strength 480 N/mm <sup>2</sup> ), counter sunk head, comprising of 10 mm dia polyamide PA 6 grade sleeve, including drilling of hole in frame , concrete/ masonry, etc. as per direction of Engineer-in-charge.				
7.8.1	10 x 140 mm	1,040.00	Each	151.40	1,57,456.00
7.9	Providing and fixing factory made stainless steel (Grade 316) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).	3,100.00	Kg	881.20	27,31,720.00
7.10	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.				
7.10.1	80x1.25 mm M.S. laths with 1.25 mm thick top cover	24.00	Sqm	3,396.60	81,518.00
7.11	Providing and fixing ball bearing for rolling shutters.	10.00	Each	488.40	4,884.00
7.12	Extra for providing grilled rolling shutters manufactured out of 8 mm dia M.S. bar instead of laths as per design approved by Engineer-in- charge, (area of grill to be	12.00	Sqm	747.50	8,970.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	measured).				
	<b>TOTAL STEEL WORK :</b>			<b>Rs.</b>	<b>49,82,894.00</b>
8.0	<b>FLOORING WORK</b>				
8.1	Providing and laying Heavy duty Floor Tiles of size approved by Engineer-in-charge (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joints with white cement and matching pigments etc., complete.	360.00	Sqm	1,272.85	4,58,226.00
8.2	Providing and fixing 18 mm thick gang saw cut, mirror polished, pre-moulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 Portland Pozzolana Cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing of edges to give high gloss finish etc. complete at all levels.				
8.2.1	Granite stone slab of colour black, Cherry/Ruby red				
8.2.1.1	Area of slab upto 0.50 sqm	20.00	Sqm	4,568.90	91,378.00
8.2.1.2	Area of slab over 0.50 sqm	240.00	Sqm	4,030.55	9,67,332.00
8.3	Extra for fixing marble /granite stone, over and above in Item No. 8.3, in <b>facia</b> and drops of width upto 150 mm with epoxy resin based adhesive, including cleaning etc. complete.	90.00	Metre	465.05	41,855.00
8.4	Extra for providing opening of required size & shape for wash basin/kitchen sink in kitchen platform, vanity counter and similar location in marble/ Granite/ stone work, including necessary holes for pillar taps etc. including moulding, rubbing and polishing of cut edges etc. complete.	75.00	Each	773.75	58,031.00
8.5	Providing and laying Anti-skid vitrified floor tiles of any size (as approved by engineer-in-charge) (thickness to be	510.00	Sqm	1,515.55	7,72,931.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	specified by the manufacturer) of 1st quality conforming to IS : 15622 of approved make in colours, shades, as approved by Engineer-in-charge laid on 20 mm thick cement mortar 1:4 (1 Portland Pozzolana Cement : 4 Coarse sand), including providing spacers of 3mm wide and grouting the joints of flooring tiles having joints of 3 mm width, using matching colour epoxy grout mix of 0.70 kg of organic coated filler of desired shade of approved make (0.10 kg of hardener and 0.20 kg of resin per kg), including filling / grouting and finishing complete as per direction of Engineer-in-charge. (For Toilets & Kitchen)				
8.6	Providing and laying Vitrified tiles in floor in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 Portland Pozzolana Cement : 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including providing spacers of 3mm wide and grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only . Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, levelling system and rubber mallet for placing the tiles gently and easily.				
8.6.1	Glazed vitrified floor tiles polished finish of size				
8.6.1.1	Size of Tile 600 x 1200 mm (Minimum Size)	2,175.00	Sqm	1,165.70	25,35,398.00
8.7	Providing and laying Leather finish Granite stone flooring in all colours in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 Portland Pozzolana cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing , curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge.				
8.7.1	Leather finish granite stone slab (For Ramps, Entry Steps, Staircase Tread in Single Piece)	980.00	Sqm	3,110.05	30,47,849.00



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
8.8	Providing and laying Polished Granite stone flooring in all colours in required design and patterns, in linear as well as curvilinear portions of the building and staircase treads with single piece granite stone including making 3 grooves parallel to the nosing all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 Portland Pozzolana cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge.				
8.8.1	Polished Granite stone slab of all colour.	2,110.00	Sqm	3,470.40	73,22,544.00
8.9	Providing and laying 18 mm thick Polished Granite stone in all colours in required design and patterns in staircase risers with single piece granite stone, in linear as well as curvilinear portions of the building over 12 mm thick bed of cement mortar 1:3 (1 Portland Pozzolana cement : 3 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade etc. all complete as per the architectural drawings and direction of the Engineer-in-Charge.				
8.9.1	Polished Granite stone slab of all colour.	210.00	Sqm	3,527.65	7,40,807.00
8.10	Providing edge moulding to 18 mm thick granite stone in all colours (Staircase steps), including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge.	1,040.00	Metre	406.75	4,23,020.00
8.11	Providing and laying cement concrete flooring of mix M-30 with ready mixed concrete from batching plant. The ready mixed concrete shall be laid and finished with screed board vibrator, vacuum dewatering process and finally finished by floating, brooming with wire brush etc. including curing, making provision for contraction / expansion, construction & longitudinal joints (10 mm wide x 40 mm deep) by groove cutting machine, providing and filling joints with approved joint filler and sealants, complete all as per direction of Engineer-in-charge (Item of groove cutting, joint fillers, sealants to be paid separately) complete as per specifications and directions of Engineer-in- charge. (The panel shuttering work shall be paid for separately).	360.00	Cum	7,981.50	28,73,340.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	<b>Note:-</b> 1) Cement content considered in this item is @ 350 kg/cum. 2) Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
8.12	Cutting of grooves of size 10mm wide and 40mm deep using stand-on groove cutting machine between the panels in both directions with perfect lines and grid as specified and directed and filling the grooves with sealing compound of approved make all complete, as per direction of Engineer-in-Charge.	4,470.00	Metre	167.65	7,49,396.00
8.13	Providing and laying 12 mm thick AC-4, grade laminate wooden flooring & skirting of having 2 mm thick direct laminate on top of specially developed substrate core (high density fibre board) of plank size as per manufacturer's specification having smart lock, joint tongue and groove construction i/c top of skirting should be sealed with 4mm thick teak wood lipping. The under layer has to be a 2 mm thick alkali resistant polyethylene sheet of density 30-32 kg. per cum on top to secure the floor. The work shall be carried out as per manufacturer's installation procedure and as per direction of Engineer-in-charge.	595.00	Sqm	2,095.50	12,46,823.00
	<b>TOTAL FLOORING WORK :</b>			<b>Rs.</b>	<b>2,13,28,930.00</b>
9.0	<b>ROOFING WORK</b>				
9.1	Providing and Fixing 15 mm thick densified tegular edged eco friendly light weight calcium silicate false ceiling tiles of approved texture of size 595 x 595 mm in true horizontal level, suspended on inter locking metal grid of hot dipped galvanised steel sections (galvanising @ 120 grams per sqm including both side) consisting of main 'T' runner suitably spaced at joints to get required length and of size 24x38 mm made from 0.33 mm thick (minimum) sheet, spaced 1200 mm centre to centre, and cross "T" of size 24x28 mm made out of 0.33 mm (Minimum) sheet, 1200 mm long spaced between main 'T' at 600 mm centre to centre to form a grid of 1200x600 mm and	2,810.00	Sqm	1,910.20	53,67,662.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	<p>secondary cross 'T' of length 600 mm and size 24 x28 mm made of 0.33 mm thick (Minimum) sheet to be inter locked at middle of the 1200x 600 mm panel to from grid of size 600x600 mm, resting on periphery walls /partitions on a Perimeter wall angle pre-coated steel of size(24x24X3000 mm made of 0.40 mm thick (minimum) sheet with the help of rawl plugs at 450 mm centre to centre with 25 mm long dry wall screws @ 230 mm interval and laying 15 mm thick densified edges calcium silicate ceiling tiles of approved texture in the grid, including, cutting/ making opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc., wherever required. Main 'T' runners to be suspended from ceiling using G.I. slotted cleats of size 25x35x1.6 mm fixed to ceiling with 12.5 mm dia and 50 mm long dash fasteners, 4 mm G.I. adjustable rods with galvanised steel level clips of size 85 x 30 x 0.8 mm, spaced at 1200 mm centre to centre along main 'T', bottom exposed with 24 mm of all Tsections shall be pre-painted with polyester baked paint, for all heights, as per specifications, drawings and as directed by Engineer-in-Charge.</p> <p>Note :- Only calcium silicate false ceiling area will be measured from wall to wall. No deduction shall be made for exposed frames/opening (cut outs) having area less than 0.30 sqm. The calcium silicate ceiling tile shall have NRC value of 0.50 (Minimum), light reflection &gt; 85%, non-combustible as per B.S. 476 part IV, 100% humidity resistance and also having thermal conductivity &lt;0.043 w/mK.</p>				
9.2	<p>Providing &amp; fixing false ceiling at all height including providing &amp; fixing of framework made of special section, power pressed from M.S. sheets and galvanised with zinc coating of 120 gms/ sqm (both side inclusive) as per IS : 277 and consisting of angle cleat of size 25mm wide x 1.6mm thick with flanges of 27mm and 37mm, at 1200mm c/c, one flange fixed to the ceiling with dash fastener 12.5mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25 x10 x0.50mm of required length with nuts &amp; bolts of required size and other end of angle hanger fixed with intermediate G.I channels 45 x15 x 0.90mm running at the spacing of 1200 mm c/c, to which the ceiling section 0.5mm thick bottom wedge of 80mm with tapered flanges of 26 mm each having lips</p>				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	of 10.5mm, at 450mm c/c, shall be fixed in a direction perpendicular to G.I intermediate channel with connecting clip made out of 2.64mm dia x 230mm long G.I wire at every junction, including fixing perimeter channels 0.50mm thick 27mm high having flanges of 20mm and 30mm long, the perimeter of ceiling fixed to wall/ partitions with the help of Rawl plugs at 450mm centre, with 25mm long dry wall screws @ 230mm interval, including fixing of Calcium Silicate Board to ceiling section and perimeter channels with the help of dry wall screws of size 3.5 x25mm at 230mm c/c, including jointing & finishing to a flush finish of tapered and square edges of the board with recommended jointing compounds, jointing tapes, finishing with jointing compounds in three layers covering up to 150mm on both sides of joints and two coats of primer suitable for boards, all as per manufacture's specification and also including the cost of making opening for light fittings, grills, diffusers, cut outs made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in charge but excluding the cost of painting with:				
9.2.1	8 mm thick Calcium Silicate Board made with Calcareous & Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process.	1,580.00	Sqm	1,458.30	23,04,114.00
9.3	Supply & Installation of U Baffle Aluminium panel ceiling of consisting of Wood finish panel size 50 mm width X 150 mm deep (0.6mm thick), panel length up to 4 metre, Coil Coated on a Continuous Paint Line, Double baked and roll formed from enamelled corrosion resistance Aluminium alloy AA 3005 (Al. Mg) for higher strength and good roll forming characteristics. Panels shall be clipped to a baked enamelled Aluminium carrier of 30 mm wide x 47 mm high x 0.5 mm thick, Black Colour coated, one leg of the carriers with cut outs to hold the panels in a module of 200 mm. Panel carrier shall be suspended by means of threaded rod of same make of panel ceiling at a distance of 1.8 metre c/c. Aluminium panels shall be achromatised for maximum bond between metal and paint enamelled twice under high temperature, Exposed side with a full primer and finish coat on a Continuous Paint Line. Ceiling area above U Baffle to be painted in black colour before fixing this system. The work shall be	150.00	Sqm	12,284.05	18,42,608.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	executed as per manufacturer's specifications, drawings and as directed by Engineer-in-Charge.				
9.4	Providing and fixing precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-Charge) of total coated thickness 0.50mm (base metal of minimum 0.45mm thickness with total coating thickness of 0.05mm) with zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x 55 mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces, excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.	1,050.00	Sqm	695.60	7,30,380.00
9.5	Providing and fixing precoated galvanised steel sheet roofing accessories of total coated thickness 0.50mm (base metal of minimum 0.45mm thickness with total coating thickness of 0.05mm) with Zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self drilling/ self tapping screws complete :				
9.5.1	Flashings/ Aprons.( Upto 600 mm)	230.00	Metre	463.80	1,06,674.00
9.5.2	Gutter (600 mm over all girth)	230.00	Metre	1,172.90	2,69,767.00
	<b>TOTAL ROOFING WORK:</b>			<b>Rs.</b>	<b>1,06,21,205.00</b>
10.0	<b>FINISHING WORK</b>				
10.1	Providing and applying 12 mm thick (average) premixed formulated one coat gypsum lightweight plaster having additives and light weight aggregates as vermiculite/ perlite respectively conforming to IS: 2547 (Part - 1 & II) 1976, applied on hacked / uneven background such as bare brick/ block/ RCC work on walls & ceiling at all floors and locations, finished in smooth line and level etc. complete.	12,140.00	Sqm	397.55	48,26,257.00



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
10.2	12 mm cement plaster of mix :				
10.2.1	1:6 (1 Portland Pozzolana Cement : 6 Coarse sand)	1,100.00	Sqm	256.85	2,82,535.00
10.3	15 mm cement plaster on the rough side of single or half brick wall of mix :				
10.3.1	1:6 (1 Portland Pozzolana Cement : 6 Coarse sand)	3,840.00	Sqm	295.20	11,33,568.00
10.4	12 mm cement plaster finished with a floating coat of neat cement of mix :				
10.4.1	1:3 (1 Portland Pozzolana Cement : 3 Coarse sand)	101.00	Sqm	336.25	33,961.00
10.5	6 mm cement plaster of mix including mixing of synthetic polyester triangular fibre of length 6mm, effective diameter 10-40 microns and specific gravity 1.34 to 1.40 in cement plaster / mortar by using 125 grams of synthetic polyester triangular fibre for 50 kgs cement used in cement mortar as per direction of Engineer-in-charge.:				
10.5.1	1:3 (1 Portland Pozzolana Cement : 3 fine sand)	460.00	Sqm	236.80	1,08,928.00
10.6	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface : Note: 1. This item to be operated wherever cement based water proof wall putty is not applied. 2. No plastering and painting is to be done wherever false ceiling is provided. Only priming coat shall be applied. Water thinnable cement primer	5,100.00	Sqm	59.85	3,05,235.00
10.7	Finishing walls with water proofing cement paint of required shade :				
10.7.1	New work (Two or more coats applied @ 3.84 kg/10 sqm)	2,340.00	Sqm	107.75	2,52,135.00
10.8	Providing & Applying high quality acrylic modified resin based texture of Dholpur/Red sand stone Pattern Textured finish of required shade and colour by creating "big lines"/"Jumbo lines" of required pattern by scratching with trowel or any other method approved by engineer-in charge with anti algae and UV resistance properties to be applied as intermediate finish in desired pattern @ 43.04 kgs/10 sqm to form film of 1- 1.5 mm thickness after scrapping and properly cleaning the surface to remove loose particles from the plaster surface, followed by top coating with Premium Acrylic Smooth exterior paint with Silicone additives of required shade by two or more	910.00	Sqm	382.50	3,48,075.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	coats @ 1.43 litres/10 sqm, complete as the direction of Engineer-in Charge. No wall putty shall be measured and paid wherever this item is operated.				
10.9	Finishing walls with Premium Acrylic Smooth exterior paint having low VOC (Volatile Organic Compound) content with Silicone additives of required shade				
10.9.1	New work (Two or more coats applied @ 1.43 ltr/10 sqm over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm)	1,400.00	Sqm	127.35	1,78,290.00
10.10	Painting with synthetic enamel paint having low VOC (Volatile Organic Compound) content of approved brand and manufacture to give an even shade:				
10.10.1	Two or more coats on new work (Steel Work)	1,920.00	Sqm	122.15	2,34,528.00
10.11	Wall painting with premium quality, washable emulsion paint VOC (Volatile Organic Compound) content less than 50 grams/litre with a best mid sheen luxury finish of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.				
10.11.1	Two or more coats on new work	12,870.00	Sqm	107.90	13,88,673.00
10.12	Providing and fixing Chicken wire mesh of 28G x 12.5mm hexagonal mesh in junctions of Columns/beams and walls & at all locations of conduits, pipes etc, for all floors and heights etc. including fixing with U-nails 150mm center to center before plastering as per the direction of Engineer in charge.	400.00	Sqm	137.90	55,160.00
10.13	Extra for plastering exterior walls of height more than 10 m from ground level for every additional height of 3 m or part thereof.	1,900.00	Sqm	71.75	1,36,325.00
10.14	Extra for plastering on circular work not exceeding 6 m in radius:				
10.14.1	In one coat	100.00	Sqm	36.75	3,675.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
10.15	Extra for plastering done on moulding, cornices or architraves including neat finish to line and level:				
10.15.1	In one coat	40.00	Sqm	540.25	21,610.00
10.16	18 mm thick plain cement mortar band in cement mortar 1:4 (1 Portland Pozzolana Cement : 4 fine sand):				
10.16.1	Raised Band	3,600.00	Cm per Mtr.	8.75	31,500.00
10.17	Applying priming coat:				
10.17.1	With ready mixed pink or Grey primer having low VOC (Volatile Organic Compound) content of approved brand and manufacture on wood work (hard and soft wood)	231.00	Sqm	60.05	13,872.00
10.18	Painting with synthetic enamel paint having low VOC (Volatile Organic Compound) content of approved brand and manufacture of required colour to give an even shade :				
10.18.1	One or more coats on old work	330.00	Sqm	80.50	26,565.00
10.19	Finishing walls with Acrylic Smooth exterior paint having low VOC (Volatile Organic Compound) content of required shade :				
10.19.1	Old work (One or more coat applied @ 0.90 ltr/10 sqm).	1,060.00	Sqm	66.60	70,596.00
10.20	Polishing in high gloss/matt finish melamine clear polish on wood work in required color/wooden shade texture with following process in the sequence as detailed below: 1. The surface to be polished is rubbed with sand paper 80/120 no. and then with sand paper of 160/180 nos. 2. Applying two coats of sealer with spray gun and allowing sufficient drying time for 1st coat and 2nd coat is allowed to dry for 8 to 12 hrs. 3. On drying of sealer coat, wet rubbing with emery cloth of finer grading with ample water to remove excess sealer layer and make the surface further smooth after this wet rubbing, then surface is applied with special grade melamine fillers to fill all the small and big holes/grooves etc. Filler coat to be allowed to dry for 4 to 6 hrs on which again a light wet rubbing is done this surface is further allowed to dry for 12 hrs. 4. On this, 1st coat of melamine polish is applied with spray gun using melamine clear polish and melamine thinner in required proportion. This 1st coat is allowed to dry	650.00	Sqm	2,741.80	17,82,170.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	for 24 hrs then this dry surface is again fine wet rubbed smooth, which is further allowed to dry for 12 hrs. The final melamine polish is applied with compressor pressure spray gun using melamine clear polish and melamine thinner mixed in required proportion complete as per direction of Engineer-in-Charge. (Final coat to be done in 1 or 2 layers without gap of time.)				
	<b>TOTAL FINISHING WORK :</b>			<b>Rs.</b>	<b>1,12,33,658.00</b>
11.0	<b>PILE WORK</b>				
11.1	Boring, providing and installation bored cast-in-situ reinforced cement concrete piles of grade <b>M-30</b> of specified diameter and length below the pile cap, to carry a safe working load not less than specified, excluding the cost of steel reinforcement but including the cost of boring with bentonite solution and temporary casing of appropriate length for setting out and removal of same and the length of the pile to be embedded in the pile cap etc. by percussion drilling using Direct mud circulation (DMC) or Bailer and chisel technique by tripod and mechanical Winch Machine all complete, including removal of excavated earth with all its lifts and leads (length of pile for payment shall be measured up to bottom of pile cap).				
11.1.1	750 mm dia piles	5,700.00	Metre	4,337.15	2,47,21,755.00
11.2	Vertical load testing of piles in accordance with IS 2911 (Part IV) including installation of loading platform by Kentledge/Anchor piles method and preparation of pile head or construction of test cap and dismantling of test cap after test etc. complete as per specification & the direction of Engineer in-charge. Note: 1. Initial and Routine Load Test shall not be carried out by Dynamic method of testing. Note: 2. Testing agency shall submit the design of loading platform for the approval of Engineer-in-charge.				
11.2.1	Single pile above 50 tonne Safe capacity				
11.2.1.1	Initial Test (Upto Failure Load)	2.00	Per Test	1,10,742.05	2,21,484.00
11.2.1.2	Routine Test (Test Load 1.5 times the Safe capacity)	7.00	Per Test	83,056.55	5,81,396.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
11.3	Lateral load testing of single pile in accordance with IS Code of practice IS : 2911 (Part IV) for determining safe allowable lateral load on pile :				
11.3.1	Upto 50 tonne capacity pile	2.00	Per Test	38,759.70	77,519.00
11.4	Integrity testing of Pile using Low Strain/ Sonic Integrity Test/ Sonic Echo Test method in accordance with IS 14893 including surface preparation of pile top by removing soil, mud, dust & chipping lean concrete lumps etc. and use of computerised equipment and high skill trained personal for conducting the test & submission of results, all complete as per direction of Engineer-in-charge. <b>Note:</b> The inclusion of the above item in the schedule of work shall be judiciously decided by the technical sanctioning authority, keeping in view the quality control, type of soil strata & importance of the project.	327.00	Per Test	1,107.40	3,62,120.00
	<b>TOTAL PILE WORK :</b>			<b>Rs.</b>	<b>2,59,64,274.00</b>
12.0	<b>WATER PROOFING WORK :</b>				
12.1	Suppling, applying, and installation of pre-applied waterproofing membrane of minimum 1.5 mm thick (with bare HDPE membrane thickness of 1.0 mm or more) flexible sheets for waterproofing treatment below horizontal surface of foundations or underground structures exposed to soil (e.g. grade slab, raft, footing, lift pit base, UG tank, etc.). The Membrane shall confirm to following properties (minimum)- i) Puncture resistance of >1000N as per ASTM E 154, ii) Tensile strength of > 25 Mpa as per ASTM D 412, iii) Resistance to hydrostatic head of >70m ss per ASTM D 5385, iv) Elongation of >500% as per ASTM D 412, v) Peel adhesion to concrete of >900 N/m as per ASTM D 903. vi) Joint strength in shear: 15000 N/m $\pm$ 10% The pre-applied, fully bonded HDPE sheet membrane shall be loosely laid on PCC. The fully bonded HDPE sheet membrane shall consist of a high-performance PE film, self-adhesive polymer layer and unique particulate layer with pressure sensitive adhesive, which bonds fully to the poured	3,510.00	Sqm	971.75	34,10,843.00



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	concrete above it. The membrane shall have minimum of 75mm side laps and end laps which shall be sealed with double sided adhesive tape. Third party test report from NABL accredited approved laboratory along with MTC of product should be submitted. Test report should not be older than 5 years. All detailing components of the system has to be compatible with the proposed waterproofing membrane and has to be manufactured and supplied by the manufacturer of waterproofing membrane. The system shall be installed as per manufacturer's specification and executed by manufacturer's certified applicators (in house team) after successful mock-up at site etc. (The product performance shall carry guarantee for 10 years against any leakage.)				
12.2	<p>Supplying and installing post applied SBS based self-adhesive waterproofing membrane having minimum thickness of 1.5 mm on vertical sides of foundation system or underground structures (e.g. lift pit walls, retaining walls, walls in continuation with the foundations, basement wall, UG tank etc.). The membrane shall be topped with HDPE cross laminated film. The installation involves cleaning the surface, priming the surface with cold applied bituminous primer@4-6 sqm. /litre, properly sealing the joints &amp; maintaining 75 mm overlap between the membrane selvedge &amp; 100 mm overlap on the end joints of the membrane over the slab etc. complete.</p> <p>The self-adhesive membrane shall have following minimum properties:            (i)Tensile strength (ASTM D 412): &gt; 4 N/mm<sup>2</sup>,            (ii) Resistance to Hydrostatic Head (ASTM D 5385) : &gt; 6 bar,            (iii) Tear Resistance (ASTM D 4073) : &gt; 30 N/mm<sup>2</sup>, Longitudinal 165 N and transfer 135.            (iv) Puncture Resistance (ASTM E 154) : &gt; 220 N/mm<sup>2</sup>,            (v) Lap adhesion (ASTM D 1876) : &gt; 2000 N/mm.            vi) Peel adhesion to prime surface (ASTM D1000): 3N/mm.            vii) elongation (ASTM D412: min. 200%</p>	1,070.00	Sqm	1,320.60	14,13,042.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	The membrane shall be protected by spot bonding 7-8mm thick dimpled HDPE protection board, spot bonded onto the self-adhesive membrane with liquid mastic which shall be applied prior to backfilling. The backfilling shall be done within 2-3 days of fixing protection board. Third party test report from NABL accredited approved laboratory along with MTC should be submitted. Test report should not be older than 5 years. All detailing components of the system has to be compatible with the proposed waterproofing membrane and has to be manufactured and supplied by the manufacturer of waterproofing membrane. The system shall be installed as per manufacturer's specification and executed by manufacturer's certified applicators (in house team) after successful mock-up at site etc. (The product performance shall carry guarantee for 10 years against any leakage.)				
12.3	Water proofing on Terrace with insulation work consisting of following: A) (Surface Preparation): Mechanically grinding of substrate so as to achieve surface free of dust, loose particles. All cracks to be treated by cutting a groove and sealing cracks with prepack Polymer modified cement mortar having min. strength of 40 MPA. Making coving with 1:3 cement mortar modified with 10% SBR polymer. Providing and laying reinforcing mesh on all horizontal and vertical members of termination points and cracks. B) (Waterproofing Membrane): Supplying and installing spray/ roller applied a high performance, low odour, one-part, fast curing, high solids, cold applied polyurethane elastomer waterproof membrane over uniform surface. The material shall be pure polyurethane with DFT of 1.5mm and consumption of 2.2 - 2.4 Kg/Sqm. It should not contain bitumen or tar and should not bleed or stain and should have following minimum properties:i) Solid % Vol: > 85ii) Tensile Strength > 2 Mpa iii) Elongation > 500%iv) Tear Strength > 12 N/mmshall be applied as per manufacturer specification. C) SPRAY APPLIED INSULATION (PUF): Providing, supplying, and applying instant setting spray applied two component Rigid Polyurethane Foam (PUF) Insulation average 50mm thick on the terrace having density 45-50 kg/m <sup>3</sup> , Thermal conductivity 0.020-0.030 W/mK, closed cell content of >90%, Fire resistance conforming to Class - B2. It shall be applied as per the	1,400.00	Sqm	5,394.50	75,52,300.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	<p>manufacturer's recommendations applied over the RCC slab and on the vertical surfaces on the parapet walls upto 300mm above FFL, etc. complete.</p> <p>D) PU Sealer coat over PUF: Supplying and installing spray/ roller applied a high performance, low odour, one-part, fast curing, high solids, cold applied polyurethane elastomer waterproof membrane over uniform surface. The material shall be pure polyurethane with consumption of 1.5 Kg/Sqm. It should not contain bitumen or tar and should not bleed or stain and should have following minimum properties:</p> <p>i) Solid % Vol: &gt; 85</p> <p>ii) Tensile Strength &gt; 2 Mpa minimum</p> <p>iii) Elongation &gt; 500%</p> <p>iv) Tear Strength &gt; 12 N/mm</p> <p>shall be applied as per manufacturer specification.</p> <p>v) Crack bridging ability not less than 2 mm ASTM C836-95</p>				
	<p>E) Protection Geotextile Membrane: Providing and laying geotextile membrane of 200 GSM as a separation layer. Geotextile membrane shall be overlapped by 50mm and spot bonded.</p> <p>F) Protection screed: Providing &amp; laying average 100mm protective screed of M20 grade with slope 1:100 containing 100% virgin polypropylene fibres @ 0.9 Kg per Cum with a broom finish, well compacted, curing for 7 days etc. complete. The screed shall be laid in panels with 10mm wide construction joint and filling the panel joints with PU Sealant. (The product performance shall carry guarantee for 10 years against any leakage.)</p>				
12.4	<p>Providing and installing the waterproofing treatment over the slab (having earth filling). It includes the following components and stages.</p> <p>1.Surface Preparation: it involves mechanically grinding of substrate so as to achieve a flat and smooth surface free of dust, loose particles. All cracks shall be treated by cutting a groove and sealing cracks with Polymer modified cement mortar. It also includes additionally applying a coat of PU membrane followed by bonding a reinforcement mesh to the substrate with PU membrane. Coving shall be made with 1:3 cement mortar modified with 10% SBR polymer. Reinforcing mesh on all horizontal and vertical members of termination points and cracks shall be provided and applied.</p>	1,900.00	Sqm	3,376.25	64,14,875.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	Such geotextile shall be adhered to substrate with waterproofing membrane.				
	<p>2. Supplying and installation of waterproofing membrane: It involves supplying and installing spray applied two component, 100% solids, instant setting polyurea waterproofing membrane suitable for waterproofing over suitable primer to entire surface. The material shall be applied with DFT of 1.5mm and consumption of 1.6 Kg/Sqm.</p> <p>It should not contain bitumen or tar and should not bleed or stain and should have following minimum properties:</p> <p>i) Solid % Vol: &gt; 100;</p> <p>ii) Tensile Strength &gt;12 Mpa;</p> <p>iii) Elongation &gt; 450 %;</p> <p>iv) Tear Strength &gt; 50 N/mm.</p> <p>v) Dynamic crack bridging ability not less than 0.5-3.2 mm ASTM C1305-08</p>				
	3. Laying of Protection Geotextile Membrane: It includes providing and laying geotextile membrane of 200 GSM as a separation layer. Geotextile membrane shall be overlapped by 50mm and spot bonded.				
	4. Providing & Laying of Protection screed: It includes providing and laying protective screed of M20 grade with slope 1:100 with a broom finish, well compacted, including curing etc. complete.				
	5. Dimple board with geotextile for Landscape area: It includes providing and installation of Rolled Matrix Soil Filter cum surface drainage System as per manufacturers specifications. Polypropylene geotextile laminated dimpled board having minimum 10mm thickness, of compressive strength not less than 400kN/m <sup>2</sup> shall be used. This geotextile fabric composite allows passage of moisture through fabric while preventing fine soil from entering to drainage channel bonded to a high strength polypropylene geotextile fabric. This geotextile fabric composite allows passage of moisture through fabric while preventing fine soil from entering to drainage channel. (The product performance shall carry guarantee for 10 years against any leakage.)				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
12.5	<p>Water proofing treatment to vertical and horizontal surfaces in all internal wet areas of building (e.g. Toilets/Kitchens/AHU/balconies etc.) shall be done with two-component, high elasticity acrylic modified cementitious coating system made from best quality Portland cement, properly selected &amp; graded aggregates additives &amp; acrylic emulsion polymer as a binder. The product consumption shall be at least @ 2kg/sqm. The coating system must have the following characteristics:</p> <p>i) Tensile strength &gt;1 Mpa  ii) Bond Strength with concrete &gt; 1 Mpa,  iii) Elongation &gt; 175%  iv) Crack bridging ability not less than 1.5 mm.  v) Shore A hardness 79 ASTM D 2240:2010 and shall be applied as per manufacturer specification. The coating shall be continued to the entire horizontal area and should be terminated at 300mm above the floor finish level complete as per manufacturer's specification. The coating shall be followed by providing and applying 15 mm thick Protective mortar of (1 Cement: 4 Coarse Sand) mixed with integral waterproofing compound of approved make as per manufacturer's specifications. All systems shall be installed by authorized applicators (in house team of manufacturer) as per manufacturer's recommendations and includes all lead and lift for all materials and labor complete. (The product performance shall carry guarantee for 10 years against any leakage.)</p>	510.00	Sqm	791.10	4,03,461.00
12.6	<p>Providing and mixing integral crystalline admixture for water proofing treatment to RCC structures like basement raft, retaining walls, reservoir, sewage &amp; water treatment plant, tunnels / subway and bridge deck etc. at the time of transporting of concrete into the drum of the ready-mix truck , using integral crystalline admixture @0.80% (minimum) to the weight of cement content per cubic meter of concrete) or higher as recommended by the manufacturer's specification in reinforced cement concrete at site of work. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90%, compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure. The crystalline admixture shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all</p>	13,590.00	Kg	297.10	40,37,589.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	complete as per specification and the direction of the Engineer-in-charge. (The product performance shall carry guarantee for 10 years against any leakage).				
12.7	Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels / subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. (The product performance shall carry guarantee for 10 years against any leakage.)				
12.7.1	For vertical surface two coats @ 0.70 kg per sqm	380.00	Sqm	783.00	2,97,540.00
12.7.2	For horizontal surface one coat @1.10 kg per sqm.	150.00	Sqm	482.45	72,368.00
12.8	Providing and placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete as per direction of engineer in charge.				
12.8.1	Serrated with central bulb (225 mm wide, 8-11 mm thick)	950.00	Metre	346.05	3,28,748.00
<b>TOTAL WATER PROOFING WORK :</b>				<b>Rs.</b>	<b>2,39,30,766.00</b>



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
13.0	<b>STRUCTURAL GLAZING</b>				
13.1	<p>Designing, fabricating, testing, protection, installing and fixing in position semi (grid) unitized system of structural glazing (with open joints) for linear as well as curvilinear portions of the building for all heights and all levels, including:</p> <p>(a) Structural analysis &amp; design and preparation of shop drawings for the specified design loads conforming to IS 875 part III (the system must passed the proof test at 1.5 times design wind pressure without any failure), including functional design of the aluminum sections for fixing glazing panels of various thicknesses, aluminium cleats, sleeves and splice plates etc. gaskets, screws, toggles, nuts, bolts, clamps etc., structural and weather silicone sealants, flashings, fire stop (barrier)-cum-smoke seals, microwave cured EPDM gaskets for water tightness, pressure equalisation &amp; drainage and protection against fire hazard including:</p> <p>(b) Fabricating and supplying serrated M.S. hot dip galvanised / Aluminium alloy of 6005 T5 brackets of required sizes, sections and profiles etc.</p> <p>to accommodate 3 Dimensional movement for achieving perfect verticality and fixing structural glazing system rigidly to the RCC/ masonry/structural steel framework of building structure using stainless steel anchor fasteners/ bolts, nylon seperator to prevent bimetallic contacts with nuts and washers etc. of stainless steel grade 316, of the required capacity and in required numbers.</p> <p>(c) Providing and filling, two part pump filled, structural silicone sealant and one part weather silicone sealant compatible with the structural silicone sealant of required bite size in a clean and controlled factory / work shop environment, including double sided spacer tape, setting blocks and backer rod, all of approved grade, brand and manufacture, as per the approved sealant design, within and all around the perimeter for holding glass.</p> <p>(d) Providing and fixing in position flashings of solid aluminium sheet 1 mm thick and of sizes, shapes and profiles, as required as per the site conditions, to seal the gap between the building structure and all its interfaces with curtain glazing to make it watertight.</p>	510.00	Sqm	4025.75	20,53,133.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	<p>(e) Making provision for drainage of moisture/ water that enters the curtain glazing system to make it watertight, by incorporating principles of pressure equalization, providing suitable gutter profiles at bottom (if required), making necessary holes of required sizes and of required numbers etc. complete. This item includes cost of all inputs of designing, labour for fabricating and installation of aluminium grid, installation of glazed units, T&amp;P, scaffolding and other incidental charges including wastages etc., enabling temporary structures and services, cranes or cradles etc. as described above and as specified. The item includes the cost of getting all the structural and functional design including shop drawings checked by a structural designer, dully approved by Engineer-in-charge. The item also includes the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working structural glazing as specified, cleaning and protection till the handing over of the building for occupation. In the end, the Contractor shall provide a water tight structural glazing having all the performance characteristics etc. all complete as required, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge.</p> <p><b>Note:- 1.</b> The cost of providing extruded aluminium frames, shadow boxes, extruded aluminium section capping for fixing in the grooves of the curtain glazing and vermin proof stainless steel wire mesh shall be paid for separately under relevant items under this sub- head. However, for the purpose of payment, only the actual area of structural glazing (including width of grooves) on the external face shall be measured in sqm. up to two decimal places.</p> <p><b>Note:-2.</b> The following performance test are to be conducted on structural glazing system if area of structural glazing exceeds 2500 Sqm from the certified laboratories accredited by NABL(National Accreditation Board for Testing and Calibration Laboratories), Department of Science &amp; Technologies, India. Cost of testing is payable separately.</p> <p>1. Performance Laboratory Test for Air Leakage Test (-50pa to - 300pa) &amp; (+50pa to +300pa) as per ASTM E-283-04 testing method for a range of testing limit 1 to 200</p>				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	mVhr.2. Static Water Penetration Test. (50pa to 1500pa) as per ASTM E- 331-09 testing method for a range up to 2000 ml.3. Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range upto 2000 ml.4. Structural Performance Deflection and deformation by static air pressure test (1.5 times design wind pressure without any failure) as per ASTM E-330-10 testing method for a range upto 50 mm5. Seismic Movement Test (upto 30 mm) as per AAMA 501.4-09 testing method for Qualitative test, Tests to be conducted on site.6. Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ml				
13.2	<p>Providing, assembling and supplying vision glass panels (IGUs) comprising of hermetically-sealed 6-12-6 mm insulated glass (double glazed) vision panel units of size and shape as required and specified, comprising of an outer heat strengthened float glass 6mm thick, of approved colour and shade with reflective soft coating on surface # 2 of approved colour and shade, an inner Heat strengthened clear float glass 6mm thick, spacer tube 12mm wide, dessicants, including primary seal and secondary seal (structural silicone sealant) etc. all complete for the required performances, as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer-in-Charge. The IGUs shall be assembled in the factory/ workshop of the glass processor. (Payment for fixing of IGU Panels in the curtain glazing is included in cost of item No.25.2) For payment, only the actual area of glass on face # 1 of the glass panels (excluding the areas of the grooves and weather silicone sealant) provided and fixed in position, shall be measured in sqm.</p> <p>(i) Coloured tinted float glass 6mm thick substrate with reflective soft coating on face # 2, + 12mm Airgap + 6mm Heat Strengthened clear Glass of approved make having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25- 0.28) and U value of 3.0 to 3.3 W/m<sup>2</sup> degree K etc. The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.</p>	510.00	Sqm	5,176.55	26,40,041.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
13.3	Extra for openable side / top hung vision glass panels (IGUs) including providing and supplying at site all accessories and hardwares for the openable panels as specified and of the approved make such as heavy duty stainless steel friction hinges, min 4 -point cremone locking sets with stainless steel plates, handles, buffers etc. including necessary stainless steel screws/ fasteners, nuts, bolts, washers etc. all complete as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer-in-Charge.	12.00	Sqm	3,665.35	43,984.00
13.4	Providing, fabricating and supplying shadow box of required size and shape, for fixing in the spandrel portion of the structural glazing, in linear as well as curvilinear portions of the building by providing semi -rigid, inorganic, non-combustible fibre glass wool insulation 50 mm thick, conforming to IS: 8183 and BS: 3958 Part 5. The insulation layer shall have facing (factory bonded on surface # 1 of the fibre glass insulation layer), of black non-woven fibre glass tissue of nominal thickness 0.5 mm and nominal mass not less than 60 gm /sqm, made of randomly oriented glass fibres distributed in a binder by a wet-lay process including fixing 1.5 mm thick solid aluminum sheet backing using, 6 mm thick cement board including SS rivets, nuts, bolts, washers etc complete.	24.00	Sqm	2,171.00	52,104.00
13.5	Providing and supplying Spandrel Glass Panels comprising of 6 mm thick heat strengthened monolithic float glass of approved colour and shade with reflective soft coating on surface # 2 of approved colour and shade so as to match the colour and shade of the IGUs in the vision panels etc. ,all complete for the required performances as specified, as per the Architectural drawings, as per the approved shop drawings, as specified, and as directed by the Engineer- in- Charge. For payment, only the actual area of glass on face # 1 of the glass panels (but excluding the area of grooves and weather silicone sealant) provided and fixed in position, shall be measured in sqm. (Payment for fixing of Spandrel Glass Panels in the curtain glazing is included in cost of relevent Item*).“(i) Coloured tinted float glass 6 mm thick substrate with reflective soft coating on face # 2, having properties as visible Light transmittance	24.00	Sqm	2,477.70	59,465.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	(VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25- 0.28) and U value of 3.0 to 3.3 W/m <sup>2</sup> K etc. . The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.				
	<b>TOTAL STRUCTURAL GLAZING WORK :</b>			<b>Rs.</b>	<b>48,48,727.00</b>
14.0	<b>ALUMINIUM WORKS</b>				
14.1	Providing and fixing factory made Alloy Aluminium Sliding and Fixed Windows, Sliding Doors, Ventilators etc. with DGU as per drawings using extruded built-up sections of Aluminium Alloy grade 6063 T6, design confirming to IS:1948-1961 and Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron as per IS: 138731-1993), multi-chambered frame, sash and mullion/coupler (where ever required) extruded profiles of required shape & size as per approved drawing, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / panelling, C.P. brass / stainless steel screws. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of approved size and quality, all complete as per architectural drawings and the directions of Engineer-in-charge. (The Rate are inclusive with all required hardware / Fitting & Fixture all complete, only DGU will be paid for separately)				
	Note: Structural design proof checked from a Government Engineering Institute, to be provided by the manufacturer for basic wind speed > 45 m/sec as per IS 875 – Part 3.				
14.1.1	Two track two panels sliding window with channel for roller track, wool pile, nylon rollers with SS 316 body as per approved drawing.				
14.1.1.1	For fixed portion	750.00	Kg	618.10	4,63,575.00
14.1.1.2	For shutters of doors, windows & ventilators	1,290.00	Kg	747.90	9,64,791.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
14.2	Providing and fixing double glazed hermetically sealed glazing in aluminium windows, ventilators and partition etc. with 6 mm thick toughened glass both side, having 12 mm air gap, including providing EPDM gasket, perforated aluminium spacers, desiccants, sealant (Both primary and secondary sealant) etc. as per specifications, drawings and direction of Engineer-in-charge complete.	270.00	Sqm	4,286.85	11,57,450.00
14.3	Providing and fixing Semi black out Roller Blinds for windows, polyester blends along with sturdy hanging system to ensure their long-lasting perfection, along with user-friendly plastic pull-down chain for easy usability, with necessary installation brackets and mounting hardware etc. all complete as per direction of Engineer-in-charge. (Make, design and shade of roller blinds shall be approved by the Engineer-in-Charge.)	245.00	Sqm	2,034.35	4,98,416.00
14.4	Providing and fixing S.S. grills (316 grade) of required pattern for windows etc. with flats, square or round bars etc., fixed to window openings with necessary arrangements like screws etc., all complete as per design and pattern approved by Engineer-in-charge.	2,040.00	Kg	1,184.00	24,15,360.00
14.5	Providing and fixing 12mm thick frameless toughened glass door shutter of approved brand and manufacture, including providing and fixing top & bottom pivot & double acting hydraulic floor spring type fixing arrangement and making necessary holes etc. for fixing required door fittings, all complete as per direction of Engineer in charge (Door handle, lock and stopper etc. to be paid separately)	15.00	Sqm	8,008.05	1,20,121.00
14.6	Providing and fixing floor spring with adjustable spring strength Size EN 1 - 4, closing speed with standard spindle and cover plate featuring hydraulically fully controlled closing cycle and backcheck, including upto box and adjustable closing speed from 175°, Hold open at 90°, Conforming to EN 1154 and CE marked. Durability: 500,000 Cycles, Finish: Satin stainless steel etc. complete as per the direction of Engineer-in-charge.	2.00	Each	10,029.10	20,058.00



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
14.7	Providing and fixing mortice lock ( Glasklar lock package 98412302 of approved make) for glass doors shutters including necessary cutting and making good etc. all complete as per the direction of Engineer-in-charge.	2.00	Each	7,911.10	15,822.00
	<b>TOTAL ALUMINIUM WORKS :</b>			<b>Rs.</b>	<b>56,55,593.00</b>
15.0	<b>MISCELLANEOUS ITEMS</b>				
15.1	Providing and wet drilling accurate and clean holes of specified diameter in RCC walls, slabs, beam or any other RCC member without vibration by core cutting (diamond drilling) machine of approved make for laying service lines including scaffolding, safety majors, disposing the debris, cleaning, making good, providing epoxy mortar/ micro concrete/ ready mix polymer modified patch repair mortar/ Non shrink grout for concrete for grouting the gaps around the pipes for all levels/ all height, after approval of engineer in charge etc compete. Measurement shall be taken for the depth of holes in running meter for specified diameter. Holes shall made by authorized approved agency. Scanning of reinforcement shall be carried out before core cutting if required and as suggested by Engineer in charge. Location of core cutting shall be approved by Engineer in charge.				
15.1.1	Upto 75mm dia	3.00	Metre	1,933.40	5,800.00
15.1.2	75mm to 100mm dia	6.00	Metre	2,164.05	12,984.00
15.1.3	100mm to 150mm dia	8.00	Metre	2,671.65	21,373.00
15.1.4	150mm to 200mm dia	4.00	Metre	3,779.10	15,116.00
15.2	Providing and fixing multi walled transparent/opaque 10 mm thick polycarbonate sheet of required colour blue, brown or green etc. UV co-extruded and having UV coating on one side multi walled sheet of weight not less than 1.60 to 2.05 kg/sqm as approved by Engineer-in-charge. The light transmission from transparent or translucent or opaque polycarbonate sheet varies from 30 to 80% and shall be decided by engineer-in charge as per requirement. The panel shall satisfy the Dart drop impact test for value above 15 and upto 60 Joules and confirm either flame retardancy of class UL-94HB/94V-0 category as per IS 14434:2023 or category V0 & HB as per ASTM D635-18 or BS1D0 classification as				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	per EN13501 for fire safety. The yellowness index tested as per ASTM E313 (D1925) shall be less than or equal to 2 it shall be 1 unit as per ASTM D 2244 at the time of installation an shall be less than or equal to 10 as per ASTM E313 (D 1925) or 6 units as per ASTM D 2244 on a sample after 5000 hours of exposure of UV/sunlight. The multi walled poly carbonate sheet shall be fixed on tubular steel structure with aluminium Alcox section of size 60x18x2 mm (anodized 25 microns thick) and weight not less than 0.462 kg/m. Weather proof Neoprene/ EPDM rubber gasket shall be fixed on both side of joints to make the whole structure water tight as per approved design/drawings. The aluminium section shall be fixed on Joints at both sides (top & bottom) of polycarbonate sheet to hold the sheets rigidly together. The weather proof neoprene gasket and aluminum profile shall be fixed and sealed with silicon sealant to make the joints fully water proof. The open overhead ends of polycarbonate sheet to be sealed with anodized aluminum U Profile/ channel of size 10x10x1.5 mm thick of weight not less than 0.2 kg/m. The polycarbonate sheet and aluminum profile shall be fixed to MS framed structure with self-taping and self-drilling 55 mm long steel screws to be fixed @ 300 mm centre to centre. The rate shall be inclusive of cost of all material involved such as polycarbonate sheet, aluminium profile and aluminum channel, EPDM gasket, self-taping screws, nuts bolts, silicon sealant or any other material required for fixing the sheet but excluding the cost of steel structure which shall be paid separately including hoisting the sheet and fixing in position in required scaffolding shape. The rate shall also include the cost of all T&P scaffolding and safety precautions required during execution of the work. The entire work shall be executed as per required design/drawings and direction of Engineer-in-charge, all complete.				
15.2.1	10 mm thick and U- value not more than 2.50 W/m2k	210.00	Sqm	963.00	2,02,230.00
15.3	Providing & fixing false ceiling at all height including providing & fixing of framework made of special section, power pressed from M.S. sheets and galvanised with zinc coating of 120 gms/ sqm (both side inclusive) as per IS : 277 and consisting of angle cleat of size 25mm wide x 1.6mm thick with flanges of 27mm and 37mm, at 1200mm c/c, one flange fixed to the ceiling				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	with dash fastener 12.5mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25 x10 x0.50mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I channels 45 x15 x 0.90mm running at the spacing of 1200 mm c/c, to which the ceiling section 0.5mm thick bottom wedge of 80mm with tapered flanges of 26 mm each having lips of 10.5mm, at 450mm c/c, shall be fixed in a direction perpendicular to G.I intermediate channel with connecting clip made out of 2.64mm dia x 230mm long G.I wire at every junction, including fixing perimeter channels 0.50mm thick 27mm high having flanges of 20mm and 30mm long, the perimeter of ceiling fixed to wall/ partitions with the help of Rawl plugs at 450mm centre, with 25 mm long dry wall screws @ 230mm interval, including fixing of commercial ply (8/9 mm thick) to ceiling section and perimeter channels with the help of dry wall screws of size 3.5 x25mm at 230mm c/c, all as per manufacture's specification and also including the cost of making opening for light fittings, grills, diffusers, cut outs made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in charge but excluding the cost of painting with:				
15.3.1	8/9mm thick commercial ply conforming to IS : 1328 BWR type	480.00	Sqm	1,687.90	8,10,192.00
15.4	Providing and fixing 4mm thick veneers with necessary screws/nuts & bolts/ nails/silicone adhesive on Aluminium frame work including making groove pattern, complete as per direction of Engineer-in-charge (Frame work shall be paid for separately).	440.00	Sqm	3,233.90	14,22,916.00
15.5	Providing and fixing frame work for partitions/ wall lining etc. made of hollow Aluminium section, placed along the walls, ceiling and floor in a grid pattern with spacing @ 60 cm centre to centre both ways (vertically & horizontally) or at required spacing near opening, fixing the frame to wall/ ceiling/ floors with necessary Stainless Steel screw, Aluminium angle cleat etc. as required at junctions, including making provision for opening for doors, windows, electrical conduits, switch boards etc. complete, as per direction of Engineer-in-charge.				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
15.5.1	Anodised aluminium, anodised transparent or dyed to required shade according to IS: 1868, Minimum anodic coating of grade AC 15	2,330.00	kg	394.50	9,19,185.00
15.6	Providing and fixing thermal insulation with Resin Bonded rock wool conforming to IS: 8183, having density 48 kg/cum 50 mm thick, wrapped in 200 G Virgin Polythene Bags fixed to wall with screw, rawel plug & washers and held in position by criss crossing Gl wire etc. complete as per directions of Engineer-in-Charge.	390.00	Sqm	284.55	1,10,975.00
15.7	Providing and fixing plain lining with necessary screws/nuts & bolts/ nails and fixed on wooden /steel frame work/Alumunium frame work complete as per direction of Engineer-in- charge (Frame work shall be paid for separately).				
15.7.1	20mm thick wood wool Board of approved make and quality	440.00	Sqm	1,113.15	4,89,786.00
15.8	Providing and fixing plain lining with necessary screws/nuts & bolts/ nails, including a coat of approved primer on one face, and fixed on wooden /steel frame work, complete as per direction of Engineer-in- charge (Frame work shall be paid for separately).				
15.8.1	12mm thick commercial ply conforming to IS : 1328 BWR type	440.00	Sqm	1113.05	4,89,742.00
15.9	Providing & Fixing acoustically absorptive fabric paneling, over 20 mm thick wood wool board lining, to be neatly fixed on the base structure, finished with 350 gsm, Fire Retardent, stretch fabric of approved shade over gripper system (UK) UPVC Grippers, standard, Cove, mono, edge. Installation of fabric with gripper will be as per drawing/ design approved as per manufacturer specifications and entire satisfaction of engineer in charge. (Cost of wood wool board lining to be paid separately)	440.00	Sqm	516.35	2,27,194.00
	<b>TOTAL MISCELLANEOUS WORKS :</b>			<b>Rs.</b>	<b>47,27,493.00</b>
16.0	<b>SANITARY INSTALLATIONS</b>				
16.1	Providing and fixing white vitreous china extended wall mounting water closet of (Make: JAQUAR: [FLS-WHT-5353PPZ], KEROVIT : [KS106], HINDWARE : [Cat. No. 92535]) including providing & fixing concealed cistern (Make : JAQUAR [ZPS-WHT-VB03], KEROVIT : [KSPPC-001])	34.00	Each	13,897.70	4,72,522.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	with dual flush fitting (Make RACK bolt - JAQUAR [ZPS-SNS-RB01], KEROVIT [FSW-07]) of flushing capacity 3 litre/ 6 litre (adjustable to 4 litre/ 8 litres), including seat cover , and cistern fittings, nuts, bolts and gasket etc complete.				
16.2	Providing and fixing water closet squatting pan (Indian type W.C. pan) of (Make: Hindware: [Cat.No: 20042], KEROVIT: [Cat.No: KS606]) with 110 mm unplasticised PVC - SWR P or S trap, C P Brass Flush Valve Dual Flow 32mm Size (Concealed Body) With Exposed Shut Off Provision & 100mm Square Plate etc. , with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required: - White Vitreous China Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests.	8.00	Each	5,879.65	47,037.00
16.3	Providing and fixing white vitreous china battery based infrared sensor operated urinal of (Make: Urinal BASIN: JAQUAR: URS-WHT-13255, KEROVIT [Cat.No: KS508], HINDWARE [Cat. No.: 96010]) having pre & post flushing with water (250 ml & 500 ml consumption), having water inlet from back side, including fixing to wall with suitable brackets all as per manufacturers specification and direction of Engineer-in-charge.	38.00	Each	12,571.35	4,77,711.00
16.4	Providing and fixing Under counter Wash basin of size 605x410x200 mm of (Make: JAQUAR [FNS-WHT-40701], KEROVIT [KS207], HINDWARE [Cat. No.: 10080]) of rectangular shape with a single C.P. Brass long neck Pillar cock (MAKE: JAQUAR [PRS-031], KEROVIT [ KA860001], ROCA [RT5A4277C00]) with brackets, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever required.	55.00	Each	4,782.35	2,63,029.00
16.5	Providing and fixing wash basin with pedestal C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:				
16.5.1	White Vitreous China Flat back wash basin (Make: JAQUAR [CNS-WHT-801] & [CNS-WHT-301], KEROVIT [KS201], HINDWARE [Cat. No.: 10098.Ped.: 11032]) size 550x 400 mm with single 15	9.00	Each	6,107.95	54,972.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	mm C.P. brass pillar tap (MAKE: : JAQUAR [OPP-15001PM], KEROVIT [KB611001], ROCA [RT5A4B90CA1])				
16.6	Providing and fixing Stainless Steel 316 garde kitchen sink as per IS:13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required :				
16.6.1	Kitchen sink (Make: HINDWARE K/KS/SS/HIN/S/00483 or Equivalent) with drain board				
16.6.1.1	1041x508 mm bowl depth 203 mm.	2.00	Each	6,651.20	13,302.00
16.6.2	Kitchen sink (Make: HINDWARE K/KS/SS/HIN/S/00450 or Equivalent) without drain board				
16.6.2.1	610x457 mm bowl depth 203 mm	1.00	Each	4,902.75	4,903.00
16.7	Providing and fixing white vitreous china laboratory sink with C.I. brackets, C.P. brass chain with rubber plug, 40 mm C.P brass waste and 40mm C.P. brass trap with necessary C.P. brass unions complete, including painting of fittings and brackets, cutting and making good the wall wherever required :				
16.7.1	Size 600x450x200 mm	8.00	Each	6,882.20	55,058.00
16.8	Providing and fixing P.V.C. waste pipe for sink or wash basin including P.V.C. waste fittings complete.				
16.8.1	Semi rigid pipe				
16.8.1.1	32 mm dia	111.00	Each	108.10	11,999.00
16.9.1.2	40 mm dia	11.00	Each	120.60	1,327.00
16.9	Providing and fixing beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete or as directed by the Engineer in charge.	20.00	Sqm	5,204.05	1,04,081.00
16.10	Providing and fixing CP Brass Toilet paper holder (Make : JAQUAR- [ACN-1153S], KEROVIT [KA990009], ROCA [RA816070159]).	34.00	Each	1,214.45	41,291.00



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
16.11	Providing and fixing 15mm C.P brass Single Lever bath & Shower Mixer (Make: KEROVIT-[KB411019], JAQUAR [FUS-29273UPR ],ROCA[RT5A0297CA1]) including cutting and making good the walls wherever required etc. all complete as per the direction of Engineer in charge.	4.00	Each	5,443.25	21,773.00
16.12	Providing and fixing 15mm C.P brass Sink Mixer (Make: KEROVIT-[KB411024], JAQUAR [LYR-38309], ROCA[RT5A7698CA1] for kitchen sink with swinging spout complete. Including cutting and making good the walls wherever required etc. all complete.	11.00	Each	4,234.95	46,584.00
16.13	Providing and fixing CP Brass Towel Rail (600 mm) (Make: JAQUAR [AKP-35711PS], KEROVIT [KA670001], ROCA [RA816070165]) all complete as per directions of the Engineer-in-charge.	13.00	Each	1,316.25	17,111.00
16.14	Providing and fixing CP Brass liquid soap dispenser & wall flange of (Make: JAQUAR [CPA-1135], ROCA [RA816070105]) as per the direction of Engineer-in-charge	75.00	Each	1,427.70	1,07,078.00
16.15	Providing and fixing health faucet (Make: JAQUAR [ALD-CHR-577], KEROVIT [KA580008], ROCA [RF5B9330C00]) with 1 m long flexible tube and wall hook including all fittings.	34.00	Each	1,362.70	46,332.00
16.16	Providing and fixing unplasticised P.V.C. connection pipe with PTMT Nuts, collar and bush of approved quality and colour.				
16.16.1	15 mm nominal bore with 45 cm length.	159.00	Each	123.30	19,605.00
16.17	Providing and fixing C.P. brass bib cock of (Make: JAQUAR [OPP-15037PM], KEROVIT [KB911004], ROCA [RT5A784FCA1]) conforming to IS:8931 : 15 mm nominal bore	43.00	Each	1,736.20	74,657.00
16.18	Providing and fixing C.P. brass angle valve (Make: JAQUAR [OPP-15053PM], KEROVIT [KB2711003], ROCA [RT5A8009CA1]) for basin mixer and geyser points of approved quality conforming to IS:8931 : 15 mm nominal bore	181.00	Each	1,034.40	1,87,226.00
16.19	Providing and fixing C.P. brass Two way bib cock of (Make: JAQUAR [OPP-15041PM], KEROVIT [KB911005], ROCA	34.00	Each	1,892.25	64,337.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	[RT5A934FCA1]) : 15 mm nominal bore.				
16.20	Providing and fixing C.P. brass showerhead (Make: Shower Head: KEROVIT - KA570030, Jaquar - OHS-35495, Roca - RF5B2350C00) with shower arm (MAKE : KEROVIT - KA960004, Jaquar - SHA-455L400, Roca - RF525883100) in polished chrome : 150 mm square.	4.00	Each	2,707.55	10,830.00
16.21	Providing and fixing CP Brass 32mm size Bottle Trap of (Make: JAQUAR [ALD-769L300x190], KEROVIT [KA870002], ROCA [RF9066A1]) as per the direction of Engineer-in-charge.	75.00	Each	1,440.60	1,08,045.00
16.22	Providing and fixing C.P. Brass extension nipple (size 15mmx50mm) of approved make and quality as per direction of Engineer-in-charge.	228.00	Each	133.25	30,381.00
16.23	Providing and fixing Urinal Partitions (Make: JAQUAR [JSE-CHR-110UC450X], Hindware [SU11OSC-S-STD-CR]), 10mm thick Toughened Frosted Glass of required size, shape, including all necessary fittings, all complete as per direction of Engineer-in-charge.	35.00	Each	5,118.90	1,79,162.00
16.24	Providing and fixing of Toilet unit of (Make: HINDWARE [Cat.No: 70002], or equivalent) for physically challenged persons by providing 1No. EWC along with flushing cistern with necessary fittings, washbasin with fittings of size 460mmX360mm with one pair mounting brackets, One looking mirror of size600x450mm, 1 No. Wall Mounted Hinged hand rail (750X100 mm) covered by Nylon surface with contour finish (for better grip) with two bracket complete, 4 nos. Wall Mounted Grab Bars, covered by Nylon surface with contour finish (for better grip) with Anti-bacterial surface, at appropriate location wherever required inclusive of connection pipes, necessary screws etc, complete as per manufacture's specification of approved make or equivalent and as per the directions of Engineer-in-charge. Note: The PH Toilet shall be completed with all required accessories as per CPWD specifications and nothing extra shall be paid.	8.00	Each	52,158.45	4,17,268.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
16.25	Providing and fixing 120 litre/ hr. cooling and storage capacity of, fully stainless steel electric storage type water cooler of (Make: Blue Star SS SDLX 120120, Voltas SS FSS-150 or equivalent) as approved by engineer in charge with inlet hose connection inbuilt float valve. 2 Nos. outlet faucet, drain tray with waste and pipe up to floor trap heavy compressor and wire up to socket, 3 pin plug etc complete in all respect.	10.00	Each	59,088.40	5,90,884.00
16.26	Providing and Fixing of Hand Dryer (Make: JAQUAR [HDR-SSF-AK2803D] or equivalent), SS 316 grade, total power 1000W, Hot & cold switch with a air speed of 110m/s, noise level upto 75 DB, Energy efficient all complete as per approved make and direction of Engineer-in-charge.	27.00	Each	7,729.05	2,08,684.00
16.27	Supplying, installation, testing and commissioning of fully automatic Reverse Osmosis System (R.O. System)(Make-Aqua Guard-Prima 50 / Kent-Elite Plus/Pentair or equivalent) of output capacity 50 litres / hour designed at a minimum Flux at inlet etc. all complete of approved make and direction of Engineer-in-charge.	10.00	Each	46,648.75	4,66,488.00
	<b>TOTAL SANITARY WORKS :</b>			<b>Rs.</b>	<b>41,43,677.00</b>
17.0	<b>RAIN WATER AND SOIL, WASTE &amp; VENT PIPES</b>				
17.1	Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete 1:2:4 (1 Portland Pozzolana Cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) over P.V.C. sheet 1 m x 1 m x 400 micron, finished with 12 mm cement plaster 1:3 (1 Portland Pozzolana Cement : 3 coarse sand) and a coat of neat cement, rounding the edges and making and finishing the outlet complete.	18.00	Each	255.15	4,593.00
17.2	Providing and fixing on wall face unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes.				
17.2.1	110 mm diameter	340.00	Metre	318.05	1,08,137.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
17.3	Providing and fixing on wall face unplasticised - PVC moulded fittings/ accessories for unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion.				
17.3.1	Single pushfit Coupler				
17.3.1.1	110 mm	78.00	Each	142.05	11,080.00
17.3.2	Bend 87.5°				
17.3.2.1	110 mm bend	18.00	Each	153.60	2,765.00
17.3.3	Shoe (Plain)				
17.3.3.1	110 mm Shoe	18.00	Each	145.70	2,623.00
17.4	Providing and fixing unplasticised - PVC pipe clips of approved design to unplasticised - PVC rain water pipes by means of 50x50x50 mm hard wood plugs, screwed with M.S. screws of required length, including cutting brick work and fixing in cement mortar 1:4 (1 cement : 4 coarse sand) and making good the wall etc. complete.				
17.4.1	110 mm	234.00	Each	286.85	67,123.00
17.5	Providing and fixing unplasticized Rigid UPVC Push Fit single socketed pipes conforming to IS 13592 Type B (pressure of 6 kg/sqcm) including jointing with seal ring conforming to IS : 5382 leaving 10mm gap for thermal expansion as per the direction of the Engineer-in-charge for soil, waste and vent pipes including necessary fittings and accessories complete.				
	(Note : 1. All the joints shall be leak proof. 2. The centre line length of pipes shall be measured for the purpose of payment. 3. Floor trap and terminal guard only shall be measured separately for payment).				
17.5.1	110 mm nominal outside dia.	300.00	Meter	444.95	1,33,485.00
17.5.2	75 mm nominal outside dia.	380.00	Meter	312.45	1,18,731.00
17.6	Providing and fixing GI U-clamps of required size and shape embedded in cement concrete blocks 10x10x10cm of 1:2:4 mix (1 Portland Pozzolana Cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) for UPVC Pipes including cost of cutting holes and making good the walls etc. :				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
17.7.1	110 mm	120.00	Each	282.40	33,888.00
17.7.2	75 mm	150.00	Each	279.65	41,948.00
17.7	Providing and fixing UPVC fittings and specials conforming to IS 13592 Type-B as per the direction of the Engineer-in-charge for soil, waste and vent pipes. - Terminal guard:				
17.8.1	110 mm	8.00	Each	76.85	615.00
17.8.2	75 mm	10.00	Each	58.70	587.00
17.8	Providing and fixing UPVC Push Fit Joint P or S trap of self cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : 110 mm	73.00	Each	163.50	11,936.00
17.10	Providing and fixing UPVC Push Fit Joint Multi floor trap of self cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : 100 mm inlet and 100 mm outlet	40.00	Each	181.85	7,274.00
17.11	Providing and fixing SS grating of approved quality and colour.				
17.11.1	Circular type				
17.11.1.1	125 mm nominal dia with 25 mm waste hole	86.00	Each	163.35	14,048.00
17.11.2	Rectangular type with openable circular lid				
17.11.2.1	150 mm nominal size square 100 mm diameter of the inner hinged round grating	50.00	Each	346.05	17,303.00
	<b>TOTAL SOIL, WASTE, RAIN WATER &amp; VENT PIPES WORKS :</b>			<b>Rs.</b>	<b>5,76,136.00</b>
18.0	<b>WATER SUPPLY WORKS</b>				
18.1	Providing and fixing Stainless Steel pipe and fitting of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards complete with press type fitting i/c fixing of the pipe with clamps at 1.00 m spacing including cutting and making good the walls including testing of joints complete as per direction of Engineer-in-charge.				
	Internal work - Exposed on wall				
18.1.1	22 mm outer dia pipe	80.00	Metre	783.05	62,644.00
18.1.2	28 mm outer dia pipe	70.00	Metre	957.95	67,057.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
18.1.3	35 mm outer dia Pipe	140.00	Metre	1,419.70	1,98,758.00
18.1.4	42 mm outer dia Pipe	220.00	Metre	1,729.60	3,80,512.00
18.1.5	54 mm outer dia Pipe	130.00	Metre	2,162.05	2,81,067.00
18.2	Providing and fixing Stainless Steel pipe and fitting of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards complete with press type fitting i/c fixing of the pipe with clamps at 1.00m spacing and also including cutting of chases and making good the walls including testing of joints complete as per direction of Engineer-in-charge.				
	Internal work - Concealed Pipe				
18.2.1	15 mm outer dia pipe	840.00	Metre	776.00	6,51,840.00
18.2.2	22 mm outer dia pipe	300.00	Metre	1,118.30	3,35,490.00
18.3	Providing and fixing Stainless Steel pipe and fitting of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards complete with press type fitting including trenching, refilling & testing of joints complete as per direction of Engineer in Charge.				
	External work				
18.3.1	35 mm outer dia Pipe	120.00	Metre	1,354.60	1,62,552.00
18.3.2	42 mm outer dia Pipe	160.00	Metre	1,620.70	2,59,312.00
18.3.3	54 mm outer dia Pipe	220.00	Metre	2,053.15	4,51,693.00
18.4	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :				
18.4.1	20 mm nominal bore	12.00	Each	946.05	11,353.00
18.4.2	25 mm nominal bore	10.00	Each	1,230.80	12,308.00
18.5	Providing and fixing gun metal ball valve of approved quality for SS Pipe pipe line, complete all as per direction of Engineer-in-charge :				
18.5.1	25 mm nominal bore	12.00	Nos.	1,464.30	17,572.00
18.5.2	32 mm nominal bore	10.00	Nos.	2,207.30	22,073.00
18.5.3	40 mm nominal bore	8.00	Nos.	2,878.05	23,024.00
18.5.4	50 mm nominal bore				



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
		6.00	Nos.	4,303.10	25,819.00
18.6	Providing and fixing gun metal non- return valve of approved quality (screwed end) :				
18.6.1	50 mm nominal bore - Horizontal	4.00	Nos.	3,635.75	14,543.00
18.6.2	50 mm nominal bore - Vertical	4.00	Nos.	2,664.55	10,658.00
18.7	Providing and filling sand of grading zone V or coarser grade all-round the SS pipes in external work.				
18.7.1	32 mm diameter pipe	120.00	Mtr.	128.15	15,378.00
18.7.2	40 mm diameter pipe	160.00	Mtr.	129.80	20,768.00
18.7.3	50 mm diameter pipe	220.00	Mtr.	134.65	29,623.00
18.8	Providing and fixing of Single phase electrical actuator operated wafer type rubber lined butterfly valve with by pass arrangement as per drawing attached including level controller, 3 nos. normal butter fly valves,necessary control and Power cables (Maximum 10 M. Length of each type) and control panel installed on OH tank filling line near the tanks complete : 40 mm dia.	2.00	Each	16,571.00	33,142.00
18.9	Providing and fixing threaded end brass digital water meter complete in all respect : 40 mm dia.	2.00	Each	10,322.85	20,646.00
18.10	Providing and fixing brass single acting air release valve with screwed inlet including cost of SS Pipe required complete : 25 mm dia.	6.00	Each	969.00	5,814.00
	<b>TOTAL WATER SUPPLY WORKS :</b>			<b>Rs.</b>	<b>31,13,646.00</b>
19.0	<b>SEWERAGE AND DRAINAGE WORKS</b>				
19.1	Providing and fixing square-mouth S.W. gully trap class SP-1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300 x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design:				
19.1.1	150 x 100 mm size P type				
19.1.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	30.00	Each	2,656.60	79,698.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
19.2	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., including trenching and refilling etc., all complete as required				
19.2.1	150 mm dia	45.00	Metre	451.25	20,306.00
19.2.2	200 mm dia	240.00	Metre	633.30	1,51,992.00
19.2.3	300 mm dia	310.00	Metre	1,132.80	3,51,168.00
19.3	Constructing brick masonry manhole in cement mortar 1:4 (1 Portland Pozzolana cement : 4 coarse sand ) with R.C.C. top slab with 1:1.5:3 mix (1 Portland Pozzolana cement : 1.5 coarse sand (zone-III) : 3 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 Portland Pozzolana cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 Portland Pozzolana cement : 3 coarse sand) finished with floating coat of neat Portland Pozzolana cement and making channels in cement concrete 1:2:4 (1 Portland Pozzolana cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design :				
19.3.1	Inside size 90x80 cm and 45 cm deep including precast RCC manhole cover with frame L.D.-2.5, rectangular shape 600X450 mm internal dimensions.				
19.3.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	6.00	Each	10,146.30	60,878.00
19.3.2	Inside size 120x90 cm and 90 cm deep including SFRC Cover and frame (medium duty MD- 10 grade designation) 500 mm internal diameter conforming to I.S. 12592:				
19.3.2.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	15.00	Each	20,847.20	3,12,708.00
19.4	Extra for depth for manholes :				
19.4.1	Size 90x80 cm				
19.4.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Metre	7,277.15	14,554.00
19.4.2	Size 120x90 cm				
19.4.2.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	4.00	Metre	8,723.35	34,893.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
19.5	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910, on 12 mm dia steel bar conforming to IS: 1786, having minimum cross section as 23 mmx25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacture's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1 Portland Pozzolana Cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) complete as per design.	260.00	Each	458.90	1,19,314.00
19.6	Constructing brick masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 Portland Pozzolana Cement : 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame complete as per standard design :				
19.6.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	20.00	Each	5,036.75	1,00,735.00
19.7	Extra for depth beyond 45 cm of brick masonry chamber :				
19.7.1	For 455x610 mm size				
19.7.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	5.00	Metre	5,053.30	25,267.00
19.8	Providing and fixing in position pre-cast R.C.C. manhole cover and frame of required shape and approved quality				
19.8.1	L D - 2.5				
19.8.1.1	Rectangular shape 600x450 mm internal dimensions	10.00	Each	1,928.45	19,285.00
	<b>TOTAL SEWARGE AND DRAINAGE WORKS :</b>			<b>Rs.</b>	<b>12,90,798.00</b>
20.0	<b>RAIN WATER HARVESTING &amp; TUBEWELL</b>				
20.1	Boring/drilling bore well of required dia for casing/ strainer pipe, by suitable method prescribed in IS: 2800 (part I), including collecting samples from different strata, preparing and submitting strata chart/ bore log, including hire & running charges of all equipments, tools, plants & machineries required for the job, all complete as per				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	direction of Engineer-in-charge, upto 90 metre depth below ground level.				
20.1.1	All types of soil				
20.1.1.1	300 mm dia	270.00	Metre	629.25	1,69,898.00
20.2	Supplying, assembling, lowering and fixing in vertical position in bore well, unplasticized PVC medium well casing (CM) pipe of required dia, conforming to IS: 12818, including required hire and labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer -in-charge				
20.2.1	200 mm nominal size dia	120.00	Metre	871.30	1,04,556.00
20.3	Supplying, assembling, lowering and fixing in vertical position in bore well unplasticized PVC medium well screen (RMS) pipes with ribs, conforming to IS: 12818, including hire & labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer-in-charge.				
20.3.1	200 mm nominal size dia	150.00	Metre	1,007.15	1,51,073.00
20.4	Supplying, filling, spreading & leveling stone boulders of size range 5 cm to 20 cm, in recharge pit, in the required thickness, for all leads & lifts, all complete as per direction of Engineer-in-charge	7.00	Cum	1,401.95	9,814.00
20.5	Supplying, filling, spreading & leveling gravels of size range 5 mm to 10 mm, in the recharge pit, over the existing layer of boulders, in required thickness, for all leads & lifts, all complete as per direction of Engineer-in-charge.	7.00	Cum	1,429.65	10,008.00
20.6	Supplying, filling, spreading & leveling coarse sand of size range 1.5 mm to 2 mm in recharge pit, in required thickness over gravel layer, for all leads & lifts, all complete as per direction of Engineer -in charge.	7.00	Cum	1,429.65	10,008.00
20.7	Gravel packing in tubewell construction in accordance with IS: 4097, including providing gravel fine/ medium/ coarse, in required grading & sizes as per actual requirement, all complete as per direction of Engineer-in-charge.	12.00	Cum	1,889.30	22,672.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
20.8	Providing and fixing factory made precast RCC perforated drain covers, having concrete of strength not less than M-25, of size 1000 x 450x50 mm, reinforced with 8 mm dia four nos longitudinal & 9 nos cross sectional T.M.T. hoop bars, including providing 50 mm dia perforations @ 100 to 125 mm c/c, including providing edge binding with M.S. flats of size 50 mm x 1.6 mm complete, all as per direction of Engineer-in-charge.	40.00	Each	1,367.40	54,696.00
20.9	Development of tube well in accordance with IS : 2800 (part I) and IS: 11189, to establish maximum rate of usable water yield without sand content (beyond permissible limit), with required capacity air compressor, running the compressor for required time till well is fully developed, measuring yield of well by "V" notch method or any other approved method, measuring static level & draw down etc. by step draw down method, collecting water samples & getting tested in approved laboratory, i/c disinfection of tubewell, all complete, including hire & labour charges of air compressor, tools & accessories etc., all as per requirement and direction of Engineer-in-charge.	90.00	Hour	1,075.65	96,809.00
20.10	Providing and fixing suitable size threaded mild steel cap or spot welded plate to the top of bore well housing/ casing pipe, removable as per requirement, all complete for borewell of:				
20.10.1	200 mm dia	3.00	Each	312.50	938.00
20.11	Providing and fixing M.S. clamp of required dia to the top of casing/ housing pipe of tubewell as per IS: 2800 (part I), including necessary bolts & nuts of required size complete.				
20.11.1	200 mm dia	3.00	Each	1,843.75	5,531.00
20.12	Providing and fixing Bail plug/ Bottom plug of required dia to the bottom of pipe assembly of tubewell as per IS:2800 (part I).				
20.12.1	200 mm dia	2.00	Each	349.65	699.00
20.13	Providing and fixing G.I. pipes complete with G.I. fittings all complete.				
20.13.1	50 mm dia nominal bore	200.00	Metre	928.45	1,85,690.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	<b>TOTAL RAIN WATER HARVESTING &amp; TUBEWELL WORKS:</b>			<b>Rs.</b>	<b>8,22,392.00</b>
21.0	<b>ROAD WORK</b>				
21.1	Providing and laying design mix cement concrete of M-30 grade, in roads/ taxi tracks/ runways, using cement content as per design mix, using coarse sand and graded stone aggregate of 40 mm nominal size in appropriate proportions as per approved & specified design criteria, providing dowel bars with sleeve/ tie bars wherever required, laying at site, spreading and finished with screed board vibrator, vacuum dewatering process and finally finished by floating, brooming with wire brush etc, levelling to required slope/ camber, finishing with required texture, including steel form work with sturdy M.S. channel sections, curing, making provision for contraction/ expansion, construction & longitudinal joints (10 mm wide x 50 mm deep) by groove cutting machine, providing and filling joints with approved joint filler and sealants, complete all as per direction of Engineer-in-charge (Item of joint fillers, sealants, dowel bars with sleeve/ tie bars to be paid separately). Note:- Cement content considered in M-30 is @ 340 kg/cum. Excess/ less cement used as per design mix is payable/ recoverable separately.				
21.1.1	Cement concrete prepared with batch mixing machine. <b>Note:-</b> If the agency wants to procure the concrete from the RMC plant, they can procure with prior approval of the design mix and RMC plant from the Engineer in charge. No additional claims will be admissible in this regards.	385.00	Cum	9,395.55	36,17,287.00
21.2	Providing and filling in position rubberized bitumen hot sealing compound for sealing of expansion joints in roads / pavements all complete as per direction of the Engineer-in-Charge.	28,700.00	per cm depth per cm width per metre length	7.35	2,10,945.00
21.2.1	Using grade 'A' sealing compound conforming to IS: 1834.				
21.3	Providing and laying at or near ground level factory made kerb stone of M-30 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm),	30.00	Cum	11,288.05	3,38,642.00



Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
	including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).				
21.4	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge.				
21.4.1	80 mm thick C.C. paver block of M-30 grade with approved colour design and pattern.	1,620.00	Sqm	1,175.90	19,04,958.00
21.5	Providing and laying factory made chamfered edge Cement Concrete Grass paver blocks in footpath, parks, lawns etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern and cutting of paver blocks as per required size and pattern, finishing etc. complete all as per direction of Engineer-in-Charge.				
21.5.1	80 mm thick C.C. Grass paver block of M-30 grade with approved color design and pattern.	100.00	Sqm	1,162.40	1,16,240.00
21.6	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20mm thick base of cement mortar 1:4 (1 Portland Pozzolana Cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	410.00	Sqm	1,393.45	5,71,315.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
21.7	Providing and laying cement concrete (M-30 grade) tactile tile such as directional, warning or hazardous (for vision impaired persons as per standards) of size 300x300x80 mm {80mm base +(5mm ± 0.5mm) thick raised portion) of approved make in all colours (preferably yellow) and shades for footpath laid in required colour & pattern over 50mm thick compacted bed of coarse sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with river sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks , lawns, drive ways or light traffic parking etc. complete as per manufacturer's specifications & direction of engineer-in-charge (the thickness of wearing layer should not be less than 8mm) and as per harmonized guidelines and space standards for barrier free built environment for persons with disability and elderly person.	115.00	Sqm	1,175.90	1,35,229.00
21.8	Providing and laying 125 micron thick Polyethylene sheet (separation membrane) below the Cement Concrete and CC Pavements etc. all complete as per the direction of Engineer in charge. The overlaps of sheet at sheet joint shall not be less than 100mm.	2,600.00	Sqm	28.65	74,490.00
21.9	Preparation and consolidation of sub grade with power road roller of 8 to 12 tonne capacity after excavating earth to an average of 22.5 cm depth, dressing to camber and consolidating with road roller including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earthwith lead upto 50 metres.	1,020.00	Sqm	158.85	1,62,027.00
21.10	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-I (size range 75 mm to 0.075 mm) having CBR Value-30	310.00	Cum	1,845.85	5,72,214.00

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
21.11	Providing and applying 2.5 mm thick road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	150.00	Sqm	710.65	1,06,598.00
21.12	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.				
21.12.1	Mandatory/ Regulatory sign boards of size 900x600 mm support length of 2500 mm	9.00	Sqm	9,115.95	82,044.00
	<b>TOTAL ROAD WORK:</b>			<b>Rs.</b>	<b>78,91,989.00</b>

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
22.0	<b>HORTICULTURE</b>				
22.1	Supplying and stacking of good earth at site including royalty and carriage upto 5 km lead complete (earth measured in stacks will be reduced by 20% for payment).	254.00	Cum	666.75	1,69,355.00
22.2	Supplying and stacking at site dump manure from approved source, including carriage upto 5 km lead complete (manure measured in stacks will be reduced by 8% for payment) :				
22.2.1	Screened through sieve of I.S. designation 20 mm	15.00	Cum	339.00	5,085.00
22.2.2	Screened through sieve of I.S. designation 16 mm	15.00	Cum	387.10	5,807.00
22.2.3	Screened through sieve of I.S. designation 4.75 mm	15.00	Cum	406.30	6,095.00
22.3	Spreading of sludge, dump manure and/or good earth in required thickness as per direction of officer-in-charge (cost of sludge, dump manure and/ or good earth to be paid separately).	20.00	Cum	52.75	1,055.00
22.4	Mixing earth and sludge or manure in the required proportion specified or directed by the Officer-in-charge	25.00	Cum	367.05	9,176.00
22.5	Digging holes in ordinary soil and refilling the same with the excavated earth mixed with manure or sludge in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1 part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any, with all leads and lifts (cost of manure, sludge or extra good earth if needed to be paid for separately)				
22.5.1	Holes 60 cm dia, and 60 cm deep	100.00	Each	81.55	8,155.00
22.5.2	Holes 45 cm dia, and 45 cm deep	120.00	Each	34.50	4,140.00
22.6	Providing & laying Selection no. 1 doob grass turf with earth 50mm to 60mm thickness of existing ground prepared with proper level and ramming with required tools wooden and than rolling the surface with light roller make the surface smoothen and light watering the same and maintenance for 30 days or more till the grass establish properly, as per direction of the officer in charge	800.00	Per Sqm	118.85	95,080.00
22.7	Plantation of Trees, Shrubs, and Hedge at site i/c watering and removal of unserviceable material's as per direction of officer in charge (excluding cast of plant & water)				

Item No.	Description of Item	Quantity	Unit	Rate (In Rs.)	Total Amount (In Rs.)
22.7.1	Trees Plant	170.00	Each	7.35	1,250.00
22.7.2	Shrubs Plant	1000.00	Each	3.65	3,650.00
22.7.3	Hedge Plant	1000.00	Each	2.45	2,450.00
22.8	Providing and Displaying Golden Bottle brush Topiary well developed with fresh & healthy foliage 5 to 6 big ball 115 to 180 cm ht in 40 cm Cement Pot as per direction of the officer-in-charge.	20.00	Each	1778.30	35,566.00
22.9	Providing and stacking of Bottle palm of ht. 210-240 cm bottom girth 30-35 cm well developed in big HDPE bags.	10.00	Each	692.15	6,922.00
22.10	Providing and stacking of Cassia fistula (Amaltash) of height 120-135 cm. in big poly bags of size 25 cm as per direction of the officer-in-charge.	10.00	Each	131.50	1,315.00
22.11	Providing and stacking of Delonix regia (Gulmohar) of height 150-165 cm. in big poly bags of size 25 cm as per direction of the officer-in-charge.	10.00	Each	124.60	1,246.00
22.12	Providing and stacking of Ficus benjamina (green) of height 150-165 cm., bushy with healthy branches and lush green foliage in big size HDPE bags as per direction of the officer-in-charge.	10.00	Each	346.05	3,461.00
22.13	Providing and stacking of Grevillea robusta (Silver Oak) of height 150-165 cm. in big poly bags of size 25 cm as per direction of the officer-in-charge.	10.00	Each	110.75	1,108.00
22.14	Providing and stacking of Michelia champa (Golden Champa) of height 90- 105 cm. in earthen pots of size 25 cm as per direction of the officer-in-charge.	5.00	Each	207.65	1,038.00
22.15	Providing and stacking of Ficus panda of height 30-45 cm. with 3-4 branches and healthy foliage in p.bag of size 20 cm as per direction of the officer-in-charge.	150.00	Each	69.20	10,380.00
22.16	Providing and stacking Vernonia elaeagnifolia (curtain creeper) plant of height 30 cm to 45 cm. in 20 cm size of Earthen pots / Plastic pots & as per direction of the officer-in-charge.	150.00	Each	62.30	9,345.00
	<b>TOTAL HORTICULTURE WORKS:</b>			<b>Rs.</b>	<b>3,81,679.00</b>
	<b>TOTAL OF ALL SUBHEADS:</b>			<b>Rs.</b>	<b>41,31,26,677.00</b>

# **PART-C**

## **ADDITIONAL CONDITIONS, SPECIFICATIONS AND SCHEDULE OF QUANTITIES APPLICABLE TO ELECTRICAL AND MECHANICAL COMPONENT OF THE WORK**



## **ADDITIONAL CONDITIONS**

1. The scope includes Planning, Design & preparation of Drawings for E&M services, obtaining approvals from the department, supplying, Installation, testing and commissioning of Internal Electrical Installations, Point Wiring, Power wiring, LT Cabling Work, LED light Fittings, Ceiling fans, Switch boards, MCB / MCCB DBs, 11KV Substation, Automatic Fire Alarm System, Fire Fighting with wet riser and sprinkler system, Lifts, DG set, Solar PV generation, LAN, UPS, Central AC plant (HVAC), Water Pumps, Lighting Protection system, IBMS, Street Lighting, EV Charging System, STP, Water Treatment Plant, Boom Barrier & Fire Suppression System as per CPWD specifications and relevant BIS standards as amended up to last date of submission of bid including extensions if any.
2. The work shall be carried out strictly in accordance with CPWD specification for electrical works CPWD general specification Part-I (Internal) 2023, Part- II (External) 2023, Part-III (Lift & Escalator) 2003 and amended up to date, Part -IV (Substation) 2013, Part-V (Wet riser & Sprinkler System) 2020, Part-VI Fire detection and alarm System-2018, General Specification for Electrical works Part-VII (DG set) 2013, Part VIII Gas Based Fire Extinguisher System, General Specification for Heating Ventilation & Air Conditioning (HVAC) 2024, and in accordance with Indian Electricity Rules, 1956, India Electricity Act, 2003, ECSBC 2024 as amended up to date and NBC 2016 as amended up to date and as per instructions of the Engineer-in-Charge and nothing extra will be paid.
3. The scope of works & specification is given in general but they are not exhaustive i.e. does not mention all the incidental works required to be carried out for complete execution of the item of work. The work shall be carried out, all in accordance with true intent and meaning of the specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings and/ or described in the specifications, provided that the same can be reasonably inferred there from. There may be several incidental works, which are not mentioned in the contract document/specifications but will be necessary to complete the item in all respect.
4. All these incidental works/ costs which are not mentioned, but are necessary to complete the work shall be deemed to have been included in the overall amount quoted by the contractor for various components of work. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation/change in actual working drawings.
5. Adjustment of rates shall not be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such items in all respects) on account of the directions of Engineer-in-charge. Nothing extra shall be payable on this account.
6. Three final copies of the documents prepared shall be submitted to Engineer-in-charge for record. All the documents created out of the assignment will become the sole property of the Department.
7. Stage Payment for E&M packages: The following percentage of contract rates shall be payable against the stages of work shown herein:

S. No.	Stage of Work	Payment terms in %
1	On initial inspection of materials and delivery at site in good condition on basis	50%
2	On completion of installation	25%
3	On completion of testing and commissioning	20%
4	On Handing Over	5%
	<b>Total</b>	<b>100%</b>

8. **ELIGIBILITY CRITERIA FOR ASSOCIATE AGENCY:** The Composite category contractor is also eligible to carry out electrical and mechanical services works himself/herself without associating any specialized agency provided he fulfils the prescribed eligibility criteria respectively for these work(s) as mentioned below:

a) **Eligibility Criteria for Fire Fighting & Fire safety system:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

Similar work shall mean **SITC of Fire Fighting & Fire safety system.**

b) **Eligibility Criteria for Automatic Fire Alarm & PA System:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

Similar work shall mean **“SITC of Automatic Fire Alarm & PA System”.**

c) **Eligibility Criteria for Sub-Station Work :-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean **“The capacity of individual transformer being 80% of individual capacity (rounded off to next available higher capacity) of the equipment i.e. transformer proposed in NIT”.**

d) **Eligibility Criteria for DG set:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean **“The capacity of individual DG Set being 80% of individual capacity (rounded off to next available higher capacity) of the equipment i.e. DG Set proposed in NIT”.**

e) **Eligibility Criteria for UPS: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “UPS System”

f) **Eligibility Criteria for HVAC system:-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “The **capacity of individual Chiller being 80% of individual capacity (rounded off to next available higher capacity) of the equipment i.e. Chiller/ proposed in NIT**”.

g) **Eligibility Criteria for Solar PV System:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “Solar PV generation plant”

h) **Eligibility Criteria for CCTV Work: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**CCTV Work**”

i) **Eligibility Criteria for IBMS System: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Integrated Building Management System**”

j) **Eligibility Criteria for LAN Work:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**LAN Work**”

k) **Eligibility Criteria for IPBAX (IP Based) work:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

Similar work shall mean “**IPBAX (IP Based) System**”

l) **Eligibility Criteria for STP: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Sewage Treatment Plant**”

m) **Eligibility Criteria for Boom Barrier & Driver Face and Number Plate Recording System :-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Boom Barrier & Driver Face and Number Plate Recording System**”.

n) **Eligibility Criteria for Lift:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.



Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Lifts System**”.

o) **Eligibility Criteria for WTP:-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Water Treatment Plant**”.

p) **Eligibility Criteria for Fire Suppression System: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Fire Suppression System**”.

q) **Eligibility Criteria for Water Supply Pumps: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “Water Supply Pumps”.

The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum, calculated from the date of completion to the last date of submission of bids.

- r) The contractor has to submit MOU with associated contractor (in case electrical contractor is associated), engineers name, credential, email address & mobile no. before start of work. The main agency should possess a valid electrical contractor licence for executing EI works otherwise he has to associates contractor having valid electrical contractor licence.
- s) All the material to be used on this work by the contractor shall be got approved from the Engineer-in-Charge in advance before installation at the site.
- t) All damages done to the building during the execution of electrical work shall be the responsibility of the contractor and the same will be made good immediately at his own cost to the satisfaction of the Engineer-in-Charge. In case, the repair is not satisfactory, the department will get it rectified & any expenditure incurred by the department in this connection shall be recovered from the contractor and decision of the Engineer-in-charge
- u) All the debris of the electrical works should be removed and the site should be cleared by the contractor immediately after the accruing of debris daily. Similarly rejected material if any should be immediately cleared off from the site by the contractor.
- v) 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.
- w) The size of conduit and wiring shall be got approved from the Engineer-in-Charge before the execution of work.
- x) The contractor shall make his own arrangement at his own cost for Electrical/ General tools and plants required for the work. In case, proper tools are not available, the department will purchase the tools for bonafide use of work at the risk & cost of the contractor.
- y) Main board and main distribution board: The work shall be carried out according to the drawing/details as approved by the Engineer-in-Charge. The contractor shall have to get the sample approved before the whole lot is brought to site. The main board, distribution board shall be properly labelled.

- z) The entire installation shall be at the risk and responsibility of the contractor until these are tested and handed over to the department. The watch & ward is the responsibility of the contractor till handing over.
- aa) 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.
- bb) Nothing extra shall be paid for inter connections with thimbles/Wires/Tapes strips etc. used on the work.
- cc) The contractor has to make his own arrangements for stores and watch and ward and no extra claim for this will be entertained.
- dd) The contractor shall make his own arrangements for electrical power supply for the construction activities. No extra payments for the same will be made.
- ee) The wiring and conduit route shall be marked by the contractor on the drawing first, and shall be got approved from the Engineer-in-charge.
- ff) The rupturing capacity of the MCB's shall be 10KA. The MCB's shall have ISI mark.
- gg) The insulated copper wire to be used on this work shall be FRLS type of multi stranded.
- hh) Make of MCB/MCCB shall be the same as the make of MCB DB.
- ii) The contractor shall on demand by the Engineer-in-charge, furnish the proof to the satisfaction of Engineer-in-charge regarding purchase of Wires, Modular switches & accessories, MCBs MCBDB fan & fixture and accessories and other items, from the manufactures authorized outlets.
- jj) 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.
- kk) Cutting of brick walls shall be done with due care. All repairs and patch works shall be neatly carried out to match the original finish and to the entire satisfaction of the Engineer in Charge.
- ll) 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. However, wires within the cubicle panel will be measured and paid under relevant item of work.
- mm) 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 TV, Telephone etc., where wiring is not done along with IEI work, fish wire shall be invariably drawn.
- nn) The connection between incoming switch/isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.

- oo) Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and terminals provided with crimped lugs.
- pp) 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.
- qq) All hardware items such as nuts/bolts/screws/washers etc. to be used in work shall be of zinc/cadmium plated iron.
- rr) While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the Engineer-in-charge.
- ss) Materials to be used in work are to be ISI marked. The make of the materials has been indicated in the list of preferred makes. No other makes will be acceptable. The materials to be used in the work shall be got approved by the Engineer in Charge/his representative 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 acceptable.
- tt) Where switches / sockets / regulator / telephone / TV / internet outlets are to be provided, the same shall be of only one make. Modular accessories for UPS outlets shall be of distinguishable colour.
- uu) The firm should submit the warranty against manufacturer defect for a period of 5 years from the date of completion of work for LED fittings and products from the manufacturer.
- vv) The contractor shall have to work as per the convenience of the concerned Department.
- ww) Any conduit which is not to be wired by the contractor shall be provided with GI fish wire for wiring for some other agency subsequently. Nothing extra shall be paid for the same.
- xx) The tenderer should either himself meet the eligibility conditions for the respective E&M components or otherwise he will have to associate with agencies, fulfilling the eligibility requirements and hence consent letter from eligible Associate Agency of the respective components of E&M work shall also be submitted as per attached **Proforma in Form "A"**.
- yy) In case the main contractor is himself eligible (as per eligibility criteria) for executing any specific minor component and intends doing the job himself, he may not be required to associate with another agency for that minor component of work. In such cases the main contractor also has to submit the documents as per eligibility criteria mentioned for associated agency of individual E&M component.
- zz) In support of the eligibility conditions of the proposed Associated Contractor, copy of their registration documents, Electrical License, GST Documents duly attested by the applicants (Main Contractor) shall be submitted to the **Executive Engineer-in-charge** for deciding the eligibility. Each such Associated Contractor will certify that they are not debarred as on the day of application for tender participation. Proposal for associating agency for minor components of work shall be submitted in **Form 'B'** of this tender document from each associate independently for all electrical and mechanical components.

- aaa) The main contractor should submit an affidavit of MoU signed with eligible associated contractor. The MoU in the enclosed **Form ‘C’** shall be signed by both the parties, main contractor as 1<sup>st</sup> party and associated contractor as 2<sup>nd</sup> party independently for all electrical and mechanical components.
- bbb) In the event of the concerned E&M agency not performing satisfactorily or failure of associate contractor to complete the E&M work, the main contractor on written directions of the department, shall remove the Associate contractor deployed on the work and shall submit name of new associate agency who fulfil the conditions mentioned in the NIT to execute the leftover work without any loss of time or variation in cost to the department. **Such associates shall also give an undertaking along with the main tenderer but both of them together will stand guarantee for the equipment’s 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 contractor 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 Department. No change of Associated Contractor will be allowed without prior approval of the Engineer-in-charge of the work.
- ccc) In respect of all works i.e., Electrical installation., the materials shall be procured only from the original equipment manufacturers / authorized dealers of OEM. The contractor shall submit all documentary details in fulfilment of these conditions regarding procurement of materials including relevant test certificates.
- ddd) Before completion of defect liability period as per condition laid down in GCC 2023, the main contractor has to submit security deposit of 5% of 80% of the Quoted price of SITC of LED fittings for the warranty period for LED fittings in acceptable form i.e. FDR/ Bank guarantee to Engineer in charge. The Security Deposit deducted from the bills of contractor shall be refunded to the main contractor only after submission of above security deposit for LED fittings by main contractor, failing which this LED security deposit shall be deducted from Security Deposit deducted for total work and balance amount only will be refunded after completion of defect liability period. The LED Security Deposit will be released after completion of warranty period of 5 years to the main contractor.
- eee) The contractor shall execute the whole work in the most substantial and workman like manner in strict accordance with the specifications, approved design, drawings, particular specifications, special conditions, additional conditions and instructions of the Engineer-in-Charge.
- fff) The contractor shall at his own expense and risk arrange land for accommodation of labour, setting up of office, storage of materials, erection of temporary workshops, construction of approach roads to the site of work, including land required for carrying out of all jobs connected with the completion of the work. The contractor shall have to abide by the regulations of the authorities concerned and the directions of the Engineer-in-Charge for use of land available at the site of work. If it becomes necessary during construction to remove or shift the stored materials, shed, workshop, access roads, etc, to facilitate execution of the work included in this agreement or any other work by any other agency, the contractor shall

remove or shift these facilities as directed by the Engineer-in-Charge and no claim whatsoever shall be entertained on this account.

ggg) The necessary tests shall be conducted in the laboratory approved by the Engineer-in-Charge. The samples for carrying out all or any of the tests shall be collected by the Engineer-in-charge or on his behalf by any other officer of CCU. The contractor or his authorized representative shall associate himself in collection, preparation, packing and forwarding of such samples for the prescribed tests and analysis. In case the contractor or his authorized representative is not present or does not associate himself in the aforesaid operation the results of such tests and consequences thereon shall be binding on the contractor.

hhh) Materials used on work without prior inspection and testing (where testing is necessary) and without approval of the Engineer-in-Charge are liable to be considered unauthorized, defective and not acceptable. The Engineer-in-Charge shall have full powers to require the removal of any or all of the materials brought to site by contractor which are not in accordance with the contract specifications or do not conform, in character or quality to the samples approved by the Engineer-in-Charge. In case of default on the part of the contractor in removing rejected materials, the Engineer-in-Charge shall be at liberty to have them removed at the risk and cost of the contractor.

iii) The contractor shall make his own arrangement of water required for execution of work and get the water tested at his own cost with regard to its suitability for use in the works and get written approval from the Engineer-in-Charge before he proceeds with the use of same for execution of work.

jjj) The work shall be carried out in such a manner so as not to interfere or adversely affect or disturb other works being executed by other agencies, if any.

kkk) Any damage done by the contractor to any existing works or work being executed by other agencies shall be made good by him at his own cost.

lll) The work shall be carried out in the manner complying in all respects with the requirement of relevant rules and regulations of the local bodies under the jurisdiction of which the work is to be executed and nothing extra shall be paid on this account.

mmm) For completing the work in time, the contractor may have to work in two or more shifts and no claims whatsoever shall be entertained on this account, notwithstanding the fact that the contractor will have to pay to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour regulations and the agreement entered upon and/or extra amount for any other reasons.

nnn) The contractor shall take all precautions to avoid all accidents by exhibiting necessary caution boards and by providing red flags, red lights and barriers. The contractor shall be responsible for any accident at the site of work and consequences thereof.

ooo) **Quality Assurance Manual (Quality Assurance Plan & Checklist for E &M Service).**



- (a) Main contractor/Associate agency shall submit the required quantity of materials as sample for Testing from Govt. / approved private Laboratory.
  - (b) The decision on testing shall be as per E&M quality checklist of CPWD vide OM No. 51(4)/CE(E)/CSQ/2016/293 (H) dated 31.03.2016 as applicable and/or as per direction of Engineer in charge and shall be binding on contractor. Contractor shall submit the required size and quantity of samples for the testing.
  - (c) Department shall send the samples to the testing laboratory & the test results shall be reported directly to department.
- ppp) All the equipment shall be delivered with (i) Manufacturer's test certificate, (ii) Manufacturer's technical catalogues and Installation / Instruction (O&M) manuals. For LED luminaries, the contractor shall also submit the LM-79 test report of LED luminaries from NABL accredited laboratory.
- qqq) Scaffoldings & any other T & P required for execution, testing and commissioning of work shall be arranged by the contractor and is included in the cost of work tendered by the contractor.
- rrr) **Inspection before Dispatch:** All routine tests shall be conducted before dispatch of equipment. No equipment shall be dispatched out from the manufactures premises before such tests are conducted and test result recorded. These test certificates shall be given along the supply of equipment. The Engineer- In-charge shall, if he so desires inspect and witness the pre-delivery tests. For this purpose, the agency shall give 15 days advance notice. Agency shall arrange for inspection of the department. Department shall bear expenses of its officials for inspection as far as travelling, boarding and / lodging is concerned. However, the inspection shall be done at the discretion of the department without any cost implication but **ROUTINE TEST & TYPE TEST Certificates** shall have to be submitted for all the equipment.
- sss) Prior to dispatch, all equipment shall be adequately protected & insured for the whole period of transit, storage and erection against corrosion and incidental damages etc. from the effect of vermin, sunlight, rain, heat, humid climate and accidents etc.
- ttt) **APPROVAL OF MATERIALS, SHOP FLOORDRAWINGS AND COMMENCEMENT OF WORK:** The contractor shall submit list of makes & Model numbers of all items of equipment and accessories for each Sub Head of work. Catalogues of the equipment to be supplied. Shop floordrawings of each packages/ Sub work shall be submitted separately for approval. It is the responsibility of the tenderer to get the makes, models and shop floor drawings approved by the department before placing of order.
- uuu) **Insurance:** The agency shall include storage cum erection insurance including third party insurance right from the storage to commissioning and handing over of various equipment. In insurance, the beneficiary shall be Engineer-In-charge at the cost of the agency. All insurance which the agency is required to enter into under the contract shall be affected any authorized general insurance company and the agency shall produce the

policies of insurance. In case of any delay in handing over, the insurance cover will be suitably extended by the contractor at his own cost.

vvv) **Remedy of failure to insure:** If the agency fails to effect and keep in force the insurance referred to in the preceding sub-clause and in case of unforeseen eventuality of theft/damage etc. to any material, the contractor only shall be held responsible and necessary rectification/replacement has to be done by contractor himself.

www) **Quality of material and workmanship:** All parts of the equipment shall be of such design, size and material so as to function satisfactorily under all rated conditions of operation. All components of the equipment shall have adequate factor of safety. The work of fabrication and assembly shall conform to sound engineering practice and on the basis of "Fail Safe Design". The mechanical parts subject to wear and tear shall be easily replaceable type. The construction of the equipment shall be such as to facilitate easy operation, inspection, maintenance and repairs. All connections and contacts shall be designed to minimize risk of accidental short circuits caused by animals, birds and vermin etc. All identical items and their component parts should be completely interchangeable including spare parts.

xxx) All electrical & mechanical fittings / fixture / appliances, to be provided for the work, where BEE certification is available should have **5-star rating (of BEE)**.

yyy) **QUALITY ASSURANCE:** The Contractor shall make available, on request from the Department, for record, copies of challans, cash memos, receipts and other certificates, if any, vouchers towards the quantity and quality of various materials procured and the same shall be kept in record. These shall also provide information on the name of the manufacturer, manufacturer's product identification, manufacturer's instructions, warning, date of manufacturing and test certificates from manufacturers for the product for each consignment delivered at site, shelf life, if any, for the department to ensure that the material have been procured from the approved source and of the approved quality, as directed by the Engineer-in-Charge.

zzz) Storage and safe custody of all materials shall be the sole responsibility of the Contractor. Nothing extra shall be payable on this account. This shall include cost of painting of the entire installation. The major equipment's shall be factory final finish painted. The agency shall be required to do only touch up to the damages caused to the painting during transportation, handling & installation at site, if there is no major damage to the painting. However, hangers, supports etc. of bus trunking & cable tray etc. shall be painted with required shade including painting with two coats of anticorrosive primer paint or pressurized paint for touch up of powder coated equipment at site.

aaaa) The scope of works includes the on job technical training of two persons of department at site. Nothing extra shall be payable on this account.

**CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF MINOR  
COMPONENT OF WORK**

**Name of work:** .

I / We hereby give my consent to associate with M/s.....,  
for Executing the minor component of work of  
.....  
(Mention category).

I / We will execute the work as per specifications and conditions of the agreement and as per directions of the Engineer –in-Charge for the corresponding minor 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.

Also, I / We will employ full time technically qualified Engineer / supervisor for the minor component of the work as required for the work. I / We will attend inspection of officers of the department as and when required.

Date:

Signature with date of Major component  
Contractor  
Address

Signature with date of Associate/Minor Component  
Contractor  
Address

Witness with address  
(From major component contractor side)

Witness with address  
(From minor component contractor side)

**PROPOSAL FOR ELIGIBLE ASSOCIATING AGENCIES FOR MINOR  
COMPONENTS OF WORK**

I/we hereby propose the following agencies as mentioned against each for executing corresponding minor components of work. Their consent letters are also attached.

<b>Sl. No</b>	<b>Name of Associated Contractor</b>	<b>Category and class of registration</b>	<b>Enlistment copy / Completion Certificates attached</b>	<b>Monetary Limit of work</b>	<b>Validity of registration</b>	<b>Consent Letter Attached (Yes/No)</b>
1)						

**Note:** Self-Attested photocopies of enlistment order, valid electrical contractor license, work experience certificates of each agency for each component of E&M work shall be submitted.

Signature of contractor

**AFFIDAVIT OF MEMORANDUM OF UNDERSTANDING (MOU)**

(to be submitted for each and every E&M component)

M/s. (Name of the firm with full address) .....Enlistment Status (Valid Upto)  
.....(Henceforth called the main Contractor)

M/s. (Name of the firm with full address)..... Enlistment Status (Valid  
Upto).....(Henceforth called Associated Contractor)

For the execution of E &M component Works

**Name of work:** .....

We state that M.O.U between us will be treated as an agreement and has legality as per Indian Contract Act (amended up to date) and the department (CCU) can enforce all the terms and conditions of the agreement for execution of the above work. Both of us shall be responsible for the execution of work as per the agreement to the extent this MOU allows. Both the parties shall be paid consequent to the execution as per agreement to the extent this MOU permits. In case of any dispute, either of us will go for mediation by the Engineer In charge. Any of us may appeal against the mediation to the Chief Engineer, ..... His decision shall be final and binding on both of us.

We have agreed as under:

The Associated Contractor will execute all E & M works in the wholesome manner as per terms and conditions of the agreement.

The Associated Contractor shall be liable for disciplinary action if he fails to discharge the action(s) and other legal action as per agreement.

All the machinery and equipments, tools and tackles required for execution of the E & M works, as per agreement, shall be the responsibility of the Associated Contractor.

The site staff required for the E & M work shall be arranged by the Associated Contractor as per terms and conditions of the agreement.

SIGNATURE OF MAIN CONTRACTOR

Date:

Place:

SIGNATURE OF ASSOCIATED CONTRACTOR

Date :

Place:

Witness with address

(From major component contractor side)

Witness with address

(From minor component contractor side)



**UNDERTAKING LETTER FROM MANUFACTIRERES OF LED FITTINGS  
(ON THEIR LETTER HEAD)**

We hereby agree that:

1. All the LED fittings supplied by us are guaranteed for five years including drivers from the date of handing over.
2. In case of discontinuation of model and non-availability of spares, we will replace the fittings with equivalent/ high end model in case of manufacturing defect during the warranty period of 5 years.

For M/S .....,

.....

(Authorized signatory of manufacturer of LED luminaries)

Counter Signature,

Major contractor

## **LIST OF PREFERRED MAKES OF MATERIALS**

Acceptable makes of materials to be used in the work are enclosed. In case of non-availability of these makes, the Superintending Engineer, CCU may allow use of alternative makes on the recommendations of Engineer-in-charge. Only BIS marked materials in the list shall be used in the work. Non-BIS marked materials may be permitted by the Engineer-in-charge only when BIS marked materials are not manufactured. If approved make/brand of any material is not given in the list, the same will be approved by the Superintending Engineer, CCU on the recommendations of Engineer-in-charge.

SL. NO.	ITEMS	MAKES
	<b>ELECTRICAL INSTALLATIONS &amp; GENERAL</b>	
1	WIRES AND CABLES a) PVC INSULATED FRLS COPPER CONDUCTOR SINGLE CORE CABLE b) 1.1 KV GRADE XLPE POWER CABLE AND CONTROL CABLE c) FIRE SURVIVAL CABLE d) 11 KV GRADE XLPE POWER CABLE e) COMMUNICATION CABLE	POLYCAB/ KEI/ HAVELLS/ RR KABEL/ FINOLEX
2	a) MS CONDUIT/ PVC CONDUIT AND ITS ACCESSORIES b) GI PERFORATED CABLE TRAY c) GI RACEWAY	AKG / BEC / NIC
3	MODULAR SWITCH & SOCKET	MK -ORNA / HAVELLS (CRABTREE MURANO) / SCHNEIDER LIVIA OR MILUZ LARA
4	ANCHOR FASTENER	HILTI/ 3M/ FISCHER
5	CABLE LUGS AND BRASS GLAND	GRIPWEL / DOWELL/ COMET
6	CAT-6 UTP CAT-6A, UTP UTP PATCH CORD FIBRE OPTICS CABLE	PANDUIT/ BELDEN / 3C3 / DERWISER
8	UPVC / HDPE PIPE/DWC	DURALINE/ REX/ TIRUPATI
9	RACK FOR ALL (EPABX / AUDIO VIDEO / CCTV etc.)	PANDUIT/ APC INDIA / 3C3 / IMPULSE/ NEXXUX / BELDEN
10	PAINT, PRIMER	ASIAN PAINT/ NEROLAC / BERGER/ ICICI
11	MS PIPE, GI PIPE	SAIL/ TATA/ JINDAL (HISSAR)/JINDAL STAR
12	SERVER / DESKTOP	DELL / HP/ IBM / LENOVO / PANASONIC
13	WI- FI SYSTEM & NETWORK SWITCHES	CISCO/ JUNIPER/ NEXXUUS / IMPLUSE / BELDEN
14	STRUCTURAL STEEL	TATA/ SAIL/ JINDAL HISSAR / APL-APOLLO
15	WATER SUPPLY, STP, DRAINAGE, SUBMERSIBLE PUMPS	KIRLOSKAR /KSB/ GRUNDFOSS/ WILO/ XYLEM/ ARMSTRONG/LUVI
	<b>DG SET</b>	
1	DIESEL ENGINE	CUMMINS / CATERPILLER/ PERKINS/ KIRLOSKAR OIL ENGINE LTD.
2	ALTERNATOR	STAMFORD/ KIRLOSKAR ELECTRIC
3	PROTECTION RELAYS & CT'S	L&T/ SIEMENS/ SCHNEIDER ELECTRIC
4	BATTERY	EXIDE / AMARON/ AMARAJA
5	DG SET - ACOUSTIC ENCLOSURE & ASSEMBLER	KIRLOSKAR (JACKSON) / SUDHIR / CUMMINS INDIA
6	AMF CONTROLLER	AS PER OEM

7	POWER/ AUXILLARY CONTACTOR/ CAPACITOR DUTY CONTACTOR / METERS INCLUDING DIGITAL METERS / INDICATING LAMP (LED TYPE) / PUSH BUTTON / STARTERS /OVERLOAD RELAY / TIMER	L&T/ SIEMENS/ SCHNIEDER ELECTRIC/ ABB
	<b>SUB-STATION</b>	
1	11 KV VCB PANEL	ABB / SCHNEIDER ELECTRIC/ SIEMENS/TRICOLITE
2	a) DRY TYPE (11KV/433 VOLT)	KIRLOSKAR/ VOLTAMP/ ABB/CROMPTON GREEVES
	b) OIL TYPE TRANSFORMER (11KV/433 VOLT)	
3	ACB	SCHNEIDER ELECTRIC – MASTERPACT NW (6.0A)/ L&T - U POWER OMEGA (MTX3.5)/ SIEMENS 3WL (ETU 45B)/ ABB EMAX (PR122)
4	MCCB	SCHNEIDER – COMPACT NSX/ L&T DU/ ABB TMAX
5	MCB/ RCCB/ ISOLATOR	SCHNEIDER - ACTI9/ HAGER-H3/ SIEMENS BETA GUARD 10KA/ ABB SB200M
6	MCB DB	HAGER (H3) / SIEMENS (BETAGARD) /SCHNEIDER (ACTI-9)/ABB (ITUS)
7	MAIN LT PANEL/ SUB LT PANELS/ CAPACITOR PANEL/ SYNCHRONIZING PANEL WITH ACCESSORIES/ STARTER PANEL	NEPTUNE/ ADVANCE PANELS & SWITCHGEAR (P) LTD / ADLEC / TRICOLITE/ASPL
8	BUS DUCT, AIR INSULATED COMPACT RISING MAINS, END FEED UNIT, TAP-OFF BOX (PLUG-IN TYPE)	SCHNEIDER ELECTRIC/ LEGRAND / L&T/RR
9	HT, LT JOINTING KIT & TERMINATION KIT	REYCHEM / 3M / ABB
10	SOFT STARTERS	SIEMENS/ SCHNEIDER/ ABB / L&T
11	CT, PT	ADVANCE / KAPPA / AE
	<b>UPS</b>	
1	UPS	SCHNEIDER (APC)/ EATON/ EMERSON (VERTIV)/ PEGASUS/ ABB / NUMERIC
	<b>LIGHTING, FIXTURES &amp; FANS</b>	
1	CEILING FAN / EXHAUST FAN / KITCHEN FRESH AIR/ WALL FAN	HAVELLS/ CROMPTON/ USHA /BAJAJ
2	LED EXIT SIGNAGE	MR. LITE/ PROLITE
3	A) LED INDOOR LUMINAIRES B) LED DECORATIVE LIGHT LUMINAIRES C) LED STREET LIGHT D) BOLLARDS & OUTDOOR FITTINGS	PHILIPS/ REGENT/ LIGHTING TECHNOLOGY
4	MS DECORATIVE POLE	PHILIPS/ BAJAJ / HILITE/ TWINKLE LUXMAX/ HAVELLS/ LUSTER
5	POLYCARBONATE JUNCTION BOX WITH CONNECTOR	HENSEL / RITTAL/ SCHNIEDER
6	SENSORS & TIMER FOR LIGHT CONTROL	PHILIPS / HONEYWELL / SCHNEIDER ELECTRIC / HAVELLS
	<b>EPABX</b>	
1	IP-PBX SYSTEM / IP PHONE	CISCO / CORAL / TADIRAN
	<b>FIRE ALARM SYSTEM</b>	
1	a) ADDRESSABLE FIRE ALARM CONTROL PANEL b) ADDRESSABLE DETECTORS c) GRAPHIC USER INTERFACE SOFTWARE d) MONITOR & CONTROL MODULE	EDWARDS / NOTIFIER (HONEYWELL) / SIEMENS / BOSCH

	e) RESPONSE INDICATORS f) MANUAL CALL BOXES & HOOTERS g) INPUT /OUTPUT DEVICES	
	PUBLIC ADDRESS SYSTEM	
1	a) PYBLIC ADDRESS SYSTEM CONSOLE AND ALL ACCESSORIES b) P.A. SPEAKERS c) AMPLIFIERS	BOSCH/ BIAMP/ HONEYWELL
	<b>FIRE FIGHTING SYSTEM</b>	
1	a) 2-WAY/4-WAY FIRE BRIGADE CONNECTION b) AIR RELEASE VALVE c) LANDING VALVE d) BRANCH PIPE e) FIRST AID HOSE REEL AND DRUM f) RRL HOSE PIPE g) FIRE MAN AXE	SAFEX/ NEWAGE/ LIFE GUARD / EXFLAME
2	DIESEL ENGINE (FIRE-FIGHTING)	CUMMINS/ KIRLOSKAR / CATER PILLER
3	FIRE EXTINGUISHERS	CEASEFIRE/ MINIMAX/ NEWAGE / SAFEX / KANEX / EXFLAME
4	FLEXIBLE DROP & FLEXIBLE COUPLINGS	LIFE GUARDS / VICTAULIC/ TYCO
5	a) INSTALLATION CONTROL VALVE b) DELUGE VALVE c) SPRINKLER HEADS	TYCO / VICTAULIC / HD / HONEYWELL
6	SPRINKLER PANEL, CURTAIN SYSTEM PANEL PRESSURE RELEASE VALVE ZONE CONTROL VALVE (ZCV)	TYCO / HONEYWELL / HD
7	ALL FIRE FIGHTING PUMPS	GRUNDFOSS / WILO / MATHER PLATT / KIRLOSKAR
8	ELECTRICAL MOTOR	ABB/ KIRLOSKAR ELECTRIC CO./ SIEMENS INDIA LTD
9	THERMAL INSULATION FOR EXHAUST PIPE	UPTWIGA/ LLOYD INSULATION/ OWENS CORNING/ KIMMCO
10	M.S. FITTINGS	VS / DRP / VICTAULIC / UNIK
11	WELDING RODS	ADORE / ESAB/ MARGLAM
12	BUTTERFLY (MANUAL, GEAR OPERATED) VALVES, NON-RETURN VALVES, SLUICE VALVES Y-TYPE STRAINER FOOT VALVE WITH STRAINER AIR RELEASE VALVE BALL VALVES	AUDCO / ZOLOTO / SANT / HONEYWELL
13	TAMPER SWITCH FOR BUTTERFLY VALVE	HONEYWELL/ POTTER/ RAPID CONTROL/ SYSTEM SENSOR/ PACIFIC FIRE
14	PRESSURE SWITCH FLOW TEST METER	DANFOSS/ INDFOS/ VIKING/ DELTA CONTROL
15	PRESSURE GAUGE LIQUID FILLED	FEIBIG/ H. GURU/ EMERALD/ WAAREE
	<b>HVAC</b>	
1	SPLIT TYPE AC	HITACHI/ MITUSBISHI/ O-GENERAL
2	REFRIGERANT PIPING	MANDEV / MEXFLOW / RR SHRAMIK
3	CLOSED CELL NITRILE RUBBER INSULATION/ EPDM INSULATION	ARMAFLEX /AEROCELL / ALP
4	INLINE FANS	SYSTEMAIR/ KRUGER/ GREENHECK/ HUMIDIN/ NICOTRAAIR
5	CHILLER	TRAIN/ TROX/ YORK/DAIKEN
6	CHILLER PUMP	ARMSTRONG/ GROUND FOSS/XYLEM
7	AIR HANDLING UNITS/ TREATED FRESH AIR UNITS	SYSTEMAIR/ EDGETECH/ TRANE/ VTS/ BALANCE/ ZECO / WAVES

8	AIR WASHER	SYSTEMAIR/ EDGETECH / TRANE/ VTS/ BALANCE/ ZECOW/ WAVES
9	AIR SEPARATOR	XYLEM/ EMERALD/ ANERGY/ KD AGENCIES
10	COOLING TOWERS (CTI/ CERTIFIED)	ADVANCE/ MARLEY/ PAHARPUR/ BELL
11	GI SHEETS DUCTING ETC	SAIL/ TATA/ JINDAL
12	CO2 SENSOR	SCHNEIDER/ HONEYWELL/ SIEMENS
13	PPR PIPE	JINDAL HISSAR / ASTRAL / FUSION
14	CENTRIFUGAL & AXIAL FANS VANE AXIAL IN-LINE FANS AND THEIR MOTORS	KRUGER/ GREENHECK/ NICOTRA/ WITH MOTOR FROM THEIR APPROVED OEM
15	VIBRATION ISOLATOR RUBBED PAD DUCT SUPPORT ARRANGEMENT	DUNLOP/ RESISTOFLEX/ GERB
16	GRILL DIFFUSER FIRE DAMPERS LOUVERS VOLUME CONTROL DAMPER	SYSTEM AIR/ CARRYAIRE/ COSMOS/ TRISTER / GREENHECK/ BALANCE
17	FLEXIBLE GROOVED FITTINGS COUPLINGS	VICTAULIC/ TYCOGRINNEL/ VIKING
18	PRE FABRICATED DUCT DUCT FLANGE (WITH GI SHEETS OF MAKES)	ZECO/ ROLLASTAR/ DUCTOFAB/ WAVES
19	VARIABLE FREQUENCY DRIVE	DANFOSS/ ABB / HONEYWELL/ SIEMENS / SCHNEIDER
20	ALUMINUM TAPE	JOHNSON/ BIRLA-3M/ NIPPON INDUSTRIES
	<b>LIFT</b>	
1	LIFT	KONE ELEVATORS INDIA PVT. LTD./ MITSUBISHI / SCHINDLER/ OTIS ELEVATOR/ JHONSON / THYSSENKRUPP
	<b>SOLAR POWER</b>	
1	POWER CONDITIONING UNIT (PCU)	SMA(GERMANY)/DELTA/SCHNEIDER ELECTRIC/ABB/PANASONIC
2	SOLAR PV PANEL	TATA SOLAR/ WAAREE ENERGY/ADANI SOLAR
3	SOLAR INVERTERS	DELTA / ABB / SMA
	<b>STP</b>	
1	PLANT MANUFACTURER	GRANNUS WATER AND ENVIRONMENTAL SOLUTIONS PVT. LTD./ CIMERA ENGINEERS/ SPECTRUM ENGINEERING TECH PVT. LTD. / ION EXCHANGE / ZETA4/ WATERNEER
2	AIR BLOWER	EVEREST / BETA / ROBUSCHI
3	AIR DIFFUSERS	REHAU / SSI AERATION / MM AQUA
4	RAW SEWERAGE TRANSFER PUMP / SLUDGE RECYCLE PUMP / FILTER FEED PUMP / NON CLOG HORIZONTAL CENTRIFUGAL PUMP/ DE WATERING PUMP / DOSING PUMP/ SBR FEED PUMP/ FILTER FEED PUMP/ SLUDGE PUMP/ CHLORINE DOSING PUMP	ARMSTRONG / XYLEM / GRUNDFOS/ / WILO
5	FILTER PRESS	SACHINFILTECH / PHARMATECH / HITECH
6	TUBE SETTLER MEDIA /MBBR MEDIA	WELBRICK / PHARMATECH / MM AQUA
7	M.S. FILTER	WELBRICK / ION EXCHANGE / ASTHA / THERMAX / ZETA4
8	OZONATOR	CREATIVE/ OZONICS/ ORAPL / CHEMTRONICS / FARADAY
9	NON CLOGG HORIZONTAL SCREW TYPE FILTER PRESS PUMP	ROTO/ POSITIVE/ ROTAMAC/ TUSHACO
10	CENTRIFUGE	APOLLO/ WELBRICK/ GWSPL/ PHARMATECH / GEA
11	PRESSURE GAUGE	H GURU / FEIBIG / GLUCK / BAUMER
12	BUTTERFLY / DUAL PLATE CHECK VALVES	AUDCO / ZOLOTO / ADVANCE / CASTLE / SANT
13	PLC	DELTA/ SIEMENS/ SCHNEIDER

	<b>AUDIO-VIDEO</b>	
1	LED VIDEO WALL / LED DISPLAY	SAMSUNG/LG/ PANASONIC / SONY
2	PROJECTOR	CHRISTIE / BARCO / NEC
3	WIRELESS AND WIRED MICROPHONE BOUNDARY MICROPHONE GOOSNECK MICROPHONE WIRELESS CHARGER FOR WIRELESS GOOSNECK MICROPHONE ANTENNA & SPLITTER/ COMBINER	SHURE / SENNHEISER / AUDIO TECHNICA
4	DIGITAL PODIUM	AHA/ UNI/ BRONX
5	NETWORK VIDEO ENDPOINT	QSC/KRAMER/EXTRON/ LIGHTWARE/ CRESTRON/ LUMENS
6	FULL RANGE CEILING SPEAKERS 2 WAY SPEAKER – TYPE 1 & 2 SUBWOOFER SURROUND SPEAKER PASSIVE COLUMN ARRAY LOUDSPEAKER – TYPE 1 & 2	QSC/ BOSE / TW AUDIO
7	AMPLIFIER	QSC/ LAB GRUPPEN / POWER SOFT
8	DIGITAL SIGNAL PROCESSOR	QSC/ BOSE / SYMETRIX
9	DIGITAL IP BASED CHAIRMAN UNIT DIGITAL IP BASED DELEGATE UNIT WIRELESS DELEGATE UNIT WIRELESS CHAIRMAN UNIT WIRELESS CONFERENCE CONTROLLER	SENNHEISER/ SHURE / TELVIC
10	MATRIX SWITCHER DISTRIBUTION AMPLIFIER, TRANSMITTER & RECEIVER	LIGHTWARE/ EXTRON/ CRESTRON
11	TABLE MOUNT ENCLOSURE	KRAMER/CRESTRON/ LOGIC
12	PTZ CAMERAS	SONY/ LUMENS/ QSC/ PANASONIC
13	RECORDER & STREAMING SYSTEM	LUMENS/ MEDIA POINTE/ PANASONIC/ SONY
14	CONTROL TOUCH PANEL AND CONTROL SYSTEM	CRESTRON/QSC/EXTRON
15	SPEAKER & MICROPHONE CABLE	KRAMER / BELDONE / KRYSTAL
	CONTROL CABLE	
16	HDMI CABLE ACTIVE USB CABLE	CRESTRON/ EXTRON/ LIGHTWARE
17	VIDEO CONFERENCE SYSTEM	CISCO/ POLYCOM/ CRESTRON
	<b>CCTV</b>	
1	PTZ, BULLET, DOOM CCTV CAMERA NVR	AXIS / HONEYWELL ENTERPRISES/ MOBOTIX IMPULS
	<b>BOOM BARRIER</b>	
1	BOOM BARRIER	DESIGNA / NEPTUNE / GODREJ
	<b>FIRE SUPPRESSION SYSTEM</b>	
1	FIRE SUPPRESSION SYSTEM	SVS BUILDWELL / SAFEX / LIFEGUARD
	<b>WTP</b>	
1	WTP	ZETA4 / WATERNEER / ION EXCHANGE

**Note:**

1. The contractor shall submit samples & technical submittals of all material before procurement for approval & shall procure after approval directly from manufacturer and the Authorized dealers only.
2. Material not specified in attached list of acceptable makes shall be got approved from Engineer-in-charge & consultant before use on work. Decision of Engineer-in-charge & Consultant shall be final in this respect.
3. Either the model shall be got approved or Sample shall be submitted for approval by Engineer in Charge before confirming order to supplier.



4. Contractor shall normally not use more than two (except for Equipment's: Lifts, DG Set, Transformer, HVAC Equipment's, UPS, where only One make is allowed) out of the above preferred makes.
5. For any item not covered in the above list, the contractor shall get the samples and make approved from the Engineer-in-charge before the supply is made.
6. All items shall confirm to e-waste management and handling rules 2011 issued by Min. of Environment and Forest, Government of India or ROHS (restrictions on use of Hazardous substances)/WEEE compliant as per EU norms or American norms. Certificate shall be submitted wherever applicable.
7. The material shall not be older by more than Six months from date of supply at site.
8. Proof of dispatch from factory/dealer shall always be submitted to Engineer-in-charge for verification.

# **SCHEDULE OF QUANTITY FOR ELECTRICAL WORK**

**ANNEXURE -III****SCHEDULE OF QUANTITY (E&M WORK)**

**Name of Work :** Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.

Item No.	Description of Item	Qty	Unit	Rate	Amount
	<b><u>Package - I ( IED)</u></b>				
	<b><u>SUBHEAD-I/1 (WIRING &amp; SWITCH SOCKET )</u></b>				
1	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc as required.				
1.1	Group -C	540	Point	1,403.00	7,57,620.00
2	Wiring for group controlled (looped) light point/fan point/exhaust fan point/ call bell point (without independent switch etc.) with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed PVC conduit, and earthing the point with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable etc. as required.				
2.1	Group -C	720	Point	794.00	5,71,680.00
3	Wiring for twin control light point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed <b>PVC</b> conduit, 2 way modular switch, modular plate, suitable size GI. box and earthing the point with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc. as required.	21	Point	1,499.00	31,479.00
4	Wiring for light/ power plug with 2X4 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed <b>PVC</b> conduit alongwith 1 No. 4 sq. mm FRLS PVC insulated copper conductor single core cable for loop earthing as required.	3380	Mtr	329.00	11,12,020.00
5	Wiring for light/ power plug with 4X4 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed PVC 1 conduit alongwith 2 Nos. 4 sq. mm FRLS PVC insulated copper conductor single core cable for loop earthing as required	3090	Mtr	536.00	16,56,240.00
6	Wiring for circuit/ submain wiring alongwith earth wire with the following sizes of FRLS PVC insulated copper conductor, single core cable in surface/ recessed <b>PVC</b> conduit as required.				
6.1	2 X 1.5 sq. mm + 1 X 1.5 sq. mm earth wire	2695	Mtr	214.00	5,76,730.00
6.2	4 X 1.5 sq. mm + 2 X 1.5 sq. mm earth wire	1950	Mtr	302.00	5,88,900.00
6.3	2 X 6 sq mm + 1 X 6 sq mm earth wire	90	Mtr	435.00	39,150.00
6.4	2 X 10 sq. mm + 1 X 6 sq. mm earth wire	235	Mtr	588.00	1,38,180.00
6.5	4 X 6 sq. mm + 2 X 6 sq. mm earth wire	145	Mtr	759.00	1,10,055.00

6.6	4 X 10 sq. mm + 2 X 6 sq. mm earth wire	90	Mtr	1,058.00	95,220.00
6.7	4 X 16 sq. mm + 2 X 6 sq. mm earth wire	550	Mtr	1,473.00	8,10,150.00
8	Supplying and fixing <b>two modules</b> stepped type electronic fan regulator on the existing modular plate switch box including connections but excluding modular plate etc. as required.	2	Nos.	492.00	984.00
9	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as reqd	200	Nos.	47.00	9,400.00
10	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 A modular socket outlet and <b>5/6 A modular switch</b> , connections etc. as required.	43	Nos.	574.00	24,682.00
11	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 A modular socket outlet and <b>15/16 A modular switch</b> , connections etc. as required	238	Nos.	701.00	1,66,838.00
12	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 2 nos. 3 pin 5/6 A modular socket outlet and <b>2 nos. 5/6 A modular switch</b> , connections etc. as required.	135	Nos.	865.00	1,16,775.00
13	Supplying and fixing <b>20 A, 240 V, SPN Industrial type socket outlet</b> , with 2 pole and earth, metal enclosed plug top alongwith 20 A "C" curve, SP, MCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required.	5	Nos.	3,448.00	17,240.00
14	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.				
14.1	20mm	1000	Mtr	110.00	1,10,000.00
14.2	25mm	800	Mtr	122.00	97,600.00
14.3	32mm	500	Mtr	151.00	75,500.00
	<b><u>SUBHEAD-I/2 (MCB &amp; DBs )</u></b>				
1	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator)				
1.1	6 Way, Double Door (2+4 Way)	5	Nos.	1,882.00	9,410.00
1.2	8 way, Double door (2+8 Way)	3	Nos	2,063.00	6,189.00
1.3	12 way, Double door (2+12 Way)	1	Nos	2,404.00	2,404.00
2	Supplying and fixing following way, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/ Isolator) (IP-43)				
2.1	6 way (4 + 12), Double door	8	Nos	4,604.00	36,832.00

2.2	8 way (4 + 24), Double door	18	Nos	5,455.00	98,190.00
2.3	12 Way (4+ 36), Double Door	7	Nos	7,889.00	55,223.00
3	Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer ) as required . (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.)				
3.1	4 Way (4 + 12), Double Door	24	Nos	8,744.00	2,09,856.00
4	Supplying and fixing <b>cable end box (Loose wire box) (IP 43)</b> suitable for following single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with testing and commissioning etc. as required				
4.1	6 Way, Double Door (2+4 Way)	5	Nos	859.00	4,295.00
4.2	8 way, Double door (2+8 Way)	3	Nos	947.00	2,841.00
4.3	12 way, Double door (2+12 Way)	1	Nos	1,035.00	1,035.00
5	Supplying and fixing <b>cable end box (Loose wire box)(IP43)</b> suitable for following triple pole and neutral, sheet steel, MCB distribution board, 415V, on surface/ recess, complete with testing and commissioning etc. as required				
5.1	6 way (4 + 12), Double door	8	Nos	1,363.00	10,904.00
5.2	8 way (4 + 24), Double door	24	Nos	1,416.00	33,984.00
5.3	12 Way (4+ 36), Double Door	7	Nos	2,766.00	19,362.00
6	Supplying and fixing <b>cable end box (Loose wire box)</b> suitable for triple pole and neutral, sheet steel, Vertical MCB distribution board, 415 V, on surface/ recess, complete with testing and commissioning etc. as required.	24	Nos	2,122.00	50,928.00
7	Supplying and fixing following rating, 240/415 volts, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
7.1	6 amps -32 amps SP MCB	876	Nos	298.00	2,61,048.00
7.2	6 amps -32 amps DP MCB	8	Nos	740.00	5,920.00
7.3	40 amps -63 amps DP MCB	1	Nos	1,133.00	1,133.00
7.4	40 amps -63 amps TP MCB	96	Nos	1,737.00	1,66,752.00
7.5	40 amps -63 amps FP MCB	33	Nos	2,166.00	71,478.00
8	Providing and fixing following rating and breaking capacity MCCB in existing cubicle panel board including drilling holes in cubicle panel, making connections, etc. as required.				
8.1	125 Amp, TP MCCB 16 KA	24	Nos	9,098.00	2,18,352.00
9.0	Supplying, installing on wall, testing and commissioning of following capacity Air Insulated Compact Type <b>Rising Main</b> for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with enclosure having IP-54 rating after fixing the tap off boxes and all accessories, made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4				

	Nos aluminium bus bars having current density of 130 A/ sq cm at nominal current rating, necessary joints, elbow joints & expansion joints, fire barrier at each floor, continuous earthing with 2 Nos aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, suspenders, angle iron bracket, steel fasteners, connecting to earthing system etc. as required.				
9.1	200 A Isc = 15kA for 1 second	96	Mtr	8258.00	7,92,768.00
10.0	Supplying, installation, testing & commissioning of following capacity <b>End Feed Unit</b> for the existing Air Insulated Compact Type bus trunking/ rising mains for use on 3 phase 4 wire 415 V, 50Hz A.C. supply made with 1.6mm thick steel sheet enclosure (IP54) duly powder coated with provision of MCCB/ACB (but without MCCB/ACB) complete with necessary joints including clamping brackets, angle iron bracket, steel fasteners, connecting to earthing system etc. as required				
10.1	200 A 15kA SC for 1 sec	4	Nos	8,833.00	35,332.00
11.0	Supplying, installation, testing & commissioning of following capacity <b>Plug In/ tap off box</b> on the existing Air Insulated Compact Type bus trunking/ rising mains for use on 3 phase 4 wire 415 V, 50Hz A.C. supply made with 1.6mm thick sheet steel enclosure (IP54) duly powder coated with provision of MCCB (but without MCCB) complete etc. as required				
11.1	125 A, Isc = 15 kA for 1 second	24	Nos	9,038.00	2,16,912.00
	<b><u>SUBHEAD-I/3 (Light &amp; External lighting )</u></b>				
1.0	Supply, Installation, Testing and Commissioning of surface mounting IP 65/66 LED Batten having minimum 2400 lumens output with system efficacy of 120 Lm/Watt or better, Aluminium Housing, Opal/ PC diffuser, PF $\geq$ 0.95, CRI $>$ 80, THD $\leq$ 10%, Service life of 50,000 hrs @ L70B50, , 5700/6500K CCT , i/c connections etc complete as required at site 20W Batten Light (With 5 Years Warranty)	105	Nos	5,992.00	6,29,160.00
2.0	Supply, Installation, Testing and Commissioning of Wall Mounted IP 65/66 Upto 6W LED having minimum 400 lumens output, Aluminium housing ,PF $\geq$ 0.95,CRI $>$ 80,THD $\leq$ 10%,service life of 50,000 hrs @ L70B50, , 4000 K CCT , i/e connections etc complete as required at site.5W Step light (With 5 Years Warranty)	16	Nos	5,826.00	93,216.00
3.0	Supply, Installation, Testing and Commissioning of surface mounting LED Batten Mirror light having minimum 1000 lumens output with minimum system efficacy of 100 Lm/Watt or better, Aluminium housing, PC Diffuser, SDCM $\leq$ 5, PF $\geq$ 0.95, CRI $>$ 80, THD $\leq$ 10%, Service life of 50,000 hrs @ L70B50, , 4000/5700/6500K CCT with inbuilt Driver, i/c connections etc complete as required at site. 10W Mirror Light (With 5 Years Warranty)	55	Nos	1,258.00	69,190.00
4.0	Supply, Installation, Testing and Commissioning of Round Surface Type 15/18 W Downlighter having Aluminium and Prismatic diffuser with min. 1650 lumens output, Efficacy not less than 100 lm/watt, THD $<$ 10%, PF $>$ 0.95 , CRI $\geq$ 80, 4000/5700K CCT and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site.15/18W Surface downlight (With 5 Years Warranty)	108	Nos	3,376.00	3,64,608.00



5.0	Supply, Installation, Testing and Commissioning of bulkhead luminaire having minimum 800 lumens output with min system efficacy of 80 Lm/Watt or better, Aluminium housing, Opal/Polycarbonate diffuser, SDCM $\leq 3$ , PF $\geq 0.95$ , CRI $>80$ , THD $\leq 10\%$ , Service life of 50,000 hrs @ L70B50, , 4000/5700K CCT with inbuilt Driver, i/c connections etc complete as required at site. 10W Bulkhead Light (With 5 Years Warranty)	44	Nos	2,421.00	1,06,524.00
6.0	Supply, Installation, Testing and Commissioning of 2x2 Clean room Fitting IP65 having minimum 3600 lumens output with min system efficacy of 100 Lm/Watt or better, Consists of precisely manufactured fabricated sheet metal ( CRCA)/ aluminium extruded frame, housing & Bottom frame, Highly transmittance PC/PMMA/ prismatic diffuser, Corrosion resistant white powder coated finish, PF $\geq 0.95$ , CRI $>80$ , THD $\leq 10\%$ , Service life of 50,000 hrs @ L70B50, , 4000/5700K CCT with inbuilt Driver, i/c connections etc complete as required at site. 2 X 2 clean room fitting (With 5 Years Warranty)	64	Nos	14,713.00	9,41,632.00
7.0	Supply, Installation, Testing and Commissioning of 2x2 Fitting IP40 having minimum 4100 lumens output with min system efficacy of 113 Lm/Watt or better, Consists of precisely manufactured fabricated sheet metal ( CRCA) frame, housing & Bottom frame, Highly transmittance PC/PMMA/ prismatic diffuser, Corrosion resistant white powder coated finish. PF $\geq 0.95$ , CRI $>80$ , THD $\leq 10\%$ , Service life of 50,000 hrs @ L70B50, , 4000/5700K CCT with inbuilt Driver, i/c connections etc complete as required at site. 2 X 2 Fitting (With 5 Years Warranty)	85	Nos	5,162.00	4,38,770.00
8.0	Supply, Installation, Testing and Commissioning of 2x2 Fitting With Dali Driver IP40 having minimum 4100 lumens output with min system efficacy of 110 Lm/Watt or better, Consists of precisely manufactured fabricated sheet metal ( CRCA) frame, housing & Bottom frame, Highly transmittance PC/PMMA/ prismatic diffuser, Corrosion resistant white powder coated finish . PF $\geq 0.95$ , CRI $>80$ , THD $\leq 10\%$ , Service life of 50,000 hrs @ L70B50, , 4000/5700K CCT with inbuilt Driver, i/c connections etc complete as required at site. 2x2 Fitting With Dali Driver (With 5 Years Warranty)	64	Nos	8,069.00	5,16,416.00
9.0	Supply, Installation, Testing and Commissioning of Round recessed Type Downlighter having Aluminium Housing and Prismatic diffuser with min. 1650 lumens output, Efficacy not less than 110 lm/watt, THD $<10\%$ , PF $>0.95$ , CRI $\geq 80$ , 4000/5700K CCT, With constant current driver and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site. 15W Round recessed Type Downlighter . (With 5 Years Warranty)	363	Nos	3,002.00	10,89,726.00
10.0	Supply, Installation, Testing and Commissioning of Round recessed reflector Type Downlighter with precise beam angle 38 degree for glare free light visibility, Aluminium Housing and Prismatic diffuser with min. 1500 lumens output, Efficacy not less than 100 lm/watt, THD $<10\%$ , PF $>0.95$ , CRI $\geq 80$ , 4000/5700K CCT, With constant current driver and Min. service life of 50000 Hrs @ L70B50 complete etc	35	Nos	2,836.00	99,260.00

	as required at site.15W Round recessed reflector Type Downlighter (With 5 Years Warranty)				
11.0	Supply, Installation, Testing and Commissioning of Round recessed Type Downlighter having Aluminium Housing and Prismatic/PS diffuser with min. 1300 lumens output, Efficacy not less than 110 lm/watt, THD<10%, PF>0.95 , CRI>=80, 4000/5700K CCT, with constant current driver and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site.12W Round recessed Type Downlighter (With 5 Years Warranty)	106	Nos	2,836.00	3,00,616.00
12.0	Supply, Installation, Testing and Commissioning of Round recessed Type Downlighter IP 20 having Aluminium Housing and Prismatic diffuser with min. 1100 lumens output, Efficacy not less than 110 lm/watt, THD<10%, PF>0.95 , CRI>=80, 4000/5700K CCT , 160-270V Constant current driver and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site.10W Round recessed Type Downlighter (With 5 Years Warranty)	24	Nos	2,670.00	64,080.00
13.0	Supply, Installation, Testing and Commissioning of Round recessed Reflector Type Downlighter with precise beam angle 38 degree for glare free light visibility IP 40 having Aluminium Housing and Prismatic diffuser with min. 2500 lumens output, Efficacy not less than 100 lm/watt, THD<10%, PF>0.95 , CRI>=80, 4000/5700K CCT, With Constant current driver and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site. 24W Round recessed Reflector Type Downlighter (With 5 Years Warranty)	30	Nos	7,238.00	2,17,140.00
14.0	Supply, Installation, Testing and Commissioning of Suspended task light IP 40 having Extruded Aluminium Housing and Satin/Prismatic diffuser with min. 3100 lumens output, Efficacy not less than 100 lm/watt, THD<10%, PF>0.95 , CRI>=80, 4000/5700K CCT, With Constant current driver and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site. 28W Suspended task light (With 5 Years Warranty)	1	Nos	12,222.00	12,222.00
15.0	Supply, Installation, Testing and Commissioning of Suspended Decorative Light IP 20 having PDC Aluminium Housing and Opal/High efficiency diffuser with min. 1200 lumens output, Efficacy not less than 100 lm/watt, THD<10%, PF>0.95 , CRI>=80, 4000/5700K CCT, With Constant current driver and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site. Dining Suspended Decorative Light (With 5 Years Warranty)	46	Nos	5,577.00	2,56,542.00
16.0	Supplying, Installation, Testing and Commissioning of Upto 40 Watt stylish LED Street light fitting with die cast aluminium housing having, Toughened Glass/PC Diffuser, Minimum 4050 Lumens output, CRI >=70, PF>=0.95, Min. service life 50000 Hrs @ L70B50, IP65/66 Ingress protection, With inbuilt driver ,Min. 4KV Surge Protection to be mounted on existing Street light pole including connections with 3 x 1.5 sq.mm. FRLS PVC insulated PVC sheathed copper conductor cable from looping box to Fitting etc. complete as reqd. LED Street light (With 5 Years Warranty)	14	Nos	8,234.00	1,15,276.00

17.0	Supplying, Installation, Testing and Commissioning of Upto 40 Watt GATE light with die cast aluminium housing, PC Diffuser, having Min. 4000 lumens , CRI $\geq 70$ , PF $\geq 0.95$ , Min. service life 50000 Hrs @ L70B50, IP65/66 Ingress protection, With inbuilt driver ,Min. 4KV inbuilt and 10Kv external Surge Protection to be mounted on existing Gate column including connections with 3 x 1.5 sq.mm. FRLS PVC insulated PVC sheathed copper conductor cable from looping box to post top lantern etc. complete as reqd. Gate light (With 5 Years Warranty)	4	Nos	27,275.00	1,09,100.00
18.0	Supplying, installation, testing and commissioning of Upto 10 Watt LED Bollard Light having Min. 650 lumens output, made out of PDC/Extruded Aluminium Housing, PC Diffuser, and specially designed Top with diffuser in bottom, IP66 IK 08 Protection , Height - Approx. 600-750 mm , Along with IP 66 Connectors i/c mounting base plate, duly wired, connection, etc. complete as reqd. The luminaire shall be BIS Registered with electronic driver with input voltage range of 140-300V, PF $\geq 0.95$ , 50000 Hrs LED life with L70B50 Criteria. The internal surge protection should min. 4kv and external spd of 10kv. 10 Watt LED Bollard Light (With 5 Years Warranty)	41	Nos	13,883.00	5,69,203.00
19.0	Supply , Installation, Testing & Commissioning of Integrated Post Top Lantern having die cast aluminium/CRCA housing, Toughned Glass/PC Diffuser, With Upto 25 W LED having Min. 2000 lumens output CRI $\geq 70$ , PF $\geq 0.95$ , THD $\leq 10\%$ Min. service life 50000 Hrs @ L70B50, IP65/66 Ingress protection, With inbuilt driver , Min. 4KV Internal Surge Protection and 10KV External Surge Protection, suitable to fix on post top pole or at main Gate complete as required. Post Top Lantern With 25 W LED (With 5 Years Warranty)	15	Nos	20,286.00	3,04,290.00
20.0	Supplying, Installation, Testing and Commissioning of Upto 25 Watt stylish LED Street light fitting with Die cast aluminium housing, Toughned Glass/PC Diffuser, having Minimum 3000 Lumen output, CRI $\geq 70$ , PF $\geq 0.95$ , Min. service life 50000 Hrs @ L70B50, IP65/66 Ingress protection, With inbuilt driver ,Min. 4KV Surge Protection to be mounted on existing 4 Mtr Street ligh pole including connections with 3 x 1.5 sq.mm. PVC insulated PVC sheathed copper conductor cable from looping box to post top lantern etc. complete as reqd. LED Street light (With 5 Years Warranty)	5	Nos	5,577.00	27,885.00
21.0	Supplying of 7 mtr long hot dip Galvanized octagonal Pole top of the pole Approx. 70 mm dia (A/F) and bottom of the pole Approx. 130 mm dia (A/F) made out of 3mm sheet with MS base plate of size (As per OEM Standard), opening inside the pole with flush door with locking facility preferably with LN key having proper arrangement with Accommodating of 1 Nos. 6 Amp, 10 KA SPMCB & neutral link 4 way connector suitable for 25 sqmm cable complete ii/c providing 4 Nos steel foundation bolts & nuts as per OEM Standard etc.as required.	19	Nos	18,044.00	3,42,836.00

23.0	Erection of metallic pole of following length in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) foundation including excavation and refilling etc. as required.				
a	Above 4/ 4.5 Mtr and upto 6.5 Mtr	15	Nos	4,984.00	74,760.00
b	Above 6.5 Mtr and upto 8 Mtr	19	Nos	6,002.00	1,14,038.00
22.0	Supplying, Installation, Testing and Commissioning of 4.0 /4.5 mtr. Aesthetically designed decorative hot dipped galvanised mild steel step pole with grey powder finish. Compatible for all post top range. Window - Plasma cut & duly chamfered opening window of 300x110 mm for terminal connections & mounting accessories. Window cover is fitted with allen screws to the pole etc as required.	15	Nos	29,070.00	4,36,050.00
24.0	Design, manufacture, Supply, installation, testing & commissioning at works of Double door panel fabricated with minimum 2mm thick MS sheet, , tapered drip proof top, angle iron legs, Conform to IS Specification, with IP-55 enclosure protection, as per IS-2137(Revised), floor mounting free standing on a suitable massanory pedestal outdoor type panel, provided with hinged detachable and lockable outer opening doors with the following incoming/outgoing MCCB/ MCBs mounted therein including making connections/ interconnections, earthing, painting etc. as required. The panel shall have canopy arrangement on the top. All MCB to be C curve .				
	(Note : The fault withstanding capacity shall be 10 KA for one sec. Earth bus shall be part of the panel. All MCB to be 10 KA breaking capacity.				
	<b>Feeder Pillar for Street light</b>				
	<b>Incommer</b>				
a	4-pole 63 Amp, 16KA MCCB - 1 Nos.				
b	63 A 4 Pole power contactor- 1 no				
c	Astronomical 24 hours time switch (L&T) - 1 no.				
d	By pass arrangement with toggle switch				
e	RYB LED indicating Lamp - 1 Set				
f	Bus Bar - 100 Amp TPN - 1 Set				
	<b>outgoing</b>				
a	32A DP MCB -5 nos.				
b	20A DP MCB -10 nos.				
c	10A DP MCB -5 nos.	1	Sets	92,016.00	92,016.00
	<b>LMS</b>				
25.00	SITC of Passive Infrared (PIR) technology based Occupancy sensor having high preformance, non regulating programmable type, suitable for connected load upto 10A, for mounting height upto 3 Mtr and for 6 Mtr dia Mtr coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	200	Nos	2,016.00	4,03,200.00
26.00	SITC of Passive Infrared (PIR) technology based Day light cum occupancy sensor with day light dimming lighting level shall be regulated as per availability of natural day light in an area along with occupancy detection.) having high preformance, regulating	95	Nos	13,389.00	12,71,955.00

	programmable type, suitable for connected load upto 10A, for mounting height upto 3 Mtr and for 6 Mtr diaMtr coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.				
27.00	SITC of 2-Channel DALI® Interface Interfaces with 2 independent DALI® loops Controls up to 128 DALI ballasts PoE communication for single-wire installation Integrated DALI power supply with all accessories including mounting arrangement etc as required.	1	Nos	3,51,706.00	3,51,706.00
	<b><u>SUBHEAD-I/4 (Cable work )</u></b>				
1.00	Supplying of one number XLPE insulated and PVC sheathed Armoured power cable of 1.1 KV grade as per IS 7098(Part I) 1988 as amended up to date of following size etc as required				
a.	4C x 6 sq.mm	730	Mtr	217.00	1,58,410.00
b.	4C x 10 sq.mm	560	Mtr	297.00	1,66,320.00
c.	4C x 16 sq.mm	1020	Mtr	317.00	3,23,340.00
d.	3.5C x 35 sq.mm	615	Mtr	471.00	2,89,665.00
e.	3.5C x 50 sq.mm	20	Mtr	640.00	12,800.00
f.	3.5C x 70 sq.mm	115	Mtr	860.00	98,900.00
g.	3.5C x 95 sq.mm	745	Mtr	1,074.00	8,00,130.00
h.	3.5C x 185 sq.mm	205	Mtr	2,020.00	4,14,100.00
i.	3.5C x 300 sq.mm	440	Mtr	3,121.00	13,73,240.00
2.00	Laying of one number PVC insulated / XLPE power cable of 1.1 KV grade of following sizes in the existing RCC/HUME/ METAL pipe as required.				
a.	Upto 35 sq.mm	765	Mtr	33.00	25,245.00
b.	Above 35 sq mm and Upto 95 sq.mm	80	Mtr	50.00	4,000.00
c.	Above 95 sq mm and Upto 185 sq.mm	60	Mtr	68.00	4,080.00
d.	Above 185 sq mm and Upto 400 sq.mm	30	Mtr	117.00	3,510.00
3.00	Laying of one number PVC insulated / XLPE power cable of 1.1 KV grade of following sizes in the existing masonry open duct as required.				
a.	Upto 35 sq.mm	215	Mtr	25.00	5,375.00
b.	Above 35 sq mm and Upto 95 sq.mm	190	Mtr	40.00	7,600.00
c.	Above 95 sq mm and Upto 185 sq.mm	55	Mtr	55.00	3,025.00
d.	Above 185 sq mm and Upto 400 sq.mm	210	Mtr	99.00	20,790.00
4.00	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.				
a.	Upto 35 sq. mm (clamped with 1mm thick saddle)	1945	Mtr	42.00	81,690.00
b.	Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	610	Mtr	86.00	52,460.00
c.	Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	90	Mtr	107.00	9,630.00
d.	Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp) mm	200	Mtr	169.00	33,800.00
5.00	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.				

a.	2 X 6 sq. mm (19mm)	60	Nos.	227.00	13,620.00
b.	2 X 10 sq. mm (19mm)	44	Nos	229.00	10,076.00
c.	4 x 16 sq.mm (28 mm)	64	Nos.	300.00	19,200.00
d.	4 x 35 sq.mm (32 mm)	10	Nos	359.00	3,590.00
e.	3.5 x 50 sq.mm (35 mm)	4	Nos	404.00	1,616.00
f.	3.5 x 70 sq.mm (45 mm)	8	Nos	462.00	3,696.00
g.	3.5 x 95 sq.mm (45 mm)	22	Nos	577.00	12,694.00
h.	3.5 x 185 sq.mm (57 mm)	6	Nos	868.00	5,208.00
i.	3.5 x 300 sq.mm (70 mm)	20	Nos	1,203.00	24,060.00
6.00	Supplying and installing following size of perforated pre-painted M.S. cable trays with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with M.S. suspenders including bolts & nuts, painting suspenders etc as required.				
a.	150 mm width X 50 mm depth X 1.6 mm thickness	350	Mtr	517.00	1,80,950.00
b.	300 mm width X 50 mm depth X 1.6 mm thickness	200	Mtr	654.00	1,30,800.00
c.	450 mm width X 50 mm depth X 2.0 mm thickness	250	Mtr	959.00	2,39,750.00
7.00	Supply and fixing of following sizes single/triple compartment under floor trunking made out of 1.6mm thick pregalvanised sheet steel complete with all accessories and fixing accessories as per site requirement all as required & specified.				
a)	225mm x 38mm x 1.6mm (3 compartment)	100	Mtr	459.00	45,900.00
b)	300mm x 38mm x 1.6mm (3 compartment)	50	Mtr	515.00	25,750.00
8.00	Supply, installation, testing & commissioning of under floor cross over box suitable for of following sizes with metal lid and suitable for three/ single compartment metal ducting / trunking / raceway made out of high pressure die- cast zinc alloy complete with all accessories such as top cover base support frame, base support stud etc. complete as required.				
a)	250mm x 250mm x 60-75mm.	60	Nos.	884.00	53,040.00
b)	300mm x 38mm x 1.6mm (3 compartment)	45	Nos.	1,275.00	57,375.00
	<b><u>SUBHEAD-I/5 (Main LT Panel, Essential Panel, APFC Panel &amp; Distribution Panel)</u></b>				
	Supplying, installation, testing & commissioning of cubicle type <b>LT panel</b> suitable for 415V, 3 Phase, 4 Wire 50 Hz Ac supply system, fabricated in compartmentalized (preferably) design from CRCA sheet steel of 2mm thick for frame work and covers, 3mm thick for gland, plates i/c cleaning & finishing complete with 7 tank process for powder coating in approved shade, having Suitable Amp capacity extensible type TPN aluminium alloy bus bars of high conductivity, DMC/SMC bus bar supports, with short circuit withstand capacity of 31 MVA for 1 Sec., bottom base channel of MS section not less than 100mmx 50mm x 5mm thick, fabrication shall be done in transportable sections, entire panel shall have a common copper earth bar of size 25mm x 5mm at the rear with 2 Nos. earth stud, solid connections from main bus bar to switch gears with required size of Al. bus bars and control wiring with 2.5 sq. mm. FRLS PVC insulated copper conductor S/C cable, cable alleys,				



	cable gland plates in two half, i/c providing following switch gears :-				
	<i>Note- All MCCBs of 250A &amp; above shall be Microprocessed release with O/L, S/C protection and below 250A shall be thermal magnetic release. All MCCB shall be with rotary handle and have Ics = 100 % Icu.</i>				
1.00	<b><u>NON ESSENTIAL PANEL (Panel shall be TTA as per IEC 61439)</u></b>				
I.	<b>Incoming for Transformer (2 x 630 KVA TRANSFORMER) :</b>				
a)	<b>2 Nos. 1250 Amps, 50KA, 440 volt</b> 4-P Electrically operated draw out ACB complete with Microprocessor releases based release for adjustable setting for over current, earth fault & short circuit protection with 4 line LCD (R,Y,B,N) display with bar graph for % loading of phases. all three current and neutral current (Class 1 accuracy), release should self powered requiring no external power supply, protection against phase unbalance, counting the number of operations and contact wear of arc chutes, protection against under , over frequency, voltage unbalance, reverse power, over temperature protection with 20 fault history and event history minimum 20 and inbuilt zone selective interlocking feature (Microprocessor based) having variable range with time lag facility to achieve discrimination. Required Interlocking with other incomers & Bus Coupler to be provided as per Interlocking / operation scheme indicated in Main Schematic Diagram. The ACB shall have suitable arrangement for termination of cable termination on incoming side and busbar connection at outgoing side, complete with following for each ACB:				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port with 3 Nos. current transformers of 1250/5 ratio, 15 VA Class 1.0 for Mtring.				
c)	6 nos NO/NC contacts for remote opening & closing.				
d)	Red/Green/Amber ON/OFF/TRIP indicating lamps with 2A SP MCB backup protection.				
e)	1 set of three phase indicating lamps along with 2A SP MCB backup protection.				
f)	Spring charge& DC supply healthy indicating lamp with 2A SP MCB backup protection.				
g)	1 no. current transformer of <b>1250/5A</b> ratio Class 1.0, 15 VA Burden for PF correction relay.				
h)	Motor wound spring closing mechanism.				
i)	Suitable arrangement to receive incoming Aluminium Cable of 4R 3.5C 300Sq.mm Size.				
j)	T-N-C Breaker control switch				
k)	Control MCB, control terminals& wiring as required.				
l)	One auto/manual selector switch				
m)	Combined Under voltage and over voltage relay ,3 Phase with Time delay setting.				
n)	Restricted Earth Fault Relay ,				
o)	1 no. current transformer of <b>1250/5A</b> ratio Class PS 15 VA Burden to be supplied loose to mount in Transformer				

II.	<b>Bus Couplers:</b>				
a)	<b>1 No. 1250 Amps</b> horizontal 4 pole electrically drawout type, air circuit breakers of fault breaking capacity 36 KA (Ics=Icu upto 433V) manually operated, with interlocked door, automatic safety shutters, mechanical ON/OFF and service/test/isolated position indicators and frame earthing contact conforming to IS-13947- 2-1993 as amended upto date complete with following accessories for each ACB:				
b)	Independent manual spring closing mechanism-I No.				
c)	Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.- 1 set				
III.	<b>Bus Bars:</b>				
a)	4 strip aluminium bus bars of minimum of <b>1400 Amps</b> capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bare cross section, size supports & their spacing etc. for withstanding fault level of 36 kA				
IV.	<b>Interlocking:</b>				
a)	Electrical through advance contacts in ACB's (incomers & Bus couplers) and mechanical (castel key) interlocking should be provided to ensure that only one supply is available at a time on each section of bus and to eliminate any possible of accidentally approaching two supplies at one bus section.				
V.	<b>Capacitor bank 2 nos 150 KVAR</b>				
	Supplying , Installation , testing , & commissioning of factory built floor mounted auto-manual capacitor bank of total capacity of 150 KVAR having 3 phase MPP heavy duty type with ISI marked / conforming to IEC power capacitor & suitable steps APFC relay having capacitor of sizes (25+25+25+25+10+10+10+10+5+5) including 1 No 10 KVAR as static provided with Thyristor Electronic switching of suitable rating to suppress switching of inrush current to improve capacitor life.				
	The system shall have micro processor based APFC relay provided in the command module for target P. F setting with digital P. F. display. The Controller consists: all three powers, .i. e KVA, KW and KVAR phase wise .				
	The system shall be provided with required capacity master MCCB having protection for over load, short circuit, etc.The panel shall be made of 2mm thick CRCA Sheet including 600 A size of 4- strip aluminum bus bar powder coated painting provided with exhaust fans (with thermostat) and grills for proper ventilation, interconnections with suitable size conductor cables & lugs and accommodating the following switchgears & accessories:				
a)	400A FP 36kA with Microprocessor based release for O/C, S/C & E/F Protection with Under Volatge Release Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.				
b)	10 step APFC relay - 1No.				

c)	Digital type voltMtr (0-500volt) - 1 No.				
d)	Digital type amMtr (0-800A) - 1 No.				
e)	Thyrister Electronic switches for 5/10/15 KVAR capacitor 440V - 6 Nos.				
f)	Thyrister Electronic switches for 25 KVAR capacitor, 440V - 4 Nos.				
g)	16A 10 KA MCB TP- 2 Nos.				
g)	25A 10 KA MCB TP- 4 Nos.				
h)	63A 25 KA thermal magnetic release MCCB TP- 4 Nos.				
i)	Selector switches of required Nos. for auto/manual control, indicating lamps				
j)	MPP heavy duty shunt capacityor 3 phase 440 volt:- (25+25+25+25+10+10+10+10+5+5) KVAR.				
VI.	<b>Outgoing (Sec-I):</b>				
a)	All MCCB shall have Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.- 1 set				
	400 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	250 Amp 4 Pole 36 KA MCCB – 2 Nos.				
	200 Amp 4 Pole 36 KA MCCB – 2 Nos.				
	100 Amp 4 Pole 36 KA MCCB – 1 Nos.				
VII.	<b>Outgoing (Sec-II):</b>				
a)	1 nos 630 amps 36 kA 440 volt FP EDO ACB with overcurrent and short circuit and earth fault module, with heavy duty solid detachable neutral link complete with:				
	ON/OFF indicating lamps with MCB as backup protection.				
	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of KWHr, V, A, equivalent to EM6433 NG, with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	All MCCB shall have Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.- 1 set				
	400 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	250 Amp 4 Pole 36 KA MCCB – 2 Nos.				
	200 Amp 4 Pole 36 KA MCCB – 2 Nos.				
	160 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	100 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	<i>Describe as above Non essential panel</i>	1	SET	28,45,934.00	28,45,934.00
2.00	<b><u>ESSENTIAL PANEL (Panel shall be TTA as per IEC 61439)</u></b>				

	Supplying, installation, testing & commissioning of cubicle type <b>LT panel</b> suitable for 415V, 3 Phase, 4 Wire 50 Hz Ac supply system, fabricated in compartmentalized (preferably) design from CRCA sheet steel of 2mm thick for frame work and covers, 3mm thick for gland, plates i/c cleaning & finishing complete with 7 tank process for powder coating in approved shade, having Suitable Amp capacity extensible type TPN aluminium alloy bus bars of high conductivity, DMC/SMC bus bar supports, with short circuit withstand capacity of 31 MVA for 1 Sec., bottom base channel of MS section not less than 100mmx 50mm x 5mm thick, fabrication shall be done in transportable sections, entire panel shall have a common copper earth bar of size 25mm x 5mm at the rear with 2 Nos. earth stud, solid connections from main bus bar to switch gears with required size of Al. bus bars and control wiring with 2.5 sq. mm. FRLS PVC insulated copper conductor S/C cable, cable alleys, cable gland plates in two half, i/c providing following switch gears :-				
	<b>Note- All MCCBs of 250A &amp; above shall be Microprocessed release with O/L, S/C protection and below 250A shall be thermal magnetic release. All MCCB shall be with rotary handle and have Ics = 100 % Icu.</b>				
<b>I.</b>	<b>Incoming form Non Essential Panel sec-I :</b>				
	400A FP 36kA with Microprocessor based release for O/C, S/C & E/F Protection with Under Voltage Release Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.				
<b>II.</b>	<b>Incoming form DG Set 125 KVA Sec_I :</b>				
a)	250A FP 36kA with Microprocessor based release for O/C, S/C & E/F Protection with Under Voltage Release Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of THD, KVARH KW, KWH, KVAR, PF, V, A, Hz ,with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	6 nos NO/NC contacts for remote opening & closing.				
d)	Red/Green/Amber ON/OFF/TRIP indicating lamps with 2A SP MCB backup protection.				
e)	1 set of three phase indicating lamps along with 2A SP MCB backup protection.				
f)	Spring charge & DC supply healthy, DG set on, MCCB ON indicating lamp with 2A SP MCB backup protection.				
g)	Motor wound spring closing mechanism -Motorised MCCB				
h)	Suitable arrangement to receive incoming cable of 1 runs of 3.5 x 185 sq. mm "Al." XLPE conductor.				
i)	T-N-C Breaker control switch				
j)	Control MCB, control terminals& wiring as required.				

k)	Combined Undervoltage & Overvoltage relay 3 phase with time delay setting, Reverse Power relay.				
l)	One auto/manual selector switch				
m)	one set of push buttons for DG start, DG Stop Reset & Emergency Stop.				
n)	One 16 amp automatic Battery charger with inbuilt facility of trickle / boost & consisting of :				
o)	DC AmMtr (0-30)V.				
p)	DC VoltMtr.(0-30)Amp				
q)	Charger ON, OFF indications .				
r)	1 Nos 6 Window microprocessor based annuciation panel (for each D.G. set) for following indications & Buzzer :				
s)	DG set Alarm				
t)	DG set Fault				
u)	DC supply failure				
v)	O/V Fault				
<b>III.</b>	<b>Incoming form Non Essential Panel sec-II :</b>				
	250A FP 36kA with Microprocessor based release for O/C, S/C & E/F Protection with Under Volatge Release Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.				
<b>IV.</b>	<b>Incoming form DG Set 58.5 KVA Sec- II :</b>				
a)	160A FP 36kA with Microprocessor based release for O/C, S/C & E/F Protection with Under Volatge Release Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of THD, KVARH KW, KWH, KVAR, PF, V, A, Hz ,with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	6 nos NO/NC contacts for remote opening & closing.				
d)	Red/Green/Amber ON/OFF/TRIP indicating lamps with 2A SP MCB backup protection.				
e)	1 set of three phase indicating lamps along with 2A SP MCB backup protection.				
f)	Spring charge & DC supply healthy, DG set on,MCCB ON indicating lamp with 2A SP MCB backup protection.				
g)	Motor wound spring closing mechanism -Motorised MCCB				
h)	Suitable arrangement to receive incoming cable of 1 runs of 3.5 x 95 sq. mm "Al." XLPE conductor.				
i)	T-N-C Breaker control switch				
j)	Control MCB, control terminals& wiring as required.				
k)	Combined Undervoltage & Overvoltage relay 3 phase with time delay setting, Reverse Power relay.				
l)	One auto/manual selector switch				
m)	one set of push buttons for DG start, DG Stop Reset &				

	Emergency Stop.				
n)	One 16 amp automatic Battery charger with inbuilt facility of trickle / boost & consisting of :				
o)	DC AmMtr (0-30)V.				
p)	DC VoltMtr.(0-30)Amp				
q)	Charger ON, OFF indications .				
r)	1 Nos 6 Window microprocessor based annuciation panel (for each D.G. set) for following indications & Buzzer :				
s)	DG set Alarm				
t)	DG set Fault				
u)	DC supply failure				
v)	O/V Fault				
<b>V.</b>	<b>Bus Couplers:</b>				
a)	250A FP 36kA with Microprocessor based release for O/C, S/C & E/F Protection with Under Volatge Release Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.				
b)	Independent manual spring closing mechanism-I No.				
c)	Breaker 'ON' indicating light with back up 2A HRC fuse/MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.- 1 set				
<b>VI.</b>	<b>BUSBAR Sec-I</b>				
	4 strip aluminium bus bars of minimum of 600 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bare cross section, size supports & their spacing etc. for withstanding fault level of 36 KA				
<b>VII</b>	<b>BUSBAR Sec-II</b>				
	4 strip aluminium bus bars of minimum of 300 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bare cross section, size supports & their spacing etc. for withstanding fault level of 36 KA				
<b>VIII.</b>	<b>Interlocking:</b>				
a)	All (incomers & Bus couplers) and mechanical (castel key) interlocking should be provided to ensure that only one supply is available at a time on each section of bus and to eliminate any possible of accidentally approaching two supplies at one bus section.				
<b>IX.</b>	<b>Outgoing Sec-I:</b>				
a)	All MCCB shall have Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.- 1 set				
	250 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	250 Amp 4 Pole 36 KA MCCB - 1 Nos.				
	200 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	160 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	100 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	63 Amp 4 Pole 36 KA MCCB – 3 Nos.				
<b>X.</b>	<b>Outgoing Sec-II:</b>				



a)	All MCCB shall have Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.- 1 set				
	160 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	100 Amp 4 Pole 36 KA MCCB – 1 Nos.				
	63 Amp 4 Pole 36 KA MCCB – 4 Nos.				
	<i>Describe as above Essential panel</i>	1	SET	17,87,465.00	17,87,465.00
3.00	<b><u>Distribution Panels:</u></b>				
	SITC of Distribution Panel made out of 2 mm thick sheet Steel , totally enclosed , IP54 protection , free standing / wall mounting dust and vermin proof , indoor type , copartmentalized, powder coated of approved shade after antirust treatment( with min. 7 tanks) suitable for operation on 3 phase and nutral 415V,, 50Hz, Ac supply system with Busbbar interconnection with suitable size of copper wire / solid Alluminium strips, control circuits, rotary operating handle for MCCBs & suitable spreader terminals for cable connections according to size, bottom base channel of MS section 50x50x5mm, fabrication shall be done in transportable section, entire panel shall have a common earth bus bar at rear with 2 nos. earth stud, cable alleys, cable gland plates in two half complete as required, as per Single Line Diagram and specification enclosed with the following switchgears:-.				
	<b>Note:-</b>				
	The panels shall be FRONT operated, with cable entry from the top /bottom. Earth bus shall be part of the panel.) (All MCB to be "C" Curve)				
	The following provisions shall be required to be made in the Distribution Panel as detailed below:				
	All live accessible parts shall be shrouded with 1mm thick polycarbonate/3 mm thick FRP sheet and all equipment shall be finger touch proof. The busbar insulation shall be with heat shrinkable sleeves according to the colour code. SMC shrouds and busbar supports shall be used. All MCCB door handle shall be interlocked and lockable in OFF position.				
	Galvanised hardware with zinc passivation shall be used in fabrication of Switchboards.				
	Suitable Aluminium earth bus to be provided throughout the length of Switchboards.				
	All indication lamps / illuminated push buttons shall be LED type.				
	Coil of all motor starters shall be fed from 440 V / 230 V Control Transformer.				
	2A SP MCBs shall be used as backup protections.				
	All MCCBs shall be variable setting type with thermal magnetic up to 630 A rating and with microprocessor based releases above 630 A rating, line load reversibility, Ics = 100% Icu,& rotary handle.				
	All control& power wiring shall be broughtout upto the cable alley in the terminal blocks.				
	An approval shall be taken for each panel before manufacturing.				

	Provision of one 6/16 amp socket & compartment lighting for each vertical section of main panel.				
	Illuminated push button on Starter Panels of Pumps.				
	Interlocking / Auto start command terminals for Starter panels. All Ventilation & pressurisation fans shall be interlocked with Fire Alarm Panel as per given logic.				
	All breaking Capacity for MCCB to be $I_{cs}=100\%I_{cu}$ .				
	All MCB to be C Curve				
<b>A</b>	<b>Car Charging Panel (PTTA):</b>				
<b>I.</b>	<b>Incoming:</b>				
a)	1 No. of 250 Amp FP MCCB of 16 KA Breaking capacity & inbuilt overcurrent and short circuit releases.				
<b>II.</b>	<b>Mtring for incoming:</b>				
a)	3 nos 250/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
<b>III.</b>	<b>Bus Bars:</b>				
a)	Electrolytic high conductivity aluminium three phase and neutral busbars rated at 400 amps, 36KA, insulated with heat shrinkable coloured PVC sleeves & clip on shrouds for joints. Current density of Bus Bar to be 1.0 sq.mm / amp.				
<b>IV.</b>	<b>Outgoing</b>				
i)	07 Nos. 63 Amp DP MCB of 10 KA breaking capacity.				
ii)	03 Nos. 80 Amp FP MCB of 10 KA breaking capacity.				
	<i>Describe as above Car Charging Panel complete as required.</i>	1	SET	1,17,718.00	1,17,718.00
<b>B</b>	<b>PLUMBING PANEL (PTTA):</b>				
	<b>Incoming:</b>				
	1 No. 40 Amp FP MCB, 10 KA breaking capacity.				
	<b>Mtring for incoming:</b>				
a)	3 nos 40/5A Class 1, 15 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bars:</b>				
	Electrolytic high conductivity aluminium three phase and neutral busbars rated at 80 amps, 10KA, insulated with heat shrinkable coloured PVC sleeves & clip on shrouds for joints. Current density of Bus Bar to be 1.0 sq.mm / amp.				
	<b>Outgoing</b>				

i)	2 Nos. of 20 A FP MCB of 10 KA breaking capacity with following for each outgoing motor starter feeder.				
	<b>DOL Starter</b> with 9A contactor with 2NO and 2NC auxillary contacts.				
	Over load relay of rating 4.5-7.5 A with in built single phasing preventer.				
	AmMtr of range 0-20 A (Direct)				
	One set of AMBER indication with 2A SP MCB as back up, Start, Stop Push button illuminated type with remote control start, stop arrangement, Auto/ manual/ off selector switch.				
	P-2 to start at L-3 (At L-3 both pump will be running) audible alarm at L-4(50 Mtr range).				
	Hooter for annunciation.				
	Where L-1 < L-2 < L-3 < L-4 (level of water in the sump) (probes /sensors to control operation)				
	There shall be selector sw to interchange the starting sequence between P1&P2 in manual mode . Cyclic relay for automatic duty rotation for both pumps in auto mode.				
	RYB indicating lamps with backup fuses. Auto/Manual selector switch. Starter ON/OFF& high level Indications,amMtr for both pumps. DOL starter and O/L relay with SPP suitable for motors as per data given below.				
	Accept /reset push button				
	<b>SUMP PUMP PANEL</b> as described above shall be complete with all interconnections, risers, internal wiring, labels, terminal blocks etc. complete as required.	1	SET	1,52,352.00	1,52,352.00
C.	<b>FIRE FIGHTING PANEL (PTTA):</b>				
	<b>Incoming:</b>				
	1 No. of 400 Amp FP MCCB of 36 KA breaking capacity with inbuilt overcurrent and short circuit releases.				
	<b>Mtring for incoming:</b>				
a)	3 nos 400/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bars:</b>				
	Electrolytic high conductivity aluminium three phase and neutral busbars rated at 600 amps, 36 KA insulated with heat shrinkable coloured PVC sleeves& clip on shrouds for joints.				
	<b>Outgoing (All normal/smoke ex. fans MCB shall be suitable for motor duty):</b>				
i	3 nos. of 125 A TP MCCB of 36 KA breaking capacity with heavy duty solid detachable neutral link for (2+1 Spare). 65 HP motor along with following for each outgoing motor starter feeder.				
	<b>Star/Delta</b> with contactor with 2 NO and 2NC auxillary contacts & timer.				

	Over load relay rating 124-198A with in built single phasing preventer.				
	AmMtr of range 0-125A selector switch & 3Nos. of associated CT's of rating 125/5A. of accuracy CL-1, 5VA burden.				
	One set of AMBER indication with 2A SP MCB as back up, Start, Stop Push button illuminated type with remote control start, stop arrangement, Auto/ manual/ off selector switch.				
ii	2 nos. of 63 A TP MCCB of 36 KA breaking capacity with heavy duty solid detachable neutral link for 3 Nos 7 HP motor along with following for each outgoing motor starter feeder.				
	<b>Star/Delta</b> with 63 A contactor with 2 NO and 2NC auxillary contacts & timer.				
	Over load relay of rating 124-198A with in built single phasing preventer.				
	AmMtr of range 0-63A selector switch & 3Nos. of associated CT's of rating 63/5A. of accuracy CL-1, 5VA burden.				
	One set of AMBER indication with 2A SP MCB as back up, Start, Stop Push button illuminated type with remote control start, stop arrangement, Auto/ manual/ off selector switch.				
iii.	1 No. 63 A TP MCB of 36 KA breaking capacity with heavy duty solid detachable neutral link along with ON indication lamp.				
	AmMtr of range 0-63A selector switch & 1Nos. of associated CT's of rating 60/5A. of accuracy CL-1, 5VA burden.				
	Over load relay of rating 9-15 A with in built single phasing preventer.				
	<b>FIRE FIGHTING PANEL</b> as described above complete as required.	1	SET	5,08,662.00	5,08,662.00
D.	<b>LIFT PANEL (PTTA):</b>				
	<b>Incoming:</b>				
	1 No. of 250 Amp FP MCCB of 16 KA Breaking capacity & inbuilt overcurrent and short circuit releases.				
	<b>Mtring for incoming:</b>				
a)	3 nos 250/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bars:</b>				
	Electrolytic high conductivity aluminium three phase and neutral busbars rated at 400 amps, 10KA, insulated with heat shrinkable coloured PVC sleeves & clip on shrouds for joints. Current density of Bus Bar to be 1.0 sq.mm / amp.				
	<b>Outgoing</b>				
i)	11 Nos. 63 Amp FP MCB of 10 KA breaking capacity.				

v)	<b>LIFT PANEL</b> as described above complete as required.	1	SET	1,08,261.00	1,08,261.00
<b>E.</b>	<b>UPS PANEL (PTTA):</b>				
<b>I.</b>	<b>Incoming form Essential Panel sec-I :</b>				
	2 nos. 63 A FP 36kA with Microprocessor based release for O/C, S/C & E/F Protection with Under Voltage Release Breaker 'ON' indicating light with back up 2A MCB test terminal block, fuses, circuits contactors for positive electrical interlocking of breakers, etc. as required.				
<b>II.</b>	<b>Mtring for incoming:</b>				
a)	3 nos.63/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
<b>IV.</b>	<b>BUSBAR</b>				
	4 strip aluminium bus bars of minimum of 100 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bare cross section, size supports & their spacing etc. for withstanding fault level of 36 KA				
	<b>Outgoing</b>				
i)	8 Nos. 63 Amp FP MCB of 10 KA breaking capacity.				
v)	<b>UPS PANEL</b> as described above complete as required.	1	SET	2,05,006.00	2,05,006.00
<b>F.</b>	<b>HVAC PANEL (PTTA):</b>				
	<b>Incoming From essential Panel Sec II</b>				
ii)	630 amps 36 kA 440 volt FP EDO ACB with overcurrent and short circuit and earth fault module, with heavy duty solid detachable neutral link				
	<b>Mtring for incoming:</b>				
a)	3 nos 630/5A Class 1, 15 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of THD, KVARH KW, KWH, KVAR, PF, V, A, Hz, equivalent to EM6400 NG, with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
c)	ON/OFF indicating lamps with 3X2A SP MCB as backup protection.				
	<b>Bus Bars:</b>				
	Electrolytic high conductivity aluminium three phase and neutral busbars rated at 800 amps, 36 KA, insulated with heat shrinkable coloured PVC sleeves & clip on shrouds for joints. Current density of Bus Bar to be 1.0 sq.mm / amp.				
	<b>Outgoing (All MCB shall be suitable for motor duty):</b>				
i)	3 no. of 160 A FP MCCB of 36 KA breaking capacity along with VFD Starter for each outgoing motor starter feeder.				
	3Nos. of associated CT's of rating 160/5A. of accuracy CL-III, 15VA burden.				

	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of THD, KVARH KW, KWH, KVAR, PF, V, A, Hz , equivalent to EM6400 NG, with 3 Nos. current transformers of required ratio, 15 VA Class 1.0				
ii)	10 no. of 63 A FP MCCB of 16 KA breaking capacity along with VFD Starter for each outgoing motor starter feeder.				
	3Nos. of associated CT's of rating 63/5A. of accuracy CL-III, 5VA burden.				
	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of THD, KVARH KW, KWH, KVAR, PF, V, A, Hz , equivalent to EM6400 NG, with 3 Nos. current transformers of required ratio, 5 VA Class 1.0				
iii)	9 nos. of 63 A TP MCCB of 16 KA breaking capacity along with following for each outgoing motor starter feeder.				
	Star/Delta starter with contactor with 2 NO and 2NC auxiliary contacts and timer.				
	Over load relay of rating with in built single phasing preventer.				
	AmMtr of range 0-63A with AmMtr Selector Switch & 3Nos. of associated CT's of rating 63/5A. of accuracy CL-III, 5VA burden.				
	One set of AMBER indication with 2A SP MCB as back up, Start, Stop Push button illuminated type with remote control start, stop arrangement, Auto/ manual/ off selector switch.				
	HVAC PANEL complete as required.	1	SET	10,06,165.00	10,06,165.00
<b>G</b>	<b>VENTILATION PANEL (PTTA):</b>				
	<b>Incoming from Essential panel Sec I</b>				
	1 No. of 63 Amp FP MCCB of 25 KA Breaking capacity & inbuilt overcurrent and short circuit releases.				
	<b>Mtring for incoming:</b>				
a)	3 nos 63/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 5 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bars:</b>				
	Electrolytic high conductivity aluminium three phase and neutral busbars rated at 100 amps, 25KA, insulated with heat shrinkable coloured PVC sleeves & clip on shrouds for joints. Current density of Bus Bar to be 1.0 sq.mm / amp.				
	<b>Outgoing</b>				
i)	7 Nos. 40 A TPN MCCB of 10 KA breaking capacity.				
i)	4 Nos. 32 Amp TPN MCCB of 10 KA breaking capacity.				
ii)	1 Nos. 100 Amp FP MCCB of 10 KA breaking capacity.				



	VENTILATION PANEL. complete as required.	1.00	SET	5,78,380.00	5,78,380.00
H	<b>AHU STARTER PANEL -1/ GF (PTTA):</b>				
	<b>Incomer from Basement FL HVAC Panel</b>				
	1 Nos. 63 Amp FP MCCB OF 16 KA Breaking Capacity				
	<b>Mtring for incoming:</b>				
a)	3 nos63/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 5 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bar</b>				
a)	TPN Aluminium busbars of minimum of 100 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required.				
	<b>Outgoing</b>				
a)	1 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA alongwith VFD Starter				
b)	5 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA	1	Set	1,39,421.00	1,39,421.00
I	<b>AHU STARTER PANEL -2/ 1F (PTTA):</b>				
	<b>Incomer from Basement FL HVAC Panel</b>				
	1 Nos. 63 Amp FP MCCB OF 16 KA Breaking Capacity				
	<b>Mtring for incoming:</b>				
a)	3 nos63/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 5 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bar</b>				
a)	TPN Aluminium busbars of minimum of 100 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required.				
a)	1 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA alongwith VFD Starter				
b)	7 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA	1	Set	1,39,421.00	1,39,421.00
J	<b>AHU STARTER PANEL -3/ 2F (PTTA):</b>				
	<b>Incomer from Basement FL HVAC Panel</b>				
	1 Nos. 63 Amp FP MCCB OF 16 KA Breaking Capacity				
	<b>Mtring for incoming:</b>				
a)	3 nos63/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 5 VA Class 1.0				

c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bar</b>				
a)	TPN Aluminium busbars of minimum of 100 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required.				
	<b>Outgoing</b>				
a)	1 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA alongwith VFD Starter				
b)	3 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA	1	Set	1,07,478.00	1,07,478.00
K	<b>AHU STARTER PANEL -4/ 3F</b>				
	<b>Incomer from Basement FL HVAC Panel</b>				
	1 Nos. 63 Amp FP MCCB OF 16 KA Breaking Capacity				
	<b>Mtring for incoming:</b>				
a)	3 nos 63/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 5 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bar</b>				
a)	TPN Aluminium busbars of minimum of 100 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required.				
	<b>Outgoing</b>				
a)	1 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA alongwith VFD Starter				
b)	5 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA	1	Set	1,27,815.00	1,27,815.00
L	<b>AHU STARTER PANEL -5/ 4F</b>				
	<b>Incomer from Basement FL HVAC Panel</b>				
	1 Nos. 63 Amp FP MCCB OF 16 KA Breaking Capacity				
	<b>Mtring for incoming:</b>				
a)	3 nos 63/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 5 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bar</b>				
a)	TPN Aluminium busbars of minimum of 100 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required.				
	<b>Outgoing</b>				

a)	1 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA alongwith VFD Starter				
b)	5 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA	1	Set	1,27,815.00	1,27,815.00
<b>M</b>	<b>PRESSURIZATION PANEL</b>				
	<b>Incomer from Basement FL HVAC Panel</b>				
	1 Nos. 100 Amp FP MCCB OF 16 KA Breaking Capacity				
	<b>Mtring for incoming:</b>				
a)	3 nos 63/5A Class 1, 5 VA Burden CT's for Mtring & 1 nos associated Neutral CT for earth fault module.				
b)	Digital flush type class -1.0 accuracy multifunction Mtr with RS-485 communication port for measurement of PF, V, A, Hz, equivalent to EM6459 NG, with 3 Nos. current transformers of required ratio, 5 VA Class 1.0				
c)	ON/OFF indicating lamps with MCB as backup protection.				
	<b>Bus Bar</b>				
a)	4 strip aluminium bus bars of minimum of 200 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bare cross section, size supports & their spacing etc. for withstanding fault level of 16 KA				
	<b>Outgoing</b>				
a)	12 Nos. 32 Amp TPN MPCB With breaking capacity of 10KA alongwith VFD Starter	1	Set	1,39,531.00	1,39,531.00
	<b><u>SUBHEAD-I/6 (Earthing &amp; Lighting Protection)</u></b>				
1.0	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 Mtr long etc. with charcoal/ coke and salt as required.	36	Set	14,075.00	5,06,700.00
2.0	Earthing with GI earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 Mtr long etc. with charcoal/ coke and salt as required.	8	Set	7,423.00	59,384.00
3.0	Earthing with G.I. earth pipe 4.5 Mtr long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required.	8	Set	6,820.00	54,560.00
4.0	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, washer excavation and re-filling etc. as required.	40	Mtr	1,609.00	64,360.00
5.0	Providing and fixing 25 mm X 5 mm GI strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	240	Mtr	726.00	1,74,240.00
6.0	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	80	Mtr	1,195.00	95,600.00
7.0	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	530	Mtr	236.00	1,25,080.00
8.0	Providing and fixing 6 SWG dia GI wire on surface or in recess for loop earthing along with existing surface/recessed conduit/submain wiring/ cable as required.	450	Mtr	40.00	18,000.00

9.0	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or on surface of wall for lightning conductor complete as required.(For horizontal run)	350	Mt	122.00	42,700.00
10.0	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or on surface of wall for lightning conductor complete as required. (For vertical run)	280	mt	187.00	52,360.00
11.0	Jointing copper /G.I. tape (with another copper / G.I tape, base of the finial or any other metallic object) by riveting / nut bolting/ sweating and soldering etc. as required.	210	Nos.	112.00	23,520.00
12.0	Providing and fixing testing joint, made of 20 mm X 3 mm thick G.I. strip, 125 mm long, with 4 Nos. of G.I. bolts, nuts, chuck nuts and spring washers etc. complete as required.	60	Nos.	119.00	7,140.00
13.0	Providing & Fixing if lightning conductor finial, made of 25 mm dia 300 mm long, G.I tube, having single prong at top, with 85 mm dia 6 mm thick G.I base plate including holes etc. complete as required.	12	Nos.	498.00	5,976.00
	<b><u>SUBHEAD-I/7 (EV Charger)</u></b>				
1.0	Supply, installation, testing and commissioning of IP 54/ IP55/IP65/IP66 or better, plinth mounted with housing DC fast EV charger of wattage not less than 30 KW with following specifications.				
	Input voltage:- 400V AC, 3Ph 4W+PE				
	Input voltage range:- 340-480 V				
	frequency: 50+/-5 Hz				
	Power factor: 0.99				
	Current THD: </=5%				
	Output voltage:- 200 to 750 Vdc				
	Output voltage range:- 200-750Vdc				
	Output Current max.: Minimum 40 amp for 500 VDC -750VDC / 60 amp For 200 VDC - 500 VDC				
	Regulation accuracy: </= 0.5%				
	Precision of Current: </= 1%				
	Output Power max.: 24-30KW				
	Operating temperature: -10°C to +50°C				
	Storage Temperature: -40°C to +70°C				
	Cooling: Forced ventilation				
	Display: LCD: 7 inch touch screen Or as per OEM satisfying display paraMtr requirement.				
	Inbuilt status indicators: Power, status, charging, fault				
	DC Plug: CCS II				
	Gun: Single Gun				
	Mtring and billing: Compatibility/ provision for\ Grid Responsive Mtring QR code OTP/Rfid card/APP Server Based online payment				
	Charging operation: RFID Card/scan code/APP based authentication				
	Charging communication protocol: OCPP1.6 or higher				
	Altitude: Upto 2000 Mtr				
	Compliance: Charging Device: IS 17017-23,				

	EV-EVSE Communication: IS-17017-24(CAN) IS-15118(PLC)				
	Charging point plug/socket: IS-17017-2-3				
	Inbuilt Protections: Over current, under voltage, over voltage, DC residual current, short circuit, over temperature, ground fault, plug out protection				
	Minimum Plug cable length: 3.5-5 Mtrs				
	Inbuilt Power and energy monitoring				
	Warranty Period: Minimum 12 Month				
	Certification: CE/UL/US/BIS	2	Nos.	554264.00	11,08,528.00
	<b><i>Note: The scope of work includes software, License for Comprehensive CMS applications, mobile application and 300mm height PCC foundation and it is covered with 20mm granite stone all around &amp; one no cash entry DWC pipe of 50mm dia for installation of EV charger as per site requirement and as per the direction of engineer-in-charge.</i></b>				
2.0	Supply, installation, testing and commissioning of IP 54 or better Type 2 AC charger of 7.4 KW with following specification.				
	Input supply Requirments-Single phase supply 230 V, 32 A				
	Vehicle serviced simultaneously (Ports Available)-1				
	Number of plugs- 1				
	Plug type- type 2 AC				
	Plug output current,KW - 32 AMP ,7.4 KW maximum				
	Under Voltage Limited < 205 V per phase				
	Over Voltage Limited > 270 V per phase				
	Max output current limited - 32 AMP				
	Residual current detection 30 mA				
	Earth pin detection - Yes				
	Emergency Shutdown button - Yes				
	Simultaneously Charging - Yes				
	Status Indication - Yes ( Power, status, charging, Fault)				
	Protection - Over current , under voltage , over voltage , DC residual current,short circuit, over temparature , ground Fault , plug out protection				
	Plug output voltage - 230 V 1 Ph AC 32 A				
	Plug cable length - Minimum 4 Mtr ( site requirement to be taken in to account)				
	Power and energy monitoring - Yes				
	Voltage frequency - 50 HZ				
	User Interface - LCD display				
	Enclosure - IP 54 or better				
	Dimensions(W*H*D) - As per OEM				
	Weight - As per OEM				
	Mounting - Wall mount/ Pole mount				
	Max Internal Temperature - +60 degree celsius				
	Ambient temperature Rating - -10 ± 55 degree Celsius				

	Network Interface - Compatibility for Ethernet ( Standard ) , WLAN (optional), 3G/4G (optional) For backend communication				
	Charging communication Protocol - OCPP 1.6 or higher				
	Altitude - upto 2000 Mtr				
	Compliance - Charging devices: IS 17017-22-1 EV - EVSE Communication : Bluetooth low energy Charging Point plug/ Socket IS -60309				
	Warranty Period: Minimum 12 Month				
	Mtring and billing - Compatibilty / Provision for Grid Responsive Mtring QR code OTP/ RFID card/ APP server based online payment				
	Charging Operation - RFID Card / Scan code / APP based authentication	5	Nos.	64784.00	3,23,920.00
	<b>Total of Package-1 IEI Rs.</b>				<b>3,42,97,935.00</b>
	<b>Package-II Fire Fighting System with Sprinklers</b>				
1.0	Supplying, installation, testing and commissioning of Electric driven Main Fire Pump suitable for automatic operation and consisting of following, complete in all respects, as required :				
	(a) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520.				
	(b) Suitable HP Squirrel cage induction motor, TEFC, synchronous speed 1500 RPM, suitable for operation on 415 volts, 3 phase 50 Hz, AC supply with IP 55 protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-325. (Pump Efficiency shall be as per Latest Super ECBC Building Criteria)				
	(c) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required.				
	(d) Suitable cement concrete foundation duly plastered with anti vibration pads.				
	2280 lpm at 88 m Head	2	Set	473505.00	9,47,010.00
2.0	Supplying, installation, testing and commissioning of diesel engine driven main fire pump suitable for automatic operation and consisting of following, complete in all respects, as required : (Diesel Driven Pump) Horizontal type, multistage, centrifugal pump of cast of iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520. Suitable HP, 1500 RPM water cooled with radiator, diesel engine conforming to relevant IS standard complete with auto starting mechanism, 12 /24 volts electric starting equipment, diesel tank, exhaust pipe extended upto 10 m outside pump house duly insulated with 50 mm thick glass wool with 1.0 mm thick aluminium sheet cladding, residential silencer, instruments and protection as per standard specification, stop solenoid for auto stop in the event of fault with audio indications, painted with post office red colour etc. as required. M.S fabricated, common base plate, coupling, coupling guard, foundation bolts etc. as required. Suitable cement concrete foundation duly plastered and with anti vibration pads.				



	M.S fabricated, common base plate, coupling, coupling guard, foundation bolts etc. as required.				
	Suitable cement concrete foundation duly plastered and with anti vibration pads.				
	2280 lpm at 88 m Head	1	Set	694851.00	6,94,851.00
3.0	Supplying, installation, testing and commissioning of electric driven pressurisation pump suitable for automatic operation and consisting of following, complete in all respects, as required : (Jockey Pump)				
	Horizontal type, multistage, centrifugal pump of cast iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS : 1520.				
	Suitable HP squirrel cage induction motor TEFC type suitable for operation on 415 volts, 3 phase 50 Hz AC supply with IP 55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS : 325. (Pump Efficiency shall be as per Latest Super ECBC Building Criteria)				
	M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required.				
	Suitable cement concrete foundation duly plastered and with anti vibration pads.				
	180 lpm at 88 m Head	2	Set	139338.00	2,78,676.00
4.0	Providing and fixing in position the 100mm(Glycirine Filled) industrial type pressure gauges with gun metal / brass valves complete as required	36	Nos	1391.00	50,076.00
5.0	Providing laying, testing & commissioning of 'C' class heavy duty MS Pipe conforming to IS 1239/3589 i/c fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. in ground including groove type fittings, excavation & providing cement concrete blocks as supports, anticorrosive treatment with coaltar/asphalt tape as per IS 10221, refilling the trench etc. of following sizes complete as required.				
a	150 mm Dia.	80	Mtr	3237.00	2,58,960.00
6.0	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including groove type fittings, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required:				
6.1	25 mm Dia.	2100	Mtr	635.00	13,33,500.00
6.2	32 mm Dia.	30	Mtr	724.00	21,720.00
6.3	40 mm Dia.	600	Mtr	445.00	2,67,000.00
6.4	50 mm Dia.	450	Mtr	1079.00	4,85,550.00
6.5	65 mm Dia.	310	Mtr	1327.00	4,11,370.00
6.6	80 mm Dia.	460	Mtr	1552.00	7,13,920.00
6.7	100 mm Dia.	310	Mtr	2073.00	6,42,630.00
6.8	150 mm Dia.	630	Mtr	2880.00	18,14,400.00
6.9	200 mm Dia.(Thickness-6.35mm)	20	Mtr	4531.00	90,620.00
7.0	Supplying and fixing single headed internal hydrant valve with instantaneous Gunmetal/Stainless Steel coupling of 63 mm dia with cast iron wheel ISI marked				

	conforming to IS 5290 (Type -A) with blank Gunmetal/Stainless Steel cap and chain as required :				
7.1	Single headed Stainless Steel	48	Set	9003.00	4,32,144.00
8.0	Supplying and fixing Single headed external yard hydrant valve with 1 No. 63 mm dia instantaneous FM Gunmetal/Stainless Steel coupling and cast iron wheel, ISI marked, conforming to IS 5290 (type A) with blank Gunmetal/Stainless Steel cap and chain as required :				
8.1	Single headed Stainless Steel	7	Set	7481.00	52,367.00
9.0	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required :				
9.1	80 mm Dia.	13	Set	4951.00	64,363.00
9.2	100 mm Dia.	13	Set	6274.00	81,562.00
9.3	150 mm Dia.	2	Set	8689.00	17,378.00
9.4	200 mm Dia.	1	Set	15940.00	15,940.00
10.0	Supplying, fixing, testing & commissioning of double flanged sluice valve of rating PN 1.6 with non rising spindle, bronze/gun metal seat, ISI marked complete with nuts, bolts, washers, gaskets and conforming to IS 780 of following sizes as required :				
10.1	150 mm Dia.	11	Set	23626.00	2,59,886.00
10.2	200 mm Dia.	2	Set	36664.00	73,328.00
11.0	Supplying and fixing orifice plate made out of 6 mm thick stainless steel (Grade 304) with orifice of required size to be fitted between flange & landing valve of external and internal hydrants to reduce pressure at the outlet to the level of 3.5 kg/cm2 complete as required.	8	Set	1358.00	10,864.00
12.0	Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required :				
12.1	80 mm Dia.	3	Set	7264.00	21,792.00
12.2	100 mm Dia.	4	Set	9421.00	37,684.00
12.3	150 mm Dia.	9	Set	16609.00	1,49,481.00
12.4	200 mm Dia.	1	Set	28469.00	28,469.00
13.0	Providing, installation, testing and commissioning of stainless steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange.				
13.1	80 mm Dia.	2	Set	7371.00	14,742.00
13.2	150 mm Dia.	3	Set	17580.00	52,740.00
14.0	Supplying and fixing 63 mm dia, 15 m long RRL hose pipe with 63 mm dia male and female couplings duly bound with GI wire, rivets etc. conforming to IS 636 (type-A) as required :				
14.1	Gun Metal	110	Set	5611.00	6,17,210.00
15.0	Supplying and fixing first-aid Hose Reel with MS construction spray painted in post office reqd, conforming to IS 884 complete with the following as required. 20 mm nominal internal dia water hose thermoplastic (Textile reinforced) type -2 as per IS:				

	12585 20 mm nominal internal dia gun metal globe valve & nozzle. Drum and brackets for fixing the equipments on wall. Connections from riser with 25 mm dia stop gun metal valve & M.S. Pipe and socket.				
15.1	30 m	24	Set	15021.00	3,60,504.00
16.0	Supplying & fixing 63 mm dia short branch pipe with 20 mm nominal internal diameter size nozzle conforming to IS 903 suitable for instantaneous connection to interconnect hose pipe coupling as required :				
16.1	Gun Metal	55	Nos	2358.00	1,29,690.00
17.0	Supplying and fixing of fire brigade connection of cast iron body with gun metal male instantaneous inlet couplings complete with cap and chain as reqd. for suitable dia MS pipe connection conforming to IS 904 as required :				
17.1	2 way-100 mm dia M.S. Pipe	5	Set	10526.00	52,630.00
17.2	4 way-150 mm dia M.S. Pipe	2	Set	13848.00	27,696.00
18.0	Supplying and fixing air vessel made of 250 mm dia, 8 mm thick MS sheet, 1200 mm in height with air release valve on top and flanged connection to riser, drain arrangement with 25 mm dia gun metal wheel valve with required accessories, pressure gauge and painting with synthetic enamel paint of approved shade as required.	6	Set	18918.00	1,13,508.00
19.0	Providing, fixing, testing & commissioning of 15mm dia quartzoid bulb type sprinklers of rating 68 degree centigrade with required accessories :				
19.1	Pendent Sprinkler	940	Nos	499.00	4,69,060.00
19.2	Upright Sprinkler	580	Nos	526.00	3,05,080.00
19.3	Horizontal side wall sprinkler	18	Nos	554.00	9,972.00
20.0	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	6	Nos	1587.00	9,522.00
21.0	Providing & fixing flow switch in following sizes M.S. pipe including connection etc as required.				
21.1	100 mm Dia.	5	Nos	7737.00	38,685.00
21.2	150 mm Dia.	1	Nos	9312.00	9,312.00
22.0	Providing, fixing, testing & commissioning of installation control valve of cast iron body, brass/bronze working parts comprising of water motor alarm, bronze seat clapper, clapper arm and hydraulically driven mechanical gong bell to sound continuous alarm when the wet riser/sprinkler system activates, pressure gauges, emergency releases, strainer, pressure switch, cock valve complete with drain valve and bypass, test control box, ball valves, MS pipe of required size, flanges, orifice plate, gasket etc of following sizes as required :				
22.1	150 mm Dia.	1	Nos	52309.00	52,309.00
23.0	Supplying, installation, testing & commissioning of sprinkler flexible pipe (UL Listed) of stainless steel complete with 15 NPT on reducer thread with maximum working pressure of 175 PSI test pressure of 875 PSI (Burst) with branch line (Inlet) 25mm NPT male thread to sprinkler head (Outlet) 15mm NPT female thread with reducer, nipple, 2 side brackets, center bracket, stockbar of following sizes complete as required.				

23.1	1000mm	200	Nos	1142.00	2,28,400.00
23.2	1200mm	380	Nos	1198.00	4,55,240.00
24.0	Supplying, installation, testing & commissioning of deluge valve (to be used for water curtains) UL listed with wet pilot basic trim assembly for DVA with test and alarm, drip and drain valve with water motor gong complete as required.				
24.1	100mm dia	2	Nos	72039.00	1,44,078.00
25.0	Providing, installation, testing & commissioning of electric release trim assembly for deluge wall with two way solenoid valve, weather proof operation on 24 volts DC supply complete as required.	2	Nos	7143.00	14,286.00
26.0	Providing, installation, testing & commissioning of adjustable rosette plate for 15mm dia in white finish UL Listed or FM approved complete as required.	580	Nos	221.00	1,28,180.00
27.0	Providing and fixing gun metal / Bronze ball Valve with rotatory handle of approved quality :				
27.1	25 mm nominal bore	24	Nos	1497.00	35,928.00
28.0	Supplying and fixing of Fire Hose Cabinet (External) 900mm x 600 mm x 500 mm made of 2mm thick MS sheet with 6 mm thick glazed glass doors i/c necessary locking arrangements suitable to accommodate external yard hydrant with butterfly valve, 2Nos. 15mtr.long Hose pipe, 1No. branch pipe, mounted on wall OR raised brick platform & duly painted with post office red externally and white internally with synthetic enamel paint complete in all respect, for external hydrant, as required.	7	Nos	8926.00	62,482.00
29.0	FIRE BUCKET STAND WITH 4 NOS. OF FIRE BUCKET Including canopy support structure made out of 50x50x6 angle verticals and horizontal member. The top canopy shall be made out of 1 mm thick corrugated aluminum sheet. The overall height of the canopy shall be 2 meters from FGL and the buckets shall be hung at support provided at 1 meter from FGL. The Aluminum shade shall be fixed to the MS structure with SDST screws of Hilti or equivalent make .All the MS Structure shall be applied with two coats of primer and two coats of synthetic Enamel paint as approved by Client.	1	Nos	4859.00	4,859.00
30.0	Supplying and fixing of fire 100mm Dia Fire brigade draw out connection of Stainless Steel body with cap and chain as reqd. for suitable dia MS pipe connection conforming to Iscode as required :	1	Set	11661.00	11,661.00
31.0	Supplying and fixing of Drain test assembly as reqd. for suitable dia MS pipe connection conforming to IS code as required :	6	Set	15116.00	90,696.00
32.0	Supplying and installing following size of perforated painted with powder coating M.S. cable trays with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with M.S. suspenders including bolts & nuts, painting suspenders etc as required.				
32.1	150 mm width X 50 mm depth X 1.6 mm thickness	45	Mtr	631.00	28,395.00
33.0	P/F/T/C of 24 zone Sprinkler Annunciation Panel having zonewise LED Window and inbuilt battery charger including necessary connection and wiring to the flow switches etc. complete to the entire satisfaction of Fire Officer.	3	Nos	31,384.00	94,152.00

34.0	Supplying, Fixing, Testing & Commissioning of Rubber Bellow of PN 1.6 rating complete to the entire satisfaction and direction of Fire Officer/Engr-in-Charge.				
34.1	80 mm dia	4	Nos	5,731.00	22,924.00
34.2	150 mm Dia	6	Nos	10,456.00	62,736.00
35.0	P/F/T/C of gun metal / Brass Air Release Valve of 25 mm dia of approved quality etc. complete to the entire satisfaction and direction of Fire Officer/Engr-in-Charge.	6	Nos	1,584.00	9,504.00
	Fire Extinguisher				
36.0	S.I.T.C. Of ISI marked ABC stored pressure type Fire Extinguisher of 6 kg capacity confirming to IS:15683 complete with squeeze grip release valve ,discharge pipe, pressure guage, locking arrangement , initial gas charged, carrying handle and wall mounting bracket etc. as reqd.with 6 year Warranty.	53	Nos	3138.00	1,66,314.00
37.0	S.I.T.C. Of ISI marked CO2 gas type fire extinguisher of 4.5 kg capacity confirming to IS:15683 in complete with delivery hose horn , wheel tyre release valve , locking arrangement , initial gas charged, carrying handle and wall mounting bracket etc. as reqd. with 6 year warranty.	53	Nos	5630.00	2,98,390.00
38.0	Supply, installation, testing and commissioning of Clean Agent 4 Kg Fire Extinguisher Clean Agent Fire Extinguisher 4Kgs. Capacity complete Charge with HFC Based Gas only. The Extinguisher will be Manufactured Strictly as per IS: 15683: 2018 bearing ISI. Mark with 6 year warranty.	8	Nos	18642.00	1,49,136.00
	Exit Signages				
39.0	SITC of exit signage, single/double side, directional arrow as per site requirement, visible from 20 mtrs. with integral battery capacity of 3 hrs , IP 20 rating, operating voltage 20-240V AC/ 50-60 Hz, Battery Specification - 3.6V/ 0.8 AH [ NI-CAD Type],Materail Type - Polycarbonate type/Aluminum/ABS, Mounting option - Wall Mount / Ceiling Mount/ Recess Mount. complete etc. as required at site.	31	Nos	8012.00	2,48,372.00
40.0	SITC of LED beam Light Twin swivel type its it is made up of ms white housing portable swivel type beam , having a burning hours of up to 50,000 hrs.12 volt 7.2 ah lead.acid battery complete etc. as required at site.	45	Nos	10860.00	4,88,700.00
41.0	Supplying & laying of 2x1.5 sqmm fire survival armoured cable, 600/1000V rated with annealed copper conductor having glass mica fire barrier tape covered by Mica Tape XLPE insulation and LSZH inner bedding, steel wire armouring & LSZH outer sheath complete as required.	1000	Mtr	244.00	2,44,000.00
41.0	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator				
41.1	12 Way	1	Nos	2020.00	2,020.00

42.0	Supplying and fixing following rating, 240/415 volts, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
42.1	Single pole	1	Nos	223.00	223.00
42.2	Double Pole	10	Nos	592.00	5,920.00
43.1	Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS PVC insulated copper conductor, single core cable in surface/ recessed steel conduit as required				
43.2	2 X 6 sq. mm + 1 X 6 sq. mm earth wire	30	Mtr	342.00	10,260.00
<b>Total of Package-II Fire Fighting System with Sprinklers Rs.</b>					<b>1,45,25,057.00</b>
<b>Package - III Fire Alarm and PA System</b>					
<b>Automatic Fire Alarm System</b>					
1.0	Supplying, installation, testing and commissioning of micro processor based intelligent addressable main fire alarm panel, central processing unit with the following loop modules and capable of supporting not less than 240 devices (including detectors) and minimum 120 detectors per loop and loop length up to 2 km, network communication card, minimum 320 character graphics/ LCD display with touch screen or other keypad and minimum 4000 events history log in the non volatile memory (EPROM), power supply unit (230 $\pm$ 5% V, 50 hz), 48 hrs back-up with 24 volt sealed maintenance free batteries with automatic charger. The panel shall have facility to connect printer to printout log and facility to have seamless integration with analog/digital voice evacuation system (which is part of the schedule of work under SH: PA System) and shall be complete with all accessories . The panel shall be compatible for IBMS system with open protocol BACnet/ Modbus over IP complete as per specifications.				
1.1	Ten Loop Panel.	1	Nos	9,54,523.00	9,54,523.00
2.0	Supplying, installation, testing & commissioning of repeater panel with 320 character/ Touch screen LCD display with inbuilt reset, acknowledge and silence switches complete as required.	2	Nos	99,524.00	1,99,048.00
3.0	Supplying, installation, testing & commissioning of intelligent analog addressable photothermal multidetector complete with mounting base complete as required.	448	Nos	3,360.00	15,05,280.00
4.0	Supplying, installation, testing & commissioning of intelligent addressable thermal detector with rate of rise cum fixed temperature thermistor complete with base as required.	132	Nos	3,325.00	4,38,900.00
5.0	Supplying, installation, testing & commissioning of response indicator on surface/recessed MS Box having two LED, metallic cover complete with all connections etc as required.	198	Nos	172.00	34,056.00
6.0	Supplying, installation, testing & commissioning of addressable beam detector with short circuit isolator (inbuilt or separate) complete with emitter and receiver including connections with remote test features etc complete as required.	1	Nos	1,06,072.00	1,06,072.00



7.0	Supplying, installation, testing & commissioning of addressable manual call point complete as required.	21	Nos	3,475.00	72,975.00
8.0	Supplying, installation, testing & commissioning of addressable horn cum strobe complete as required.	21	Nos	3,314.00	69,594.00
9.0	Supplying, installation, testing & commissioning of fire fighter phone jack complete as required.	18	Nos	6,500.00	1,17,000.00
10.0	Supplying, installation, testing & commissioning of fault isolator complete with base as required.	29	Nos	3,641.00	1,05,589.00
11.0	Supplying, installation, testing & commissioning of fire fighter telephone handset complete as required.	18	Nos	14,523.00	2,61,414.00
12.0	Supplying & laying of 2x1.5 sqmm fire alarm armoured cable, 600/1000V rated with annealed copper conductor having XLPE insulation, steel wire armouring & FRLS outer sheath complete as required.	5500	Mtr	244.00	13,42,000.00
	<b>PUBLIC ADDRESS SYSTEM</b>				
13.0	Supplying, installation, testing & commissioning of 6 zone, voice alarm controller with USB, MP3 player (including 6 zone button paging station) with seamless integration facility with main fire alarm panel for voice evacuation complete as required.	1	Nos	3,53,918.00	3,53,918.00
14.0	Supplying, installation, testing & commissioning of 6 inches dia, 2 watts, 70/100 volts ceiling speaker complete as required.	113	Nos	3,394.00	3,83,522.00
15.0	Supplying, installation, testing & commissioning of digital audio amplifier 300 Watt, 25V rms operating at 240 volt AC supply complete as required.	1	Nos	1,21,542.00	1,21,542.00
16.0	Supplying and drawing of cable Fire Retardant PVC insulated copper conductor cable in the existing surface/ recessed steel conduit of following pairs, cores and size including connections and interconnections etc. as required.				
a)	Speaker cable Single pair, 2-core, 1.5 sqmm	1200	Mtr	79.00	94,800.00
17.0	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.(Norpack)				
a)	20 mm	1200	Mtr	122.00	1,46,400.00
	<b>Total Amount of Package - III Fire Alarm and PA System Rs.</b>				<b>63,06,633.00</b>
	<b>Package IV : SUBSTATION EQUIPMENTS</b>				
	<b>11KV HT Panel (1 I/C + 2 O/G)</b>				
1.0	Supplying, installation, testing & commissioning of indoor type floor mounted metal clad, 11 KV VCB panel totally enclosed & fully interlocked, horizontal drawout, horizontal/ vertical isolation type breaker as per IS 13118, as amended up to date and additional specifications, having capacities as mentioned below, single break, trip free mechanism, motorised/manually charged and auto/manually closing breaker suitable for use on 11 KV, 3 phase, 50Hz AC supply with short circuit fault level of 350 MVA, complete with self contained, fully interlocked, rack in and rack out mechanism, air insulated but encapsulated copper bus bars of 630 Amps capacity, breaker featured with mechanical ON/OFF indicator with hand trip device, spring release coil, shunt trip coil, auxiliary relay (for				

	tripping through RTT of Transformer) and auxiliary switch of 4 NO + 4 NC, suitable capacity power pack and equipped with following switchgears and accessories i/c connections suitable up to 3 x 240 sq.mm XLPE 11KV cable (cable entry from bottom), etc. as required. (Note-Cost of end termination not included in this item) .				
	a) Incoming- 1 No.630 A VCB				
	b) 1No. -11KV/110Volts PT Class 0.5 accuracy and 100 VA burden with 1 No. Voltmeter (0-15KV), digital type, selector switch for voltmeter and protection fuses/MCB for HT metering upto 12 KV on incomer.				
	c) 1 No. (0-100A) dual scale Ammeter, digital type, selector switches for ammeters.				
	d) 1 No. Microprocessor based numerical relay with O/L, E/F and S/C protection.				
	e) 1 No. set of dual core dual ratio 3 CTs 100/50/5/5A of 15VA burden and accuracy Class-1.0 for metering and class 5P10 for protection.				
	a) Outgoing - 2 Nos. 630A VCB.				
	b) 2 Nos. - (0-75A) Ammeters, dual scale digital type & selector switches for Ammeters.				
	c) 2 Nos.. - Microprocessor based numerical relays with O/L, E/F & S/C protections.				
	d) 2 Nos. - set of dual core dual ratio 3 CTs 60/30/5/5A of 15VA burden and accuracy Class-1.0 for metering and class 5P10 for protection.				
	e) 1set of 24 V DC power system for control including 2x65 AH SMF Batteries.	1	Set	2177961.00	21,77,961.00
	<b>TRANSFORMER</b>				
2.0	Supplying, installation, testing & commissioning of 630 KVA 11/0.433 KV, 3 phase, 50 Hz, Dyn11, indoor AN type, copper wound Dry Type Transformer with class F insulation with OFF load tap changing arrangement on HV side in steps of @2.5%, - 7.5% to + 7.5% having cable end boxes on HV side & LT cables connection with all accessories and confirming to ECSBC super building - confirming to BEE 5 - Star labelling requirement & i/c supplying and laying of copper conductor multicore control cable from transformer to HT breaker for safety tripping, suitable mounted on M.S. channel i/c supplying grounding of suitable M.S. Channel with all accessories complete in all respects as required at site.	2	Set	2408413.00	48,16,826.00
	<b>BUS TRUNKING</b>				
3.0	Supplying, installing by suspension on ceiling, testing and commissioning of following capacity Sandwich Type Bus Trunking for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with metal clad enclosure made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos aluminium bus bars, necessary joints, elbow joints & expansion joints and bends, fire barrier at each floor, provision of tapping at every metre, adopter box and copper flexible for joints, continuous earthing with 2 Nos aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, suspenders, angle iron bracket, steel				

	fasteners, connecting to earthing system etc. as required.				
3.1	1250 amps 50KA SC for 1 sec	20	Mtr	32396.00	6,47,920.00
	<b>HT Cabling</b>				
4.0	Supply of Earthed 11 KV grade HT XLPE cable of following size galavanised steel strip armoured aluminium conductor cable 3 core earthed system conforming to IS 7098 Part II amended upto date as reqd.				
4.1	3 x 240 Sq.mm HT CABLE	160	Mtr	2554.00	4,08,640.00
5.0	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
5.1	Above 120 to 400 sq. mm	100	Mtr	117.00	11,700.00
6.0	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing masonry open duct as required.				
6.1	Above 120 to 400 sq. mm	60	Mtr	99.00	5,940.00
7.0	Supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required				
7.1	240 Sq.mm	8	Nos	16749.00	1,33,992.00
8.0	Supplying and making outdoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required				
8.1	240 sq. mm	1	Nos	23590.00	23,590.00
9.0	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	120 mm dia (OD-120 mm & ID-103 mm nominal)	500	Mtr	356.00	1,78,000.00
	<b>Safety Equipments</b>				
10.0	Supplying & fixing safety instruction chart in word duly framed with 5 mm thick glass as required. (approx. front area 1.20 sq.mt.)	2	Nos	726.00	1,452.00
11.0	FIRE BUCKET STAND WITH 4 NOS. OF FIRE BUCKET Including canopy support structure made out of 50x50x6 angle verticals and horizontal member. The top canopy shall be made out of 1 mm thick corrugated aluminum sheet. The overall height of the canopy shall be 2 meters from FGL and the buckets shall be hung at support provided at 1 meter from FGL. The Aluminum shade shall be fixed to the MS structure with SDST screws of Hilti or equivalent make .All the MS Strucutre shall be applied with two coats of primer and two coats of synthetic Enamel paint as approved by Client.	1	Set	4859.00	4,859.00

12.0	Supply & fixing shock treatment chart duly mounted on a wooden frame with 5 mm thick glass as required. (approximate front area 1.20 sq.mtr.)	2	Nos	726.00	1,452.00
13.0	Providing of rubber mat 2mm thick in position, Class A, withstand upto 3.3 KV, 1 mtr wide and as per IS 15652-(2006) as required.	8	Mtr	540.00	4,320.00
14.0	Providing of rubber mat 3mm thick in position, Class C, withstand upto 33 KV, 1 mtr wide and as per IS 15652-(2006) as required.	10	Mtr	813.00	8,130.00
	<b>Total Amount of Package IV : SUBSTATION EQUIPMENTS Rs.</b>				<b>84,24,782.00</b>
	<b>Package V : DG Set</b>				
	<b>DG Set</b>				
1.0	Supplying, installing, testing and commissioning of 'Silent Type' Diesel Generating Set of following Prime Power Rating at 415 Volt, 1500 RRM, 0.8 lagging PF, 3-Phase, 4 Wire, 50 Hz, AC supply system and for 0.85 load factor along with the acoustic enclosure as per the latest CPCB norms (CPCB-IV+), complete including making suitable cement concrete foundation as per the manufacturers design and as required by CPWD specifications, complete including the following:				
	<b>Diesel Engine:</b>				
	Diesel engine 4 stroke, turbo charged, water cooled, electric start, of suitable BHP at 1500 RPM suitable for 125 KVA output of alternator at 40 Degree Centigrade, 50% RH and at 1000 meter MSL and confirming to BS:5514, BS:649, IS:10000, Capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine shall be fitted complete with all the required accessories and electronic governor (Class A2) for Parallel synchronized operation of DG Sets.				
	<b>Engine mounted instrument panel fitted with and having digital display for following</b>				
	i) Start-Stop switch with key				
	ii) Water temperature indication				
	iii) Lubrication oil pressure indication				
	iv) Lubrication oil temperature indication				
	v) Battery charging indication				
	vi) RPM indication				
	vii) Over speed indication				
	viii) Low lube Oil trip indication				
	ix) Engine Hours indication				
	<b>Alternator:</b>				
	Synchronous alternator rated at <b>125 KVA</b> , 415 volts at 1500 RPM, 3 phase, 4 wire system, 50 Hz, AC supply with 0.8 lagging power factor at 40 Degree C, 50% RH and at 1000 meter MSL . The alternator shall be having SPDP enclosure, brushless, continuous duty, self-excited and self – regulated through AVR conforming to IS : 4722/BS 2613 suitable for tropical conditions and with class-H insulation				
	<b>Base Frame &amp; Foundation :</b>				

	Both the engine and alternator shall be mounted on suitable base frame made of MS channel with necessary reinforcement which shall be installed on suitable cement concrete foundation and vibration isolation arrangement as per recommendations of manufacturer specification.				
	<b>Fuel Tank:</b>				
	Built-in daily service fuel tank of capacity as per OEM Standard complete with all standard accessories and fuel piping between fuel tank and diesel engine, complete with valves, level indications & accessories as required as per specifications				
	<b>Exhaust System</b>				
	Dry exhaust manifold with residential exhaust silencer and catalytic converter				
	<b>Starting System :</b>				
	12 /24 V DC starting system comprising of starter motors, voltage regulator and arrangement for initial excitation complete with suitable nos. of batteries (Lead Acid with 2 year guarantee) as per manufacturers recommendation as required as per specifications				
	<b>Acoustic enclosure :</b>				
	Acoustic and weather proof enclosure with arrangement for fresh air intake for cooling of the engine & alternator, extraction, discharging hot air in to the atmosphere as per specifications				
	<b>Warrantee :</b>				
	The DG Set shall be Guaranteed/Warranted for a period of 2 years against all manufacturing defects from the date of supply.				
	<b>As per above description 125 KVA DG set</b>	1	Set	13,44,411.00	13,44,411.00
2.0	Supplying, installing, testing and commissioning of 'Silent Type' Diesel Generating Set of following Prime Power Rating at 415 Volt, 1500 RRM, 0.8 lagging PF, 3-Phase, 4 Wire, 50 Hz, AC supply system and for 0.85 load factor along with the acoustic enclosure as per the latest CPCB norms <b>CPCB-IV+</b> , complete including making suitable cement concrete foundation as per the manufacturers design and as required by CPWD specifications, complete including the following:				
	<b>Diesel Engine:</b>				
	Diesel engine 4 stroke, turbo charged, water cooled, electric start, of suitable BHP at 1500 RPM suitable for 58.5 KVA output of alternator at 40 Degree Centigrade, 50% RH and at 1000 meter MSL and confirming to BS:5514, BS:649, IS:10000, Capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine shall be fitted complete with all the required accessories and electronic governor (Class A2) for Parallel synchronized operation of DG Sets				
	<b>Engine mounted instrument panel fitted with and having digital display for following</b>				
	i) Start-Stop switch with key				
	ii) Water temperature indication				
	iii) Lubrication oil pressure indication				

	iv) Lubrication oil temperature indication				
	v) Battery charging indication				
	vi) RPM indication				
	vii) Over speed indication				
	viii) Low lube Oil trip indication				
	ix) Engine Hours indication				
	<b>Alternator:</b>				
	Synchronous alternator rated at <b>58.5 KVA</b> , 415 volts at 1500 RPM, 3 phase, 4 wire system, 50 Hz, AC supply with 0.8 lagging power factor at 40 Degree C, 50% RH and at 1000 meter MSL . The alternator shall be having SPDP enclosure, brushless, continuous duty, self-excited and self – regulated through AVR conforming to IS : 4722/BS 2613 suitable for tropical conditions and with class-H insulation				
	<b>Base Frame &amp; Foundation :</b>				
	Both the engine and alternator shall be mounted on suitable base frame made of MS channel with necessary reinforcement which shall be installed on suitable cement concrete foundation and vibration isolation arrangement as per recommendations of manufacturer specification.				
	<b>Fuel Tank:</b>				
	Built-in daily service fuel tank of capacity as per OEM Standard complete with all standard accessories and fuel piping between fuel tank and diesel engine, complete with valves, level indications & accessories as required as per specifications				
	<b>Exhaust System</b>				
	Dry exhaust manifold with residential exhaust silencer and catalytic converter				
	<b>Starting System :</b>				
	12 /24 V DC starting system comprising of starter motors, voltage regulator and arrangement for initial excitation complete with suitable nos. of batteries (Lead Acid with 2 year guarantee) as per manufacturers recommendation as required as per specifications				
	<b>Acoustic enclosure :</b>				
	Acoustic and weather proof enclosure with arrangement for fresh air intake for cooling of the engine & alternator, extraction, discharging hot air in to the atmosphere as per specifications				
	<b>Warranty :</b>				
	The DG Set shall be Guaranteed/Warranted for a period of 2 years against all manufacturing defects from the date of supply.				
	<b>As per above description 58.5 KVA DG set</b>	1	Set	7,69,100.00	7,69,100.00
3.0	Supply, installation, testing and commissioning of exhaust pipe fabricated out of Black MS, 'B' class pipe, conforming to IS:1239 Part-I (Tata/ Jindal Hissar), cut to required lengths and installed with necessary bends, supports, anti-vibration mountings and with all fixing accessories and hardware's. The exhaust pipes shall be dual insulated with first layer of 25 mm thick ceramic fibre wool insulation (128 Kg/ cubic metre density) and second layer of 50 mm thick mineral wool				



	(150 Kg/ cubic metre density) insulation wrapped in chicken mesh and clad with 24 SWG aluminium sheet including all support as required				
3.1	80 mm dia.	24	Mtr	1,787.00	42,888.00
3.2	125 mm dia.	25	Mtr	2,937.00	73,425.00
4	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete. (Agency should submit the Design and shop drawing got Approved from Engineer In Charge)	3000.00	Kgs	124.00	3,72,000.00
	<b>Total Amount of Package V : DG Set Rs.</b>				<b>26,01,824.00</b>
	<b>Package VI : UPS SYSTEM</b>				
	<b>UPS System</b>				
1	Supplying installation testing and commissioning of following capacity True Online dual conversion(Pure Sine Wave), microprocessor based Online UPS System with One years warantee having pollution free instantaneous true sinewave control and without inbuilt isolation transformer, 3 Phase AC input and 3 phase AC output, LCD display & indication for various electrical parameters, LED indication with alarm for major fault, provision for remote indication and provision of communication to BMS system through RS 485/RS232/Modbus port etc. The UPS system shall be as per detailed specifications and shall be complete with parallel redundant kit, battery bank for providing 30 minutes backup time with SMF batteries having minimum 2 years warrantee, with all connections interconnections cables, MS stand for battery bank etc. complete as required				
	<b>Specifications of UPS</b>				
	a) Capacity : 30 KVA Capacity Online UPS System				
	b) Technology : True Online dual conversion (Pure Sine Wave)				
	<b>Input Parameters</b>				
	a) Input Voltage range : 352-475VAC, 3-Φ AC Supply				
	b) Rated frequency : 50Hz/ 60 Hz ± 10%				
	c) UPS Power factor: 0.99 or better lagging				
	d) Harmonic distortion: with Linear load ≤3%				
	<b>Output Parameters</b>				
	a) Rated Voltage: 415 V ± 10%				
	b) Frequency: 50Hz ± 0.5Hz				
	c) Output wave form: Pure sine wave				
	d)Overload capacity: 150% of rated load for min. 1minutes, 125% of rated load for min. 5 minutes				
	<b>General Parameters</b>				
	a) Ambient operating temp: Upto 40° C or better				
	b) Noise Level : ≤ 65 db at 1.5m distance or better				
	c) Overall efficiency: 94% or better				
	d) Computer interface: RS232 / RS485				
	e) Cooling: Forced Cooling				

	f) Bypass: Manual/Static	2	Set	5,88,995.00	11,77,990.00
	<b>Total Amount of Package VI : UPS SYSTEM Rs.</b>				<b>11,77,990.00</b>
	<b>Package VII : HVAC</b>				
	<b>SUB-HEAD 'A' -HIGH SIDE EQUIPMENT</b>				
<b>1</b>	<b>Water Cooled Screw Chiller with VFD</b>				
	Supply, Installation, testing & commissioning of <b>AHRI certified</b> water cooled screw chilling machines having minimum Actual capacity at design conditions <b>80TR with 5Star Rating and at site condition</b> given below, suitable for operation on refrigerant R-134a comprising of the following complete as per specification & as required.				
	<b>Site Conditions are follows:</b>				
	<b>Chiller:</b>				
	Chilled Water Temperature IN / OUT = 12.2°C / 6.67°C				
	Evaporator Fouling Factor = 0.0005 (FPS Unit)				
	Max. Permissible Pressure Drop = 10 meter of water head				
	Chilled Water Flow = 200 USGPM				
	<b>Condenser:</b>				
	Condenser Water Temperature IN / OUT = 32.2°C / 36.4°C				
	Condenser Fouling Factor = 0.001 (FPS Unit)				
	Max. Permissible Pressure Drop = 10 meter of water head				
	Condenser Water Flow = 300 USGPM				
	<b>Chilling units performances shall be as follows:</b>				
	C.O.P at AHRI conditions shall not be less than 6.0				
	1kW/TR at 100% load at site conditions should not more than 0.67 KW/TR				
	IPLV <=0.37 & NPLV <=0.39				
	<b>Specification of Chillers are as follows:</b>				
	The chillers shall be complete with single / multiple twin screw type semi hermetic compressor and shall be complete with automatic capacity control, safety switches, speed increasing gears forced feed lubrication system etc. complete as per specifications as required.				
	The unit shall be designed to unload upto 30% of its rated capacity at constant condenser water entering temperature at site design condition (given below) & at AHRI conditions without surging & without hot gas bypass. The compressor shall have mechanism for stable operation at part loads.				
	Suitable Nos & suitable capacity squirrel cage induction motor with class 'F' insulation suitable for operation on 415 volts ±10% , 50 Hz, A.C. supply.				
	Suitable capacity of unit mounted <b>VFD</b> starter (min. IP-42) suitable for compressor motor complete complete having over-load protection, under-voltage protection, protection against phase reversal, current sensing independent single phasing protection etc. including multi-function meter and CTs, complete as per detailed specifications. VFD should be UL & CE certified. VFDs shall be compatible for Modbus/Bacnet Protocols. In case of multiple compressors, VFD shall				

	be separate with each compressor. Active harmonic filters shall be provided to achieve THD levels less than 5% at all loads which will be in scope of chiller OEM or Drive authorized supplier of chiller OEM.				
	Software Selection Sheet to be AHRI Certified based on latest version. Which can be verified online through AHRI website.				
	Factory Testing - 4 point load test shall be carried out in presence of representatives of client at factory at 100%, 75%, 50% & 30% for one chiller of same capacity at constant condenser water temperature to check stable operation and efficiency of chiller. 5th point load test shall be carried out at 100% load in AHRI condition to verify COP of chiller. Chiller manufacturer must have in-house AHRI certified test bed for above mentioned capacity chiller for testing at site condition & AHRI condition.				
	Suitable No. of Sets - Lubrication device consisting of automatic electric oil pump, oil cooler, head tank, oil strainer, automatic pressure regulating valve, oil heater, oil heater thermal switch etc. as per specifications.				
	Matching shell and tube water cooled condenser of M.S. shell and integrally finned copper tubes having even pass.				
	Matching shell & tube flooded type chiller for screw type units of MS shell and copper tubes having even pass.				
	Refrigerant piping fittings, valves, Expansion valves and accessories to inter connect compressor, condenser, chiller and expansion valve etc. complete as per specification as required.				
	Microprocessor based control panel comprising of Controls including sensors, factory manufactured and tested. All Control function including start up and shut down leaving chilled water temperature Control, Compressor and Electronic Expansion Valve modulation, anti re-cycle logic, automatic Compressor and load limiting. it shall also be equipped with the following protection and monitoring devices - 1 Set.				
	High (Condenser) & Low (Evaporator) pressure protection.				
	Low oil level & pressure protection.				
	Chilled/Condenser Water flow loss.				
	Chiller Water Freeze protection & Sensor error protection.				
	Motor load control and overload.				
	High motor temperature protection & High oil temperature protection.				
	Chiller inlet and outlet Water temperature.				
	Condenser inlet / discharge Compressor pressure.				
	Suction and discharge Compressor pressure.				
	Current in each phase of Compressor, Motor.				

	The Microprocessor shall have a simple keyboard access input system and complete with not less than two line 80 characters alphanumeric display. A computer graphic package shall also be provided. Microprocessor based control panel shall have suitable hardware & software so that it can be integrated directly to with standard communication open protocol using backnet / Modbus as well as open IP.				
	Refrigerant line accessories comprising of safety valves, angle valve, liquid line indication, liquid level control etc. complete as per specifications as required.				
	Water flow switches at inlet of condenser & chiller, water drain & air purge valves wherever required as per specifications. Chiller shall be complete with necessary vibration isolation arrangement and flexible pipe joint (rubber bellow).				
	Suction line and chiller insulation with minimum 19 mm thick polyvinyl nitrile rubber insulation finished with 0.63 mm thick G.S.S. cladding complete as per specifications as required.				
	Frame work for mounting the above condenser, chiller, compressor and motor with base plate complete with antivibration pads/ springs etc. complete as per specifications as required.				
	Initial/ first charge of refrigerant gas & compressor oil complete as per specifications as required.				
	The work shall include Freight, Insurance, Port clearance, loading / unloading, Installation, testing and commissioning, testing of all safeties and interlocks, summer and monsoon season tests etc. as per specifications.				
<b>1.1</b>	<b>Water Cooled Screw Chiller as described above (2W+1S)</b>	<b>3</b>	<b>Nos.</b>	<b>27,54,846.00</b>	<b>82,64,538.00</b>
<b>2</b>	<b>CHILLER PLANT MANAGER</b>				
	Supply, Installation, Testing and Commissioning of CPM				
	Chiller plant manager (CPM) with necessary hardware & software for controlling, operating & monitoring 3Nos of Water Screw Chillers with VFD, 3 Nos of primary chilled water pumps, 3Nos. Variable Secondary chilled water pumps, 3Nos. Cooling tower with VFD, 3Nos. condenser water pumps, motorized valves etc.. The quoted price shall include the software/hardware for transfer of entire signal to the third party BMS system. Plant manager shall be able to do sequencing, scheduling, load sharing between the chillers. The communication protocol shall be Modbus / Bacnet / IP.				
	Workstation & Software as per OEM				
	DDC Enclosure / DDC Controller with I/O module Controllers shall be 16/32 bit microprocessor based standalone and net workable type with real time clock and Local Storage of historical database events. High-speed router/ gateway that can connect control modules to a BACnet®/IP backbone. Support for BACnet/IP, BACnet-over-Ethernet, ARCNET 156 Kbps, MS/TP, and BACnet PTP communications.				
	CPM should be able to communicate/interface with main IBMS. All required software and hardware to be provided.				

	Any other hardwares required etc..				
	<b>FIELD DEVICES-Qtys. as required</b>				
	Immerssion type Temperature Sensor with thermowell				
	Outside Temp. & RH Sensor				
	Level Switch				
	Flow sensor/ Flow meter				
	Differential Pressure Sensors				
	<b>Lot of CABLES, CONDUITS &amp; CABLE TRAY</b>				
	Cabling from all instruments, controls & valves to DDC and communication cabling from DDC to central equipment complete with cable gland, earthing, supports & PVC conduits etc. Surface laid or cable tray laid cables shall be ferruled and tagged, and shall use lugs for termination at both ends. Wherever multicore cables are used, the price shall include the cost of Marshalling Boxes (MS Powder Coated with Elmex Terminals) to connect the multicore cables to 2 core cables for termination in equipments.				
	Supplying, laying and fixing 2 x1.0/1.5 Sq. mm copper conductor PVC Flexible cable overall shielded Signal Cable, including termination/ connection etc. as required on surface/wireway etc. as required.				
	Supplying, laying and fixing 2 x1.0/1.5 Sq. mm copper conductor PVC Flexible cable overall Unshielded Signal Cable, including termination/ connection etc. as required on surface/wireway etc. as required.				
	Supplying, laying and fixing CAT 6/5 unarmoured Cables with required accessories like RJ45 connector etc.				
	Supplying, laying and fixing 3 x1.5 Sq. mm copper conductor PVC FRLS including termination/ connection etc. as required on surface/ wireway etc. as required.				
	<b>PVC Conduits</b>				
	Supply & laying of 25mm dia heavy guage rigid FRLS PVC pipe on surface/recess including cutting/ filling chases along with GI pulling wire, accessories etc as required for complete installation.				
	Supplying and laying of 25mm dia PVC Flexible Steel Reinforced <b>conduit</b> on surface/recess including cutting/filling chases along with conduit accessories such as couplers etc. complete as required.				
	<b>Steel Conduits</b>				
	Supply & laying of 25mm dia steel conduit along with accessories in surface including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
	Supplying, installation, testing and commissioning of 1.6 mm thick GI cable tray with of the required sizes complete with angle iron supports/hanging arrangement etc				
<b>2.1</b>	<b>Complete Chiller Plant Manager as decsibed above</b>	1	Lot	11,51,279.00	11,51,279.00
<b>3</b>	<b>CHILLED WATER PUMP</b>				

	Supply, installation, testing and commissioning of End suction vertical back pull out type pumps mounted on a common base with electric motor for re-circulation of water for the central air conditioning system. The pumps shall be flexible coupled protected coupling guard, with CI casing, Bronze/gunmetal impeller, SS shaft and MS fabricated base plate .The pump motor shall be suitable for 415± 10% volts, 50 cycles, 3 phase AC power supply of IE3 efficiency class (IP-55 protected). Pump, base, coupling and motor shall be factory assembled. For unit responsibility all the items shall be sourced from single supplier.				
	Min. pump efficiency at duty conditions shall be 70%				
	Receiving, Unloading, shifting to foundation and Installation of Chilled water Primary Pumps complete in all respect as required with all accessories. Pump need to be insulated at site with same material as of pipe insulation. All required fittings & accessories, floating foundtaion for pump, vibration isolation arrangement by means of rubber type mounting, VI pads, nuts, bolts complete as required to be provided by contractor.				
<b>3.1</b>	<b>200 USGPM , 15 meter Head</b>	3	Nos.	1,21,841.00	3,65,523.00
<b>4</b>	<b>VARIABLE SPEED CHILLED WATER SECONDARY PUMP WITH VARIABLE SPEED PUMPING SYSTEM CONTROLLER</b>				
	Supply, installation, testing and commissioning of End suction vertical back pull out type pumps mounted on a common base with electric motor for re-circulation of water for the central air conditioning system. The pumps shall be flexible coupled protected coupling guard, with CI casing, Bronze/gunmetal impeller, SS shaft and MS fabricated base plate .The pump motor shall be suitable for 415± 10% volts, 50 cycles, 3 phase AC power supply of IE3 efficiency class (IP-55 protected). Pump, base, coupling and motor shall be factory assembled. For unit responsibility all the items shall be sourced from single supplier.				
	Min. pump efficiency at duty conditions shall be 70%				
	<b>Variable Speed Pumping System for Secondary Pumps</b>				
	The variable speed pumping package shall consist of a IP54 rating factory built Panel which shall consist Variable frequency drive (VFD) for each pump, 1 No. microprocessor based pump controller housed with in the enclosure of one of the VFD or standalone, other electrical components. Differential Pressure Transmitter as per the site requirement.The entire system along with secondary pumps must be sourced from pumping system supplier only, for unit responsibility. Microprocessor based control panel shall have suitable hardware & software so that it can be integrated directly to IBMS with standard communicationopen protocol using backnet / Modbus as well as open IP.				
	Differential Pressure Transmitter (for zone differential pressure sensing) as per the site requirement.				



	The pump shall be insulated at site with same material of pipe.				
	Receiving, Unloading, shifting to foundation and Installation of Chilled water Secondary Pumps with VFDs and controller etc. complete in all respect as required with all accessories. Pump need to be insulated at site with same material as of pipe insulation. All required fittings & accessories, floating foundtaion for pump, vibration isolation arrangement by means of rubber type mounting, VI pads, nuts, bolts complete as required to be provided by contractor.				
	Installation of VFDs, controller, required control devices, with control wiring required for system for proper operation of system etc. Complete in all respect to be done by contractor.				
<b>4.1</b>	<b>Set of 3Nos. Pumps (2W+1S) each pump having flow rate of 200 USGPM and head of 25 meter</b>	1	Set	1,29,742.00	1,29,742.00
<b>5</b>	<b>CONSTANT CONDENSER WATER PUMP</b>				
	Supply, installation, testing and commissioning of End suction vertical back pull out type pumps mounted on a common base with electric motor for re-circulation of water for the central air conditioning system. The pumps shall be flexible coupled protected coupling guard, with CI casing, Bronze/gunmetal impeller, SS shaft and MS fabricated base plate .The pump motor shall be suitable for 415± 10% volts, 50 cycles, 3 phase AC power supply of IE3 efficiency class (IP-55 protected). Pump, base, coupling and motor shall be factory assembled. For unit responsibility all the items shall be sourced from single supplier.				
	Min. pump efficiency at duty conditions shall be 70%				
	Receiving, Unloading, shifting to foundation and Installation of Condenser water Pumps complete in all respect as required with all accessories. All required fittings & accessories, floating foundtaion for pump, vibration isolation arrangement by means of rubber type mounting, VI pads, nuts, bolts complete as required to be provided by contractor.				
<b>5.1</b>	<b>300 USGPM , 30 meter head as per design</b>	3	Nos.	1,64,218.00	4,92,654.00
<b>6</b>	<b>COOLING TOWER (CTI CERTIFIED)</b>				
	Supply, installation, testing and commissioning of FRP CTI Certified induced draft Counter/ cross flow cooling tower with FRP water basin, PVC fills with integral louvers and drift eliminators complete with hot water basin either fitted with spray nozzles or having self rotating sprinklers, statically & dynamically balanced axial flow, direct driven fans with TEFC or driven through reduction gear box with induction motor of class F insulation, efficiency class IE-4 (IP-55 protection) operated with VFD suitable for operation on 415 + 10% volts, 50 Hz. AC supply; suction screen, make up-quick fill arrangement, overflow and drain connections with all necessary valves & foot valves, suitable inspection ladder, access arrangement for cooling tower interior, steel /masonry supporting structure with proper design, anti-vibration mountings,				

	foundation nuts, bolts, painting etc. complete as required and as per specification.				
	Noise level should not exceed 75dbA at 3Mtr.				
	The work shall inclusive of all duties & taxes, insurance, transportation / shipment cost from works to site, loading /unloading etc., shifting to foundation @ terrace and proper installation of machine complete with accessories as required. All required fittings & accessories, vibration isolation arrangement by means of rubber type mounting, VI pads, nuts, bolts, ladder requirement etc. complete as required to be provided.				
<b>6.1</b>	Capacity : 100 TR Nominal capacity (Suitable for chiller actual capacity of 80TR)				
	Flow Rate: 300 USGPM				
	Water Leaving Temperature : 32.2 °C (90.0 °F)				
	Water Entering Temperature : 36.4 °C (97.5 °F)				
	Wet Bulb Temperature : 29.4 °C (85 °F)	3	Nos.	3,02,265.00	9,06,795.00
<b>7</b>	<b>CLOSED PRESSURISED CHILLED WATER EXPANSION TANK WITH PRESSURE MAINTAINING STATION &amp; MICROBUBBLE AIR &amp; DIRT SEPARATOR</b>				
	Supplying, installing, testing and commissioning of <b>PRESSURISED CHILLED/HOT WATER EXPANSION TANK</b> of following capacity for chilled/hot water circuits along with necessary accessories such as <b>Centrifugal Air &amp; Dirt Separator</b> , suitable pumps, pressurisation unit of rating PN16 and control panel etc. in order to keep chilled water system under positive pressure and to prevent entrapment of pressure and to prevent entrapment of air in the system.				
	The tank shall be precharged steel expansion tank with replaceable heavy duty butyl rubber bladder. The tank shall have 50 MM system connection and 20 mm drain and charging valve connection to facilitate the on site charging of the tank to meet system requirement. The tank shall be fitted with lifting rings and a floor mounting skirt for vertical installation. The tank and air separator must be constructed in accordance with <b>IS standard and pressure vessel code</b> and shall be designed for 175 PSI working pressure.				
	The pumps shall be configured with one working + one standby. The complete system shall be sourced from single manufacturer, supplied and installed with all accessories and safety fixtures required for proper functioning of the complete hydronic system. The necessary control cable, power cable from the nearest source of supply and earthing shall be included. Receiving all the equipments at site, unloading, storing, handling, hoisting, installing in position, effecting connections, anchoring, grouting, testing and commissioning the equipment including supplying &				

	installing all necessary accessories as required to complete the installation.				
	32mm thick nitrile insulation over expansion tank and air & dirt separator to be done by contractor.				
	<b>Pressurized Expansion Tank with Air &amp; dirt Separator &amp; Pressure Maintaining station as required &amp; specified above</b>				
<b>7.1</b>	<b>Expansion Tank:- 500Ltrs &amp; Air &amp; dirt separator for 125mm dia header line</b>	1	Set	2,57,820.00	2,57,820.00
<b>8</b>	<b>Pot Strainer</b>				
	Supplying, fixing, testing and commissioning of Pot Strainer for following Dia. pipe having PN 16 working pressure.				
	<b>Pot strainer</b> having MS body, bolted cover, flanged ends, basket of stainless steel screen with 1.5 mm perforations and a permanent magnet for condenser water application complete with flanges, nuts-bolts, gaskets etc. as per specifications.				
<b>8.1</b>	<b>150 mm dia.</b>	1	Nos.	54,942.00	54,942.00
	<b>SUB HEAD 'B' - LOW SIDE EQUIPMENTS</b>				
<b>1</b>	<b>FLOOR MOUNTED AIR HANDLING UNITS</b>				
	Supply, Installation, Testing and commissioning of factory built <b>floor mounted</b> chilled water double skin air handling units made of 40±2 mm thick consisting of pre coated/ preplasticized G.I. casing of thickness 0.8mm outside layer and 0.8mm inside layer with polyurethane foam (PUF) insulation factory injected between them by injection moulding machine, complete with direct driven backward curved plenum plug fan (shall be AMCA Certified) section with blower with suitable for 35mm Extrenal static pressure, minimum 2bend GSS/PVC eliminators, 6row deep cooling coil section with aluminium finned copper tubes (tube thickness not less than 0.5mm)-Coil shall be designed for following parameters: Chilled Water IN / OUT - 44 °F/ 54 °F, filter sections with 50 mm thick washable synthetic type air pre-filters (EU-4 / MERV-8) & Electronic Air Cleaner : Merv-14 or Higher efficiency, direct drive package with TEFC drive motor (IE-3 ) suitable for 415 ± 10% V, 50Hz, 3 Phase AC supply compatible for VFD operation, drain Pan of AHUs must be made of Stainless Steel of Suitable thickness(18 G) duly insulated with required thickness & density of insulating material & drain slope on both side, limit switch, LED lamp, necessary vibration isolation arrangement, fire rated canvas connection with metallic flange inside AHU, gravity louver complete as required and as per specifications, drawings and of following capacities.				

	<p>Electronic Air Cleaner</p> <p>The air purification system should be suitable to reduce harmful pollutants like particulate matter (PMx), PM 2.5, allergens, pollen, smoke, bacteria, pathogens etc. based on below principle technology viz; Impingement, Polarisation and Agglomeration as a passive air It should be a slim structured unit specifically designed for integration in Return Air path of ceiling suspended indoor units, to centrally capture. It should be equivalent to Merv-14 or Higher efficiency for AHU and Ductable* Units with low pressure drop. It should have 3x working principles. The units shall meet ANSI/ASHRAE 52.2/ISO 16890 standards and have valid test report to verify filtration efficiency. The Supplier shall carry UL2998 certification against Zero Ozone Emission. The test report for pressure drop need to be submitted for passive air purification and the same shall be demonstrated at site.</p>				
	<p>Mechanical performance of AHU casing shall be Eurovent certified and should meet the following characteristics:</p> <p>As per EN 1886</p> <p>Mechanical Strength D1</p> <p>Thermal Bridging TB2</p> <p>Thermal Transmittance T2</p> <p>Air Leakage L1</p>				
	Fans shall be selected for minimum power consumption, maximum efficiency & minimum sound level. The efficiency of fan preferably shall be minimum 70% and in case if 70% is not achievable, Fans should be selected for maximum possible efficiency. Unit outlet velocity should not exceed 10.2 m/s (2000 FPM). Sound level at 1.5m distance from AHU shall not exceed 60 dBA.				
	Face velocity across filters & coil shall be maximum 2.5 m/s (500 FPM).				
	AHU cooling coils shall be AHRI / Eurovent certified.				
	Fan Static Indicated are tentative for external ducting work only, however internal static pressure of AHU shall be as per OEM Standards. Contractor shall submit fan static calculations based on approved shop drawings & as per actual site condition before ordering the unit. Any rise in static required shall be offer by contractor without any additional cost.				-
1.1	3400 CFM/ 8.0 TR	1	Nos.	1,96,036.00	1,96,036.00
1.2	4500 CFM/ 12.0 TR	1	Nos.	2,88,234.00	2,88,234.00
1.3	4800 CFM/ 10.0 TR	1	Nos.	2,91,191.00	2,91,191.00
1.4	7100 CFM/ 16.0 TR	1	Nos.	4,10,611.00	4,10,611.00
1.5	8000 CFM/ 15.0 TR	1	Nos.	4,17,817.00	4,17,817.00
2	<b>CEILING SUSPENDED AIR HANDLING UNITS</b>				

	Supply, Installation, Testing and commissioning of factory built <b>ceiling suspended</b> chilled water double skin air handling units made of 40±2 mm thick consisting of pre coated/ preplasticized G.I. casing of thickness 0.8mm outside layer and 0.8mm inside layer with polyurethane foam (PUF) insulation factory injected between them by injection moulding machine, complete with direct driven backward curved plenum plug fan (shall be AMCA Certified) section with blower with suitable for 35mm Extrenal static pressure, minimum 2bend GSS/PVC eliminators, 6 row deep cooling coil section with aluminium finned copper tubes (tube thickness not less than 0.5mm)-Coil shall be designed for following parameters: Chilled Water IN / OUT - 44 °F/ 54 °F, filter sections with 50 mm thick washable synthetic type air pre-filters (EU-4 / MERV-8) and Electronic Air Cleaner : Merv-14 or Higher efficiency, direct drive package with TEFC drive motor (IE-3 ) suitable for 415 ± 10% V, 50Hz, 3 Phase AC supply compatible for VFD operation, drain Pan of AHUs must be made of Stainless Steel of Suitable thickness(18 G) duly insulated with required thickness & density of insulating material & drain slope on both side, limit switch, LED lamp, necessary vibration isolation arrangement, fire rated canvas connection with metallic flange inside AHU, gravity louver complete as required and as per specifications, drawings and of following capacities.												
	<p>Electronic Air Cleaner</p> <p>The air purification system should be suitable to reduce harmful pollutants like particulate matter (PMx), PM 2.5, allergens, pollen, smoke, bacteria, pathogens etc. based on below principle technology viz;Impingement, Polarisation and Agglomeration as a passive air It should be a slim structured unit specifically designed for integration in Return Air path of ceiling suspended indoor units, to centrally capture. It should be equivalent to Merv-14 or Higher efficiency for AHU and Ductable* Units with low pressure drop. It should have 3x working principles. The units shall meet ANSI/ASHRAE 52.2/ISO 16890 standards and have valid test report to verify filtration efficiency. The Supplier shall carry UL2998 certification against Zero Ozone Emission.</p> <p>The test report for pressure drop need to be submitted for passive air purification and the same shall be demonstrated at site.</p>												
	<p>Mechanical performance of AHU casing shall be Eurovent certified and should meet the following characteristics:</p> <p>As per EN 1886</p> <table><tr><td>Mechanical Strength</td><td>D1</td></tr><tr><td>Thermal Bridging</td><td>TB2</td></tr><tr><td>Thermal Transmittance</td><td>T2</td></tr><tr><td>Air Leakage</td><td>L1</td></tr></table>	Mechanical Strength	D1	Thermal Bridging	TB2	Thermal Transmittance	T2	Air Leakage	L1				
Mechanical Strength	D1												
Thermal Bridging	TB2												
Thermal Transmittance	T2												
Air Leakage	L1												

	Fans shall be selected for minimum power consumption, maximum efficiency & minimum sound level. The efficiency of fan preferably shall be minimum 70% and in case if 70% is not achievable, Fans should be selected for maximum possible efficiency. Unit outlet velocity should not exceed 10.2 m/s (2000 FPM). Sound level at 1.5m distance from AHU shall not exceed 60 dBA.				
	Face velocity across filters & coil shall be maximum 2.5 m/s (500 FPM).				
	AHU cooling coils shall be AHRI / Eurovent certified.				
	Fan Static Indicated are tentative for external ducting work only, however internal static pressure of AHU shall be as per OEM Standards. Contractor shall submit fan static calculations based on approved shop drawings & as per actual site condition before ordering the unit. Any rise in static required shall be offer by contractor without any additional cost.				-
<b>2.1</b>	1600 CFM/ 9.0 TR	1	Nos.	1,44,610.00	1,44,610.00
<b>2.2</b>	1900 CFM/ 5.0 TR	1	Nos.	1,49,229.00	1,49,229.00
<b>2.3</b>	2100 CFM/ 5.0 TR	6	Nos.	1,52,370.00	9,14,220.00
<b>2.4</b>	2300 CFM/ 6.0 TR	1	Nos.	1,54,464.00	1,54,464.00
<b>2.5</b>	3100 CFM/ 12.5 TR	2	Nos.	2,15,190.00	4,30,380.00
<b>2.6</b>	3650 CFM/ 11.0 TR	1	Nos.	2,31,758.00	2,31,758.00
<b>2.7</b>	4400 CFM/ 12.0 TR	1	Nos.	2,88,173.00	2,88,173.00
<b>3</b>	<b>FAN COIL UNIT</b>				
	Supply, Installation, testing & commissioning of GI powder coated horizontal FAN COIL UNITS with following specification and required accessories.				
	The horizontal type of fan coil units shall be complete with centrifugal blowers of aluminum construction, 3 speed fan motor, cooling coil, filter, sandwiched type duly insulated drain pan extended type to accommodate all the valves as required for chilled water pipe connection. The interior chassis shall be constructed of galvanized sheet steel and painted with approved shade of powder coating finish. Drain pan shall be fabricated from 20gauge stainless steel with all corners welded, and an additional inner bottom panel of 20gauge GI shall be provided to prevent damage to, and floatation of the bottom panel insulation. The cooling coil shall be 3/4 row deep having minimum 4.7 fins / cm. The OD of copper tube shall be 9.5 mm minimum & minimum wall thickness of 0.4mm. The Fan Coil Units shall be provided with the following accessories like Anchors, Hangers, Vibration isolators to be provided.				
<b>3.1</b>	1.0 TR, 400 CFM	2	Nos.	18,721.00	37,442.00
<b>3.2</b>	2.0 TR, 800 CFM	1	Nos.	24,070.00	24,070.00
<b>3.3</b>	3.0 TR, 1200 CFM	1	Nos.	28,372.00	28,372.00
<b>4</b>	<b>HYDRONIC HI-WALL UNIT</b>				
	Supply, Installation, testing & commissioning of Hi-wall Hydronic Cassette unit with following specification and required accessories.				



	The units shall be complete with centrifugal blowers of aluminum construction, 3 speed fan motor, cooling coil, filter, sandwiched type duly insulated drain pan extended type to accommodate all the valves as required for chilled water pipe connection. Drain pan shall be fabricated from 20gauge stainless steel. The cooling coil shall be 2/3 row deep having minimum 4.7 fins / cm. The OD of copper tube shall be as per OEM. The Units shall be provided with all required accessories. Cordless remote with unit to be provided.				
<b>4.1</b>	1.0 TR	4	Nos.	20,349.00	81,396.00
<b>4.2</b>	1.5 TR	3	Nos.	26,163.00	78,489.00
<b>5</b>	<b>VALVE STATION FOR FCU &amp; CASSETTE UNIT</b>				
	Supply, Installation, testing and commissioning of Preassembled valve station link complete with required valves as specified. Link consist of 3Nos. full port isolating valves in supply, return & bypass, Fixed Orifice Plate Measuring Station, Strainer with stainless Steel Mesh, Drain Cock, Two Pressure / Temperature measuring knobs, Flow regulating valve (Balancing Valve), 2 way control Valve with on/off actuator, Stainless Steel flexible Connector 300mm (2 pieces), Thermal insulating kit made of high Density Black EPP. Min. Pressure rating (PN-16)				
<b>5.1</b>	1.0 TR/ 2.4 GPM	6	Nos.	16,860.00	1,01,160.00
<b>5.2</b>	1.5 TR/ 3.6 GPM	3	Nos.	16,860.00	50,580.00
<b>5.3</b>	2.0 TR/ 4.8 GPM	1	Nos.	16,860.00	16,860.00
<b>5.4</b>	3.0 TR/ 7.2 GPM	1	Nos.	16,860.00	16,860.00
<b>6</b>	<b>THERMOSTAT FOR FCU</b>				
	Providing and fixing of FCU's Room Thermostat and can control fan speed at 3stage complete with all required accessories including control wiring between control valve and thermostat with conduiting as required in all respect and complete as per specification.	11	Set	2,884.00	31,724.00
<b>7</b>	<b>AXIAL FAN (AMCA CERTIFIED)</b>				
	Supplying, installation, testing and commissioning of ceiling hang / floor mounted long cased Axial flow fans of suitable capacity with powder coated MS/GSS casing and aluminium alloy impellers with high efficiency aero-foil sections, blades, the impeller directly driven by TEFC induction motor of high efficiency class IE2 (with IP55 protection) suitable for 3 Phase 50 Hz 415V $\pm$ 10 %. <b>Motor for supply/fresh air fans shall have class 'F' insulation and class 'H' insulation for Exhaust air Fans as required and as per specifications.</b> Motors shall be pre-wired to an external electrical terminal box through weatherproof flexible conduit/ vanes/tube.				
	The exhaust air fan and motor shall be rated for a minimum of 250 Deg C for a minimum of 2 hours application as per EN 12101:3-2015, every model shall be mention in test report, make of motor shall be same as per test report.				

	Efficiency of fans should not less than 60%. To achieve the efficiency vane type axial fan can be selected. However; If OEM is not able to meet 50% efficiency for any specific case, 55-60% fan efficiency can be excepted subject to detail technical justifications from Vendor/OEM."				
	Fans shall be selected for maximum 1450 RPM.				
	Sound level for fan shall not exceed more than 80dB(A) at three meter distance at both ends when measured in hemispherical reverberant room conditions. Max. Outlet velocity should not more than 3000FPM.				
	Fan should be complete with all accessories including vibration isolators, mounting brackets,nut, bolts, bird screen etc. as specified in the specification.				
	Air moving capacity shall be as follows:				
<b>7.1</b>	<b>SERVICE ROOM VENTILATION EXHAUST AIR FAN</b>				
7.1.1	2800 CFM, SP= 25mm wg	1	Nos.	42,649.00	42,649.00
7.1.2	3500 CFM, SP= 25mm wg	1	Nos.	47,681.00	47,681.00
<b>7.2</b>	<b>SERVICE ROOM VENTILATION FRESH AIR FAN</b>				
7.2.1	2800 CFM, SP= 25mm wg	1	Nos.	37,826.00	37,826.00
7.2.2	3500 CFM, SP= 25mm wg	1	Nos.	40,699.00	40,699.00
<b>7.3</b>	<b>PRESSURIZATION FAN</b>				
7.3.1	7500 CFM, SP= 25mm wg	4	Nos.	64,954.00	2,59,816.00
7.3.2	9000 CFM, SP= 30mm wg	2	Nos.	77,469.00	1,54,938.00
7.3.3	12000 CFM, SP= 30mm wg	2	Nos.	1,01,329.00	2,02,658.00
<b>7.4</b>	<b>SMOKE EXTRACTION (EXHAUST AIR FAN)</b>				
7.4.1	16000 CFM, SP= 35mm wg	1	Nos.	1,22,770.00	1,22,770.00
<b>7.5</b>	<b>SMOKE EXTRACTION (FRESH AIR FAN)</b>				
7.5.1	16000 CFM, SP= 35mm wg	1	Nos.	1,22,770.00	1,22,770.00
<b>8</b>	<b>OUTDOOR TYPE CABINET FAN SECTION FOR EXHAUST AIR</b>				
	Supplying, installation, testing and commissioning of double skin floor mounted cabinet fan section for exhaust air made of 25 ± 2 mm thick panel fabricated having extruded aluminium profile sections consisting of pre-plasticized/ precoated G.I. casing of thickness 0.63mm outside layer and 0.63 mm inside layer with polyurethane foam (PUF) insulation of density 38 ± 2 kg/m3 factory injected between them by injection moulding machine, complete with DIDW backward/forward curved belt driven centrifugal fan (fan should be non-overloading type) for exhaust air application suitable for static pressure as required with TEFC induction motor (IP 55 protection) should be of high efficiency class IE3 suitable for 3 Phase 50 Hz 415V ± 10 %, of class 'F' insulation, Filter sections as describe below, fire rated flexible connection internal connection etc. including all accessories complete as required and as per specifications. A common base frame for motor and fan with anti vibration isolators. Gravity louvers will be provided so as to avoid reverse flow.				

8.1	2900 CFM, External Static Pressure= 25mm wg	1	Nos.	67,973.00	67,973.00
8.2	3300 CFM, External Static Pressure= 25mm wg	1	Nos.	76,737.00	76,737.00
<b>9</b>	<b>PROPELLER FAN</b>				
	Supplying, installation, testing & commissioning of low noise Plastic body circular/rectangular Propeller exhaust fans suitable for following capacities complete with electric motor suitable for operation on 220 V+ 10%, 50 Hz, 1 phase AC supply, 6 Amp plug and wiring between the fan and the socket, fitted with mounting frames, NRD/ louvers/bird screen etc. as per specifications of the following capacities.				
<b>9.1</b>	150mm sweep dia	11	Nos	3,117.00	34,287.00
<b>9.2</b>	300mm sweep dia	8	Nos	3,857.00	30,856.00
	<b>SUB-HEAD 'C' - CHILLED WATER &amp; CONDENSER WATER PIPING WORK</b>				
<b>1</b>	<b>CHILLED WATER PIPING (INSULATED)</b>				
	Supplying, laying/ fixing, testing and commissioning of following nominal sizes of chilled water piping inside the building (with necessary clamps, vibration isolators and fittings but excluding valves, strainers, gauges etc.) duly insulated with following closed cell elastometric nitrile rubber of minimum 45 Kg / cu m density, thermal conductivity 0.037 W/MK or better at 20 deg mean temperature class 'O' insulation with factory fitted fibreglass GC cloth in blue color applied by suitable adhesive complete including repairing of damage to building etc. as per specifications and as required complete in all respect.				
	Note:- The Pipes of sizes 150mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35mm thick M.S. Sheet for pipes upto 350 mm dia. and from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.				
	All pipes on floor to be supported/hanged on wire rope hangers system as per specifications with lock(s) and pre-crimped end fixing(s) except risers.				
1.1	150 mm dia. (32 mm thick insulation)	58	Mtr	4,847.00	2,81,126.00
1.2	125 mm dia. (32 mm thick insulation)	23	Mtr	4,347.00	99,981.00
1.3	100 mm dia. (32 mm thick insulation)	23	Mtr	3,430.00	78,890.00
1.4	80 mm dia. (32 mm thick insulation)	46	Mtr	2,487.00	1,14,402.00
1.5	65 mm dia. (32 mm thick insulation)	115	Mtr	2,067.00	2,37,705.00
1.6	50 mm dia. (32 mm thick insulation)	414	Mtr	1,785.00	7,38,990.00
1.7	40 mm dia. (32 mm thick insulation)	115	Mtr	1,422.00	1,63,530.00
1.8	32 mm dia. (19 mm thick insulation)	184	Mtr	1,237.00	2,27,608.00
1.9	25 mm dia. (19 mm thick insulation)	150	Mtr	1,010.00	1,51,500.00
1.10	20 mm dia. (19 mm thick insulation)	69	Mtr	860.00	59,340.00
<b>2</b>	<b>INSULATED VALVES</b>				
	Supplying, fixing, testing and commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				

<b>2.1</b>	BUTTERFLY VALVE (MANUAL) with C I body SS Disc, Nitrile Rubber Seal & O- Ring PN 16 pressure rating for chilled water/hot water circulation as specified				
2.1.1	125 mm dia.	3	Nos.	7,829.00	23,487.00
2.1.2	100 mm dia.	18	Nos.	7,032.00	1,26,576.00
2.1.3	80mm dia.	4	Nos.	4,794.00	19,176.00
2.1.4	65mm dia.	8	Nos.	4,368.00	34,944.00
2.1.5	50mm dia.	8	Nos.	4,043.00	32,344.00
2.1.6	40mm dia.	12	Nos.	3,643.00	43,716.00
2.2	Supplying, fixing, testing and commissioning of Y - Strainer of Ductile CI Body flanged ends with stainless steel strainer for chilled water circulation including insulation as specified.				
2.2.1	125 mm dia.	6	Nos.	21,857.00	1,31,142.00
2.2.2	80 mm dia.	2	Nos.	10,633.00	21,266.00
2.2.3	65 mm dia.	4	Nos.	9,004.00	36,016.00
2.2.4	50 mm dia.	4	Nos.	6,801.00	27,204.00
2.2.5	40mm dia.	6	Nos.	5,316.00	31,896.00
2.2.6	32mm dia.	6	Nos.	4,144.00	24,864.00
2.3	Supplying, fixing, testing and commissioning of Non return valve with dual plate of CI body and SS plates vulcanized NBR seal flanged and PN 16 pressure rating for chilled / hot water circulation including insulation as specified.				
2.3.1	80 mm dia.	6	Nos.	7,102.00	42,612.00
2.4	Providing, fixing, testing & commissioning of resilient rubber lined double arch vibration eliminator expansion bellows for Pump, Chiller inlet & outlet to provide relief from stresses at pipe flanges. It should be complete as per manufacturer's specifications & as directed by Engineer- in-charge.(PN 16 rating)				
2.4.1	125 mm dia.	12	Nos.	8,409.00	1,00,908.00
2.4.2	80 mm dia.	18	Nos.	5,613.00	1,01,034.00
2.5	Supply,Installation Testing and Commissioning of the following Ball Valves duly insulated as per specifications and drawings. It shall be bronze forged body construction with chrome plated bronze ball and handle of stainless steel constructions.				
2.5.1	32mm dia.	12	Nos.	4,342.00	52,104.00
2.6	Supplying, fixing, testing and commissioning of Fully Automatic Pre-set Balancing Valves (For Chiller Outlet) with 304 stainless steel cartridges. Dual pressure/ temperature test plugs for verifying accuracy of flow performance.				
2.6.1	125 mm dia.	3	Nos.	32,913.00	98,739.00
<b>3.0</b>	<b>PRESSURE INDEPENDENT BALANCING CUM CONTROL VALVE</b>				
	Supply, Installation, Testing and Commissioning of following sizes electronic, self-balancing, pressure independent type dynamic balancing valve with integrated 2 way modulating control valve in a single body. The actuator shall be capable of accepting upto 10V DC and upto 20mA electric signal and shall provide similar transduced feedback output to control				

	system. Maximum close off pressure shall not be less than 6 Bar for upto 50 mm valves and 7Bar for 65 mm & above. Valves should have pressure rating of 25Bar minimum.				
3.1	65mm dia.	6	Nos.	55,497.00	3,32,982.00
3.2	50mm dia.	4	Nos.	35,947.00	1,43,788.00
3.3	40mm dia.	6	Nos.	32,793.00	1,96,758.00
3.4	32mm dia.	6	Nos.	17,658.00	1,05,948.00
4	Providing and fixing of AHU's Thermostat for 2pipe system complete with all required accessories including control wiring between control valve and thermostat with conduiting as required in all respect and complete as per specification.	22	Set	5,087.00	1,11,914.00
5	Providing and fixing of in position the industrial type pressure gauges with gun metal / brass valves complete as required.	74	Nos.	1,081.00	79,994.00
6	Providing and fixing of in position the mercury in glass industrial type thermometers.	56	Nos.	1,036.00	58,016.00
7	Supply, installation ,testing and commissioning of Auto Air vents,at the highest points in the chilled water & condenser piping, FM AHU coil as per approved makes and specifications.25 mm Dia Auto Air Vents, with isolating ball valves.	22	Nos.	1,526.00	33,572.00
8	Supply, installation, testing and commissioning of Manual Air vents as per approved makes and specifications.25 mm Dia Air Vents, with isolating ball valves for drain.	4	Nos.	534.00	2,136.00
9	Providing and fixing in position the following Water flow switch at chiller & HWG and as per specifications:	6	Nos.	1,170.00	7,020.00
10	Supply, Installation Testing and Commissioning of the following <b>drain Valves</b> as per specifications and drawings.				
10.1	32mm dia.	24	Nos.	1,641.00	39,384.00
10.2	25mm dia.	8	Nos.	1,641.00	13,128.00
11	<b>CONDENSER WATER PIPING</b>				
	Supplying, fixing, testing and commissioning of condenser water pipes of following sizes of MS 'C' class along with necessary clamps, vibration isolators and fittings such as bends,tees etc.but excluding valves, strainers, gauges etc. adequately supported on rigid supports duly painted/buried in ground excavation and refilling etc. as per specification and as required complete in all respect.				
	Note:-The Pipes size 150mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35mm thick M.S. Sheet for pipes upto 350 mm dia. And from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.				
11.1	150 mm dia.	200	Mtr	3,806.00	7,61,200.00
11.2	100 mm dia.	20	Mtr	2,776.00	55,520.00
12	<b>VALVES WITHOUT INSULATION</b>				
	Supplying, fixing, testing and commissioning of following size valves, gauges and strainers for condenser water circulation as per specifications.				

<b>12.1</b>	BUTTERFLY VALVE (MANUAL) with C I body SS disc nitrile sheet & O-ring & PN 16 pressure rating as specified.				
12.1.1	150 mm dia.	18	Nos.	8,651.00	1,55,718.00
12.1.2	100 mm dia.	2	Nos.	6,051.00	12,102.00
12.2	Supply, installation ,testing and commissioning of NON - RETURN VALVE with dual plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating as specified.				
12.2.3	150 mm dia.	3	Nos.	11,846.00	35,538.00
<b>12.3</b>	Supply, installation ,testing and commissioning of <b>Y - Strainer</b> of Ductile CI Body flanged ends with stainless steel strainer for chilled / hot water circulation PN16 including insulation as specified.				
12.3.1	150 mm dia.	3	Nos.	27,020.00	81,060.00
<b>12.4</b>	Supply, installation ,testing and commissioning of Fully Automatic Pre-set Balancing Valves ( <b>For Condenser Outlet &amp; Cooling tower inlet</b> ) with 304 stainless steel cartridges. Dual pressure/ temperature test plugs for verifying accuracy of flow performance.				
<b>12.4.1</b>	150 mm dia.	6	Set	44,628.00	2,67,768.00
<b>12.5</b>	<b>Providing, fixing, testing &amp; commissioning of resilient rubber lined double arch vibration eliminator expansion bellows for Pump, Chiller inlet &amp; outlet</b> to provide relief from stresses at pipe flanges. It should be complete as per manufacturer's specifications & as directed by Engineer- in-charge.(PN 16 rating)				
<b>12.5.1</b>	150 mm dia.	12	Nos.	8,409.00	1,00,908.00
<b>13.0</b>	<b>CONDENSATE DRAIN PIPE FOR AHU &amp; FCU &amp; CASSETTE UNITS</b>				
	Supplying, fixing, testing and commissioning of UPVC drain piping with all fitting such as bends, tees etc. necessary clamps, adequate support duly insulate with 9 mm nitrile rubber insulation complete as per specifications, requirement, standard and drawings.				
<b>13.1</b>	50 mm dia.	12	Mtr	177.00	2,124.00
<b>13.2</b>	40 mm dia.	46	Mtr	115.00	5,290.00
<b>13.3</b>	32 mm dia.	104	Mtr	80.00	8,320.00
<b>13.4</b>	25 mm dia.	201	Mtr	50.00	10,050.00
<b>13.5</b>	20 mm dia.	23	Mtr	36.00	828.00
	<b>SUB-HEAD 'D' - AIR DISTRIBUTION WORKS</b>				
<b>1</b>	<b>GSS DUCT</b>				
<b>1.1</b>	<b>Factory Fabricated GSS Duct</b>				
	Supply, installation, balancing and commissioning of factory fabricated GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required.				
	All ducting to be supported/hanged on wire rope hangers system as per specifications with lock(s) and pre-cripped end fixing(s) except shaft ducting, inside AHU room and terrace.				
1.1.1	Thickness 0.63 mm sheet	967	SQM.	890.00	8,60,630.00



1.1.2	Thickness 0.80 mm sheet	705	SQM.	1,031.00	7,26,855.00
1.1.3	Thickness 1.00 mm sheet	501	SQM.	1,108.00	5,55,108.00
1.1.4	Thickness 1.25 mm sheet	50	SQM.	1,665.00	83,250.00
<b>1.2</b>	<b>Site Fabricated GSS Duct</b>				
	Supply, installation, balancing and commissioning of fabricated at site GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required.				
1.2.1	Thickness 0.63 mm sheet	48	SQM.	1,048.00	50,304.00
1.2.2	Thickness 0.80 mm sheet	35	SQM.	1,251.00	43,785.00
1.2.3	Thickness 1.00 mm sheet	25	SQM.	1,623.00	40,575.00
1.2.4	Thickness 1.25 mm sheet	3	SQM.	1,835.00	5,505.00
<b>3</b>	Supply, installation, testing and commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc., as per specifications.	32	SQM.	6,064.00	1,94,048.00
<b>4</b>	Supply, installation, testing of extruded aluminium powder coated linear grill without volume control damper as per approved shop drawings and specifications..				
<b>4.1</b>	150 MM	12	Mtr	1,149.00	13,788.00
<b>5</b>	Supply, Installation and Testing of collar damper of galvanised steel sheet, provided with suitable links, levers and quadrants for manual control of volume of air flow and for proper balancing of air distribution as per approved shop drawings and specifications.	1.5	SQM.	3,639.00	5,459.00
<b>6</b>	Supplying, fixing testing commissioning of supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti smudge ring & removable core.	85	SQM.	13,200.00	11,22,000.00
<b>7</b>	Supplying, fixing testing commissioning of Return air diffusers of powder coated aluminium without volume control dampers with anti smudge ring & removable core.	85	SQM.	8,890.00	7,55,650.00
<b>8</b>	Supplying, Fixing,testing and commissioning of fire dampers in supply air duct/main branch and return air path as and where required of required sizes i/c control wiring,the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally mounted. The damper shall also be closed in the event of fire signal complete as required and as per specifications.				
<b>8.1</b>	Fire damper	3.5	SQM.	7,788.00	27,258.00
<b>8.2</b>	Actuator	10	Nos	9,617.00	96,170.00
<b>9</b>	Supply, fixing and commissioning of Fresh/ exhaust air louvers with section comprising of powder coated Aluminium louvers & bird screen as required.	0.8	SQM.	6,735.00	5,388.00
<b>10</b>	Supply, fixing and commissioning of powder coated extruded aluminium Door Transfer Grill complete with nuts, bolts, SS screws etc. complete as required.	2	SQM.	9,388.00	18,776.00
	<b>SUB-HEAD 'E' - INSULATION WORKS</b>				
<b>1</b>	<b>DUCT ACOUSTIC LINING</b>				

	Supply and fixing of acoustic lining of supply air duct and plenum with 25 mm thick resin bonded glass wool having density of 32kg/m³, with 25 mm X 25 mm GI section of 1.25 mm thick, at 600mm centre to centre covered with Reinforced Plastic tissue paper and 0.5 mm thick perforated aluminum sheet fixed to inside surface of ducts with cadmium plated nuts, bolts, stick pins, CPRX compound etc. complete as required and as per specifications.	250	SQM.	837.00	2,09,250.00
<b>2</b>	<b>THERMAL INSULATION FOR DUCT</b>				
	Supplying and fixing of following thickness duly laminated aluminum foil of mat finish closed cell Nitrile rubber (Class "O") insulation on existing duct after applying suitable adhesive for Nitrile rubber. The joints shall be sealed with 50 mm wide and 3 mm thick self adhesive nitrile rubber tape insulation complete as per specifications and as required.				
<b>2.1</b>	19 mm	2100	SQM.	1,044.00	21,92,400.00
	<b>SUB-HEAD 'F' - 'Air Purification System (Plasma Ionization)</b>				
	The Active Air Purification system should consist of Supply, Installation, Testing and commissioning of Bipolar Ionisation System. The Bipolar Ionisation System must be Carbon Fibre Brush Model for FCU, Hi-wall and Cassette unit for VRF's, and Needle Type ionization for AHU/CSU. System should produce positive and negative ions for creating a Bio Climate rich in ions and hence neutralising harmful pollutants including pathogens, Volatile Organic Compounds and Particulate Matter.				
	Product should have UL 867 and UL 2998 certification (for zero ozone emission) , UL 2043 (for Fire and Smoke Safety) , ISO 16000 , CSA C22.2# 187 on atleast any one product .The OEM shall have Efficacy test report on SARS-CoV-2 OMICRON VARIANT and from any Internationally/Nationally recognised Laboratory.				
	Manufacturers shall provide Test report from Internationally/Nationally recognized Lab for proven efficacy on below pathogens with minimum kill rates for the following pathogens given the allotted time and in a space condition: a) SARS-CoV-2 (COVID-19) Human Strain b) MS2 Bacteriophage (Surrogates COVID-19) c) Omicron Variant of SARS-CoV-2 d) H1N1 e) Total Bacterial Count Reduction rate of more than 90% from NABL Accredited Lab f) Yeas & Mold/Total fungal count Reduction rate of more than 90% from NABL Accredited Lab				
<b>1.1</b>	3400 CFM/ 8.0 TR	1	Nos.	50368.00	50,368.00
<b>1.2</b>	4500 CFM/ 12.0 TR	1	Nos.	60442.00	60,442.00
<b>1.3</b>	4800 CFM/ 10.0 TR	1	Nos.	61047.00	61,047.00
<b>1.4</b>	7100 CFM/ 16.0 TR	1	Nos.	86483.00	86,483.00
<b>1.5</b>	8000 CFM/ 15.0 TR	1	Nos.	91570.00	91,570.00
<b>1.6</b>	1600 CFM/ 9.0 TR	1	Nos.	15669.00	15,669.00
<b>1.7</b>	1900 CFM/ 5.0 TR	1	Nos.	15669.00	15,669.00
<b>1.8</b>	2100 CFM/ 5.0 TR	6	Nos.	35610.00	

					2,13,660.00
<b>1.9</b>	2300 CFM/ 6.0 TR	1	Nos.	35610.00	35,610.00
<b>2</b>	3100 CFM/ 12.5 TR	2	Nos.	50872.00	1,01,744.00
<b>2.1</b>	3650 CFM/ 11.0 TR	1	Nos.	50872.00	50,872.00
<b>2.2</b>	4400 CFM/ 12.0 TR	1	Nos.	61047.00	61,047.00
<b>2.3</b>	1.0 TR, 400 CFM	2	Nos.	15669.00	31,338.00
<b>2.4</b>	2.0 TR, 800 CFM	1	Nos.	15669.00	15,669.00
<b>2.5</b>	3.0 TR, 1200 CFM	1	Nos.	15669.00	15,669.00
<b>2.6</b>	1.0 TR – Hi Wall Split Unit	4	Nos.	15669.00	62,676.00
<b>2.7</b>	1.5 TR – Hi Wall Split Unit	3	Nos.	15669.00	47,007.00
<b>2.8</b>	1.0 TR/ 2.4 GPM	6	Nos.	15669.00	94,014.00
<b>2.9</b>	1.5 TR/ 3.6 GPM	3	Nos.	15669.00	47,007.00
<b>3</b>	2.0 TR/ 4.8 GPM	1	Nos.	15669.00	15,669.00
<b>3.2</b>	3.0 TR/ 7.2 GPM	1	Nos.	15669.00	15,669.00
	<b>Total Amount of Package VII : HVAC Rs.</b>				<b>3,11,65,893.00</b>
	<b>Package VIII : Solar PV System</b>				
1	Supply, installation, testing and commissioning of <b>On grid Solar Photovoltaic Power Plant conforming to MNRE specification as amended upto date</b> , consisting of Mono-Crystalline (PERC, Half Cut) / Bifacial Silicon Solar Cells (efficiency not less than 21.12%), Net Metering facility, Integration module suitable for Grid, DG and Solar Power, necessary protections, earthing, GI mounting structure(As per Requirement/Solar Analysis) of suitable strength with following components complete as required.				
a)	<b>Supply &amp; Installation of Solar Photovoltaic Module of capacity 545 Wp or above (MONO PERC, HALF CUT / BIFACIAL), Make in India (DCR)</b> , With minimum 10 years warranty conforming to IS14286/IEC61730-Part-1, IS/IEC61730-Part-2, Solar Photovoltaic Module conversion efficiency shall not be less than 21.12%) PV modules used in Solar Power Plant/ System must be warranted for their output peak watt capacity which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.				
b)	<b>Supply &amp; Installation of MPPT based Suitable Capacity Power Conditioning Unit (PCU)</b> with 10 years onsite warranty, 350-1000 V DC Input Voltage range and 400V AC, three Phase, 4 Wire, 50 Hz, Output Voltage suitable to generate AC Power with efficiency not less than 97%, total harmonic distortion less than 3%, and suitable for ambient temperature from 0°C to 50°C. The PCU shall adjust the voltage and frequency level to suit the Grid voltage and frequency. PCU should come with Remote Monitoring System (RMS) with suitable provision for data integration.				
c)	Supply & Installation of module mounting structures (MMS) with mounting Clips shall be manufactured with Hot dip galvanized steel angles & channels; galvanized to IS 1477 Part-1 with thickness of 80 microns of aluminium alloy as per IS 5905. All fasteners shall be of Stainless steel. MMS having adequate strength & appropriate design and shall be suitable to withstand the wind velocity of 150 Km/hr, complete with civil work concrete (400:400:400 mm)				

	made of PCC (1:2:4) M15 and other required hardware. Structure should be anchor fastened to RCC Slab with Chemical SS Fastners (MakeL Fisher/ Hilti)				
d)	Supply and Fixing of Array Junction Box (DCDB) and Solar Main Junction Box (ACDB) with IP:68 Protection and termination arrangement for incoming and outgoing cable alongwith glands, lugs and inclusive of all required components etc. as required.				
e)	Complete System with Loto Box with necessary protection devices and all required accessories for Net Metering as per updated norms of DiSCOM/ MNRE.				
f)	<b>Connections &amp; interconnection</b> by supplying & fixing required size XLPE insulated copper conductor DC cables (minimum 6 Sq.mm) between Solar Modules, AC power cable from inverter to ACDB alongwith supplying & fixing of necessary channel/conduit, compression glands, lugs and other accessories etc. as required				
g)	<b>Supplying and laying of following size DWC HDPE pipe</b> 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, minimum 70 mtr. or as per requirement at site)				
i)	90 mm dia (OD-90 mm & ID-76 mm nominal)				
h)	<b>Supplying Laying of one number XLPE insulated stranded Copper conductor</b> , armoured, power cable of 1.1 KV grade conforming to IS:7098, Part-1, of following size in the existing RCC/ HUME/ METAL/ DWC pipe as required, (minimum 175 mtr. Or as per requirement at site)(Size as per Load Calculation.)				
i)	Supplying and making <b>end termination with brass compression gland</b> and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required, minimum 2 nos. or as per requirement at site.(As per Size of cable Used.)				
j)	Earthing with <b>G.I. earth plate 600 mm x 600 mm x 6 mm thick</b> including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required, (minimum 4 nos. or as per requirement at site).				
k)	Providing and fixing <b>25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe</b> from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required (minimum 20 mtr. or as per requirement at site).				
l)	Providing and fixing <b>25 mm X 5 mm G.I. strip</b> on surface or in recess for connections etc. as required. (minimum 45 mtr. or as per requirement at site).				
m)	Providing and fixing <b>6 SWG dia G.I. wire on surface or in recess</b> for loop earthing along with existing surface/ recessed conduit/ sub-main wiring/ cable as required. (minimum 350 mtr. or as per requirement at site).	250	KWp	39282.00	98,20,500.00

	Total Amount of Package VIII : Solar PV System Rs.				98,20,500.00
	Package IX : CCTV System				
1	Supply Installation Testing and Commissioning of 5 MP Dome camera , ONVIF profile S /G/ T, UL/BIS , CE , FCC Certified, NDAA Compliant,1/2.7” Progressive Scan CMOS ,2.7 mm to 13.5 mm motorized varifocal lens , Quad streamwith each stream support H.265 compression simultaneously ,min illumination : Color 0.15lux @ F1.2(AGC ON) ; In built IR LED , IR Distance upto 30 meters or better B/W 0 lux @ IR ON , Shutter speed : 1 / 30s ~ 1 / 10,000 s ,WDR , Compression : H.265/H.264/(MP), M-JPEG.SD card support upto 256GB , Alarm trigger - 1 input / 1 output , frame rate : Main stream should support 25 fps@5MP, IP 66 or better ,IK10,POE and as per specification complete etc as required.	75	Nos.	44996.00	33,74,700.00
2	Supply Installation Testing and Commissioning of 5 MP Bullet camera , ONVIF profile S/G/T ,UL/BIS , CE , FCC Certified , NDAA Compliant, 1/2.7” Progressive Scan CMOS ,2.7 mm to 13.5 mm motorized varifocal lens , Quad stream with each stream support H.265 compression simultaneously ,min illumination : Color 0.15lux @ F1.2(AGC ON) ; B/W 0 lux @ IR ON , Shutter speed : 1 / 30s ~ 1 / 10,000 s ,WDR, Compression : H.265/H.264/(MP), In built IR LED , IR Distance upto 40 meters or better M-JPEG.SD card support upto 256GB , Alarm trigger - 1 input / 1 output , frame rate : Main stream should support 25 fps@5MP, IP 66 or better ,IK10,POE and as per specification complete etc as required.	7	Nos.	52907.00	3,70,349.00
3	Supply Installation Testing and Commissioning of 5 MP PTZ Camera , UL/BIS,CE,FCC Certified , NDAA Compliant, ONVIF profile S & G , Quad stream,7mm-141.9mm focal length , 30 X Optical Zoom , 12 X digital Zoom ,Frame rate : 20 fps ,Shutter Speed : Auto / Manual 1/30 ~ 1/10,000s, Anti-Flicker , Inbuilt IR , IR distance upto 300 mtr or better , 2D / 3D noise reduction ,120 dB WDR , 360 deg endless pan , tilt - 10 to 90 deg , auto flip support ,255 presets ,Auto pan ,Edge analytics : Object Metadata:Human, Vehicle, Face, Object Detection, Intrusion, Loitering, Line Crossing, Face Detection, Video Motion Detection, Active Tampering Alarm, , SD Card support upto 128GB , white balance-Auto/manual/indoor,IP 66 weather proof , Heater, Power : 24V AC/ POE+ /DC12V.complete etc as required.	1	Nos.	261890.00	2,61,890.00
4	Supply Installation Testing and Commissioning of Video Management Server support for 128 Cameras, Rack type server, IOperating System Microsoft Windows 10 IoT Enterprise 64-bit (LTSC) Memory 16 GB DDR4 ECC 2x M.2 SSDs 240 GB (RAID 1) Processor Intel® Xeon® Silver 4310 Dell iDRAC Controller iDRAC9 Basic NVIDIA Quadro P1000 (4 GB memory) Video Outputs 4x Mini DisplayPort (DP++) 1.4 2 x Gigabit Ethernet (1000Base-T) ports IP Version IPv4 and IPv6 HDD Slot: 8 SATA HDD ( Support upto 16 TB each)Recording Throughput 450Mbps Bandwidth complete etc as required.	1	Nos.	1795614.00	17,95,614.00

5	Supply, installation, testing and commissioning of professional video monitor software, VMS should have ONVIF & RTSP compatibility, Should Support windows7(32 & 64 bit), Windows 10(32 & 64bit), Windows server 2012, 2016, 2019, Linux CentOS 6,7(64bit), MacOS High Sierra, Mojave, Catalina(64 bit). Support ONVIF video encoders. Compression format: H.265, H.264, H.264+, Axis Zipstream, MPEG4,MJPEG .Support PTZ: ONVIF, RS485 (PTZ should control via mouse, Keyboard or joystick). VMS should able to search Camera via ONVIF or UPnP and change camera encode setting like resolution, FPS, Bitrate, image setting. Hardware decoding: NVIDIA graphics processing units or Intel graphics processing unit. Support USB HID joystick . Support & provide view of 360° cameras. VMS should provide mobile view, playback view or PTZ control in Android or iOS. Support Digital I/O. Audio Recording & playback.VMS should have multiple storag Selection or NAS options. Record camera by continue, schedule event. VMS should be able to provide multiple client access on LAN/WAN from administator VMS. VMS mobile app should be available in Play store or App Store. Vms should have multiple tab selection option. Timeline display in live view for display recordings of camera as bars. VMS should have multiple user options and each user defined seperate permission. VMS should have redundancy feature, when main server goes down or disconnected then automatically start failover server and work as a main server. VMS should have atleast one of it's own analytics function for no dependancy on camera AI and support camera analytics by ONVIF profile M. VMS should provide MAP view options (in JPG or PNG image as a background) and able to add multiple MAP and add camera, monitor camera, I/O input on map view. Provide live alarm, AI notification in FIFO format. VMS should provide License plate recognition function on predefined camera. Should have Built in Motion detection. complete etc as required.	83	Nos.	13170.00	10,93,110.00
6	SITC of 43" Display Panel, 4K UHD (3840x2160) Resolution, Brightness: 400 cd/m², Response time (typical): 8 ms, Display colors: 16.7 Million, Operating system: Android 9, Contrast ratio (typical): 1200:1, Video input: HDMI 1.4 (x2), USB 2.0 (x2), Audio input: 3.5 mm jack, Audio output: 3.5mm jack, External control: RJ45, RS232 etc all complete etc as required.	2	Nos.	38295.00	76,590.00
7	Supply, Installation, Testing & Commissioning of 9U wall mount rack with fans , 2 cable managers, satationary shelf , 2 Nos. of hardware pkts.	6	Nos.	22315.00	1,33,890.00
8	Supply, Installation, Testing & Commissioning of 6F SM loaded LIU with LC adaptor plates, pigtel cables, Spilce tray, cable holder and 4 nos of cable entry exist point with rubber gurment along with the LIU, Powder Coated 1.2mm steel sheet metal, 1U etc complete as required. LIU should be in accordance with YD/T 778-2006 Optical Distribution Frame & YD/T 1272.1-2003 Optical Fiber Connector Part 1: Type LC and should	3	Nos.	22723.00	68,169.00



	have 30 years of product warranty complete etc as required.				
9	Supply, Installation, Testing & Commissioning of 24 Port POE+ Access Switches with switching capacity of 128 Gbps, forwarding performance 95 Mpps, having 24 x 10/100/1000BASE-T PoE-plus(RJ45) with minimum PoE budget of 380W, with 4 x 1/10G SFP+ uplink ports. Should have Non Blocking architecture, 16K MAC address. Should have DHCP/DHCPv6, Static route/Static route v6, RIP/RIPng, OSPFv2/OSPFv3 routing protocols from day 1, Should Support stacking on 1/10G SFP+, Should support ERPS(G.8032), EIPS 50ms link protection, Should support DHCPv4/DHCPv6 Snooping, IPv4/IPv6 Source Guard, Dynamic ARP inspection, Host Guard, ND Snooping, ARP Guard, PPPoE+, Should support long distance stacking, Two Redundant Inbuilt Power Supply and intelligent fan complete etc as required.	3	Nos.	356022.00	10,68,066.00
10	Supply, Installation, Testing & Commissioning of L2+ managed industrial PoE switch with 10*10/100/1000M RJ45 ports and 4*100/1000M uplink SFP slot ports, Port 1-8 can support IEEE802.3af/at PoE. Support DC dual power supply input and DIN rail mounting. Switching capacity of 256 Gbps, forwarding performance 20.83 Mpps, having 8 x 10/100/1000BASE-T PoE-plus(RJ45) with maximum PoE output power is 120W(at-240W)., with 2*10/100/1000Base-T uplink RJ45 ports 4*100/1000Base-X uplink SFP slot ports., 8K MAC address. Should have Static Routing, system logging, Telnet, SSH, SNMP, Network Time Protocol (NTP), and IPv6 features from day 1 complete etc as required.	2	Nos.	183758.00	3,67,516.00
11	Supply, Installation, Testing & Commissioning of fiber Modules 10G BASE	8	Nos.	63025.00	5,04,200.00
12	Supplying and drawing of CAT 6A UTP LSZH LAN Cable in the existing surface/ recessed steel/ PVC conduit as required.				
12.1	1 run of cable	1531	Mtr.	113.00	1,73,003.00
12.2	2 run of cable	303	Mtr.	209.00	63,327.00
12.3	3 run of cable	458	Mtr.	428.00	1,96,024.00
13	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.				
13.1	25mm	2480	Mtr.	122.00	3,02,560.00
	<b>Total Amount of Package IX : CCTV System Rs.</b>				<b>98,49,008.00</b>
	<b>Package X : IBMS</b>				
<b>1.00</b>	<b>CENTRAL CONTROL SERVER</b>				
1.1	SITC OF • Intel® Xeon® CPU E5-2640 x64 (or better) compatible with dual and quad core processors; • Windows 10 (32 and 64 bit), Windows 8.1 (Professional, Enterprise, Ultimate, 32 and 64 bit), Windows 7 (Professional, Enterprise, Ultimate, 32 and 64 bit), Windows Server 2012 R2 (Standard, Enterprise, SP2, 64 bit); • 4Gb minimum, 8Gb or more recommended for larger systems; • 1TB 2.5inch Solid	1	Set	201787.00	2,01,787.00

	State Drive; • Video card and monitor capable of displaying at 1024 x 768 resolution, or greater				
1.2	<b>SITC OF Client PC System:</b> Intel core i3 2.93 GHz, E7500, 3mb cache, 1066Mhz FSB, 4GB DDR3-1066/1333 Expandable up to 8GB, 500 GB SATA Hard Disk, DVD Writer, Lan Card 10/100/1000 base-T, Optical Mouse, 104 Keys Keyboard, Windows 7, Inbuilt graphics Intel chipset (1 GB NVIDIA graphics media accelerator card),	1	Set	92886.00	92,886.00
1.3	SITC OF A 4 size Inkjet color Printer suitable for the application, with driver software.	1	Nos	14093.00	14,093.00
1.4	SITC OF Display monitor for BMS Graphical User Interface - LED 32 Inch	1	Nos	20499.00	20,499.00
<b>2.00</b>	<b>SOFTWARE</b>				
2.1	SITC OF Web Based Graphical Software meeting the requirements in the Given I/O Summary and technical specifications including configuration and facility to create / provide the graphic mapping for all I/O Summary points, animate the Graphics, Navigation between pages, display of logs, changing the time zones, popup alarms, configurable password protection for Building Management System as per Specifications. The BMS GUI software should be with SMS Facility supporting not less 5,000 points. Structured Query Language (SQL) is required for all system database parameter storage. This data shall reside on a server for all database access. Systems requiring proprietary database and user interface programs shall not be acceptable. Software shall be able to communicate with Lonworks, BACnet, Modbus devices simultaneously, with unlimited user capacity. Same software can be utilized as programming / commissioning software of DDC, NAC etc. (All required Software with original license competent with BMS software)	1	Set	184651.00	1,84,651.00
<b>3.00</b>	<b>ROUTER/GATEWAY</b>				
	SITC OF Web Based Router / Network Area Controller interfacing the DDC controllers and Integrators for the system with PC. It has capacity to store trends & program backup. It should be BTL & UL Listed and shall be of the same make as DDCs	1	Job	64059.00	64,059.00
<b>4.00</b>	<b>DDC CONTROLLERS WITH MSTP ARCHITECTURE</b>				
	<b>DDC CONTROLLERS :</b> Supply, Installation, Testing and Commissioning of IP Based DDC controllers. UL and BTL Automation stations / DDC Controller. The controllers shall be 32 bit microprocessor based standalone with real time clock. The DDC's shall be capable of peer to peer communication with other DDCs on the basis of master & slave topology. Also it should come up with lockable MS mounting cabinets duly powder coated connector strip, internal wiring and space to house controller & relays, connector strip current transformer, MCB, internal wiring. <b>(Contractor shall confirm his I/O provision w.r.t requirement on basis of data point).</b> DDCs requiring more than 2 additional Plug in type IO Module cards or expansion modules to suffix the requirement of required inputs/outputs are not acceptable. Use of AI to	1	Job	1067870.00	10,67,870.00

	DI multiplexer is also not acceptable. DDCs shall be compact factory fitted with IO Points.				
<b>4.00</b>	<b>INTEGRATION</b>				
	<p>SITC OF The 3rd party Integration unit shall provide the interface between Ethernet LAN and the 3rd party field control devices or any other devices which need to be integrated. These shall also provide supervisory capability of functions over the devices connected to it. The purpose of using these units should be limited to integrate devices only, not for any DDC interface with GUI, provided by others. The Unit must provide the following hardware features as a minimum:</p> <p>a. Two No. on Board RS-485 port</p> <p>b. Provision to include / add additional communication card</p> <p>c. Two onboard Ethernet port</p> <p>d. 4GB memory</p> <p>The Integration unit shall provide flexibility of adding communication ports (RS485) by adding communication cards, minimum one slot, when required rather than adding additional unit itself. The Integration unit should have inbuilt memory for program storage. The Unit must communicate over TCP/IP with communication speed of 10/100MBPS. The Integration unit should be capable of handling multiple protocol simultaneously and should not be restricted to single protocol such as Bacnet, Modbus, M-Bus, KNX, SNMP. All integrators should be mandatorily BTL listed.</p>	1	Job	711960.00	7,11,960.00
<b>5.00</b>	<b>SENSORS AND FIELD DEVICES</b>				
	Supplying, installing, testing and commissioning of the following sensors / transducers / transmitters				
5.1	Outside Air Temperature & RH sensor (combined)	1	Nos	7047.00	7,047.00
5.2	Air Differential pressure switches across the fans for monitoring fan status	40	Nos	1441.00	57,640.00
5.3	Duct type temperature sensor	18	Nos	1601.00	28,818.00
5.4	Duct type temperature + RH sensor for AHUs.	84	Nos	5765.00	4,84,260.00
5.5	Immersion type temperature sensors	16	Nos	3523.00	56,368.00
5.6	Ambient CO2 sensor	1	Nos	37154.00	37,154.00
5.7	WATER DP SWITCH	11	Nos	7047.00	77,517.00
5.8	WATER DP /PRESSURE SENSOR	4	Nos	5125.00	20,500.00
5.9	LEVEL SWITCH	4	Nos	3203.00	12,812.00
5.10	Duct Static Pressure sensor (Air)	18	Nos	11531.00	2,07,558.00
5.11	Duct Co2	18	Nos	17937.00	3,22,866.00
5.12	WATER LEVEL TRANSMITTERS	5	Nos	14093.00	70,465.00
<b>6.00</b>	<b>CABLES</b>				
6.1	Supplying, installing, testing and commissioning of 2 Core X 1.0 Sqmm Shielded Flexible Copper Cable (per I/O points hard wired to DDC).	1200	Mtr.	67.00	80,400.00
6.2	Supplying, installing, testing and commissioning of 4 Core X 1.0 Sqmm Shielded armoured Copper Cable (per Soft I/O points to DDC).	500	Mtr.	94.00	47,000.00
6.3	Supplying, installing, testing and commissioning of 2 Core X 1.5 Sqmm Shielded Flexible Copper Cable (per DDC to Integrator).	700	Mtr.	74.00	51,800.00

6.4	Supplying, installing, testing and commissioning of Cat6e cable (for networking).	400	Mtr.	54.00	21,600.00
<b>7.00</b>	Supply and fixing of MS Powder Coated Perforated cable tray complete with all fittings,bends,supports and accessories complete etc as required.				-
7.1	150mmX50mmX2mm	300	Mtr.	517.00	1,55,100.00
7.2	450mmX50mmX2mm	100	Mtr.	959.00	95,900.00
7.3	300mmX50mmX2mm	150	Mtr.	517.00	77,550.00
	<b>Total for Package X : IBMS Rs.</b>				<b>42,70,160.00</b>
	<b>Package XI : LAN</b>				
1	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.				
1.1	RJ 45 for Cat 6A	99	Nos.	869.00	86,031.00
2	Supplying and fixing following size/ modules, GI box along with modular base & cover plate for modular switches in recess etc as required.				
2.1	1 or 2 Module (75mmX75mm)	99	Nos.	169.00	16,731.00
3	Supplying and drawing of CAT 6A UTP LSZH LAN Cable in the existing surface/ recessed steel/ PVC conduit as required.				
3.1	1 run of cable	713	Mtr.	113.00	80,569.00
3.2	2 run of cable	345	Mtr.	209.00	72,105.00
3.3	3 run of cable	429	Mtr.	304.00	1,30,416.00
4	Supply, Installation, Testing & Commissioning of armoured 6 core Singlemode OS2 (9/125 Micro), Corrugated ECCS Armor, HDPE (UV) Sheathing, Theoxotropic gel filled OFC cable with 2 Nos steel music wire embedded in side sheathing as strength member for switch connectivity. Cable should be ROHS compliant and as per IEC60749-1 with product warranty of 25 years complete etc as required.	84	Mtr.	196.00	16,464.00
5	Supply, Installation, Testing & Commissioning of 6F SM loaded LIU with LC adaptor plates, pigtail cables, Splice tray, cable holder and 4 nos of cable entry exist point with rubber gasket along with the LIU, Powder Coated 1.2mm steel sheet metal, 1U etc complete as required. LIU should be in accordance with YD/T 778-2006 Optical Distribution Frame & YD/T 1272.1-2003 Optical Fiber Connector Part 1: Type LC and should have 25 years of product warranty complete etc as required.	6	Nos.	22733.00	1,36,398.00
6	Supply, Installation, Testing & Commissioning of 24F SM loaded LIU with LC adaptor plates, pigtail cables, Splice tray, cable holder and 4 nos of cable entry exist point with rubber gasket along with the LIU, Powder Coated 1.2mm steel sheet metal, 1U etc complete as required. LIU should be in accordance with YD/T 778-2006 Optical Distribution Frame & YD/T 1272.1-2003 Optical Fiber Connector Part 1: Type LC and should have 25 years of product warranty complete etc as required.	2	Nos.	31790.00	63,580.00
7	Supply, Installation, Testing & Commissioning of LC-LC singlemode OS2 (9/125) duplex, LSZH fiber patch cord for LIU to switch connectivity. Patch Cord should have aramid yarn as strength member with 750 time mating cycle complete etc as required.	18	Nos.	3307.00	59,526.00

8	Supply, Installation, Testing & Commissioning of loaded 24 port CAT 6A UTP, Transparent shutter jack panel, 1U height, UL-94V-0, Black with cable support bar, clear label marks and earthing plug for CAT6A cable termination at rack end complete etc as required.	7	Nos.	28093.00	1,96,651.00
9	Supply, Installation, Testing & Commissioning of CAT 6A UTP, LSZH Patch Cord as per ANSI/TIA/EIA 568C.2 and UL 94-V-0, ROHS Compliant, patch cord 1 Mtr for rack side switch to jack panel connectivity complete etc as required.	99	Nos.	867.00	85,833.00
10	Supply, Installation, Testing & Commissioning of CAT 6A UTP, LSZH Patch Cord as per ANSI/TIA/EIA 568C.2 and UL 94-V-0, ROHS Compliant, patch cord 2 Mtr for rack side switch to end user connectivity complete etc as required.	99	Nos.	939.00	92,961.00
11	Supply, Installation, Testing & Commissioning of 15U wall mount rack with fans , 2 cable managers , satationary shelf , 2 Nos. of hardware pkts complete etc as required.	6	Nos.	22315.00	1,33,890.00
12	Supply, Installation, Testing & Commissioning of core switch , 1RU with 48x10G SFP+,6x 40G (QSFP+) Port, 1.4 Tbps or higher Backplane capacity and minimum 600 Mpps of forwarding rate Should Non Blocking architecture , 32K MAC address. Should have DHCP/DHCPv6, Static routing/Static routev6, RIP/RIPng, OSPFv2/OSPFv3, BGP/BGP+, ISIS/ISISv6, VRRP/VRRPv3, VBRP, PBR/PBRv6, IP-VRF, Support IGMPv1/v2/v3, MLD, MSDP, PIM-SM/PIM-DM, PIMv6-SM from day 1,Should support ERPS G.8032 from day 1 ,Should Support stacking on 10G SFP+ and 40G QSFP+ ports, Neighbor discovery, system logging, Telnet, SSHv2, WEB, Console, SNMPv2/v3, Network Time Protocol (NTP) & SNTP,IPv6 features from day 1 , Support ZTP provisioning through DHCP server and USB disk. Support SDN controller management, Support VRF and MPLS Network, Support MPLS L3 VPN, MPLS TE, DHCP/DHCPv6, Should support long distance stacking, Hot Swappable & Redundant Power Supply Unit and Fan complete etc as required.	1	Nos.	1249871.00	12,49,871.00
13	Supply, Installation, Testing & Commissioning of 24 Port POE+ Access Switches with switching capaticy of 128 Gbps, forwarding performance 95 Mpps, having 24 x 10/100/1000BASE-T PoE-plus(RJ45) with minimum PoE budget of 380W, with 4 x 1/10G SFP+ uplink ports. Should Non Blocking architecture , 16K MAC address. Should have DHCP/DHCPv6, Static route/Static route v6, RIP/RIPng, OSPFv2/OSPFv3 routing protocols from day 1 , Should Support stacking on 1/10G SFP+ , Should support ERPS(G.8032), EIPS 50ms link protection, Should support DHCPv4/DHCPv6 Snooping, IPv4/IPv6 Source Guard, Dynamic ARP inspection, Host Guard, ND Snooping, ARP Guard, PPPoE+, Should support long distance stacking, Two Redundant Inbuilt Power Supply and intelligent fan complete etc as required.	7	Nos.	302343.00	21,16,401.00
14	Supply, Installation, Testing & Commissioning of fiber Modules 10G BASE complete etc as required.	16	Nos.	58740.00	9,39,840.00

15	Supply, Installation, Testing & Commissioning of 4x4 Access Point Ceiling Mount having 11 × 10/100/1000/2500Mbps RJ45 port, 1 × 10/100/1000Mbps RJ45 port, Eth1, PoE PD (IEEE 802.3af/at), 1 × RJ45 Console Port; 1 × USB 2.0 Type-C, 1 × Kensington security slot. Wi-Fi 6 (802.11ax) or better Access Point Indoor, dual radio, 5 GHz 802.11ax 4x4:4 and 2.4 GHz 802.11ax 2x2:2, Built-In Antennas, MIMO Support, integrated with BLE/Zigbee, Scanning and Security function, Supply should include Mounting kit, Dedicated Scanning Radio for WIPS. APs should be able to work without any dedicated controller for ≤ 254 APs. Controller should be a software-based controller which can keep all the information on the premise (not on cloud). AP should support 802.11a/g/n/ac, 802.11ax, IEEE 802.11b, up to 2.9 Gbps (2.4Gbps in 5GHz and 500Mbps in 2.4GHz) data rate, Security Function WPA2, WPA3(Personal/Enterprise), WPA, IEEE 802.11i, IEEE 802.1x, TKIP, AES, Portal Page Authentication for Users, L2/L3 Roaming with or without software, Auto Channel Selection and Auto Transmit Power Control, IP40 or Better rating, In security it should support WIPS, Wireless Attack Detection & QoS, Rouge AP Detection and Containment, ACL, Captive Portal, Radius Client, User Behavior Tracking, Client Sticky Avoidance, NTP Server client, bandwidth control with SSID, Wireless mesh P2P or P2MP, 0 to 50 Deg C or better Operating temperature rating, wall or ceiling mount. Should have approvals/certifications for Radios EN 300328 (2.4 GHz), EN 301893 (5 GHz), EN 302502 (5.8 GHz), EN 301489-1, EN 301489-17, CE, FCC, UL/cUL, EN 62368-1, RoHS (EU) 2015 complete etc as required.	4	Nos.	81356.00	3,25,424.00
16	SITC of Unified Threat Management (UTM) firewall, Gigabit Ethernet, IDP/DoS Protection Anti-Virus Protection Category-based Web Content Filtering Application Control/Management Botnet Protection IP Reputation etc all complete with mounting accessories etc all complete etc as required.	1	Nos.	1158916.00	11,58,916.00
17	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.				
17.1	25mm	1571	Mtr.	122.00	1,91,662.00
	<b>Total for Package XI : LAN Rs.</b>				<b>71,53,269.00</b>
	<b>Package XII : IP BASED EPBAX SYSTEM</b>				
1	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.				
1.1	RJ 45 for Cat 6A	65	Nos.	869.00	56,485.00
2	Supplying and fixing following size/ modules, GI box along with modular base & cover plate for modular switches in recess etc as required.				-
2.1	1 or 2 Module (75mmX75mm)	65	Nos.	169.00	10,985.00
3	Supplying and drawing of CAT 6A UTP LSZH LAN Cable in the existing surface/ recessed steel/ PVC conduit as required.				-



3.1	1 run of cable	580	Mtr.	113.00	65,540.00
3.2	2 run of cable	360	Mtr.	213.00	76,680.00
3.3	3 run of cable	180	Mtr.	308.00	55,440.00
4	Supply, Installation, Testing & Commissioning of armoured 6 core Singlemode OS2 (9/125 Micro), Corrugated ECCS Armor, HDPE (UV) Sheathing, Theoxotropic gel filled OFC cable with 2 Nos steel music wire embedded in side sheathing as strength member for switch connectivity. Cable should be ROHS compliant and as per IEC60749-1 with product warranty of 30 years complete etc as required.	162	Mtr.	196.00	31,752.00
5	Supply, Installation, Testing & Commissioning of 6F SM loaded LIU with LC adaptor plates, pigtail cables, Splice tray, cable holder and 4 nos of cable entry exist point with rubber grommet along with the LIU, Powder Coated 1.2mm steel sheet metal, 1U etc complete as required. LIU should be in accordance with YD/T 778-2006 Optical Distribution Frame & YD/T 1272.1-2003 Optical Fiber Connector Part 1: Type LC and should have 30 years of product warranty complete etc as required.	6	Nos.	22723.00	1,36,338.00
6	Supply, Installation, Testing & Commissioning of 24F SM loaded LIU with LC adaptor plates, pigtail cables, Splice tray, cable holder and 4 nos of cable entry exist point with rubber grommet along with the LIU, Powder Coated 1.2mm steel sheet metal, 1U etc complete as required. LIU should be in accordance with YD/T 778-2006 Optical Distribution Frame & YD/T 1272.1-2003 Optical Fiber Connector Part 1: Type LC and should have 30 years of product warranty complete etc as required.	2	Nos.	31790.00	63,580.00
7	Supply, Installation, Testing & Commissioning of LC-LC singlemode OS2 (9/125) duplex, LSZH fiber patch cord for LIU to switch connectivity. Patch Cord should have aramid yarn as strength member with 1000 time mating cycle complete etc as required.	12	Nos.	3087.00	37,044.00
8	Supply, Installation, Testing & Commissioning of loaded 24 port CAT 6A UTP, Transparent shutter jack panel, 1U height, UL-94V-0, Black with cable support bar, clear label marks and earthing plug for CAT6A cable termination at rack end complete etc as required.	12	Nos.	26220.00	3,14,640.00
9	Supply, Installation, Testing & Commissioning of CAT 6A UTP, LSZH Patch Cord as per ANSI/TIA/EIA 568C.2 and UL 94-V-0, ROHS Compliant, patch cord 1 Mtr for rack side switch to jack panel connectivity complete etc as required.	65	Nos.	848.00	55,120.00
10	Supply, Installation, Testing & Commissioning of CAT 6A UTP, LSZH Patch Cord as per ANSI/TIA/EIA 568C.2 and UL 94-V-0, ROHS Compliant, patch cord 2 Mtr for rack side switch to end user connectivity complete etc as required.	65	Nos.	939.00	61,035.00
11	Supply, Installation, Testing & Commissioning of 15U wall mount rack with fans , 2 cable managers , stationary shelf , 2 Nos. of hardware pkts. complete etc as required.	6	Nos.	22221.00	1,33,326.00
12	Supply, Installation, Testing & Commissioning of 24 Port POE+ Access Switches with switching capacity of 128 Gbps, forwarding performance 95 Mpps, having 24 x 10/100/1000BASE-T PoE-plus(RJ45) with minimum PoE budget of 380W, with 4 x 1/10G SFP+	6	Nos.	348901.00	20,93,406.00

	uplink ports. Should Non Blocking architecture , 16K MAC address. Should have DHCP/DHCPv6, Static route/Static route v6, RIP/RIPng, OSPFv2/OSPFv3 routing protocols from day 1 , Should Support stacking on 1/10G SFP+ , Should support ERPS(G.8032), EIPS 50ms link protection, Should support DHCPv4/DHCPv6 Snooping, IPv4/IPv6 Source Guard, Dynamic ARP inspection, Host Guard, ND Snooping, ARP Guard, PPPoE+, Should support long distance stacking, Two Redundant Inbuilt Power Supply and intelligent fan complete etc as required.				
13	Supply, Installation, Testing & Commissioning of fiber Modules 10G BASE complete etc as required.	12	Nos.	61764.00	7,41,168.00
14	Supply, Installation, Testing & Commissioning of Pure IP at core server Based voice solution with 04 Port Voicemail ,04 Port FXS ,04 Port FXO ,1 PRI Trunk lines (30 Ch) Circuit with CLIP Facility ,100 IP users License ,01 Nos. IP Operator Console, 100 Party Conference ,Speed Dial, Music on Hold , Internal/ External ring difference ,Call Barring, Call Pickup, TEC should be with GR Number, - Should Support Redundant server in active-Active mode complete etc as required.	1	Set.	1131938.00	11,31,938.00
15	Supply, Installation, Testing & Commissioning of Type 1 IP Phone 1 VoIP account , Full duplex speaker phone, IPV6, 2xLAN, PoE . complete etc as required.	60	Nos.	9826.00	5,89,560.00
16	Supply, Installation, Testing & Commissioning of Type 2 IP Phone with 2 Voip accounts, 2 Lines , HD Voice, Graphic LCD display with backligh. complete etc as required.	5	Nos.	23682.00	1,18,410.00
17	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.				-
17.1	25mm	1145	Mtr.	122.00	1,39,690.00
	<b>Total for Package XII : IP BASED EPBAX SYSTEM Rs.</b>				<b>59,12,137.00</b>
	<b>Package XIII : STP</b>				
	<b>TREATMENT TECHNOLOGY: SEPTA CLEAN FOLLOWED BY ELECTRO COAGULATION (EC)</b>				
	<b>CAPACITY: 20 KLD</b>				
<b>A</b>	<b>TREATMENT SCHEME</b>				
	The proposed Sewage treatment plant shall consist of the following treatment scheme:				
a)	The sewage shall be screened though a bar screen chamber post screening shall be made to pass through oil and grease trap where the oil submerged in water floats on the above layer.				
b)	Sewage is fed into Septa clean tank which digest the sewage sludge in a closed anearobic digestion. After digestion the sewage is carried to the buffer tank or EC feed tank.				
c)	Via pumping the pre-treated sewage then carried to the Electro Coagulation setup where the pollutants are coagulated with the application of electric current and then flocculated by polymer dosing system.				

d)	After Coagulation and flocculation, the clear water is then supplied to the filtration unit for further secondary treatment.				
e)	The sludge shall be treated separately with filter press and is dewatered from its source.				
f)	Drawings should be pre approved by the governing authorities and respective engineer in charge. The drawings must include: a) Detailed shop drawings like GA Drawings, sectional drawings etc. b) Process Diagrams PFDs c) Installation drawings like P&ID, Piping drawings, Electrical drawings etc.				
<b>B</b>	<b>DESIGN CONSIDERATIONS</b>				
	Nature of Sewage - domestic sewage from toilet use & kitchen waste				
	Daily average flow - 1.0 Cum / hr				
	PH - 6.0 - 9.0				
	BOD 5 - upto 250-300 Mg/L				
	Total S. Solids - 250 - 400 Mg/L				
	COD - upto 350-450 Mg/L				
	Oil & Grease - 20 Mg / L				
	<b>Effluent discharge standard Should be as below or as per Local Body/CPCB Standards(Whichever is higher)(Nothing extra shall be paid on account of this)</b>				
	PH - 6.5 - 8.5				
	BOD 5 - Less than 10 Mg/L				
	Total S. Solids - Less than 20 Mg/L				
	COD - Less than 50 Mg/L				
	Oil & Grease - Less than 10 mg/L				
	<b>Other Equipments and items:</b>				
	EC Reactor and Components				
	Clarrifier				
	Filter Vessels- MGF F-COD				
	Pumps, Dosing units and Agitators				
	Sludge Dewatering Unit-Filter press with Pump				
	Piping, valves and fittings				
	Electrical Panel & Cabling				
	All piping, valves & level indicator/controller etc.				
	<b>Sewage treatment plant shall include the following tanks: (Not in the scope of this item)</b>				
	Bar Screens Chamber				
	Oil And Grease Trap				
	Septa Clean Tanks				
	Buffer Tank/EC Feed Tank				
	Sludge Holding Tank				
	Treated Water Tank				
<b>1</b>	<b>BAR SCREEN</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of SS Bar screens to exclude the large sized particles with associated set of guide angles.				

a)	Spacing: 10 mm				
b)	Screen MOC: SS-304				
c)	Size of screen: 0.9 m x 0.75 m				
d)	No of Screens: 1	1	Set	28873.00	28,873.00
<b>2</b>	<b>SEPTA CLEAN ENZYEMES</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Septa Clean including the enzymes and food culture.				
a)	Capacity: 20.0 KL Each x 3 Nos tanks (Not in the scope of this item)				
b)	Enzymes and EM Culture	1	Lot	108333.00	1,08,333.00
<b>3</b>	<b>EC FEED PUMP</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Semi Open Centrifugal Surface capable of handling solids upto 30-35 mm having CI casing & impeller complete with mechanical seal & all accessories, motor of required capacity. Delivery header with isolation valve, pressure gauge on delivery line with isolation cock as per P&ID. Pumps shall have following duty:				
a)	Pumps: 2 Nos. (1w+1s)				
b)	Type: Semi Open Centrifugal Surface				
c)	Flow Rate: 1.0 m3/hr				
d)	Head: 12-15 m				
e)	Solid Handling: 30-35 mm				
f)	Impeller MOC: CI				
g)	Valves: UPVC Butterfly valves at outlet	1	Set	57935.00	57,935.00
<b>4</b>	<b>ELECTRO COAGULATION UNIT</b>				
	Designing, Planning, Engineering, Providing, Supplying, Fixing, Installing, Testing & Commissioning of Electro-coagulation unit that comprises of a reactor tank, electrodes, rectifiers and other accessories. The EC unit is designed in such a way that the pollutants in the sewage are made to contact with electric current in a closed setup. The pollutants then are coagulated. The design of the tank should be pre approved by the concern authorities also an isometric diagram for the tank should be pre submitted. The tank shall be fabricated in Poly Propylene (PP).				
a)	Flow: 1.0 m3/hr				
b)	Tank MOC: Poly Propylene (PP)				
c)	Tank Capacity: 150 L				
d)	Electrode Arrangements: Parallel				
e)	Electrode MOC: Aluminium				
f)	Electrode Thickness: 4 mm				
g)	Paddles, flanges and vents to be in-situ with tank	1	Set	296739.00	2,96,739.00
<b>5</b>	<b>FLOCCULATOR</b>				
	Designing, Planning, Engineering, Construction, Testing & Commissioning of Flocculator unit that comprises of a Flocculation tank and Agitator mixture. The flocculator tank shall be designed in such a way that the coagulated sewage on mixing with polymer				

	dosing forms the floccs which may float or sink depending upon the nature of polymer. The design of the tank should be pre approved by the concern authorities also an isometric diagram for the tank should be pre submitted. The tank shall be fabricated in MS-FRP.				
a)	Tank Shape: Rectangular				
b)	Tank MOC: MS FRP				
c)	Tank Capacity: 200 L				
d)	Paddles, flanges and vents to be in-situ with tank				
e)	Agitator mixture to be installed along with gearbox and motor	1	No.	79602.00	79,602.00
<b>6</b>	<b>AGITATOR MIXER</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Agitator mixer assembly with gearbox, Motor and SS Shaft agitator.				
a)	Mixer for Flocculation Tank with all accessories				
b)	Shaft MOC: SS304				
c)	Gear Box 1:40				
d)	Mixture motor rating: 0.37 kW				
e)	No of Mixer: 1 No.	1	Set	43333.00	43,333.00
<b>7</b>	<b>POLYMER DOSING UNIT</b>				
	Designing, Planning, Engineering, Providing, Supplying, Fixing, Installing, Testing & Commissioning of polymer dosing unit. This shall comprise of dosing tank and dosing pump which will dose polymer to the flocculator tank. The polymer will react with the coagulated sewage and will for floccs. The design of the tank should be pre approved by the concern authorities also an isometric diagram for the tank should be pre submitted..The tank shall be fabricated in Poly Propylene (PP).				
a)	Tank Shape: Rectangular				
b)	Tank Capacity: 200 L				
c)	Tank MOC: Poly Propylene (PP).				
d)	Dosing Pump Arrangement: 1 No.				
e)	Dosing Pump Capacity: 0-10 LPH @ 3.5 Bar				
f)	Dosing Chemical: Polyelectrolyte @ 2-3 PPM	1	Set.	65000.00	65,000.00
<b>8</b>	<b>CLARRIFIER</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Clarifier tank. The clarifier shall be equipped with Tube settlers and its accessories. The floccs are combined to sludge and seperated out from the bottom and the clear water is carried forward. The tank shall be fabricated in MS-FRP.				
a)	Tank Shape: Lamella				
b)	Tank Capacity: 2.5 KL				
c)	Tank MOC: MS-FRP				
d)	Media MOC: PVC				
e)	Media Type: Hexagonal Chevron				
f)	Cross Sectional Area: 120 mm x 40 mm				
g)	Size: 750 mm				

h)	Fitting Type: Tounge and Groove				
i)	Inclination: 60 Deg				
j)	Thickness : 1 mm	1	Set.	374928.00	3,74,928.00
<b>9</b>	<b>FILTER FEED PUMP</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Closed Horizontal / vertical centrifugal monoblock pump set suitable for operations on 415 volts $\pm$ 10%, 3 phase, 50 Hz $\pm$ 5% AC supply with CI casing, CI impeller (hard finished and dynamically balanced), stainless steel (360) shaft with mechanical seal connected by a flexible coupling to a totally enclosed fan cooled (TEFC) induction motor as per IEC standard. Both pump and motor mounted on common M.S structural base plate as required complete as per specifications.				
a)	Pumps: 2 Nos. (1w+1s)				
b)	Type: Closed centrifugal				
c)	Flow Rate: 1.5 m3/hr				
d)	Head: 18-20 m				
e)	Impeller MOC: CI				
f)	Pressure Guage: 0-7 Bar				
g)	Valves: UPVC Butterfly valves at outlet	1	Set	63587.00	63,587.00
<b>10</b>	<b>FILTER FEED TANK</b>				
	Designing, Planning, Engineering, Construction, Testing & Commissioning of Filter feed tank. The tank is buffered for storage of clear water before futher filtration treatment and in made to contact with chlorine for disinfection. The design of the tank should be pre approved by the concern authorities also an isometric diagram for the tank should be pre submitted. The tank shall be fabricated in MS-FRP.The thickness of the sheet shall be 3 mm and FRP thickness shall be 0.8 mm.				
a)	Tank Shape: Rectangular				
b)	Tank Capacity: 5 KL				
c)	Tank MOC: MS FRP				
d)	Thickness of tank walls: 3 mm				
e)	FRP thickness: 0.8 mm				
f)	Paddles and vents to be in-situ with tank	1	No.	122935.00	1,22,935.00
<b>11</b>	<b>CHLORINE DOSING SYSTEM</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of chlorine dosing systems for chemical reaction with metering pump suitable for operation on 220 $\pm$ 5% single phase, 50 Hz AC supply, compete in all respects.				
a)	Discharge : 0-6 LPH				
b)	Pump Type: Metering Pump				
c)	MOC: PP				
d)	Dosing Tank Capacity: 100 Ltr.				
e)	Dosing Tank MOC: HDPE				
g)	No. of Pumps : 1	1	Set	56333.00	56,333.00
<b>12</b>	<b>MULTIGRADE FILTER</b>				



	Providing, Supplying, Fixing, Installing, Testing & Commissioning of multigrade sand pressure filter for filtration of treated sewage water in FRP fabrication. The filter shall be suitable to operate for 20 hours.				
	The filtration unit shall comply with the following technical requirements:				
a)	Flow rate - 1.5 m3/hr				
b)	Dimensions: 16" x 65"				
c)	Back wash duration - Once in 16 hours for 20 min				
d)	Frontal Pipe - Butterfly Valves with uPVC				
e)	Pressure drop across unit. - 1.0 Kg / sq.cm (max)				
f)	Working Pressure : 2.5-3 Kg/cm2				
g)	Filtration Size: 30 Microns				
i)	Filtration Velocity: 10 m3/hr/m2				
j)	Vessel MOC: FRP				
k)	Media: Gravel, Pebbles and Sand	1	No.	159674.00	1,59,674.00
<b>13</b>	<b>F-COD</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of F-COD for filtration of treated sewage water in FRP fabrication. The filter shall be suitable to operate for 20 hours.				
	The filtration unit shall comply with the following technical requirements:				
a)	Flow rate - 1.5 m3/hr				
b)	Dimensions: 16" x 65"				
c)	Back wash duration - Once in 16 hours for 20 min				
d)	Frontal Pipe - Butterfly Valves with uPVC				
e)	Pressure drop across unit. - 1.0 Kg / sq.cm (max)				
f)	Working Pressure : 2.5-3 Kg/cm2				
g)	Filtration Size: 30 Microns				
i)	Filtration Velocity: 10 m3/hr/m2				
j)	Vessel MOC: FRP				
k)	Media: F-COD Booster Resin	1	No.	216667.00	2,16,667.00
<b>14</b>	<b>SLUDGE TRANSFER PUMP</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Surface semi-open centrifugal pump for the transfer of sludge from Settler tank to Sludge Drying Beds with Cast Iron impeller and cast steel shaft with mechanical seal, with TEFC induction motor of class "F" insulation suitable for operation on 415 volts $\pm 10\%$ , 3 phase, 50 Hz, A.C. supply, complete in all respects and as per specification with the following capacities:				
a)	Pumps: 2 Nos. (1w+1s)				
b)	Type: Surface semi-open centrifugal				
c)	Flow Rate: 1.5 m3/hr				
d)	Head: 15-18 m				
e)	Sludge Handling : 30-35 mm				
f)	Impeller MOC: CI				
g)	Valves: UPVC Butterfly valves at outlet	1	Set	63587.00	63,587.00
<b>15</b>	<b>SLUDGE DEWATERING UNIT</b>				

	Providing, Supplying, Fixing, Installing, Testing & Commissioning of top discharge MS bucket type Filter Press of Suitable capacity with feed pump (Screw Type Monoblock Centrifugal Self Priming Type) – 1 No., associated valves, pressure guage, level switches, interconnecting piping and other associated piping, valves and items as per approved P&I.				
a)	Sludge Feed Pump: 1 No				
b)	Pump Discharge: 1.0 m3/hr @ 4 kg/cm2				
c)	Pump Head: 15-18 mtr				
d)	Pump Type: Screw				
e)	Filter Press MOC: PP with Cloth plates				
f)	Fiter Press Plate Size: 630 mm x 630 mm				
g)	Filtration area: 20 m2				
h)	Plate Thickness: 24+2 mm				
i)	No. of Plates: 18 No. Plates				
j)	No of Filter Press: 1 No	1	Set	209602.00	2,09,602.00
<b>16</b>	<b>ELECTRICAL CONTROL PANEL</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of electrical panels for STP Plant . The panel shall be designed and fabricated as per general specifications, technical details, specifications and notes as part of this tender /BOQ and relevant BIS codes. Quoted rates shall be including necessary cable trays, cabling, earthing, wiring, control cabling etc.				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of MCC Panel (motor control center) for EC Reactor to accommodate all the drive units with cabling,glanding within the STP Compartmental , Design skid mounted type with top/Bottom entry for cable the internal				
a)	The Panel should be fully automated with both Auto/Manual modes.				
b)	The panel should also include an Alarm with siren that will blow as soon as there is any hinderance or any issue arises.				
c)	The panel is to be manufactured/assembled as per the latest ISI specification, Indian Electricity Rules, Including special requirements of concerned state electricity inspectorate.				
d)	The panel shall be suitable rating to take care of full load of the sewage treatment plant including all motors and lighting.				
e)	The contractor shall also provide the wiring of entire electro-mechanical equipments throughout the STP. And shall also install the cable trays and conduits.				
f)	The panel and all other electro-mechanical equipments shall be connected with proper earthing system.				
g)	Control Connector, Lugs/sockets shall be of copper conductor and of Aluminium for conductor cable,suitable,solderless, crimping type.	1	Unit	125155.00	1,25,155.00
<b>17</b>	<b>PIPES FITTINGS AND INSTRUMENTS</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of all piping and isolation control valves for making the system complete.				

a)	Size: Suitable as per the ID and OD of the pumps				
b)	MOC: UPVC	1	Unit	127847.00	1,27,847.00
<b>18</b>	<b>SUPPORTS AND FRAMEWORK</b>				
	Providing, Supplying, Fixing, Installing, Erection and commissioning of complete system along with piping fabrication work, piping required for the entire plant, electrical connections, necessary supports, platform and Ladders.	1	Job	56522.00	56,522.00
	<b>Total Amount of Package XIII : STP Rs.</b>				<b>22,56,652.00</b>
	<b>Package XIV : Boom Barrier with Driver &amp; Number Plate recording system</b>				
1	<b>BOOM BARRIER</b>				
1.0	Supply, installation, testing and commissioning of automatic electromechanical boom barrier having brushless DC motor suitable road width 6 mtrs for intensive applications with MS housing & aluminium boom with fork rest, IP 67 Protection etc. Power Consumption- Not More than 60 Watt (for Gate Entry/Exit) and set of Entry/Exit push buttons for manual open and closing of barriers, Photocell based safety device to avoid closing of the barrier when a Vehicle is crossing the barrier, Wireless Remote with Receiver, Boom rest complete including necessary C.C. work required for installation of boom barrier etc. as required at site.	2	Each	222567.00	4,45,134.00
2	<b>DRIVER FACE AND AUTOMATION NUMBER PLATE RECORDING SYSTEM</b>				
2.1	Supply, installation, testing and commissioning of ANPR Camera to capture Number Plate of Vehicle. with inbuilt OCR software & Controller, Image Sensor - 1/3 " Progressive Scan CMOS Minimum Illumination - 0.01 Lux, Shutter Speed - 1/1000 S, Resolution - 2 Mega Pixel, IR Range-UPTO 30 Mtr, IP Protection- IP67, Accuracy - 99% for Standard Number Plate Integration With Boom Barrier CE Certified & Mounting Pole complete etc. as required.	2	Each	146895.00	2,93,790.00
2.2	Supply, installation, testing and commissioning of Driver Image Capturing Camera & Controller, Image Sensor - 1/3 " Progressive Scan CMOS Minimum Illumination - 0.01 Lux, Shutter Speed - 1/1000 S, Resolution - 2 M Pixel, IR Range-UPTO 30 Mtr IP Protection- IP67, Accuracy - 99% for Standard Number Plate Integration With Boom Barrier CE Certified Complete etc. as required.	2	Each	103520.00	2,07,040.00
2.3	SOFTWARE For ANPR & Driver Image Capturing Camera with required Licence complete etc as required.	1	Each	238095.00	2,38,095.00
2.4	SITC of Computer- work station (Server Intel Xeon Quad core, 2.66 Ghz , 4 Mb L2 Cache, Memory 16GB, HDD 2TB . Keyboard / Joystic & mouse with Windows Server enterprise OS complete including providing minimum 21 inch LED monitor with Full HD Display etc. as required.	1	Each	321677.00	3,21,677.00
	With Min. 1 Year of Warranty				
	<b>Total Amount of Package XIV : Boom Barrier with Driver &amp; Number Plate recording system Rs.</b>				<b>15,05,736.00</b>
	<b>Package XV : LIFT</b>				
1	Supplying, Installation, testing & Commissioning of <b>13 passanger ( 884 Kg) lift, MRL type</b> having contract				

	speed of 1.50/1.60 MPS of serving 6 floors (B, GF, 1F, 2F, 3F & 4F) the lift shaft as per detailed specification enclosed and as under: ( <i>Note: Lift shall be inclusive of all ancillaries and accessories as are mandatory as per the updated Bombay Lift Act, IS and GOI guidelines, whether specifically specified in the item and specification are not</i> )				
a	<b>Speed</b> - 1.50 MPS				
b	<b>Floors</b> - 6 floor (B+G+4)				
c	<b>Travel</b> -24 Meters (Approx)				
d	<b>Stop &amp; opening</b> - 6 stops & 6 Centre Opening.				
e	<b>Controller</b> : Microprocessor based A.C. variable voltage & variable frequency.				
f	<b>Operation</b> :- Microprocessor based ( Duplex.) collective selective with/ without attendant.				
g	<b>ARD</b> : Automatic Rescue Device complete with Dry maintenance free batteries as reqd.				
h	<b>Power</b> - 415V, 3 phase, 50Hz, 4 wires system.				
i	<b>Phase Reversal Protection</b> : Shall have auto phase correction device and single phase preventer protection				
	<b>BMS Compatibility</b> : Potential free contacts for each floor position up and down movement of the lift shall be provided in the controller which can be used for the building management system.				
n	<b>Type of doors.</b>				
	<b>Car entrance door :</b>				
	(a) <b>Number</b> : 1 No. (Centre Opening)				
	(b) <b>Size</b> : 900mm centre opening				
	(c) <b>Type of doors</b> :				
	Power operated, centre opening , horizontal sliding with VVVF controller, <b>Full Glass with SS frame(2 Hrs Fire Rated)</b> .				
	(d) <b>Landing doors</b> :				
	Power operated, centre opening , horizontal sliding with VVVF controller, Full Glass with SS frame(2 Hrs Fire Rated) .				
	<b>Lift Car :</b>				
	<b>a, Lift car Size</b> : 1500x1500mm				
	<b>b, Finish</b> : Stainless steel Honeycomb/Moon Rock Finish with Granite stone flooring.				
	<b>c. Ceiling</b> : Ceiling should be mirror/hairline stainless steel with LED luminaires and ventilation grills.				
	<b>d. Ventilation</b> : Suitable ventilation from ceiling with no noise high quality ventilation (fans) with louvers.				
	<b>e. Hall Buttons</b> : Illuminated Hall Buttons With Braille Markings in car and at all landings. The Hall button panel shall be with running arrow display to indicate the moving direction of the lift car.				
	<b>f. Hand Rails</b> : One hand rail of full depth of car , at 900mm above floor level to be fixed on three side in the lift car.				
	<b>g. Voice announcement system</b> : To be provided in the car to announce the position of the elevator in the hoist way as the car passes or stops at a floor served by the elevator.				

	<b>h. OLI</b> : to be provided as per OEMs standard design and capacity.				
	<b>i. Protection</b> : 1 . Protection against (i) overload voltage (ii) under voltage (iii) single phasing.				
	2. Full height infrared curtain door protection.				
	3. Door time protection				
	4. Parking key switch.				
	5. All other standard safety features as per CPWD specs.				
	<b>j. Door close safety:</b> Full height infar light curtain door safety in addition to pressure operated switch.				
	<b>k. Fireman switch:</b> Required for all Lifts at ground floor.				
	<b>l. Operating system:</b> Full duplex collective selective operation. All floors (except lower most basement) shall have Up and down key.				
	<b>m. Car Fittings:</b> Overload Device, Emenrgency Car light unit, Emergency Alarm Button, Intercom and battery operated alarm bell, Door Open/ Close Button, Manual Rescue Opertion, Belt Inspection Drive.				
	<b>n.</b> IP based CCTV camera inside car along with 30 days backup complete with NVR to be provided.				
	<b>o. Independent service (for Duplex only)</b>				
	<i>All other accessories and/or ancillaries as required and as per technical specifications and IS requirements. The lift shall be suitable for differently abled and the entrance shall be suitable for mechanized wheel chair)</i>	4	EACH	2423395.00	96,93,580.00
	<b>Goods Lift</b>				
2	Supply, Installation , Testing & Commissioning of 1000 Kg Gearless and Machine Room Less Goods cum Passenger Lift having contract speed of 1 Mtr/Sec serving different floors in the existing lift shaft as per detailed specifications enclosed as under with all accessories,guide rails, lift car, machine, cables, ropes, barrier free requirement etc in complete shape and the existing site work condition etc as required.(Quality) standards shall conform to IS/ISO- 9001:2015 as amended up to date.)				
	(i) Speed- 1 Mtr/Sec.				
	(ii) Floors- 6 (B+G + 4) Floors.				
	(iii)Travels- 24 Mtrs(Approx)				
	(iv) Stop & Openings- 6 Stops, 6 Landings, Front opening.				
	(iv)Controller- Microprocessor Based simplex- Collective selective control with or without attendant				
	(v) Drive- Variable Voltage Variable Frequency (V3F) Drive.				
	(vi) Automatic rescue device complete with dry maintenance free batteries as required.				
	(vii) Auxiliary Required- Single phase 220 V 50 cycles AC.				
	(viii) Power Supply- 415 V three phase 50 cycles AC.				

	(ix)Car Entrance: SS Moonrock/ Etched regal stripes Textured, center opening horizontal sliding power operated door without vision panel.				
	(x)Landing Entrance: SS Hair line finish, center opening horizontal sliding power operated door without vision panel.				
	(xi) Battery Operated Emergency Alarm & Light.				
	(xii) Call Registration LEDs				
	(xiii) Fire Man Drive				
	(xiv) Full Length Curtain Door Safety.				
	(xv) Lift announcing system				
	(xvi) Automatic Rescue Device for 3 ph. & 1 ph failure				
	(xvii) One handrail not less than 600 mmlength at 900 mm above floor level to be fixed adjacent to control panel in the liftcar.				
	(xviii) IP based CCTV camera inside car along with 30 days backup complete with NVR to be provided.				
	<b>Phase Reversal Protection:</b> Shall have auto phase correction device and single phase preventer protection				
	<b>BMS Compatibility:</b> Potential free contacts for each floor position up and down movement of the lift shall be provided in the controller which can be used for the building management system.				
	All other accessories and/or ancillaries as required and as per technical specifications and IS requirements.	1	EACH	2193759.00	21,93,759.00
	<b>Total Amount of Package XV : LIFT Rs.</b>				<b>1,18,87,339.00</b>
	<b>Package XVI : WATER TREATMENT PLANT</b>				
	<b>WATER TREATMENT PLANT (WTP) of FLOW 375LPH (7.5 KLD @ 20 Hrs Working).</b>				
<b>A</b>	<b>TREATMENT SCHEME</b>				
	The proposed Water Treatment Plant shall consist of the following treatment scheme:				
a)	Raw water or ground water shall be collected in a collection or Filter Feed Tank.				
b)	Henceforth, the raw water is pumped to filters like Multi Grade Filter (MGF) and Activated Carbon Filter (ACF) so that TSS and odour should be controlled and mitigated.				
c)	This shall be followed by storage of filtered water for further treatment in Softener feed tank.				
d)	After Filtration the water is then pumped to the Softener for further reduction of Hardness.				
d)	After Softener the water is stored in Domestic water tank and reused in domestic water supply.				
e)	Drawings should be pre approved by the governing authorities and respective engineer in charge. The drawings must include: a) Detailed shop drawings like GA Drawings, sectional drawings etc. b) Process Diagrams PFDs c) Installation drawings like P&ID, Piping drawings, Electrical drawings etc.				
<b>B</b>	<b>DESIGN CONSIDERATIONS</b>				
	Nature of Water - Raw water/Ground Water				



	Daily average flow - 375 Litres/Hr				
	PH -6.8-7.9				
	Total Alkalinity- 230-260 Mg/L				
	Total S. Solids - 350-450 Mg/L				
	Total Hardness - 200-300 Mg/L				
	Total Dissolved Solids - 350-450 Mg / L				
	Discharge standard after Softener				
	PH - 7.4-7.6				
	Total Alkalinity- < 10 Mg/L				
	Total S. Solids - <20 Mg/L				
	Total Hardness - <5 Mg/L				
	Total Dissolved Solids - 100-120 Mg / L				
	Water Treatment Plant shall include the following tanks:				
	Filter Feed Tank- 4.50 KL				
	Softener Feed Tank- 4.50 KL				
	Treated Water Tank- 5.0 KL				
	Other Equipments and items:				
	Pumps				
	Filter Vessels-MGF ACF				
	Softener				
	Piping, valves and fittings.				
	Electrical Panel & Cabling				
<b>C</b>	<b>Items</b>				
<b>1</b>	<b>FILTER FEED PUMP</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Closed Horizontal / vertical centrifugal monoblock pump set suitable for operations on 415 volts $\pm$ 10%, 3 phase, 50 Hz $\pm$ 5% AC supply with CI casing, CI impeller (hard finished and dynamically balanced), stainless steel (360) shaft with mechanical seal connected by a flexible coupling to a totally enclosed fan cooled (TEFC) induction motor as per IEC standard. Both pump and motor mounted on common M.S structural base plate as required complete as per specifications.				
a)	Pumps: 2 Nos. (1w+1s)				
b)	Type: Closed centrifugal				
c)	Flow Rate: 0.50 m3/hr				
d)	Head: 20-25 m				
e)	Impeller MOC: CI				
f)	Pressure Guage: 0-7 Bar				
g)	Valves: UPVC Butterfly valves at outlet	1	Set	25880.00	25,880.00
<b>2</b>	<b>MULTIGRADE FILTER</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of multigrade sand pressure filter for filtration of Raw water in FRP fabrication. The filter shall be suitable to operate for 20 hours.				
	The filtration unit shall comply with the following technical requirements:				

a)	Flow rate - 0.50 m3/hr				
b)	Dimensions: Dia-325 mm, Height: 1550 mm				
c)	Back wash duration - Once in 16 hours for 20 min				
d)	Frontal Pipe - MPV with UPVC Piping				
e)	Pressure drop across unit. - 1.0 Kg / sq.cm (max)				
f)	Working Pressure : 2.5-3 Kg/cm2				
g)	Filtration Size: 30 Microns				
i)	Filtration Velocity: 10 m3/hr/m2				
j)	Vessel MOC: FRP				
k)	Media: Gravel, Pebbles and Sand	1	No.	93168.00	93,168.00
<b>3</b>	<b>ACTIVATED CARBON FILTER</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Activated Carbon Filter for filtration of Raw water in FRP fabrication. The filter shall be suitable to operate for 20 hours.				
	The filtration unit shall comply with the following technical requirements:				
a)	Flow rate - 0.50 m3/hr				
b)	Dimensions: Dia-325 mm, Height: 1550 mm				
c)	Back wash duration - Once in 16 hours for 20 min				
d)	Frontal Pipe - MPV with UPVC Piping				
e)	Pressure drop across unit. - 1.0 Kg / sq.cm (max)				
f)	Working Pressure : 2.5-3 Kg/cm2				
g)	Filtration Size: 30 Microns				
i)	Filtration Velocity: 10 m3/hr/m2				
j)	Vessel MOC: FRP				
k)	Media: Sand, Supportive Media and Activated Carbon Media	1	No.	113872.00	1,13,872.00
<b>4</b>	<b>CHLORINE DOSING SYSTEM</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of chlorine dosing systems for chemical reaction with metering pump suitable for operation on 220 ± 5% single phase, 50 Hz AC supply, compete in all respects.				
a)	Discharge : 0-6 LPH				
b)	Pump Type: Metering Pump				
c)	MOC: PP				
d)	Dosing Tank Capacity: 100 Ltr.				
e)	Dosing Tank MOC: PP				
g)	No. of Pumps : 1	1	Set	10352.00	10,352.00
<b>5</b>	<b>SOFTENER FEED PUMP</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Closed Horizontal / vertical centrifugal monoblock pump set suitable for operations on 415 volts ± 10%, 3 phase, 50 Hz ± 5% AC supply with CI casing, CI impeller (hard finished and dynamically balanced), stainless steel (360) shaft with mechanical seal connected by a flexible coupling to a totally enclosed fan cooled (TEFC) induction motor as per IEC standard. Both pump and motor mounted on common M.S structural base plate as required complete as per specifications.				

a)	Pumps: 2 Nos. (1w+1s)				
b)	Type: Closed centrifugal				
c)	Flow Rate: 0.50 m3/hr				
d)	Head: 20-25 m				
e)	Impeller MOC: CI				
f)	Pressure Guage: 0-7 Bar				
g)	Valves: UPVC Butterfly valves at outlet	1	Set	25880.00	25,880.00
<b>6</b>	<b>SOFTENER</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of Softener for filtration of treated raw water in FRP fabrication. The filter shall be suitable to operate for 20 hours.				
	The filtration unit shall comply with the following technical requirements:				
a)	Flow rate - 0.50 m3/hr				
b)	Dimensions: Dia-325 mm, Height: 1625 mm				
c)	Back wash duration - Once in 16 hours for 20 min				
d)	Frontal Pipe - MPV with UPVC Piping				
e)	Pressure drop across unit. - 1.0 Kg / sq.cm (max)				
f)	Working Pressure : 2.5-3 Kg/cm2				
g)	Vessel MOC: FRP				
i)	Resin: INDION 220 H				
k)	Air Compressor: 1 No.				
l)	Regeneration Tank: 200 ltr				
m)	Regeneration Agitator: 1 No.	1	No.	227743.00	2,27,743.00
<b>7</b>	<b>LEVEL SWITCHES</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning two way level controllers to be included in electric control panel so that the constant operator attention is reduced and also in case of change in operating levels in various tanks, the respective pumps start / stop automatically to prevent any unwanted overflow / damage of pumps etc.				
a)	Type - Float Switch operated level controller incorporated into the main electric control panel.				
b)	Level Control - To operate Filter Feed Pumps, Softener Pumps etc				
c)	Note: These level controls are in addition to the level control provided for the Raw lift pumps.	1	Lot	5176.00	5,176.00
<b>8</b>	<b>ELECTRICAL CONTROL PANEL FOR WTP AND SOFTENER</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of electrical panels for WTP Plant . The panel shall be designed and fabricated as per general specifications, technical details, specifications and notes as part of this tender /BOQ and relevant BIS codes. Quoted rates shall be including necessary cable trays, cabling, earthing, wiring, control cabling etc.				
a)	The panel should also include an Alarm with siren that will blow as soon as there is any hinderance or any issue arises.				
b)	The panel is to be manufactured/assembled as per the latest ISI specification, Indian Electricity Rules,				

	Including special requirements of concerned state electricity inspectorate.				
c)	The panel shall be suitable rating to take care of full load of the Water Treatment Plant including all motors and lighting.				
d)	The contractor shall also provide the wiring of entire electro-mechanical equipments throughout the WTP. And shall also install the cable trays and conduits.				
e)	The panel and all other electro-mechanical equipments shall be connected with proper earthing system.				
f)	Control Connector, Lugs/sockets shall be of copper conductor and of Aluminium for conductor cable, suitable, solderless, crimping type.	1	Unit	46584.00	46,584.00
<b>9</b>	<b>PIPES FITTINGS AND INSTRUMENTS</b>				
	Providing, Supplying, Fixing, Installing, Testing & Commissioning of all piping and isolation control valves for making the system complete.				
a)	Size: Suitable as per the ID and OD of the pumps				
b)	MOC: UPVC	1	Unit	51760.00	51,760.00
<b>10</b>	<b>INSTRUMENTS AND MISC EQUIPMENTS</b>				
a)	pH meter,	2	Nos.	8282.00	16,564.00
b)	Conductivity	2	Nos.	10352.00	20,704.00
c)	Pressure Guages,	1	No.	4141.00	4,141.00
	<b>Total Amount of Package XVI : WATER TREATMENT PLANT Rs.</b>				<b>6,41,824.00</b>
	<b>Package XVII - FIRE SUPPRESSION SYSTEM</b>				-
<b>1</b>	Supply, Installation, Testing, and Commissioning of Gas Suppression System consisting of PESO Approved Cylinder with valve assembly, UL approved FK-5-1-12 Gas, Electric control head, Manual actuator assembly, cylinder brackets, Discharge hose, Discharge nozzles 180 Deg/360 Deg, Warning signs, Piping & fittings, conventional Gas release panel, conventional detectors, manual abort & release, hooter, and associated cabling within the protected space as specified below:	1	Lot	868546.00	8,68,546.00
	Server Room (6400mm x 4600mm x 3500mm)				
	UPS+ Battery Room (5000mm x 3000mm x 3500mm)				
<b>2</b>	Supply, fixing, testing and commissioning of automatic Linear pneumatic Tube Detection based Clean Agent System for Electrical Panels consisting of UL approved non ferrous Seamless Cylinder, DLP Assembly with automatic valve, push in connector for tube, UL approved FK-5-1-12 Gas ref NFPA 2001, mounting bracket, UL Listed Heat detection Tube, End of Line adopter, Pressure guage and UL approved low pressure switch for monitoring system activation. Unit for Audio/visual Alarm including electrical wiring to make each entire system functional. For the below mentioned panels:	1	Lot	283119.00	2,83,119.00
	Main LT panel (4500mm x 1250mm x 2100mm)				
	DG panel (2500mm x 400mm x 2100mm)				
	HT Panel (2300mm x 1500mm x 2100mm)				
	<b>Total Amount of Package XVII Fire Suppression System Rs.</b>				<b>11,51,665.00</b>

	<b>Package XVIII - WATER SUPPLY PUMP</b>				
1	Supplying, installation, testing and commissioning of electric driven Water Transfer pump suitable for automatic operation and consisting of following, complete in all respects, as required :				
	Horizontal Monoblock Pump (Flow 120 LPM @ Head 52 Mtr) with 3.7 kw/5 hp, 2-Pole, 415 volt, 3-phase Ac supply. Pump in CI Casing, CI Impeller & SS Shaft, Mechanical Seal Fitted, SucXDel – 50mmX40mm with stainless steel shaft, mechanical seal conforming to IS 1520. (Pump Efficiency shall be as per Latest Super ECBC Building Criteria)				
	M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required.				
	Suitable cement concrete foundation duly plastered and with anti vibration pads.				
a	120 lpm at 52 m Head	2	Nos.	42,894.00	85,788.00
2	Supplying, installation, testing and commissioning of Electrical Panel of 2 Nos. DOL Starter for 5 HP Horizontal Monoblock Pumps i/c connections etc complete in all respect as required. (For 1W+1S Operation)	1	Nos.	18,410.00	18,410.00
3	Supplying, installation, testing and commissioning of Openwell Submersible Pump (Flow 120 LPM @ Head 36 Mtr) with 2.2 kw/3 hp, 2-Pole, 415 volt, 3-phase Ac supply. Pump in CI Casing, CI Impeller, SS Shaft, Mechanical Seal Fitted, SucXDel –50mmX40mm with stainless steel shaft, mechanical seal conforming to IS 1520 complete in all respects, as required (Pump Efficiency shall be as per Latest Super ECBC Building Criteria)	2	Nos.	30,673.00	61,346.00
4	Supplying, installation, testing and commissioning of Electrical Panel DOL Starter for 3 HP Openwell Submersible Pumps i/c connections etc complete in all respect as required. 1W+1S Operation	1	Nos.	14,534.00	14,534.00
	<b>Total Amount of Package XVIII - WATER SUPPLY PUMP Rs.</b>				<b>1,80,078.00</b>
	<b>Total Amount of Package I to XVIII Rs.</b>				<b>15,31,28,482.00</b>

# FINANCIAL BID



<b>CIVIL CONSTRUCTION UNIT</b>					
<b>NIT NO. 1/2025-26/CE/CCU/CED-III/AMARAVATI</b>					
<b>Name of work : Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.</b>					
<b>SCHEDULE OF QUANTITY</b>					
<b>Name of the Contractor</b>					
<b>Sl. No.</b>	<b>Name of component</b>	<b>Estimated cost (Rs.)</b>	<b>Percentage above or below the estimated cost</b>	<b>% in Figures</b>	<b>Total Cost (Rs.)</b>
1	2	3	4	5	6
1	<b>Civil work + Electrical &amp; Mechanical Works</b>	<b>Rs. 56,62,55,159/-</b>	*	*	*

:- To be filled online in bid document.

- 1) The Column Nos. 4 & 5 are mandatory to be filled by the bidders / tenderers. If these columns are left blank, the tender become invalid.
- 2) The amount in figures in column No.6 shall appear automatically corresponding to the percentage quoted in column No.4 & 5.
- 3) The tenderer is required to quote the percentage only above or below or at par with the estimated cost to cover all the rates of item covered under the respective packages.
- 4) The percentage shall be written in 2 (two) places of decimal.
- 5) If the percentage selection in column No 4 is "At Par", by default the percentage will be considered as "Zero" only. In other words, if "At par" is selected in column No.4, then no need to fill column No. 5

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**Certified that this NIT contains Pages 1 to 334.**

Executive Engineer, CED-III, CCU  
(For and on behalf of the President of India)

PART A  
GENERAL INFORMATION

## **INFORMATION & INSTRUCTIONS FOR BIDDERS FOR e-BIDDING**

The Executive Engineer, Civil Engineering Division-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1<sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -560034 ([email- eeecd3ccu-mef@gov.in](mailto:eeecd3ccu-mef@gov.in)) on behalf of President of India invites online Percentage rate bids from CPWD enlisted contractors of appropriate class in Buildings & Roads (erstwhile composite /Building/ Infrastructure) category and firms/contractors of repute in two bid system for the following work:

NIT No.	1/2025-26/CE/CCU/CED-III/AMARAVATI
Name of Work	<b>Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.</b>
Location	Amaravati, Andhra Pradesh
Estimated cost put to bid	Rs. <b>56,62,55,159/-</b>
Earnest Money	Rs. <b>66,62,552/-</b>
Period of Completion	<b>18 Months</b>
Last time & date of submission of online bid, copy of receipt of deposition of original EMD and other documents as specified in Notice Inviting e-Tender.	03:00 PM on 07/07/2025
Time date of opening of technical bid	03:30 PM on 07/07/2025
Pre-Bid Conference	Pre-bid conference shall be held on 20/06/2025 at 11 AM with the eligible and intending bidders in <b>office of CE, CCU, 7<sup>th</sup> floor CGO Complex, Lodhi Road, New Delhi -110003.</b>

*\*\*To be filled in by the Executive Engineer*

Enlistment of the 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. ***Joint ventures/Consortium and Special Purpose Vehicles are not allowed to tender.***

1. Contractors who fulfill the following requirements shall be eligible to apply [1(b), 1(c) & 1(d) are not applicable for CPWD enlisted contractors of appropriate class. 1(a)(i) and 1(e) is applicable for CPWD enlisted contractors also]:
  - a) Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited-
    - (i) Three similar works each costing not less than **Rs. 22.65 Crores** or two similar works each costing not less than **Rs. 33.97 Crores** or one similar work costing not less than **Rs. 45.30 Crores.**

- (ii) In case, the eligible work has been executed by a Joint Venture through one or more individual firm(s), then cost of completed work shall be distributed among the individual firm(s) in proportion to their share in Joint Venture and that will be considered as work experience for individual firm(s) for pre-qualification in bidding.

“Similar Work” shall mean construction of minimum one multi-storeyed RCC/Composite framed structure building having five storeys or completing balance Construction work of one building (i/c structural work) minimum up to five storeys.

**Note-1:** Machine room and mumty shall not be counted as a storey.

**Note-2:** For this purpose, each basement, stilt constructed in the building shall be considered as a storey.

**Note-3:** Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work.

**Note-4:** For the purpose, “Cost of work” shall mean gross value of the completed work including the cost of materials supplied by the Government/Client, but excluding those supplied free of cost. This should be certified by an officer not below the rank of Executive Engineer / Project Manager or equivalent.

**In case the certificate of work experience has been issued by any Pvt. Firm / Agency / Builder, the bidders will have to submit the documentary proof of the TDS (Form - 26AS) with income tax department to ensure actual value of work done.**

**The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to previous day of last date of submission of tenders.**

- b) Should have had Average Annual Financial Turnover of Rs. **16.98** Crores on construction works during the last three years ending 31<sup>st</sup> March 2024 (Scanned copy of Certificate from CA with Unique Document Identification Number (UDIN) to be uploaded). The value of annual turnover figures shall be brought to the current value by enhancing the actual turnover figures at simple rate of 7% per annum.
- c) Should not have incurred any loss (profit after tax should be positive) in more than two years during the available last five consecutive balance sheets (standalone financial statement), ending 31<sup>st</sup> March 2024.
- d) Should have a Banker's Certificate from a commercial Bank for Rs. **22.65** Crores or Net Worth certificate from CA with Unique Document Identification Number (UDIN) of minimum 10 % amount of ECPT (Scanned copy of original to be uploaded).
- e) Should have bidding capacity equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[AxNx1.5]-B} Where,

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

**Notes:**

- i) The bidder should submit bidding capacity as per Form 'C-2'.
- ii) Bidding capacity is applicable for all the contractors including CPWD enlisted contractors.
- iii) Bidding capacity formula, for CPWD contractors who are enlisted based on rule 6.1.7 of Enlistment Rules-2022 i.e. government retired engineer/ architect for three years from the date of issue of enlistment order, is as follows: -

Bidding Capacity = {[AxNx1.5]-B}

Where,

A = Banker certificate figure as submitted by applicant (i.e. government retired engineer/ architect) at the time of enlistment for first year of enlistment and subsequent fresh bankers certificate for second and third year respectively. Value of A for first year will be mentioned in the enlistment order by the member secretary of advisory committee for enlisting authority.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and on-going works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years if it so chooses.

- iv) Bidding capacity, for CPWD contractors who are enlisted based on rules 9.6.3 & 9.6.4 of Enlistment Rules-2022 i.e. new entity based on previously enlisted entity for three years from date of issue of enlistment order, is as follows:



Annual turnover of newly enlisted entity shall be in proportion to the shareholding of partners/directors in the original enlisted entity at the time of enlistment of the newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be applicable to it for calculation of bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years, if it so chooses.

Bidding Capacity for newly enlisted entity based on rules 9.6.3 & 9.6.4 enlistment rules -2022 shall be as follows: -

$$\text{Bidding Capacity} = \{[A' \times N \times 1.5] - B\}$$

Where,

A' = Proportionate share of newly enlisted director/partner in originally enlisted company/firm multiplied by the factor A, as given below. Value of A' will be mentioned in the enlistment order by member secretary of Advisory committee for Enlistment Authority, it will remain same for three years.

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum. This value is of originally enlisted entity at the time of enlistment of newly enlisted entity.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

- v) Enlisted entities based on rules 6.1.7, 9.6.3 or 9.6.4 of enlistment rules-2022 can submit MoU from agency having requisite experience for structural system technology if the enlisted entity does not have required experience.

2. 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.
3. This information and Instructions for bidders posted on website shall form part of bid document.

4. The bid document consisting of Plans, Specifications, 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 can be seen and downloaded from website <https://etender.cpwd.gov.in> or [www.cpwd.gov.in](http://www.cpwd.gov.in) free of cost.
5. 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, CCU/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), CCU/CPWD and other documents as specified.
6. Those contractors 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>
7. The intending bidder must have valid class-III 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>.
8. On opening date, the contractor can login and see the bid opening process. After opening of bids, he will receive the competitor bid sheets.
9. Contractor can upload documents in the form of JPG format and PDF format.
10. Certificate of Financial Turn Over: At the time of submission of bid contractor may upload Affidavit/Certificate from CA mentioning Financial Turnover of last 7 years ending 31<sup>st</sup> March 2024 or for the period as specified in the bid document and further details if required may be asked from the contractor after opening of technical bids. There is no need to upload entire voluminous balance sheet.
11. Contractor 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 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 Technical Bid shall be opened first on due date and time as mentioned above. The time and date of opening of financial bid of contractors qualifying the technical bid shall be communicated to them at a later date.

13. Pre-Bid conference shall be held on **20/06/2025 at 11 AM** with the eligible and intending bidders in **office of CE, CCU, 7<sup>th</sup> floor CGO Complex, Lodhi Road, New Delhi -110003** to clear the doubt of intending bidders, if any.
14. The department reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid down criterion.
15. Copy of enlistment order and certificate of work experience and other documents as specified in the tender documents for eligibility shall be scanned and uploaded to the e-tendering website within the period of bid submission.
16. Online bid documents submitted by intending bidders shall be opened only of those bidders, whose deposited EMD and other documents scanned and uploaded are found in order.
17. If any information furnished by the applicant is found incorrect at a later stage, he shall be liable to be debarred from tendering/taking up of works in department. The department reserves the right to verify the particulars furnished by the applicant independently.
18. **List of Documents to be filled in by the tenderers in various forms, to be scanned and uploaded in JPG/PDF format within the period of bid submission:**

**For CPWD enlisted Contractors**

- (i) Copy of enlistment order in appropriate class and category issued by CPWD
- (ii) Copy of original EMD in proper form.
- (iii) Copy of receipt for deposition of original EMD to division office of any EE, CPWD/CCU.
- (iv) GST Registration Certificate, if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following under taking along with 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 CCU, whichever is earlier, failing which I/we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CCU or GST department in this regard".
- (v) Certificate of Financial Turnover from CA (Form 'A').
- (vi) List of projects under execution in Form 'C-1'.
- (vii) Bidding Capacity as per Form- 'C-2'

- (viii) Affidavit for non-execution of eligible similar work(s) through another contractor on back-to-back basis or subletting basis furnished on Rs.100/- non-judicial stamp paper attested by Notary. Undertaking for similar works in Form- 'H'.
- (ix) Affidavit for Non-Black Listing should be furnished on Rs.100/- non-Judicial stamp paper attested by Notary in Form- 'I'.
- (x) Any other document as specified in NIT

**For Non-CPWD Registered Contractors –**

- a. Copy of original EMD in proper form.
- b. Copy of receipt for deposition of original EMD to division office of any EE, CPWD/CCU.
- c. Letter of transmittal
- d. Certificate of Financial Turnover from CA (Form 'A').
- e. Banker's certificate or Networth certificate (Form 'B' and 'B-1').
- f. List of eligible similar nature of works in Form –'C'.
- g. List of projects under execution in Form 'C-1'.
- h. Bidding Capacity as per Form- 'C-2'
- i. Performance report of works (mentioned in Form-C and C-1) in Form – 'D'.
- j. Structure & Organisation (Form 'E')
- k. Affidavit for non-execution of eligible similar work(s) through another contractor on back-to-back basis or subletting basis furnished on Rs.100/- non-judicial stamp paper attested by Notary. Undertaking for similar works in Form- 'H'.
- l. GST Registration Certificate, 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 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 CCU, whichever is earlier, failing which I/we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CCU or GST department in this regard".
- m. Any other Document as specified in the bid documents.

**If any required document is not scanned and uploaded while submitting bid, the bid submitted shall become invalid and will not be considered in e-Tendering process and the bid shall be summarily rejected.**

Executive Engineer, CED-III, CCU  
(For and on behalf of the President of India)  
**(For and on behalf of President of India)**

**NOTICE INVITING TENDER**

1. Percentage rate bids are invited on behalf of President of India from approved and eligible contractors of CPWD in appropriate class in Buildings & Roads (erstwhile composite /Building/ Infrastructure) category and firms/contractor of repute in two bid system for the following work:

**Name of work: Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.**

The enlistment of the contractors should be valid on the last date of submission of bids. In case the last date of submission of bid 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. 56,62,55,159/-** This estimate, however, is given merely as a rough guide.
- 1.2. Intending bidders is eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified below: -

[1.2.2, 1.2.3 & 1.2.4 are not applicable for CPWD enlisted contractors of appropriate class. 1.2.1 and 1.2.5 is applicable for CPWD enlisted contractors also]

- 1.2.1. Should have satisfactorily completed the works as mentioned below during the last 7 years ending last day of the month previous to the one in which tenders are invited –
  - (i) Three similar works each costing not less than **Rs. 22.65 Crores** or two similar works each costing not less than **Rs. 33.97 Crores** or one similar work costing not less than **Rs. 45.30 Crores**.
  - (ii) In case, the eligible work has been executed by a Joint Venture through one or more individual firm(s), then cost of completed work shall be distributed among the individual firm(s) in proportion to their share in Joint Venture and that will be considered as work experience for individual firm(s) for pre-qualification in bidding.

“Similar Work” shall mean construction of minimum one multi-storeyed RCC/Composite framed structure building having five storeys or completing balance Construction work of one building (i/c structural work) minimum up to five storeys.

**Note-1:** Machine room and mumty shall not be counted as a storey.

**Note-2:** For this purpose, each basement, stilt constructed in the building shall be considered as a storey.

**Note-3:** Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work.

**Note-4:** For the purpose, “Cost of work” shall mean gross value of the completed work including the cost of materials supplied by the Government/Client, but excluding those supplied free of cost. This should be certified by an officer not below the rank of Executive Engineer / Project Manager or equivalent.

**In case the certificate of work experience has been issued by any Pvt. Firm / Agency / Builder, the bidders will have to submit the documentary proof of the TDS (Form -26AS) with income tax department to ensure actual value of work done.**

**The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to the last date of submission of bid.**

To become eligible for issue of bid, the bidders shall have to furnish an affidavit as under: -

“I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor 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 CCU 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 Deposit/Performance Guarantee. (Scanned copy to be uploaded at the time of submission of bid)”

- 1.2.2. Should have had Average Annual Financial Turnover of **Rs. 16.98** Crores on construction works during the last three years ending 31<sup>st</sup> March 2024 (Scanned copy of Certificate from CA with Unique Document Identification Number (UDIN) to be uploaded). The value of annual turnover figures shall be brought to the current value by enhancing the actual turnover figures at simple rate of 7% per annum.
- 1.2.3. Should not have incurred any loss (profit after tax should be positive) in more than two years during the available last five consecutive balance sheets (standalone financial statement), ending 31<sup>st</sup> March 2024.
- 1.2.4. Should have a Banker's Certificate from a commercial Bank for Rs. **22.65** Crores or Net Worth certificate from CA with Unique Document Identification Number (UDIN) of minimum 10 % amount of ECPT (Scanned copy of original to be uploaded).
- 1.2.5. Should have bidding capacity equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[A x N x 1.5] - B} Where,



A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

**Notes:**

- a) The bidder should submit bidding capacity as per Form 'C-2'.
- b) Bidding capacity is applicable for all the contractors including CPWD enlisted contractors.
- c) Bidding capacity formula, for CPWD contractors who are enlisted based on rule 6.1.7 of Enlistment Rules-2022 i.e. government retired engineer/ architect for three years from the date of issue of enlistment order, is as follows: -

$$\text{Bidding Capacity} = \{[A \times N \times 1.5] - B\}$$

Where,

A = Banker certificate figure as submitted by applicant (i.e. government retired engineer/ architect) at the time of enlistment for first year of enlistment and subsequent fresh bankers certificate for second and third year respectively. Value of A for first year will be mentioned in the enlistment order by the member secretary of advisory committee for enlisting authority.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and on-going works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years if it so chooses.

- d) Bidding capacity, for CPWD contractors who are enlisted based on rules 9.6.3 & 9.6.4 of Enlistment Rules-2022 i.e. new entity based on previously enlisted entity for three years from date of issue of enlistment order, is as follows:

Annual turnover of newly enlisted entity shall be in proportion to the shareholding of partners/directors in the original enlisted entity at the time of enlistment of the newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be applicable to it for calculation of bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years, if it so chooses.

Bidding Capacity for newly enlisted entity based on rules 9.6.3 & 9.6.4 enlistment rules -2022 shall be as follows: -

$$\text{Bidding Capacity} = \{[A' \times N \times 1.5] - B\}$$

Where,

A' = Proportionate share of newly enlisted director/partner in originally enlisted company/firm multiplied by the factor A, as given below. Value of A' will be mentioned in the enlistment order by member secretary of Advisory committee for Enlistment Authority, it will remain same for three years.

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum. This value is of originally enlisted entity at the time of enlistment of newly enlisted entity.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

- e) Enlisted entities based on rules 6.1.7, 9.6.3 or 9.6.4 of enlistment rules-2022 can submit MoU from agency having requisite experience for structural system technology if the enlisted entity does not have required experience.
- 2. Agreement shall be drawn with the successful tenderer on prescribed Form No. CPWD 7 which is available as a Govt. of India Publication and also available on website **www.cpwd.gov.in**. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
- 3. The time allowed for carrying out the work will be **18 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.

4. The site for the work is available on “as it is where it is” basis. **The bidders have to quote their rates in view of the site conditions and other parameters.**
5. The architectural and structural drawings for the work shall be made available in phased manner, as per requirement of the same as per approved programme of completion submitted by the contractor after award of work.
6. The bid document consisting of plans, 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 on website <https://etender.cpwd.gov.in> or [www.cpwd.gov.in](http://www.cpwd.gov.in) free of cost.
7. After submission of the bid the contractor can re-submit revised bid any number of times **or withdraw it** before last date and time of submission of bid as notified. **No post-tender modification is allowed by the tenderers except through negotiations, if required. In case, any tenderer does so, the tender will be rejected and the tenderer will be debarred for future tendering in CCU/CPWD for two years by the concerned enlisting authority (in case of CPWD enlisted contractor) and by the concerned CE/SE (in case of non-enlisted contractor).**
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. 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 balance amount as prescribed) from any of the Commercial Banks (drawn in favour of **Executive Engineer, CED-III, CCU, MoEF&CC, Bengaluru**) 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, CCU/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 lac, 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 a period of **180 days** or more from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders.

Copy of Enlistment Order and certificate of work experience and other documents as specified in the notice inviting e- tender 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 e- tender notice shall have to be submitted by the lowest bidder

within a week physically in the office of tender opening authority. Online bid documents submitted by intending bidders shall be opened only of those bidders, whose original EMD deposited with any division of CPWD/CCU and other document scanned and uploaded are found in order.

10. 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 copies 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 in 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.
11. 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 the 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 subcontractors, if any engaged by the contractor for the said work within the period specified in Schedule F.
12. 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 bidders 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 bidders 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.

13. 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.
14. 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 for rejection.
15. 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 bidders shall be bound to perform the same at the rate quoted.
16. The contractor/bidder shall not be permitted to bid for works in the CCU Circle responsible for award and execution of contracts, in which his near relative is posted as a 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 Civil Construction Unit or in the Ministry of Environment, Forests and Climate Change. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of the Department.
17. 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 prior 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.
18. The bid for the works shall remain open for acceptance for a period of **seventy-five (75)** days from the date of opening of technical bids. Further,
  - i. If any tenderer withdraws his tender within 7 days after last date **and time (24 hours basis)** 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 **and time (24 hours basis)** 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. **Withdrawal of the tender, by the tenderer, shall only be made through e-tender portal. Any other method i.e. through letter/ e-mail etc. shall not be considered.**

iv. 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.

19. The pre bid meeting will be held on 20/06/2025 at 11 AM with the eligible and intending bidders in **office of CE, CCU, 7<sup>th</sup> floor CGO Complex, Lodhi Road, New Delhi -110003** to clear the doubt of intending bidders if any.

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:-

- a) The Notice Inviting Bid, all the documents including additional conditions, special conditions, particular specification, 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.
- b) Standard CPWD Form '7' and other Standard CPWD Forms as applicable with amendment upto last date of submission of bid.

\*\* to be filled by EE

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

22. **Specialized Agencies for E&M services:** The tenderer must associate himself with agencies of the appropriate eligibility for each of specialized nature of items / work as per part- 'C' of NIT. The work of Lifts shall be carried out by OEM of Lift only. Such works shall be got executed only through associated agencies specialized in these fields. Separate MOU has to be signed with each of the specialized works with either OEMS (Authorised channel partners) or with specialized agencies who have the credentials of executing either one work of 80% value or two work of 60% value or three works of 40% value of the corresponding component of the specialized work in last seven years. 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 Agency. The main contractor has to associate agency(s) 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 within prescribed time. Name



of the agency(s) to be associated shall be approved by Engineer –in-Charge.

23. The proposal for all specialized agencies (for Civil works and E& M works as specified in part 'B' and Part 'C' of notice inviting tender respectively) shall be submitted by the contractor within 03 months of the date of start/commencement. MOU should be submitted within three months of the date of start/commencement. In case of non-submission or incomplete or part submission of the proposals, deduction @ Rs. 5000/- per day per proposal of specialised agency shall be made from any amount payable to the contractor.
24. 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. 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.
25. The main contractor has to enter into MOU with agency(s) associated by him. Copy of such agreement shall be submitted to EE in charge. In case of change of associate contractor, the main agency(s) has to enter into MOU/agreement with the new contractor associated by him.
26. 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/uploading tender can be resolved through ERP helpline no. 18001803286 or e-mail [cpwd.support@techmahindra.com](mailto:cpwd.support@techmahindra.com). The e- tendering bidders are also advised not to wait to raise any issues till the last date of submission of bid in their own interest.

Executive Engineer, CED-III, CCU  
(For and on behalf of the President of India)  
**(For and on behalf of President of India)**

**TECHNICAL BIDS**

Section-I  
BRIEF PARTICULARS OF WORK

- 1) The salient details of the work for which bids are invited are as under:

S. N.	Name of work	Estimated cost	Period of completion
1.	<b>Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.</b>	<b>Rs. 56,62,55,159/-</b>	<b>18 Months</b>

- 2) The site of work is located/situated at Amaravati, Andhra Pradesh.
- 3) The scope of work consists of **construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh** including all civil, electrical, mechanical, horticulture services.
- 4) Scope of work consists obtaining minimum GREEN PLUS Rating as per CPWD Green Rating Manual (GHAR) 2021 and minimum 4-star rating under GRIHA norms.
- 5) Electrical & Mechanical services/works: All the electrical & mechanical services mentioned in Part C of the tender document are in scope of work.
- 6) The contractor shall supply all documents required in obtaining all mandatory approvals and shall also extend full support to getting all required statutory & Municipal approval “Occupation and Completion” or any other document required to declare all assets eligible for bringing it in use. Contractor shall assist to CCU appointed Consultant to get completion certificate from local body, NOC from fire department and any other statutory approval related to building for handing over the assets. Contractor shall extend necessary support, as per statutory requirements, to the CPWD for these approvals. Nothing extra time Extension/Extra amount shall be paid on this account.
- 7) The contractor shall hand over the assets after completion of work with as built drawings, services route plans, Maintenance manuals, warranties / Guarantees or any other document required by the Engineer-in-charge for maintaining these establishments.
- 8) Scope of work also includes to train the 30% workers of the site as per SKILLED INDIA program under National Skill Development Corporation (NSDC) Norms & Conditions.

**Section-II**  
**INFORMATION AND GUIDE-LINES FOR BIDDERS**

**1.0 General:**

- 1.1 Letter of transmittal and 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. Bids made by telegram or e-mailed 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. No information shall be entertained after submission of eligibility criteria document unless it is called for by the Employer.
- 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 / Engineer-in-Charge/ Executive Engineer or EE, CED-III means the President of India, acting through the The Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1<sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -560034 or his successor or legal assignee thereof.
- 2.3 Bidder/Agency/Contractor/tenderer means the individual, proprietary firm, firm in partnership, limited company, private or public or corporation.
- 2.4 "YEAR" means "Financial year" unless stated otherwise.

**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. If the bidder is an individual, the application shall be signed by him above his 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 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 typewritten names and current addresses, or, alternatively, by a partner holding power of attorney for the firm. In the latter case a certified copy of the power of attorney should accompany the application. In both 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 application shall be signed by a duly authorized person holding power of attorney for signing the application accompanied by a copy of the power of attorney. The bidder should also furnish a copy of the Memorandum of Articles of Association duly attested by a Public Notary

#### **4 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 Particulars of works:**

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 Site Visit:**

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

#### **7.0 Initial Criteria for Eligibility:**

Enlistment of the contractors should be valid on the last date of submission of bids. In case only the last date of submission of bids is extended, the enlistment of contractor should be valid on the original date of submission of bids. ***Joint ventures/Consortium and Special Purpose Vehicles are not allowed to tender.***

Contractors who fulfill the following criteria shall also be eligible to apply [7.2, 7.3 & 7.4 are not applicable for CPWD enlisted contractors of appropriate class. 7.1 and 7.5 is applicable for CPWD enlisted contractors also]:

- 7.1** Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited:

- (i) Three similar works each costing not less than **Rs. 22.65 Crores** or two similar works each costing not less than **Rs. 33.97 Crores** or one similar work costing not less than **Rs. 45.30 Crores**.
- (ii) In case, the eligible work has been executed by a Joint Venture through one or more individual firm(s), then cost of completed work shall be distributed among the individual firm(s) in proportion to their share in Joint Venture and that will be considered as work experience for individual firm(s) for pre-qualification in bidding.

“Similar Work” shall mean construction of minimum one multi-storeyed RCC/Composite framed structure building having five storeys or completing balance Construction work of one building (i/c structural work) minimum up to five storeys.

**Note-1:** Machine room and mumty shall not be counted as a storey.

**Note-2:** For this purpose, each basement, stilt constructed in the building shall be considered as a storey.

**Note-3:** Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work.

**Note-4:** For the purpose, “Cost of work” shall mean gross value of the completed work including the cost of materials supplied by the Government/Client, but excluding those supplied free of cost. This should be certified by an officer not below the rank of Executive Engineer / Project Manager or equivalent.

**In case the certificate of work experience has been issued by any Pvt. Firm / Agency / Builder, the bidders will have to submit the documentary proof of the TDS (Form - 26AS) with income tax department to ensure actual value of work done.**

**The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to previous day of last date of receipt of applications for bids submission of tender.**

**7.2** Should have had Average Annual Financial Turnover of Rs. **16.98 Crores** on construction works during the last three years ending 31<sup>st</sup> March 2024 (Scanned copy of Certificate from CA with Unique Document Identification Number (UDIN) to be uploaded). The value of annual turnover figures shall be brought to the current value by enhancing the actual turnover figures at simple rate of 7% per annum.

**7.3** Should not have incurred any loss (profit after tax should be positive) in more than two years during the available last five consecutive balance sheets (standalone financial statement), ending 31<sup>st</sup> March 2024.

**7.4** Should have a Banker's Certificate from a commercial Bank for Rs. **22.65 Crores** or Net Worth certificate from CA with Unique Document Identification Number (UDIN) of minimum 10 %



amount of ECPT (Scanned copy of original to be uploaded).

- 7.5** Should have bidding capacity equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[A x N x 1.5] - B} Where,

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

**Notes:**

- i. The bidder should submit bidding capacity as per Form 'C-2'.
- ii. Bidding capacity is applicable for all the contractors including CPWD enlisted contractors.
- iii. Bidding capacity formula, for CPWD contractors who are enlisted based on rule 6.1.7 of Enlistment Rules-2022 i.e. government retired engineer/ architect for three years from the date of issue of enlistment order, is as follows: -

Bidding Capacity = {[A x N x 1.5] - B}

Where,

A = Banker certificate figure as submitted by applicant (i.e. government retired engineer/ architect) at the time of enlistment for first year of enlistment and subsequent fresh bankers certificate for second and third year respectively. Value of A for first year will be mentioned in the enlistment order by the member secretary of advisory committee for enlisting authority.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and on-going works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years if it so chooses.

- iv. Bidding capacity, for CPWD contractors who are enlisted based on rules 9.6.3 & 9.6.4 of Enlistment Rules-2022 i.e. new entity based on previously enlisted entity for three years from date of issue of enlistment order, is as follows:

Annual turnover of newly enlisted entity shall be in proportion to the shareholding of partners/directors in the original enlisted entity at the time of enlistment of the newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be applicable to it for calculation of bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years, if it so chooses.

Bidding Capacity for newly enlisted entity based on rules 9.6.3 & 9.6.4 enlistment rules - 2022 shall be as follows: -

$$\text{Bidding Capacity} = \{[A' \times N \times 1.5] - B\}$$

Where,

A' = Proportionate share of newly enlisted director/partner in originally enlisted company/firm multiplied by the factor A, as given below. Value of A' will be mentioned in the enlistment order by member secretary of Advisory committee for Enlistment Authority, it will remain same for three years.

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum. This value is of originally enlisted entity at the time of enlistment of newly enlisted entity.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

- v. Enlisted entities based on rules 6.1.7, 9.6.3 or 9.6.4 of enlistment rules-2022 can submit MoU from agency having requisite experience for structural system technology if the enlisted entity does not have required experience.

## **8.0 Evaluation Criteria:**

8.1 The details submitted by the bidder will be evaluated in the following manner.

8.1.1 The initial criteria prescribed in para 7.0 above in respect of experience of eligible similar works completed, loss, Banker's certificate, financial turnover and bidding capacity etc. will first be scrutinized and the bidder's eligibility for the work be determined.

8.1.2 The bidders qualifying the initial criteria as set out in Para 7.0 above will be evaluated for following criteria by scoring method on the basis of details furnished by them.

(a) Financial strength (Form 'A' & 'B')	Maximum	20	marks
(b) Experience in eligible similar nature of work during last 7 years (Form 'C' & 'C-1')	Maximum	20	marks
(c) Performance on works (Form 'D') Time Over Run	Maximum	20	marks
(d) Performance on works (Form 'D-1')-Quality	Maximum	40	marks
	Completed works	(25 Marks)	
	and ongoing works	(15 Marks)	
-----			
Total		100	marks
-----			

To become eligible for short listing, the bidder must secure at least 50% (Fifty percent) marks in each (section a,b,c,&d) and 60% (Sixty percent) marks in aggregate.

The department, however reserves the right to restrict the list of such qualified bidders to any number deemed suitable by it.

Note: The average value of performance of works for time over run and quality shall be taken on the basis of performance report of the eligible similar works.

8.1.3 Evaluation of Performance: -

Evaluation of the performance of contractor for eligibility shall be done by NIT approving authority or a committee constituted by him. All the eligible similar works executed and submitted by the bidder in support of eligibility and any one of the ongoing works, may be got inspected by a committee which may consists of client or any other authority as decided by NIT approving authority. The marks for the quality shall be given based on this inspection, if inspection is carried out.

**Scoring method of evaluation:** - The scoring for evaluation shall be done as given in Proforma – I.

9.0 **Financial Information:** Bidder should furnish the Annual financial statement for the last Five years in Form 'A'. banker's certificate in Form 'B' or Networth Certificate in Form 'B1'.

## **10.0 Experiences in Works Highlighting Experience in Similar Works:**

10.1 Bidder should furnish the list of eligible similar nature of works successfully completed during last seven years in Form 'C' and ongoing works as well (Form C-1).

10.2 Performance reports corresponding to work mentioned in (Form-C) and Form C-1 in Form-D. If needed, the bidder may attach a separate certificate in this regard from performance report issuing authority.

## **11.0 Organization Information:**

Bidder is required to submit the information in respect of his/her/their organization in Form-'E'.

## **12.0 Letter of Transmittal:**

The Bidder should submit the letter of transmittal attached with the document.

**13.0 Opening of Price Bid:** After evaluation of applications, a list of short-listed agencies will be prepared. Thereafter the financial bids of only the qualified and technically acceptable bidders shall be opened at the notified time, date and place in the presence of the qualified bidders or their representatives.

## **14.0 Award criteria:**

14.1 The employer reserves the right, without being liable for any damages or obligation to inform the bidder to:

14.1.1 Amend the scope of work and value of contract.

14.1.2 Reject any or all the applications without assigning any reason.

14.2 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.

**Criteria for Evaluation of the performance of contractors for Pre- Eligibility**

S.N.	Attributes	Marks	Evaluation	
(a)	Financial Strength	(20 Marks)		
	(i) Average annual turnover	16 Marks	(i) 60% marks for minimum eligibility criteria (ii) 100% marks for twice the minimum eligibility criteria or more.	
	(ii) Banker’s or Networth Certificate	04 Marks	(iii) In between (i) & (ii)- on pro-rata basis	
(b)	Experience in similar class of work	(20 marks)	(i) 60% marks for minimum eligibility criteria (ii) 100% marks for twice the minimum eligibility criteria or more. (iii) In between (i) & (ii)- on pro-rata basis	
(c)	Performance on works [Time Over run (TOR)]	(20 marks)		
	Parameter	Calculation for points	Score	Maximum Marks
	If TOR =		1.00 2.00 3.00 >3.50	20
	(i) Without levy of compensation		20 15 10 10	
	(ii) With levy of compensation		20 5 0 -5	
	(iii) Levy of compensation not decided		20 10 0 0	
	TOR = AT/ST, where AT =Actual Time; ST= Stipulated Time in the agreement plus (+) justified period of Extension of Time. Note: Marks for value in between the stages indicated above is to be determined by straight line variation basis.			
(d)	Performance of works (Quality) as per assessment in Form D-1		(40 Marks)	
	Completed works (max. 25 marks)	Ongoing works (max. 15 marks)	(Total Marks assessed)	

### **Section-III**

#### **LETTER OF TRANSMITTAL**

From:

.....

.....

To

The Executive Engineer, CED-III,  
Civil Construction Unit (CCU),  
Ministry of Environment, Forest & Climate Change (MoEF&CC),  
'D' wing, 1<sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -**560034**.  
([email- eeecd3ccu-mef@gov.in](mailto:eeecd3ccu-mef@gov.in))

Subject: Submission of Bid for the work of **Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.**

Sir,

Having examined details given in bid document for the above work, I/we hereby submit the relevant information.

1. I/We hereby certify that all the statements made and information supplied in the enclosed forms A to I and accompanying statement are true and correct.
2. I/we have furnished all information and details necessary for eligibility and have no further pertinent information to supply.
3. I/we submit the requisite certified Banker's/Networth certificate and authorize the Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1<sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -**560034** to approach the Bank issuing the banker's/Networth certificate to confirm the correctness thereof. I/We also authorize the Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1<sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -**560034** to approach individuals, employers, firms and corporation to verify our competence and general reputation.
4. I/we submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following eligible similar works:

S.No.	Name of Work	Certificate From

**Certificate:** It is certified that the information given in the enclosed eligibility bid are correct. It is also certified that I/We shall be liable to be debarred, disqualified/ cancellation of enlistment in case any information furnished by me/us found to be incorrect.

Enclosures:

Date of submission

Seal of bidder:

Signature(s) of bidder(s)



**FINANCIAL INFORMATION**

Name of the firm / Bidder- .....

- i. Financial Analysis-Details to be furnished duly supported by figures in balance sheet/ profit & loss account for the last five financial years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

Sl. No.	Particulars	Financial Years				
		2019-20	2020-21	2021-22	2022-23	2023-24
i)	Gross Annual Turnover on construction works					
ii)	Profit / Loss (standalone financial statement)					

- ii. Financial arrangements for carrying out the proposed work.

Signature of Chartered Accountant with Seal

SIGNATURE OF BIDDER(S)

**BANKERS' CERTIFICATE FROM A COMMERCIAL BANK**

This is to certify that to the best of our knowledge and information that M/s./Shri..... having marginally noted address, ..... as a customer of our bank are / is respectable and can be treated as good for any engagement up to a limit of Rs ..... (Rupees.....).

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature)

For the bank

NOTE: (1) Banker's certificate should be on letter head of the Bank, addressed to the Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1<sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -**560034** ([email- eeecd3ccu.mef@gov.in](mailto:eeecd3ccu.mef@gov.in))

(2) In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

**FORM FOR CERTIFICATE OF NET WORTH FROM CHARTERED**  
**ACCOUNTANT**

"It is to certify that as per the audited balance sheet and profit & loss account during the financial year ....., the Net Worth of M/s ..... (Name & Registered Address of individual/firm/ company), as on ..... (the relevant date) is Rs..... after considering all liabilities. It is further certified that the Net Worth of the company has not eroded by more than 30 % in the last three years ending on (the relevant date)."

Unique Document Identification Number (UDIN) .....

Signature of Chartered Accountant

Name of Chartered Accountant

Membership No. of ICAI

Date and Seal

**FORM 'C'**

**DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKS COMPLETED DURING  
THE LAST SEVEN YEARS ENDING LAST DAY OF THE MONTH PREVIOUS TO  
THE ONE IN WHICH TENDERS ARE INVITED**

Sl. No.	Name of work/ project and location	Owner or sponsoring organiza-tion	Cost of work in crores of rupees	Date of commen- cement as per contract	Stipu- lated date of completion	Actual date of completion	Litigation/ arbitration cases pending/ in progress with details*	Name and address / telephone number of officer to whom reference may be made	Whether the work was done on back to back basis Yes/No
1	2	3	4	5	6	7	8	9	10

\* Indicate gross amount claimed and amount awarded by the Arbitration Tribunal.

Signature of Bidder(s)

**FORM 'C-1'**

**PROJECTS UNDER EXECUTION**

S1. No.	Name of work/ project and location	Owner or sponsor- ing organiza tion	Cost of work in crores of rupees	Date of commencement as per contract	Stipu- lated date of completion	Upto date percentage progress of works	Slow progress if any and reasons thereof	Name and address / telephone number of officer to whom reference may be	Remarks
1	2	3	4	5	6	7	8	9	10

Signature of Bidder(s)

**FORM 'C-2'**

**Calculation of Bidding Capacity**

**Details of existing commitments and ongoing works**

Sl. No.	Name of work/ project and location	Owner or sponsor- ing organiza tion	Contract value in crores of rupees	Date of commencement as per contract	Stipu- lated date of completion	Upto date percentage progress of work	Remaining work in percentage (100-column 7)	Exixting commitment (column 4 x column 8/100	Name and address / telephone number of officer to whom reference may be made	Remarks
1	2	3	4	5	6	7	8	9	10	11

Total (B)=

Maximum Turnover in last seven years = Rs. ....

Updated value of turnover (A) = Rs. ....

No. of years (N) =.....

Bidders Capacity = {[A<sub>x</sub>N<sub>x</sub>1.5]-B} =

Certificate: I certify that all the awarded and ongoing works have been included in the above list.

Signature of Bidder(s)



**FORM 'D'**

**PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS 'C'**

1. Name of work/project & location :
2. Agreement no. :
3. Estimated cost :
4. Tendered cost :
5. Date of start :
6. Date of completion
- (i) Stipulated date of completion :
- (ii) Actual date of completion :
7. Amount of compensation levied for delayed Completion, if any
- (a) Whether case of levy of compensation  
for delay has been decided or not? : Yes / No
- (b) If decided, amount of compensation levied  
for delayed completion, if any. :
8. Amount of reduced rate items, if any :
9. Performance Report :
- (1) Quality of works : Outstanding/Very Good/Good/Poor
- (2) Financial soundness : Outstanding/Very Good/Good/Poor
- (3) Technical Proficiency : Outstanding/Very Good/Good/Poor
- (4) Resourcefulness : Outstanding/Very Good/Good/Poor
- (5) General Behavior : Outstanding/Very Good/Good/Poor

Dated:

Executive Engineer or Equivalent

## **FORM 'D-1'**

### **Assessment of Quality for Completed as well as on-going Works**

Name of work:

Date of inspection:

Date of submission of report:

<b>A.</b>	<b>General Observation &amp; Operational aspects</b>	<b>Yes/ No</b>
1.	Availability of approval from local bodies in case of construction of private buildings.	
2.	Availability of approved structural drawings	
3.	Observation on seepage/ leakage in the building	
4.	Whether line & level maintained	
5.	In case of basement, observation on seepage, if any	
6.	Any structural defects/ distress observed. If yes give details	
7.	Whether safety measures adopted at site as per CPWD Safety Code and or govt. guidelines are adequate or not	
8.	Whether the welfare facilities provided to labour as per clause 19 H of GCC for CPWD works/ and or govt. guidelines are adequate or not.	
9.	Whether AHU getting automatically switched off and fire dampers closed in case of fire signal	
10.	Whether thimbles used for termination of wires in DBs, EBDs & panels?	
<b>B.</b>	<b>Quality of work</b>	<b>Marks Assessed</b>
1.	Quality of plaster/ finishing	
2.	Quality of RCC/ CC work	
3.	Quality of flooring	
4.	Quality of wood work	
5.	Quality of steel work/ aluminum work	
6.	Quality of plumbing and sanitary installation	
7.	Quality of Workmanship	
8.	Quality of waterproofing	
9.	If cladding done, observation on efficiency/ quality of cladding/ brick work	
10.	Quality of internal electrification work	
11.	Quality of DBs, EBDs & panels?	
12.	Quality of E&M equipments, panels & feeder pillar	
13.	Quality of fire alarm system/ firefighting system	
14.	Quality of Air Conditioning work	
15.	Quality of Sub-station based on complete live diagram, capacitor panel, power factor, insulating Mat, cleanliness, cable termination, earthing pits, earthing of transformer / DG sets	
16.	Any other aspects (To be elaborated)	

Average marks (To be awarded out of 100 marks based on average of marks assessed on each attribute mentioned at B above).

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**Note:**

1. All the above parameters may be considered for assessing the overall quality of work executed by the contractor. Each attribute shall be assessed on maximum marks of 10 under B above.
2. In case, any attribute is not applicable, the same may not be included in assessment and mentioned are not applicable (N/A)
3. The works as assessed above shall be converted on a scale of 25/15 marks for completed/ongoing works respectively.
4. In case of eligible completed works being more than one the average marks assigned for eligible completed works shall be considered for marking purpose. Only one ongoing work to be assessed.

**FORM 'E'**  
**STRUCTURE & ORGANIZATION**

1.	Name & Address of the bidder	
2.	Telephone No. / Email id /Telex No./Fax No.	
3.	Legal status of the bidder (scan & upload copies of original document defining the legal status).	
a)	An Individual	
b)	A proprietary firm	
c)	A firm in partnership	
d)	A limited company or Corporation	
4.	Particulars of registration with various Government bodies (scan & upload attested photo-copy).	
	<b>ORGANIZATION/PLACE OF REGISTRATION</b>	<b>REGISTRATION No.</b>
	1.	
	2.	
	3.	
5.	Names and Titles of Directors & Officers with designation to be concerned with this work.	
6.	Designation of individuals authorized to act for the organization.	
7.	Has the bidder, or any constituent partner in case of partnership firm/ limited company/ joint venture, ever been convicted by the court of law? If so, give details.	
8.	In which field of Civil Engineering Construction, the bidder has specialization and interest?	
9.	Any other information considered necessary but not included above.	

Signature of bidder(s) with stamp

**Annexure- 'F'**

**PROFORMA FOR THE RECEIPT TO BE ISSUED BY THE EXECUTIVE ENGINEER  
RECEIVING THE EMD**

<b>Receipt of deposition of original EMD</b> (drawn in favour of <b>Executive Engineer, CED-III, CCU, MoEF&amp;CC, Bengaluru</b> ) (Receipt No. ....../ date.....)		
Name of work	:	<b>Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.</b>
NIT No	:	1/2025-26/CE/CCU/CED-III/AMARAVATI
Estimated Cost	:	<b>Rs. 56,62,55,159/-</b>
Amount of Earnest Money Deposit	:	<b>Rs. 66,62,552/-</b>
Last date of submission of bid	:	<b>03.00 PM on 07/07/2025</b>
To be filled by EMD receiving Executive Engineer		
Name of contractor	:	
Form of EMD	:	
Amount of Earnest Money Deposit	:	
Date of Submission of EMD	:	
		(Signature) Name and Designation of EMD receiving officer (EE/AE(P)/AO/AAO) along with office stamp

**(On non-judicial stamp paper of minimum Rs. 100)****(Guarantee offered by Bank to CCU in connection with the execution of contracts)****Form of Bank Guarantee for Earnest Money Deposit /Performance Guarantee/Security Deposit**

1. Whereas the Executive Engineer ..... (name of division) ....., CCU 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 irrevocable Bank Guarantee for Rs. .... (Rupees ..... only) valid upto ..... (date)\*..... as Earnest Money Deposit from ..... (name and address of contractor) .....(hereinafter 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) ....., CCU 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 upto ..... (date)..... as Performance Guarantee/Security Deposit 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 hereby undertake to pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is 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        | Staff code no.       |
| 2. Signature ..... | Bank seal            |
| Name and address   |                      |

\*Date to be worked out on the basis of validity period of 180 days 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 or for performance guarantee/security deposit/mobilization advance, as the case may be.

FORM-H

**UNDERTAKING FOR SIMILAR WORKS(S)**

I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor 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 CCU 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 Deposit/Performance Guarantee.

**(Note: Scanned copy of this affidavit to be uploaded by bidder(s) at the time of submission of bid.)**

Signature of bidder(s) with stamp

## FORM-I

### PROFORMA OF AFFIDAVIT FOR NON - BLACK LISTING

I/we undertake and confirm that our firm / partnership firm has not been blacklisted by any state /Central Departments /PSUs /Autonomous bodies during the last 7 years of its operations. Further that, if Such information comes to the notice of the department, then I / we shall be debarred for bidding in CCU in future forever. Also, if Such information comes to the notice of department on any day before date of start of work, the Engineer-in-charge shall be free to cancel the agreement and to forfeit the entire amount of Earnest Money Deposit/ Performance Guarantee **(Scanned copy of this notarized affidavit to be uploaded at the time of submission of bid)**

NOTE: Affidavit to be furnished on a ‘non-judicial’ stamp paper worth Rs.100/-

Signature of Bidder(s)  
or an authorized person of the firm with stamp

Signature of Notary with seal

**GOVERNMENT OF INDIA  
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE**

**PERCENTAGE RATE BID AND CONTRACT FOR WORKS**

Tender for the work of “**Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.**”

- i) To be uploaded by **15.00 hours on 07/07/2025** to/upload at
- ii) To be opened in presence of tenderers who may be present at **15.30 hours on 07/07/2025** in the office of in the office of the **Executive Engineer, CED-III, CCU, Bengaluru.**

\*\* To be filled by **EE, CED-III, CCU**

**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 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respect of accordance with, such conditions so far as applicable.

We agree to keep the tender open for acceptance for **75 days** from the due date of its opening of technical bid and not to make any modifications in its terms and conditions.

A copy of earnest money deposit receipt of prescribed amount deposited in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee (as prescribed) issued by a Commercial Bank, is scanned and uploaded. 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 12.2 and 12.3 of the tender form. 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 and integrity of the State.

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.

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back-to-back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred for tendering in CCU, MoEF&CC 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 Deposit/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 & integrity of the State.

Signature of contractor

Postal Address -----\*\*

Telephone No. -----\*\*

Fax -----\*\*

E-MAIL -----\*\*

Witness:

Address:

Occupation:

\*\* To be filled by Bidder

### 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.....  
(Rupees.....)  
.....)

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

(a) -----\*

(b) -----\*

(c) -----\*

For & on behalf of President of

India

Signature.....\*

Dated: -----\*

Designation .....\*

\* To be filled by Executive Engineer

**SCHEDULES (A to F)**  
**(For Civil & Electrical Component)**

**SCHEDULE ‘A’**

Schedule of work As per contract document

**SCHEDULE ‘D’**

Extra schedule for specific requirement/document for the work, if any. As per contract document

**SCHEDULE ‘E’**

Reference to : CPWD General Conditions of Contract, 2023 Construction work as amended / modified upto last date of submission of bid.  
General  
Conditions of contract

Name of Work : **Construction of Green Building and Other Amenities for Eastern Ghats Regional Centre, Zoological Survey of India at Amaravati, Andhra Pradesh.**

Estimated cost of work : **Rs. 56,62,55,159/-**

Earnest Money : **Rs. 66,62,552/-** (To be returned after receiving performance guarantee)

Performance : 5 % of accepted tendered value  
Guarantee

Security deposit : 2.5 % of accepted tendered value

**SCHEDULE ‘F’**

**GENERAL RULES & DIRECTIONS:**

Officer inviting tender	:	The Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), ‘D’ wing, 1 <sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru - <b>560034</b>
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	Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2(c).	:	See Below
<b>Definitions:</b>			
2(vi)	Engineer-in-Charge	:	The Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1 <sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru - <b>560034</b>
2(viii)	Accepting Authority	:	The Chief Engineer, Civil Construction Unit (CCU), MoEF&CC
2(x)	Percentage on cost of materials and Labour to cover all overheads and profits	:	15%
2(x)a	Standard Schedule of Rates	:	DSR 2023 Corrected up to last date of submission of bid (for civil work volume I & II)  DAR 2023 Corrected up to last date of submission of bid (for civil work volume I & II)  DSR 2022 Corrected up to last date of submission of bid (for Elect. work)  Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping)-2020 Corrected up to last date of submission of bid
2 (xi)	Department:	:	Civil Construction Unit, Ministry of Environment, Forest & Climate Change, Government of India.
9 (ii)	Standard CPWD contract form CPWD General Conditions of Contract, 2023 construction work amended / modified upto last date of submission of bid	:	CPWD-7
<b>Clause 1</b>			
(i)	Time allowed for submission of Performance Guarantee,	:	07 <b>days</b>



	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.		
(ii)	Maximum allowable extension with late fee @ 0.1 % per day of performance guarantee amount beyond the period provided in (i) above	:	03 days
<b>Clause 2</b>			
Authority for fixing compensation under clause 2:		:	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, or his legal successor or Assignee thereof.
<b>Clause 5</b>			
Time allowed for execution of work		:	18 Months
Numbers of days from date of issue of letter of acceptance for reckoning date of start		:	10 days

**TABLE OF MILE STONE (S)**

S.N.	Description of Milestone	Time Allowed in days (from stipulated date of start)	Amount to be with held in case of non achievement of mile stone
1.	Work done amounting to 8% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape)	3 months	1.0 % of the Accepted tendered value.
2.	Work done amounting to 20 of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape) including basement	6 months	0.8 % of the Accepted tendered value.

3.	Work done amounting to 45% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape) including basements	9 months	0.8 % of the Accepted tendered value.
4.	Work done amounting to 60% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape)	12 months	0.8 % of the Accepted tendered value.
5.	Work done amounting to 80% of accepted tender amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	15 months	0.8 % of the Accepted tendered value.
6.	Work done amounting to 100% of accepted tender amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	18 months	0.8 % of the Accepted tendered value.

**Note:** - With held 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.

Monthly recovery for delay in submission of the monthly progress report within specified period - not exceeding Rs. 2000/- per month for each month default

Schedule of handing over of site			
Part	Portion of site	Time period for handing over reckoned from date of issue of letter of intent	
Part A	Portion without any hindrance	On commencement date or date of start of work by the Engineer-in-Charge.	
Part B	Portions with encumbrances	NA	
Part C	Portions dependent on work of other agencies	NA	

<b>Schedule of issue of Designs</b>	:	As per approved programme chart submitted by contractor
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**Authority to decide :**

- (i) Authority to convey the decision of mile stone and extension of time : Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1<sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -560034 or his legal successor or Assignee thereof.

- (ii) Authority to decide Rescheduling of mile stones and extension of time : Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or Assignee thereof.
- (iii) Shifting of Date of start in case of delay in handing over of site : Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or Assignee thereof.

#### 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:	: Rs.2.50 Crores (civil) Rs. 0.90 Crores (electrical) <b><i>*Except for initial three running account bills &amp; Final Bill.</i></b>
<b>Clause -7A</b> <b>Whether clause 7A shall be applicable</b>	<b>YES</b>
<b>Clause -7B</b> <b>Whether clause 7B shall be applicable</b>	<b>YES</b>
<b>Clause -8</b> <b>Competent Authorties to inspect and issue part/final competion certificates</b>	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi - 110003 or his legal successor or Assignee thereof
<b>Clause -8A</b> <b>Authority to decide compensation on account if contractor fails to submit completion plans</b>	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi - 110003 or his legal successor or Assignee thereof
<b>Clause 10A</b>  List of testing equipment to be provided by the contractor at site lab	: (As per Table 1 given)
<b>Clause 10B (i)</b>  Whether Clause 10 B (i) shall be applicable	: Yes

<b>Clause 10B (ii)</b>	
Whether Clause 10 B (ii) shall be applicable	: Yes

### Clause 10CC

### Applicable

S.N.	Relevant component of Material /Labour for price escalation	Percentage of total value of work
1	Component of Cement	11%
2	Component of Labour	24%
3	Civil component of the other construction materials	29 %
4	Electrical and Mechanical (E&M) Component of Construction Materials	21%
5	Reinforcement steel bars/ TMT bars/Structural steel (including strands and cables)	15%
	Total	100 %

### Clause 11

Specifications to be followed for execution of work (for civil work)	: 1. <b>Civil work:</b> CPWD Specifications 2019 Volume- I & II with up to the date corrections slips. 2. MORTH Specifications for Roads and Bridge work.
Specifications to be followed for execution of work <b>(for Electrical work)</b>	: <b>Electrical &amp; Other works</b> (amended upto date): 1. CPWD General Specification for Electrical Works Part I (Internal) & Part II (External) –2023. 2. General Specification for Electrical Works (Part III Lifts & Escalators)-2003. 3. CPWD General Specification for Electrical Works Part IV Substation-2013. 4. CPWD General Specification for Electrical Works Part V Wet riser and sprinkler system-2020. 5. CPWD General Specification for Electrical Works Part VI fire detection and alarm system- 2018. 6. CPWD General Specification for Electrical Works Part VII DG Sets– 2013 7. CPWD General Specification for Electrical Works Part

	VIII Gas Based Fire Extinguishing System–2013. 8. General Specification for Heating Ventilation & Air-Conditioning-2017. 9. CPWD specification of Horticulture & Landscaping – 2020. 10. CPWD General Specification for Medical Gas Pipe System 2022 11. CPWD General Specification for Modular operation Theater. 2022 12. CPWD General Specification for Nurse Call System 2022
Specifications to be followed for execution of work <b>(for Horticulture &amp; Landscaping work)</b>	Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping)-2020 Corrected up to last date of submission of bid

**All the afore stated specifications shall be read with updated correction slips issued till last date of submission of bid.**

#### **Clause 12 : Construction Works**

12.2 (c)	Deviation limit beyond which clauses 12.2(c) shall apply for building work.	:	100%
	i) Deviation limit beyond which clauses 12.2(c) shall apply for foundation work (except items mentioned in earth work sub head in DSR and related items)	:	100%
	ii) Deviation limit for items mentioned in earth work sub head of DSR and related items	:	100%

#### **Clause 16**

Competent Authority for deciding reduced rates : Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or Assignee thereof

#### **Clause 19 C**

Penalty for each default : **Rs. 500/-**

#### **Clause 19 D**

Penalty for each default : **Rs. 500/-**

#### **Clause 19 G**

Penalty for each default : **Rs. 500/-**

Enhanced penalty per day for : **Rs. 500/-**  
continuous default

**Clause 19 K**

Penalty for each default : **Rs. 500/-**

**Clause 25**

(i)	<b>Conciliator</b>	:	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or Assignee thereof
(ii)	<b>Arbitrator Appointing Authority</b>	:	Chief Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or Assignee thereof
(iii)	<b>Place of Arbitration</b>	:	<b>Delhi</b>

**Clause 32 (i) Requirement of Technical Representative(s) and Recovery Rates:**

S. N.	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical / technical representative)	Minimum Experience (Years)	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling Provision of clause 32 (i)
						Figures
1	Graduate Engineer	Civil	<b>Project manager with degree in civil engineering</b>	20 (and having experience of one similar nature of work)	1	Rs.1,50,000/- per Month
2	Graduate Engineer	Civil	<b>Deputy Project Manager</b>	12 (and having experience of one similar nature of work)	1	Rs.1,00,000/- per Month
3	Graduate Engineer	Electrical	<b>Deputy Project Manager</b>	12 (and having experience of one similar nature of work)	1	Rs.1,00,000/- per Month

4	Graduate Engineer Or Diploma Engineer	Civil	<b>Project/Site Engineer</b>	5 or 10 respectively	1	Rs. 50000/- Per month
5	Graduate Engineer Or Diploma Engineer	Electrical	<b>Project/Site Engineer</b>	5 or 10 respectively	1	Rs. 50000/- Per month
6	Graduate Engineer	Civil	<b>Quality Engineer</b>	8	1	Rs. 70000/- Per month
7	Graduate Engineer	Electrical	<b>Quality Engineer</b>	8	1	Rs. 70000/- Per month
8	Diploma Engineer	Civil	<b>Surveyor</b>	8	1	Rs. 50000/- Per month
9	Graduate Engineer	Civil	<b>Project Planning /Billing</b>	6	1	Rs. 60000/- Per month
10	Graduate Engineer	Electrical	<b>Project Planning /Billing</b>	6	1	Rs. 60000/- Per month

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers. Diploma holder with minimum 10-year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50 % of requirement of degree engineers.

#### Clause 38

(i)	(a)	Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of (for civil work)	:	Delhi Schedule of Rates 2023 printed by C.P.W.D. with upto date correction slip upto last date of bid submission.
		Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of (for Electrical work)	:	Delhi Schedule of Rates 2022 printed by C.P.W.D. with upto date correction slip upto last date of bid submission.



(ii)		Variations permissible on theoretical quantities:	
	(a)	Cement	: 2% plus/minus.
	(b)	Bitumen All Works	: 2.5% plus only & nil on minus side.
	(c)	Steel Reinforcement and structural steel sections for each diameter, section and category	: 2% plus/minus variation
	(d)	All other materials.	: Nil

### RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION

S.No.	Description of Item	Rates in figures and words at which recovery shall be made from the Contractor	
		Excess beyond permissible variation	Less use beyond permissible variation
1.	Cement (PPC)	Nil	Not allowed. Substandard work will be rejected.
2.	Reinforcement Steel	Nil	
3.	Structural Steel	Nil	

Executive Engineer, CED-III,  
Civil Construction Unit (CCU),  
Ministry of Environment, Forest & Climate Change (MoEF&CC),  
'D' wing, 1<sup>st</sup> floor, Kendriya Sadan,  
Koramangala, Bengaluru -**560034**

**Table - 1****Equipment's for Testing of Materials & Concrete at Site Laboratory**

All necessary equipment for conducting all necessary tests shall be provided at the site in the well-furnished site laboratory of minimum size 25 feet X 15 feet by the contractor at his own cost. The following minimum laboratory equipment's shall be set up at site office laboratory: -

<b>Sl. No.</b>	<b>Equipment</b>	<b>Numbers (Minimum)</b>
1.	100MT compression testing machine, electrical-cum-manually operated)	1
2.	Slump cone, steel plate, tamping rod, steel scale, scoop	3
3.	Pumps and pressure gauges for hydraulic testing of pipes	2
4.	Weighing scale platform type 100 Kg capacity	1
5.	Graduated glass measuring cylinder	As per requirement
6.	Sets of sieves of 450mm internal dia for coarse aggregate [100mm, 80mm, 40mm; 20mm; 12.5mm, 10mm; 4.75mm complete with lid and pan].	2
7.	Sets of sieves of 200mm internal dia for fine aggregate [4.75mm; 2.36mm; 1.18mm; 600 microns; 300 microns & 150 micron, with lid and pan].	2
8.	Sieve Brushes and sieve shaker capable of 200mm and 450 mm diasieves, manually operated with timing switch assembly	2
9.	Cube moulds size 70mmx70mmx70mm	18
10.	Cube moulds size 150mmx150mmx150mm	30
11.	Hot air oven temp. Range 50°C to 300°C- sensitivity 1 degree	1
12.	Electronic balance	2
13.	Physical balance weight upto 5 kg	1
14.	Air Content of concrete testing machine	As per requirement
15.	Measuring jars 100ml, 200ml, 500ml	3 nos. each size
16.	Spatula 100mm & 200mm with long blade wooden handle	3
17.	Digital Verniercalipers 150 mm , 200mm , 300 mm	1 each
18.	Digital PH meter	1
19.	Digital Micrometer	1
20.	Digital paint thickness meter for steel 500 micron Range	1
21.	GI tray 600x450x50mm, 450x300x40mm, 300x250x40mm	1 no. each
22.	Electric Motor mixer 0.25 cum capacity	1
23.	Digital rebound hammer	2
24.	Screw gauge 0.1mm-10mm, North count 0.05 mm	2
25.	Water testing kit	2

Sl. No.	Equipment	Numbers (Minimum)
26.	Motorized sieve shaker	1
27.	Extra Bottom plates for 15 cm cube mould	10
28.	Standard Vibration Table	1
29.	Concrete temperature measuring thermometer with Brass protection sheath 0- 100 degree centigrade	3
30.	Dial type spring balance preferable with zero correction knob capacity 100 kgs. reading to ½ kg.	1
31.	Counter scale capacity 1 kg and 10 kg	1
32.	Iron Weight of 5 kg, 2 kg, 1 kg, 500 gm, 200 gm, 100 gm	As per actual requirement.
33.	Brass Weight of 50 gm, 20 gm, 10 gm, 5 gm, 2 gm, 1 gm	
34.	Measuring cylinder TPX or Poly propylene capacity 100 ml, 500 ml, 250 ml	
35.	Set of box spanner ratchet	
36.	Hammer 1lb& 2lb	
37.	Hacksaw with 6 blades	
38.	Measuring tape 3-meter, 5-meter, 10-meter, 30 meters	
39.	Shovels & Spade	
40.	Steel plates 5 mm thick 75x75 cm	
41.	Plastic or G.I. Buckets 15 ltr, 10 ltr, 5 ltr	
42.	Vernier calipers	
43.	Micrometer screw 25 mm gauge	
44.	A good quality plumb bob	
45.	Spirit level, minimum 30 cms long with 3 bubbles for horizontal vertical	
46.	Wire gauge (circular type) disc	
47.	Foot rule	
48.	Long nylon thread	
49.	Rebound hammer for testing concrete	
50.	Dynamic penetrometer	
51.	Magnifying glass	
52.	Screw driver 30 cms long	
53.	Ball pin hammer, 100 gm	
54.	Plastic bags for taking samples	
55.	Moisture meter for timber	
56.	Any other equipment for site tests as outlined in BIS codes and as directed by the Engineer-in-charge.	

**Table – 2**

**PLANT AND EQUIPMENT REQUIRED TO BE OWNED / TAKEN ON LEASE BY THE CONTRACTOR**

Sl. No.	Equipment	Numbers
1.	Builder's hoist	1
2.	Centralized concrete batch mix plant of capacity 30 cum per hour (fully automatic with computer control)	As per requirement
3.	Excavator cum loader (JCB 3D model or equivalent).	As per requirement
4.	Compressor machine minimum 20 CFM with rock Breaker.	As per requirement
5.	DG set of minimum capacities of 62.5 KVA.	As per requirement
6.	Transit mixers.	As per requirement
7.	Concrete pump	2
8.	Needle Vibrators.	10
9.	Screed leveller.	As per requirement
10.	Plate Vibrator	As per requirement
11.	Dumper/Tipper	As per requirement
12.	Reinforcement bending machine.	As per requirement
13.	Reinforcement cutting machine.	As per requirement
14.	Power driven earth rammer (Soil compactor).	As per requirement
15.	Total Station Machine.	2
16.	Water tanker (Minimum capacity of 5000 liters)	As per requirement
17.	Welding machine 400 Ampere	As per requirement
18.	Screeners for coarse sand and fine sand	As per requirement
19.	Centrifugal mono block water pump minimum capacity 2 HP	As per requirement
20.	Road roller 8 to 10 tons	As per requirement
21.	Vibratory roller	As per requirement
22.	Drilling machine	As per requirement
23.	Double steel scaffolding and staging materials	As per requirement
24.	Air compressor	As per requirement
26.	Floor grinding/polishing machines	1 Nos.
27.	Granite cutting machine	3 Nos.
28.	Ceramic tile cutting machine	5 Nos.

29.	Granite polishing machine	1 Nos.
30.	Granite hand polishing machine	5 Nos.
31.	Mobile tower crane	1 Nos.
32.	Any other machinery required for completion of the work as per decision of Engineer-in-charge.	As per Actual requirement

Note: The above list is only indicative and not exhaustive. However, quantity may be optimised commensurate to progress of work with the approval of engineer in Charge.

NOTES:-

1. ALL DIMENSIONS & LEVELS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED
2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED. DRAWINGS ARE NOT TO BE SCALED.
3. ANY DISCREPANCY IN THE DRAWINGS SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.

[illegible]

CLIENT -  
EXECUTIVE ENGINEER CED III  
GCU, 1ST FLOOR, 'D' WING  
'KENDRIYA SADAN',  
KORAMANGALA, BANGLORE -  
560034

PROJECT:  
FOR 2<sup>ND</sup> CONSTRUCTION OF  
GREEN BUILDING AND OTHER  
AMENITIES  
FOR EASTERN GHATS  
REGIONAL CENTRE AT  
AMARAVATI,  
ANDHRA PRADESH.

**PROJECT CONSULTANT:**  
**SWATI STRUCTURE SOLUTIONS PVT. LTD.**  
503, SACHDEVIA CORPORATE TOWER,  
PLOT NO. 3, SECTOR-8 ROHINI, DELHI-65  
PH-47528886  
E-mail: swaticonsultant@gmail.com

DRAWING TITLE :	NORTH
BASEMENT	
DESIGN BY :	WKS
CHECKED BY :	SWAHN
DATE :	15/04/2013
REV :	02
PROJECT NO. :	01

$$\begin{array}{cc} \text{AE}(p) & \text{EE}(p) \end{array}$$



ALL WATER MAINS AND LEVELS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.  
2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED. DRAUGHTS ARE NOT TO BE SCALED.  
ANY DISCREPANCY IN THE DRAUGHT SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.

[illegible]

CLIENT:  
EXECUTIVE ENGINEER CE  
III, CCU, 1ST FLOOR, D'  
WING KENDRIYA SADAN  
KORAMANGALA BANGLORE  
560034.

FOR ZSI CONSTRUCTION OF  
GREEN BUILDING AND OTHER  
AMENITIES  
FOR EASTERN GHAT'S REGIONAL  
CENTRE AT AMARAVATI,  
ANDHRA PRADESH

PROJECT CONSULTANT:

SWAINSIKROCLURE SOLUTIONS PVT. LTD  
503, SACHIDEVA CORPORATE TOWER

PLOT NO-8, SECTOR-8 ROHINI, DELHI-85  
Ph. 47528889

E-mail - swaticonsultant@gmail.com

NOTE: NATURAL GROUND IS ABOUT 15.0 M BELOW ADJACENT ROAD LEVEL. HENCE PLANT LEVEL IS 750 MM ABOVE ADJACENT ROAD LEVEL, I.E. 2.25M ABOVE NATURAL GROUND LEVEL.

SCHEDULE OF DOLBY B RECORDS			
DATE	PERIOD	REEL	REMARKS
1	PERC 20000380	2110	PERC 20000380
2	PERC 20000380	2450	PERC 20000380
3	PERC 20000380	2450	PERC 20000380
4	PERC 20000380	2450	PERC 20000380
5	PERC 20000380	2450	PERC 20000380
6	PERC 20000380	2450	PERC 20000380
7	PERC 20000380	2450	PERC 20000380
8	PERC 20000380	2450	PERC 20000380
9	PERC 20000380	2450	PERC 20000380
10	PERC 20000380	2450	PERC 20000380
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12	PERC 20000380	2450	PERC 20000380
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64	PERC 20000380	2450	PERC 20000380
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66	PERC 20000380	2450	PERC 20000380
67	PERC 20000380	2450	PERC 20000380
68	PERC 20000380	2450	PERC 20000380
69			

## SITE PLAN

### with Ground Floor Plan



ATTN: 415.778.3025

---

CHECMEDBY - 5

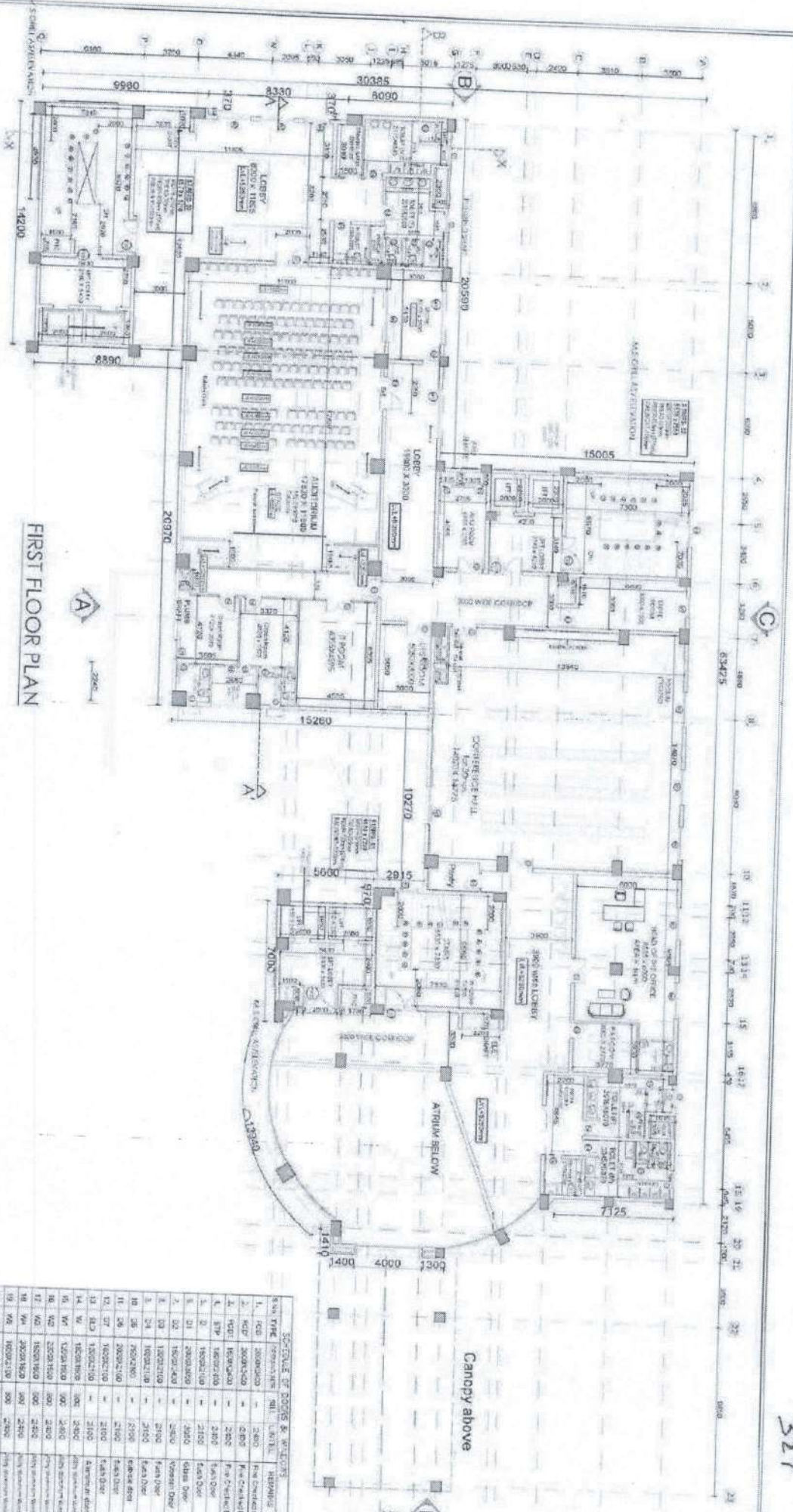
ENG. NO.

02224/ISSC

*(Continued)*

100





FIRST FLOOR PLAN


NOTES:-  
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE MENTIONED.  
2. ROOM DIMENSIONS ARE TO BE BE SECTORED.  
3. ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT TO THE NOTICE OF THE CLIENT.

REV.	DESCRIPTION
1	
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CLIENT:-  
EXECUTIVE ENGINEER C&D III  
CCU 1ST FLOOR, D WING  
KORAMANGALA, BANGALORE - 560034

PROJECT:-  
FOR 2ST CONSTRUCTION OF GREEN BUILDING AND OTHER AMENITIES  
FOR EASTERN GHATS REGIONAL CENTRE AT AMRABAVATI  
ANDHRA PRADESH

PROJECT CONSULTANT:-  
SWATI STRUCTURE SOLUTIONS PVT. LTD.  
603, SACHDEVA CORPORATE TOWER,  
PLOT NO-8, SECTOR-8 ROHINI, DELHI-165  
Ph: 47528888  
E-mail: swatistru@rediffmail.com

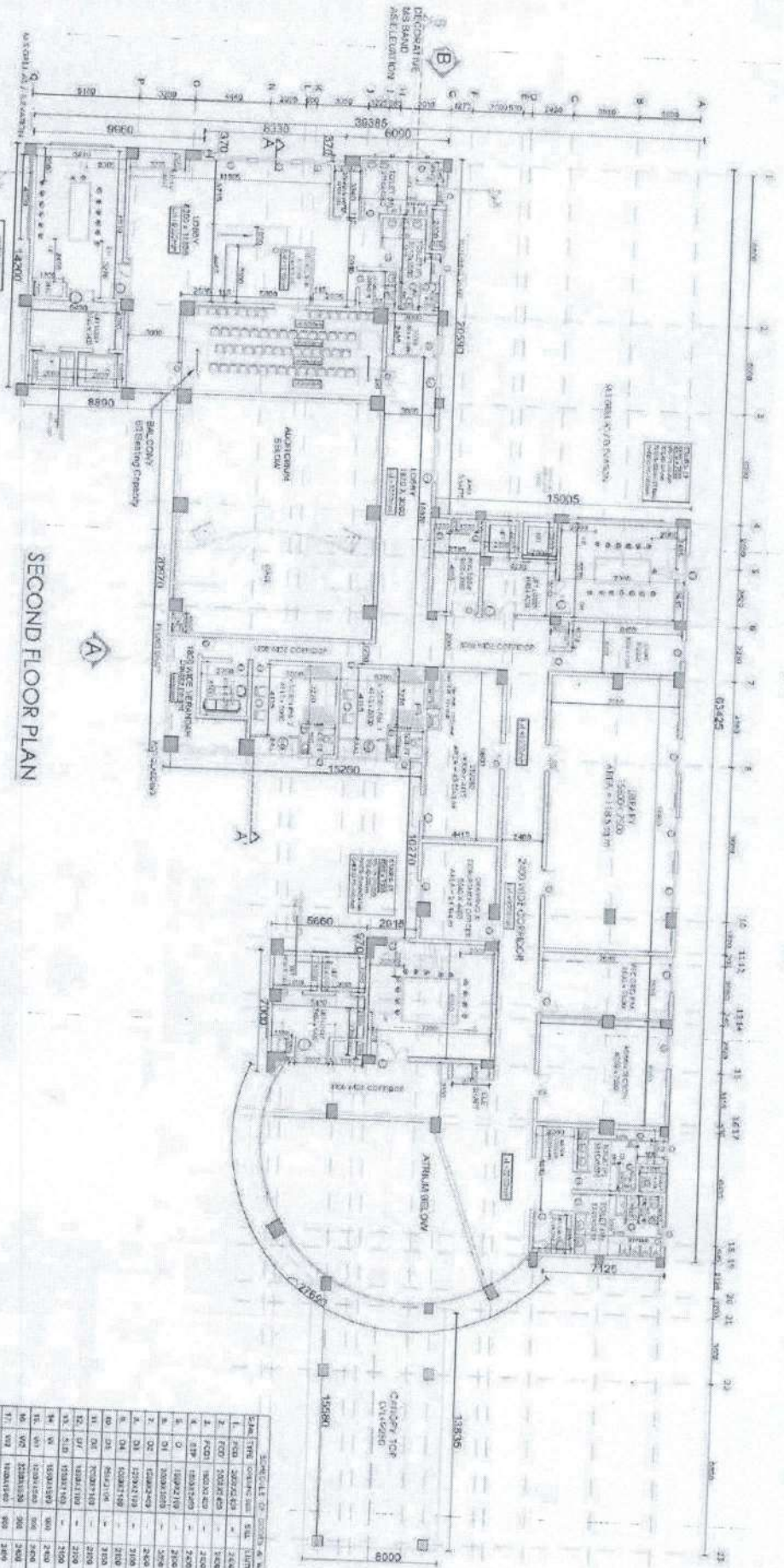
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FIRST FLOOR			
PLAN			
NO.	DATE	BY	FOR
1	15.03.2025	SWATI	REV R2
2			
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DRAWING TITLE  
FIRST FLOOR PLAN  
NORTH  
DATE: 15.03.2025  
CHECKED BY: SWATI  
REV R2  
SHEET NO. 03

AE(P)

EE(P)





SECOND FLOOR PLAN

NOTES:-  
1. ALL DIMENSIONS & LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.  
2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED. DIMENSIONS ARE NOT TO BE BOKEED.  
3. ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.

REV.	DESCRIPTION	CLIENT
1		EXECUTIVE ENGINEER C&D III CCU, 1ST FLOOR, D WING KORAMANGALA, BANGALORE - 560034.
2		PROJECT:- FOR ZSI CONSTRUCTION OF GREEN BUILDING AND OTHER AMENITIES FOR EASTERN GHATS REGIONAL CENTRE AT AMARAVATI ANDHRA PRADESH.

PROJECT CONSULTANT:-  
**SWATI STRUCTURE SOLUTIONS PVT. LTD.**  
603, SACHDEVIA CORPORATE TOWER,  
PLOT NO-8, SECTOR-6 ROHINI, DELHI-85  
E-mail:- swatichalkatti@gmail.com

DRAWING TITLE:-  
**SECOND FLOOR  
PLAN**

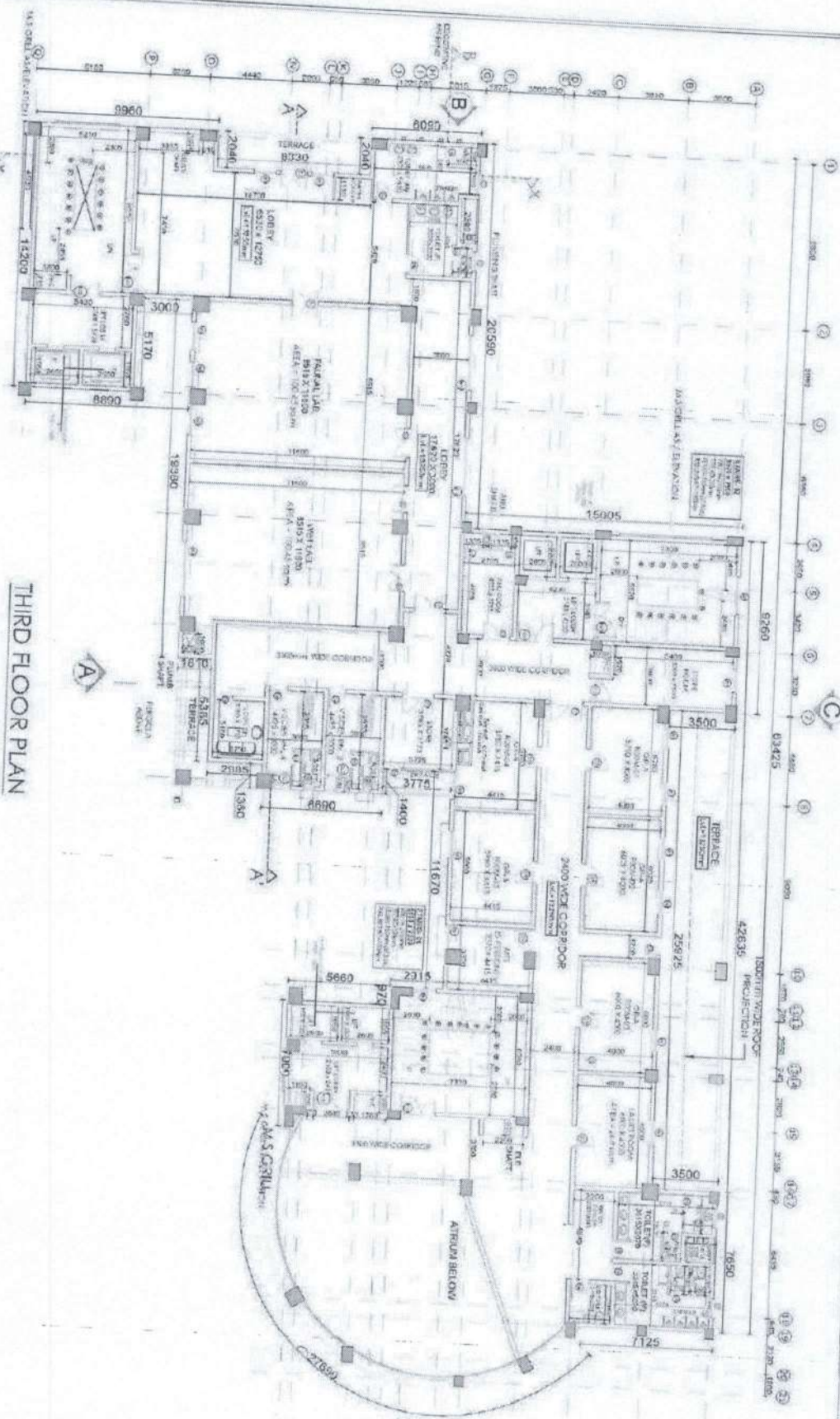


DRAWN BY:- VIKAS  
CHECKED BY:- SWATI  
DATE:- 15-03-2025  
REV 02

DWG NO. 0224SSP/VE/ROHINI/25/004  
SHEET NO. 04

AC(D) EE(D)





THIRD FLOOR PLAN

NOTES:-  
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE MENTIONED.  
2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED DRAWINGS ARE NOT TO BE SCALED.  
3. ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.

S.NO.	REVISION HISTORY

CLIENT:-  
EXECUTIVE ENGINEER, CED III  
CCU 1ST FLOOR, D WING  
KORAMANGALA, BANGLORE - 560034

PROJECT:-  
FOR 2ST CONSTRUCTION OF GREEN BUILDING AND OTHER AMENITIES FOR EASTERN GHATS REGIONAL CENTRE AT ANAPURATHI, ANDHRA PRADESH.

PROJECT CONSULTANT:-  
**SWATI STRUCTURE SOLUTIONS PVT. LTD.**  
603 SACHDEVIA CORPORATE TOWER,  
PLOT NO-8, SECTOR-9 ROHINI, DELHI 85  
Ph. 47528886  
E-mail:- swaticonsultant@gmail.com

DRAWING TITLE:  
**THIRD FLOOR PLAN**

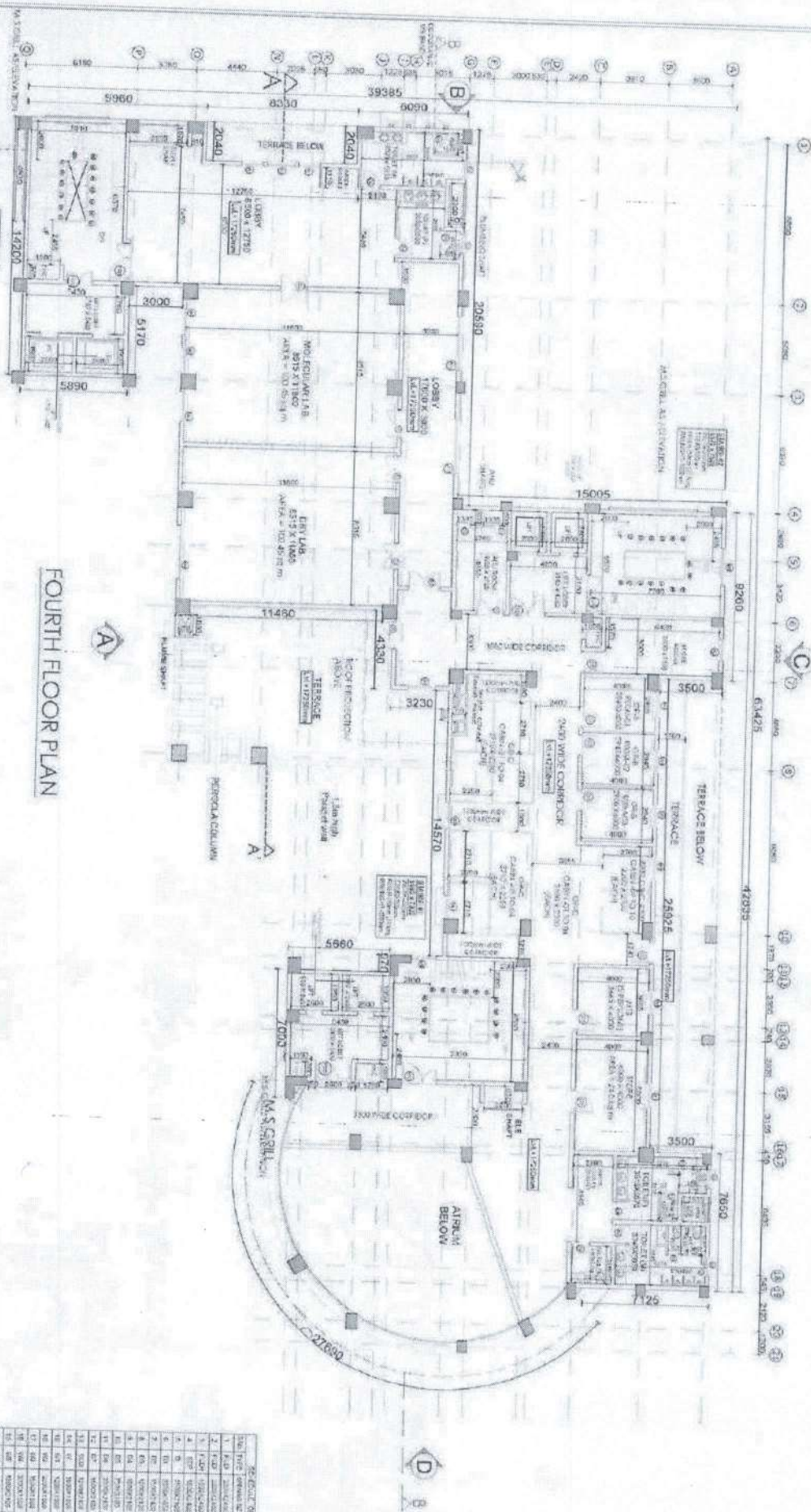
DATE: 15.01.2023  
REV: 02



Sl. No.	Description of Work & Remarks	Qty	Unit	Remarks
1	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
2	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
3	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
4	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
5	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
6	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
7	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
8	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
9	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
10	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
11	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
12	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
13	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
14	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
15	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
16	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
17	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
18	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
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20	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
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22	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
23	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
24	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab
25	100mm thick concrete slab	100	Sq. Mtr	For 100mm thick concrete slab

ACCP  
EE(01)





FOURTH FLOOR PLAN

## NOTES:

1. ALL DIMENSIONS & LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. WRITTEN QUOTATIONS ARE TO BE FOLLOWED DRAWINGS ARE NOT TO BE SCALED.
3. ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.

REV.	DESCRIPTION
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23	
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CLIENT:-  
EXECUTIVE ENGINEER, CED III  
CCU, 1ST FLOOR, 'C' WING  
KENDRA SADAK  
KORAMANGALA BANGLORE -  
560034

PROJECT:-  
FOR ZSI CONSTRUCTION OF  
GREEN BUILDING AND OTHER  
AMENITIES  
FOR EASTERN CHAIRS  
REGIONAL CENTRE AT  
AMARAVATI  
ANDHRA PRADESH

PROJECT CONSULTANT:-  
SWAT STRUCTURE SOLUTIONS PVT. LTD.,  
503, SACHDEVA CORPORATE TOWER,  
PLOT NO. 8, SECTOR-4 ROHINI, DELHI-85  
Ph. 47578898  
E-mail: swatconsultant@gmail.com

DRAWING TITLE:  
FOURTH FLOOR  
PLAN

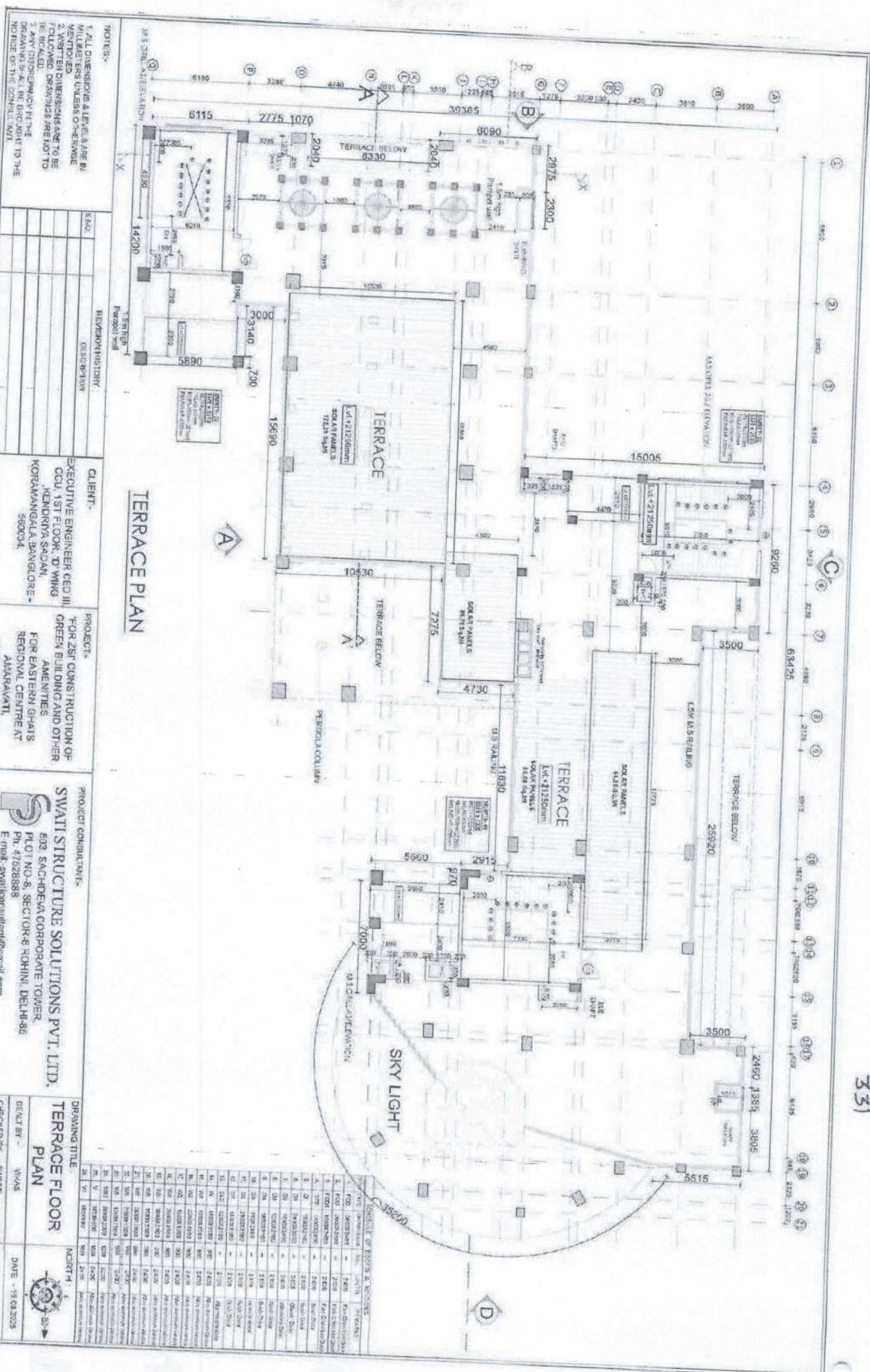
CHECKED BY - BMS/11  
DATE - 15/08/2005  
REV. 02  
SHEET NO. 08

DRG. NO. 02245558/P/J/COR/AMR/AR-08

AE(P)

EE(P)





AE(P)

EE(P)



ALL DIMENSIONS & LEVELS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED. DRAWINGS ARE NOT TO BE SCALED.

3. ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.

[illegible]

CLIENT-  
EXECUTIVE ENGINEER CED I  
CCU, 1ST FLOOR, D WING  
, KENDRIYA SADAN,  
KORAMANGALA, BANGLORE  
560074

PROJECT -  
FOR ZSI CONSTRUCTION OF  
GREEN BUILDING AND OTHER  
AMENITIES  
FOR EASTERN GHATS  
REGIONAL CENTRE AT  
ANARAYATI,  
ANDHRA PRADESH.

**PROJECT CONSULTANT:-**  
**SWATI STRUCTURE SOLUTIONS PVT. LTD.**  
503, SACHDEVIA CORPORATE TOWER,  
PLOT NO-8, SECTOR-5 ROHINI, DELHI-46  
Ph. 47528888  
E-mail:- swatitoo@gmail.com

DRAWING TITLE:		NORTH:	
ROOF PLAN			
DESIGN BY:	YINXIA	DATE:	15.03.2025
CHECKED BY:	SWASTI	REV:	02
PROJ. NO. 0225SSPLUGCAJAMKAR-03		SHEET NO. 04	

$$\begin{array}{cc} \textcircled{B} & A \\ AE(D) & EE(P) \end{array}$$



0.050  
0.075

MS HOLLOW SQUARE TUBE AS/BOC

DETAIL A

SECOND FLOOR SLAB  
4.50

FIRST FLOOR SLAB  
4.50

MS GRILL FIXING DETAIL

4.50  
2.15  
4.50

1. ALL DIMENSIONS & LEVELS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED  
2. WRITTEN DIMENSIONS ARE TO BE FOLLOWED  
DRAWINGS ARE NOT TO BE SCALED  
3. ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.

PROJECT CONSULTANT:

ELEVATION-A &amp; B



DEAL BY -	VALUE	DATE - 15.03.2015

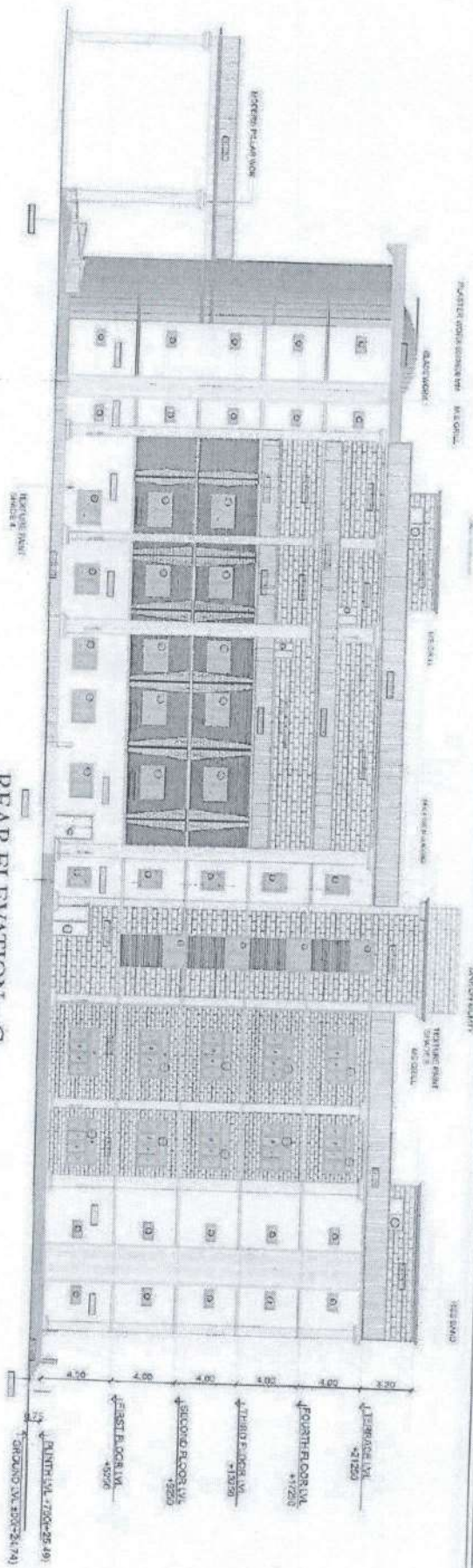
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DRG NO.	0224/BS SFL EGRC/AMR/AR-10	SHEET NO. 10
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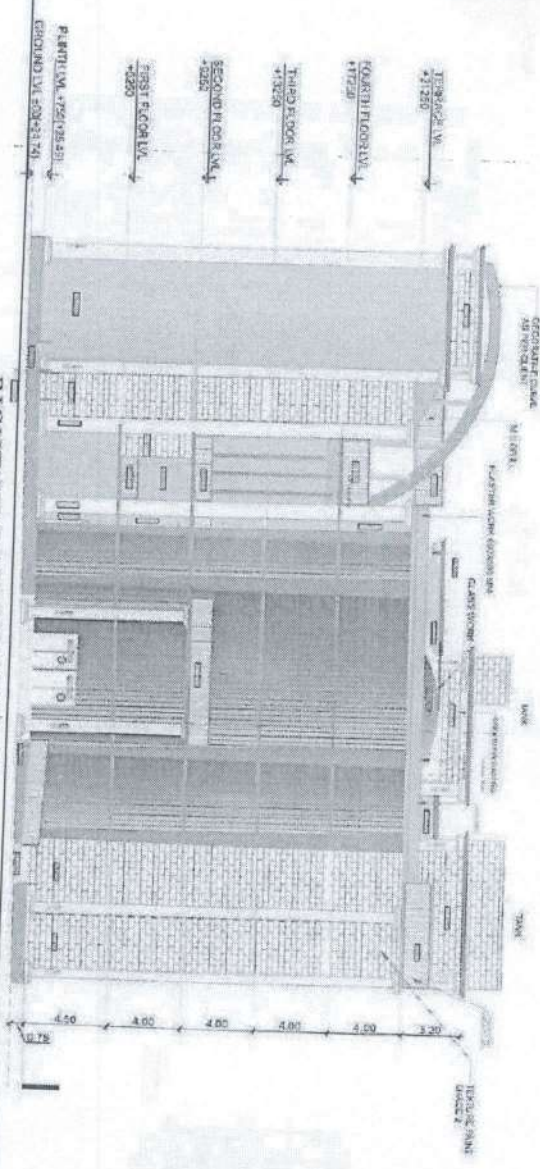
$$\in \in (P)$$



PLANT ROOM, STAIRS, ELEVATOR



REAR ELEVATION - C



RIGHT SIDE ELEVATION - D

NOTES:  
1. ALL DIMENSIONS & LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.  
2. MATERIAL SPECIFICATIONS ARE TO BE FOLLOWED.  
3. ANY DISCREPANCY IN THE DRAWING SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.

REV.	DATE	REVISION HISTORY

CLIENT:  
THE CHIEF ENGINEER  
CCU, MINISTRY OF  
ENVIRONMENT,  
GOVT. OF DELHI,  
LODH ROAD,  
NEW DELHI

PROJECT:  
FOR CONSTRUCTION OF  
GREEN BUILDING AND OTHER  
ANNEXES  
FOR EASTERN GHATS  
REGIONAL CENTRE AT  
AMARAVALI,  
ANDHRA PRADESH.

PROJECT CONSULTANT:  
SWATI STRUCTURE SOLUTIONS PVT. LTD.  
503, SACHDEVIA CORPORATE TOWER,  
PLOT NO-8, SECTOR-8 ROHINI, DELHI-85  
Ph. 47528888  
E-mail: swaticonsultant@gmail.com

DRAWING TITLE:  
ELEVATION - C & D

DESIGNED BY: V.K.S.

CHECKED BY: RAJAT

DWG. NO. 022KSHSLA/ECR/AMARAVALI-11



DATE: 15/02/2018

REV. NO. 02

SHEET NO. 11

AE (P) EEP