

## Government Of India

Ministry Of Housing & Urban Affairs



## Central Public Works Department

Excellence in Public Works

### Tender Published

#### Current Tender Details

<b>Tender ID</b>	159700	<b>NIT/RFP NO</b>	03/2026-27/CE/CCU/CED-I/New Delhi
<b>Name of Work</b>	Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work)		
<b>Procurement Type</b>	Works	<b>Bid Type</b>	Percentage
<b>Tender Type</b>	OPEN	<b>Estimated Cost</b>	₹ 57,52,92,763 ( Fifty Seven Crore Fifty Two Lakh Ninety Two Thousand Seven Hundred and Sixty Three Rupees )
<b>Bid Submission Closing Date</b>	20/07/2026 15:00	<b>Competitive Bidding Type</b>	NCB

**Tender Published Successfully.**

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## Enquiry Particulars

Regional Office	EE - CED - I	Office Inviting Bids	Chandigarh - CE - E and F - EE - CED - I
Tender ID	159700	NIT/RFP NO	03/2026-27/CE/CCU/CED-I/New Delhi
Name of Work	Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work)	Subwork/Packages	
Time Allowed	20 months	Tender Type	OPEN
Procurement Type	WORKS	Bid Type	Percentage
Type of Work	Civil Works - Buildings	Category of Tender	COMPOSITE
Estimated Cost(INR)	₹ 57,52,92,763	Competitive Bidding Type	NCB

## Bid Submission Dates

Last Date & Time of receipt of Pre-Bid Queries	02/07/2026 16:45	Receipt of Queries through	Email
Email	eeced1ccu-mef@nic.in		
Pre Bid Meeting Date & Time	02/07/2026 17:00	Pre Bid Meeting Venue	Office of CE, CCU, 7th Floor CGO Complex, Lodhi Road, New Delhi 110003
Bid Submission Closing Date & Time	20/07/2026 15:00	Bid Validity Period (In Days)	90 After Technical cum Eligibility Bid Opening
Bid Validity Expiry Date	18/10/2026 15:30	Tender Notice Type	Standard Notice Tender

## Tender Inviting Authority Particulars

Office Inviting Bids	EE - CED - I	Designation	Executive Engineer
Address	Civil Construction Unit, 7th Floor, Pt. Deendayal Antyodaya Bhawan, CGO Complex, Lodhi Road New Delh	Contact Details	9969617538
Email	eeced1ccu-mef@nic.in		

## EMD Details

EMD (INR)	EMD in favour of	Mode of Payment
₹ 67,52,928	Executive Engineer, CED-I, CCU, MoEF&CC, New Delhi-110003	DD,FDR,BC,BG

## Bid Openers

Department User Name	Region	Mobile Number	Email	Designation	Certificate serial No	Certificate Expiry
SANJAY KUMAR MEENA	EE - CED - I	9969617538	aecivilcpd@gmail.com	Executive Engineer	5b89003586e5	07/10/2027 01:07

Department User Name	Region	Mobile Number	Email	Designation	Certificate serial No	Certificate Expiry
Ranjan Kumar Swain	EE - CED - I	7838353293	ranjak.swain@gmail.com	Assistant Engineer	4b42cfb27684ef95	19/06/2027 15:54

## Tender Documents

S.No	File Name	File Description	File Size (in Bytes)	Uploaded Date
1	<a href="#">FRONT.pdf</a>	Front	326434	27/06/2026 16:41
2	<a href="#">NIT 03 CE Part A and B.pdf</a>	NIT 03 CE Part A and B	2738373	27/06/2026 16:41
3	<a href="#">NIT_03_CE_Part C.pdf</a>	NIT 03 CE Part C	2604875	27/06/2026 16:42
4	<a href="#">NIT 03 CE Financial Bid and Drawings.pdf</a>	NIT 03 CE Financial Bid and Drawings	3237045	27/06/2026 16:42
5	<a href="#">Eligibility.pdf</a>	Eligibility	477293	27/06/2026 16:43

## Mandatory Documents Details

S.No	Documents Required from Vendor	Document Type
1	For CPWD enlisted Contractors	Mandatory
2	1. Copy of enlistment order in in appropriate class and category issued by CPWD	Mandatory
3	2. Copy of original EMD in proper form	Mandatory
4	3. Copy of receipt for deposition of original EMD to division office of any EE CPWD CCU	Mandatory
5	4. 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 as prescribed in NIT page no. 8	Mandatory
6	5. Letter of transmittal	Mandatory
7	6. Certificate of Financial Turnover from CA Form A for calculation bidding capacity	Mandatory
8	7. List of eligible similar nature of completed works in Form C	Mandatory
9	8. List of projects under execution in Form C 1 for calculation bidding capacity	Mandatory
10	9. Performance report of works mentioned in Form C in Form D.	Mandatory
11	10. Bidding Capacity as per Form C 2 based on detail of work mentioned in Form C 1.	Mandatory
12	11. Affidavit for non execution of eligible similar work through another contractor on back-to-back basis or subletting basis furnished on Rs.100.00 non-judicial stamp paper attested by Notary. Undertaking for similar works in Form H.	Mandatory
13	12. Undertaking on structural stability and soundness of already completed building and infrastructure projects. Form I	Mandatory
14	13. Affidavit for Non Black Listing should be furnished on Rs.100.00 nonJudicial stamp paper attested by Notary in Form-J.	Mandatory
15	14. Any other document as specified in NIT or bid document.	Mandatory

S.No	Documents Required from Vendor	Document Type
16	For Non-CPWD Registered Contractors	Mandatory
17	1. Copy of original EMD in proper form.	Mandatory
18	2. Copy of receipt for deposition of original EMD to division office of any EE, CPWD or CCU	Mandatory
19	3. Letter of transmittal	Mandatory
20	4. Certificate of Financial Turnover from CA (Form A)	Mandatory
21	5. Bankers certificate or Net Worth Certificate (Form B and B-1)	Mandatory
22	6. List of eligible similar nature of completed works in Form C	Mandatory
23	7. List of projects under execution in Form C 1	Mandatory
24	8. Bidding Capacity as per Form C2 based on the details of works mentioned in Form C1	Mandatory
25	9. Performance report of completed works (mentioned in FormC in Form D.	Mandatory
26	10. Performance report of works (mentioned Form C1) in Form D1	Mandatory
27	11. Structure and Organization Form E	Mandatory
28	12. Undertaking on structural stability and soundness of already completed building and infrastructure projects Form I	Mandatory
29	13. Affidavit for non-execution of eligible similar work through another contractor on back-to-back basis or subletting basis furnished on Rs.100.00 non-judicial stamp paper attested by Notary. Undertaking for similar works in Form H	Mandatory
30	14. 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. As prescribed in NIT page no 08	Mandatory
31	15. Any other Document as specified in the bid documents.	Mandatory

### Tender Covers

S.No	Cover Name	Bid Opening date	View Details
1	Technical cum Eligibility Bid	20/07/2026 15:30	<a href="#">View Action</a>
2	Financial Bid	Financial Bid Date To be Decided Later	<a href="#">View Action</a>

### Technical cum Eligibility Bid

S.No	Documents Required from Vendor
1	Enlistment order copy of contractor
2	Work Experience Certificate
3	Certiifcate of financial turnover from CA
4	Net Worth
5	Details of works of similar class
6	Projects under execution or awarded
7	Performance reports of works
8	Structure and organisation

### Financial Bid

S.No	File Name	File Size(in Bytes)
1	159700-PercentageComposite1.xls	60928

## World Bank Works Details

Loan Account No	BOQ Rates Visible in NIT Pages	No
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Done

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## INDEX

**Name of work:** Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).

**NIT No.:** 03/2026-27/CE/CCU/CED-I/New Delhi.

<b>S.N.</b>	<b>Particulars</b>	<b>Pg. No.</b>
1.	Index	1
2.	Part-A: General Information	2
3.	Information & instructions for Bidders for e-Bidding	3-9
4.	Notice Inviting e-Tender- CPWD-6	10-18
5.	Technical bid	19
6.	Section-I: Brief Particulars of work	20
7.	Section-II: Information and Guidelines for bidders	21-27
8.	Criteria for Evaluation of the performance of bidder for Pre-Eligibility	28
9.	Section-III: Letter of Transmittal	29
10.	Form A to I	30-46
11.	CPWD-7	47-48
12.	Schedule A-F	49-57
13.	Table-1: Equipment's for Testing of Materials & Concrete at Site Laboratory	58-59
14.	Table-2: Plant and Equipment required to be owned / taken on lease by the contractor	60
15.	Part B: Special Conditions, Particular Specification for Civil & Horticulture work, list of preferred make and drawing list.	61-137
16.	Schedule of Quantity Civil and Horticulture work	138-208
17.	Part C: Special/Additional Conditions, Particular Specification for Electrical & Mechanical Works	209-234
18.	Schedule of Quantity of Electrical & Mechanical works	235-350
19.	Financial Bid	351-352
20.	Drawings	353-361
	This NIT contains 1 to 361 pages including this page.	

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

# PART-A

## GENERAL INFORMATION

**INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR E-TENDERING  
FORMING PART OF BID DOCUMENT**

The Executive Engineer, Civil Engineering Division-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 ([email- eeecd1ccu-mef@nic.in](mailto:eeecd1ccu-mef@nic.in), Mo. 9650371895) on behalf of President of India invites online 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.	<b>03/2026-27/CE/CCU/CED-I/New Delhi</b>
Name of Work	<b>Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).</b>
Location	<b>New Delhi</b>
Estimated cost put to bid (Rs.)	<b>Rs.57,52,92,763/-</b>
Earnest Money (Rs.)	<b>Rs. 67,52,928/-</b>
Stipulated Period of Completion of work (in months)	<b>20 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 20.07.2026
Time date of opening of technical bid	03:30 PM on 20.07.2026

\*\*To be filled by 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 fulfil the following requirements shall be eligible to apply [1(b), 1(c) & 1(d) are applicable for Non-CPWD contractors but not applicable for CPWD enlisted contractors of appropriate class. 1(a) and 1(e) is applicable for both CPWD enlisted contractors as well as non-CPWD contractors.]:
  - 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. 23.01 Crores** or two similar works each costing not less than **Rs. 34.52 Crores** or one similar work costing not less than **Rs. 46.02 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 framed structure building having five storeys with minimum one basement or completing balance construction work of one building i/c RCC framed structural work having minimum five storeys with minimum one basement.

**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. **17.26 Crores** on construction works during the last three years ending 31<sup>st</sup> March 2025 (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 2025.
- d) Should have a Banker's Certificate from a commercial Bank for **Rs. 23.01 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-2024 i.e. government retired engineer/ architect for three years from the date of issue of enlistment order, is as follows: -

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

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-2024 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/direction 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 -2024 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 annual turnover 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-2024 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) Information and Instructions for bidders posted on websites 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) But the bid can only be submitted after deposition of EMD through Payment Online payment mode and original bank guarantee including e-Bank guarantee (for balance amount as prescribed) **either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD/CCU, MoEF&CC within the period of bid submission** and uploading the mandatory scanned documents as mentioned in the NIT, receipt for deposition of original EMD to any division office of CCU, MoEF&CC/ CPWD or office of **Executive Engineer, CED-I, CCU, New Delhi** 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 instructions 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 2025 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 **02.07.2026 at 05:00 PM** 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) **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 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 (of the state where site is located), 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) Letter of transmittal.
- vi) Certificate of Financial Turnover from CA (Form 'A') for calculation bidding capacity.
- vii) List of eligible similar nature of completed works in Form –'C'.
- viii) List of projects under execution in Form 'C-1' for calculation bidding capacity.
- ix) Performance report of works (mentioned in Form-C) in Form – 'D'.
- x) Bidding Capacity as per Form 'C-2' based on detail of work mentioned in Form 'C-1'.
- xi) 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'.
- xii) Undertaking on structural stability and soundness of already completed building and infrastructure projects. (Form –'I')
- xiii) Affidavit for Non-Black Listing should be furnished on Rs.100/- non-Judicial stamp paper attested by Notary in Form- 'J'.
- xiv) Any other document as specified in NIT/bid document.

**For Non-CPWD Registered Contractors –**

- i) Copy of original EMD in proper form.
- ii) Copy of receipt for deposition of original EMD to division office of any EE, CPWD/CCU.
- iii) Letter of transmittal
- iv) Certificate of Financial Turnover from CA (Form 'A').
- v) Banker's certificate or Net Worth Certificate (Form 'B' and 'B-1').
- vi) List of eligible similar nature of completed works in Form –'C'.
- vii) List of projects under execution in Form 'C-1'.
- viii) Bidding Capacity as per Form- 'C-2' based on the details of works mentioned in Form 'C-1'
- ix) Performance report of completed works (mentioned in Form-'C') in Form – 'D'.
- x) Performance report of works (mentioned Form 'C-1') in Form 'D-1'.
- xi) Structure & Organization (Form 'E')
- xii) Undertaking on structural stability and soundness of already completed building and infrastructure projects. (Form –'I')
- xiii) 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'.
- xiv) 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 (of the state where site is located), 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".
- xv) 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-I, CCU  
**(For and on behalf of President of India).**

## CPWD 6 FOR E- TENDERING

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 “Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).”

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. **57,52,92,763/-**. 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 applicable for non-CPWD contractors only but not applicable for CPWD enlisted contractors in appropriate class while 1.2.1 and 1.2.5 are applicable for both CPWD enlisted contractors as well as non-CPWD contractors]

- 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. 23.01 Crores** or two similar works each costing not less than **Rs. 34.52 Crores** or one similar work costing not less than **Rs. 46.02 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 framed structure building having five storeys with minimum one basement or completing balance construction work of one building i/c RCC framed structural work having minimum five storeys with minimum one basement.

**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. 17.26** Crores on construction works during the last three years ending 31<sup>st</sup> March 2025 (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 2025.
- 1.2.4. Should have a Banker's Certificate from a commercial Bank for **Rs. 23.01** 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 = {[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 annual turnover 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-2024 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-2024 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/directions 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 -2024 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 annual turnover 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-2024 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 bidders 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 **20 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-I, CCU, MoEF&CC, New Delhi**) 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 tenderer whose bid is accepted will be required to furnish performance guarantee:

- a. Performance Guarantee (PG) shall be 5% of the estimated cost put to tender (ECPT) or contract amount whichever is higher, to be submitted in the form as prescribed in tender document, within 7 days from the date of issue of letter of acceptance. Performance guarantee shall remain valid for a minimum period of six months beyond the date of completion of all contractual obligations.
- b. If the quoted bid amount is lesser than 80% of the estimated cost put to tender, the bidder shall be required to submit Additional performance guarantee (APG) in addition to the standard performance guarantee as mention in (a) above. The amount of additional performance guarantee shall be equal to the difference between the 80% amount of ECPT and quoted amount.

(e.g. if EPCT is A and quoted amount is 0.7A then the amount of APG shall be 0.8A-0.7A). The additional performance guarantee shall be in the prescribed format of performance guarantee and has to be submitted within the time frame prescribed for submission of performance guarantee. The other terms and conditions for additional performance guarantee shall be same as that of PG as mention in GCC.

This period can be further extended by the Engineer- in-Charge at the written request of the tenderer, stating the reason for delays in procuring the Performance Guarantee to the satisfaction of Engineer-in- charge, for a maximum period of 3 days with late fee @ 0.1% per day of performance guarantee amount.

This guarantee shall be in the form of Deposit at Call receipt of any scheduled bank/ Banker's cheque of any scheduled bank/Demand Draft/Pay order of any scheduled bank or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank in accordance with the form annexed hereto.

In case the contractor fails to deposit the said performance guarantees as applicable (mentioned above) 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 be also be required to furnish either copy of applicable licenses/registrations or proof of applying for obtaining labour licenses, registration with EPFO, ESIC and BOCW Welfare Board including provident fund code no. if applicable and also ensure the compliance of aforesaid provisions by the sub-contractors, if any engaged by the contractor for the said work within the period specified in Schedule 'F'.

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 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 work shall remain open for acceptance for a period **90 (Ninety) days** from the date of opening of tenders.
  - 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. Pre-Bid conference shall be held on **02.07.2026 at 05 PM** 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 bidders/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of: -
- i) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.
  - ii) Standard CPWD Form '7' and other Standard CPWD Forms as applicable with amendment upto last date of submission of bid.
  - iii) General Conditions of Contract 2023 for Construction works, Central Public Works Department, as corrected up to last date of submission of bids.
21. **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, STP, ETP & WTP shall be carried out by OEMs respectively.

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.

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

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 they have to associates contractor having valid electrical contractor licence. It shall be the responsibility of contractor to sort out any dispute / litigation with the Specialized Agencies without any time & cost overrun to the Department.

The 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 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..

22. 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.
23. In case the 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.
24. The 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.
25. 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 Id 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.

\*To be filled in by NIT approving authority

Executive Engineer, CED-I  
(For and on behalf of the 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 New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).</b>	<b>Rs. 57,52,92,763/-</b>	<b>20 Months</b>

- 2) The site of work is located/situated at Delhi.
- 3) The scope of work consists of **Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi** including all civil, electrical, mechanical, horticulture services.
- 4) Scope of work consists obtaining 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 CCU for these approvals. Extra amount shall not 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-I means the President of India, acting through the Executive Engineer, Civil Engineering Division-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 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 fulfil 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. 23.01 Crores** or two similar works each costing not less than **Rs. 34.52 Crores** or one similar work costing not less than **Rs.46.02 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 framed structure building having five storeys with minimum one basement or completing balance construction work of one building i/c RCC framed structural work having minimum five storeys with minimum one basement.

**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. 17.26 Crores** on construction works during the last three years ending 31st March 2025 (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 31st March 2025.

7.4 Should have a Banker's Certificate from a commercial Bank for **Rs. 23.01 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 The bidder should have sufficient number of Technical and Administrative employees for the proper execution of the contract. The bidder shall have to submit a list of these employees stating clearly how these would be involved in this work within 15 days of award of work.

7.6 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 annual turnover 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-2024 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-2024 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/directions 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 - 2024 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-2024 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 or B1')	Maximum	20	marks
(b) Experience in eligible similar nature of work during last 7 years (Form 'C')	Maximum	20	marks
(c) Performance on works (Form 'D') Time Over Run	Maximum	20	marks
(d) Performance on works (Form 'D-1')-Quality as per assessment in Form D-1	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 Net Worth 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)		
	Average annual turnover	16 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	
	(i) Banker's or Networth Certificate	04 Marks		
(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) **		(40 Marks)	
	Completed works (max. 25 marks)		Ongoing works (max. 15 marks)	(Total Marks assessed)

\*\*The evaluation of completed and ongoing works shall be evaluated on the basis of performance certificate submitted/ uploaded by the bidder in Form 'D'. The Engineer-in-Charge shall get verified Form 'D' from the issuing authority. The Form 'D' shall be issued by the officer at least not below the rank of Executive Engineer or equivalent with duly signed and stamped with mobile number. The Engineer-in charge has right to get inspect the work independently, if desired so. Based on the performance for quality of work in Form 'D' or inspection evaluation, of completed/ ongoing works shall be made on the following basis.

S. no.	Grading	Percentage marks
1	Outstanding/excellent	90%
2	Very good	70%
3	Good/Satisfactory	60%
4	Average	50%
5	Poor	30%

**Section-III**

**LETTER OF TRANSMITTAL**

From:

.....  
.....

To

The Executive Engineer, CED-I,  
Civil Construction Unit (CCU),  
Ministry of Environment, Forest & Climate Change (MoEF&CC),  
New Delhi - 110003.  
[email- eeeced1ccu-mef@nic.in](mailto:eeeced1ccu-mef@nic.in)

Subject: Submission of Bid for the work of **Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).**

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, Civil Engineering Division-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, **New Delhi -110003** to approach the Bank issuing the banker's/Networth certificate to confirm the correctness thereof. I/We also authorize Executive Engineer, Civil Engineering Division-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, **New Delhi-110003** 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.	Description	Financial Years				
		2020-21	2021-22	2022-23	2023-24	2024-25
i)	Gross Annual Turnover on construction works					
ii)	Profit / Loss (standalone financial statement)/ consolidated financial statement both.					

- ii. Financial arrangements for carrying out the proposed work.

Unique Document Identification Number (UDIN)

Signature of Chartered Accountant .....

Name of Chartered Accountant .....

Membership No. of ICAI .....

Date and 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) Executive Engineer, Civil Engineering Division-I, Civil Construction Unit (CCU),  
Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi  
Road, New Delhi -110003 ([email- eeecd1ccu.mef@gov.in](mailto:eeecd1ccu.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 .....

**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 organization	Cost of work in crores of rupees	Date of commencement as per contract	Stipulated 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)

**PROJECTS UNDER EXECUTION**

Sl. No.	Name of work/ project and location	Owner or sponsoring organization	Cost of work in crores of rupees	Date of commencement as per contract	Stipulated 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 made	Remarks
1	2	3	4	5	6	7	8	9	10

Signature of Bidder(s)

**CALCULATION OF BIDDING CAPACITY**

**DETAILS OF EXISTING COMMITMENTS AND ONGOING WORKS**

Sl. No.	Name of work/ project and location	Owner or sponsoring organization	Contract value in crores of rupees	Date of commencement as per contract	Stipulated date of completion	Upto date percentage progress of work	Remaining work in percentage (100-column 7)	Existing 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 = {[AxNx1.5]-B} =

Certificate: I certify that all the awarded and ongoing works have been included in the above list.

Signature of Bidder(s)

**WORK EXPERIENCE CERTIFICATE OF COMPLETED WORK(S) MENTIONED IN  
FORM 'C'**

No. ....

Date: .....

1	Name of work		
2	Location of work (mention city and state)		
3	Name of contractor (same as mentioned in Award letter)		
4	Agreement/work order number		
5	Estimate cost		
6	Agreement/work order amount (Rs.)		
7	Gross value of completed work (Rs.)		
8	Amount of Gross value of last paid bill, (if final bill not paid.)		
9	Stipulated date of start (DD-MM-YYYY)		
10	Date of complete:		
	(a) Stipulated date of completion (DD-MM-YYYY)		
	(b) Actual date of completion (DD-MM-YYYY)		
	(c) Justified extended date of completion, if decided (DD-MM-YYYY)		
11	Details of work		
	(a) Nature of work (Building/Infrastructure/Road/Horticulture).		
	(b) Type of structure (RCC framed/load bearing/ composite or any other).		
	(c) (i) Type of Technology used e.g. Cast-in-situ Structural systems, Monolithic concrete construction system, Precast RCC systems, Steel Structure, Pre-stressed concrete system etc.		
	(ii) Technology used of his own or through associated agency.		
	(d) Type of building/Infrastructure (Office/College/ Hospital/ School/ Hostel/ Quarters/ Flyover/ Bridge/ Road /Culvert etc.)		
12	(e) In case of Road work, whether bituminous/CC or both.		
	Name of electrical/specialized MEP items executed in the work (Please write the names of specialized services)		Executed by self
			Executed by associated agency
	a)	internal Electrical installation, External Electrical installation, Lift, Scada, EPBAX CCTV, LAN	
	b)	Firefighting, Fire Alarm, HVAC	
	c)	Electrical substation, DG set, STP/ETP plant	
	d)	Solar Photo Voltaic power Generation/ Solar Water Heating, Access Control, Baggage scanner system, conveyor Belt	
e)	Gas/Oxygen supply Line, OT Room		
f)	Any other specialized services.		
13	Other information		
	a) If completed work is building construction, then number of storey(s) constructed without basement.		
	b) Number of basement(s).		
	c) If completed work is building construction, then approximate plinth area of the building.		
14	a) Amount of Horticulture work(s), (If executed)		

	b) Horticulture work(s), whether executed by self or through associated agency.	
15	Details of extension of time for delayed completion.	
	a) Whether extension of time for delayed completion has been decided or not? Owner department officers are requested to only mention either 'Yes or No' against this option. (Option of writing "Not applicable" is only acceptable where work is completed before stipulated date of completion).	
	b) If extension of time for delayed completion has been decided then amount of compensation levied, if any?	
16	Is there any conciliation/ mediation/ arbitration/court Case(s) (from start of work till issue of this certificate), Owner / department officers are requested to only mention either "Yes or No,".	
17	Status of owner / department Owner / department officers are requested to only mention (Central/State Government/ PSU/ Private)	
	a) Name of Project Manager or Executive Engineer or Equivalent.	
	b) Address	
	c) Phone	
	d) email	
18.	Remarks, if any.	

**The above work has been/was completed satisfactorily.**

**Signature with seal and designation**

**(Project Manager or Executive Engineer or Equivalent Officer of owner department)**

**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).

**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.

**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).	
	ORGANIZATION/PLACE OF REGISTRATION	REGISTRATION No.
	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

**PROFORMA FOR THE RECEIPT TO BE ISSUED BY THE EXECUTIVE ENGINEER  
RECEIVING THE EMD**

Receipt of deposition of original EMD (drawn in favour of <b>Executive Engineer, CED-I, CCU, MoEF&amp;CC, New Delhi</b> ) (Receipt No. .... / date.....)	
Name of work	: <b>Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).</b>
NIT No	: <b>03/2026-27/CE/CCU/CED-I/New Delhi</b>
Estimated Cost	: <b>Rs. 57,52,92,763/-</b>
Amount of Earnest Money Deposit	: <b>Rs. 67,52,928/-</b>
Last date of submission of bid	: <b>20.07.2026</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.....<br>Name and address<br>Designation | Authorized signatory<br>Name<br>Staff code no. |
| 2. Signature .....<br>Name and address               | Bank seal                                      |

\*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.

**UNDERTAKING FOR SIMILAR WORK(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 on "Non-Judicial Stamp Paper of Rs. 100/-" to be uploaded by bidder(s) at the time of submission of bid.)**

Signature of bidder(s) with stamp

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

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

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

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

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

Signature of Notary with seal

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

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

**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 New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).**”

- i) To be uploaded by **03:00 PM on 20.07.2026** to/upload at
- ii) To be opened in presence of tenderers who may be present at **03:30 PM on 20.07.2026** in the office of in the office of the Executive Engineer, CED-I, CCU, New Delhi.

\*\* To be filled by EE, CED-I

**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 **90 (Ninety) days** from the due date of its opening of 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(c) 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 Quantities - As per contract document

**SCHEDULE ‘D’**

Extra schedule for specific requirements/document for the work, if any: As per tender documents

**SCHEDULE ‘E’**

Reference to General Conditions of contract	CPWD General Conditions of Contract 2023 Construction works, as amended / modified upto previous day of the last date of submission of bid.
Name of Work	<b>Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).</b>
Estimated cost of the work	<b>Rs. 57,52,92,763/-</b>
Earnest money	<b>Rs. 68,56,485/-</b>
Performance Guarantee	(a) 5% of tendered value or Estimated Cost Put to Tender (ECPT) (Whichever is higher). (b) Where the tendered amount is less than eighty percent (80%) of the Estimated Cost Put to Tender (ECPT), the Performance Guarantee, in addition to the requirement under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tendered amount.
Security Deposit	2.50% of tendered amount.

**SCHEDULE ‘F’**

**GENERAL RULES AND DIRECTION**

Officer inviting tender	The Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or assignee thereof.
Maximum percentage of quantity of items of work to be executed beyond which rates are to be determined in accordance with Clause 12.2(c)	See at appropriate clause

**Definitions:**

2(vi)	Engineer-in-Charge (Major Component (i.e. Civil & Horticulture Components)	The Executive Engineer, CED-I, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or assignee thereof.
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	Engineer-in-Charge (Minor Component (i.e. E&M components))	The Executive Engineer (E), CCU, Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003
2(viii)	Accepting Authority	The Chief Engineer, CCU, MoEF&CC or his or his legal successor or Assignee thereof
2(x)a	Percentage on cost of materials and labour to cover all overheads and profits	15%
2(x)b	Standard Schedule of Rates	DSR 2023 Corrected up to last date of submission of bid (for civil work volume I & II)  DSR 2025 Corrected up to last date of submission of bid (for Elect. work)  Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping)-2025 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 Form 7, CPWD General Conditions of Contract 2023 Construction works, as amended / modified upto previous day of the last date of submission of bid.

<b>Clause 1</b>		
i)	Time allowed for submission of Performance Guarantee, Programme Chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance.	07 Days
ii)	Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period as provided in (i) above	03 Days
<b>Clause 2</b>		
i)	Authority for fixing Compensation under Clause 2:	The Superintending Engineer, CCU, MoEF&CC or his legal successor or Assignee thereof
<b>Clause 5</b>		
i)	Time allowed for execution of work	<b>20 Months</b>
ii)	Numbers of days from date of issue of letter of acceptance for reckoning date of start	10 Days

**Mile stones as per table given below**

S.N.	Description of Milestone	Time Allowed in days (from stipulated date of start)	Amount to be withheld in case of non achievement of milestone
1.	Work done amounting to 5% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape)	2 months	0.3 % of the Accepted tendered value.
2.	Work done amounting to 12.5% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape) including one basement	5 months	0.4 % of the Accepted tendered value.
3.	Work done amounting to 25% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape) including two basements	8 months	0.6 % of the Accepted tendered value.
4.	Work done amounting to 40% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape)	10 months	0.7 % of the Accepted tendered value.
5.	Work done amounting to 55% of accepted tender amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	12 months	0.7 % of the Accepted tendered value.
6.	Work done amounting to 70% of accepted tender amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	15 months	0.7 % of the Accepted tendered value.
7.	Work done amounting to 90% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape)	18 months	0.8 % of the Accepted tendered value.
8.	All Civil, Electrical & Mechanical, Landscape, Horticulture work complete in all respect, obtaining NOC from Fire deptt & occupancy certificate from local bodies.  (100% complete in all respect)	20 months	0.8 % of the Accepted tendered value.

**Time allowed for execution of work: 20 Months**

**Note:-** Withheld amount shall be released if and when subsequent milestone is achieved within respective time specified. However, in case milestones are not achieved by the Bidder for the work, the amount shown against milestone shall be withheld.

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	10 days (on date of commencement)
Part B	Portions with encumbrances	NA

Part C	Portions dependent on work of other agencies	NA
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i) Authority to convey the decision of shifting of milestone and Extension of Time:	The Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 or his 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 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 successor or Assignee thereof.

**CLAUSE 5.4:** Schedule of rate of recovery for delay in submission of the modified programme in terms of delay days

S.N.	Contract Value	Recovery Rs / Per day
1.	More than Rs. 1 Crore	2,000/-

**Clause 6**

i) Mode of measurement	CMB
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**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	<b>Rs. 250 lakh (civil)</b> <b>Rs.50 lakh (electrical) except for initial two running account bill and final bill</b>
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<b>Clause 7A</b> Whether clause 7A shall be applicable	Yes
<b>Clause -7B</b> Whether clause 7B shall be applicable	Yes

<b>Clause 8 A: Completion plans to be submitted by the contractor</b>	
Authority to decide compensation on account if contractor fails to submit completion plans	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his successor or Assignee thereof

**Clause 10 A**

As per site requirement and details attached in the relevant pages of this bid document

<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?	:	No.

**Clause 10 C**

Whether Clause 10 C shall be applicable	<b>Not Applicable</b>
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**Clause 10CC****Applicable**

S. N.	Relevant component of Material /Labour for price escalation	Percentage of total value of work
1	Component of Cement	<b>10%</b>
2	Component of Labour	<b>25%</b>
3	Civil component of the other construction materials	<b>35%</b>
4	Electrical and Mechanical (E&M) Component of Construction Materials	<b>15%</b>
5	Reinforcement steel bars/ TMT bars/Structural steel (including strands and cables)	<b>15%</b>
	Total	<b>100 %</b>

**Clause 11:**

Specifications to be followed for execution of work ( <b>for civil work</b> )	:	<ol style="list-style-type: none"> <li><b>Civil work:</b> CPWD Specifications 2019 Volume- I &amp; II with up to the date corrections slips.</li> <li>MORTH Specifications for Roads and Bridge work.</li> <li><b>National Building Construction Standards 2026.</b></li> </ol>
Specifications to be followed for execution of work ( <b>for Electrical work</b> )	:	<b>Electrical &amp; Other works</b> (amended upto date): <ol style="list-style-type: none"> <li>CPWD General Specification for Electrical Works Part I (Internal) &amp; Part II (External) – 2023.</li> <li>General Specification for Electrical Works (Part III Lifts &amp; Escalators)-2003.</li> </ol>

	<ol style="list-style-type: none"> <li>3. CPWD General Specification for Electrical Works Part IV Substation-2013.</li> <li>4. CPWD General Specification for Electrical Works Part V Wet riser and sprinkler system-2020.</li> <li>5. CPWD General Specification for Electrical Works Part VI fire detection and alarm system-2018.</li> <li>6. CPWD General Specification for Electrical Works Part VII DG Sets– 2013</li> <li>7. CPWD General Specification for Electrical Works Part VIII Gas Based Fire Extinguishing System–2013.</li> <li>8. General Specification for Heating Ventilation &amp; Air-Conditioning-2024.</li> <li>9. <b>National Building Construction Standards 2026</b></li> </ol>
Specifications to be followed for execution of work (for Horticulture & Landscaping work)	: Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping)-2025.

All the afore stated specifications shall be read with updated correction slips issued till last date of submission of bid.

**Clause 12 : Construction work**

12.2 (c)	Deviation limit beyond which clauses 12.2(c) shall apply for all building works items (including MEP services, Horticulture works and Furniture).	:	100%
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**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
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**Clause 18:**

List of Mandatory Machinery, tools & plants to be deployed by the contractor at site: -

As per site requirement and details attached in the relevant pages of this bid document.
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**Clause 19**

<b>Clause 19 C</b>	Penalty for each default	<b>Rs. 500/-</b>
<b>Clause 19 D</b>	Penalty for each default	<b>Rs. 500/-</b>
<b>Clause 19 G</b>	Penalty for each default Enhanced penalty per day for continuous default	<b>Rs. 500/-</b> <b>Rs. 500/-</b>
<b>Clause 19 K</b>	Penalty for each default	<b>Rs. 500/-</b>

**Clause 25:** Settlement of disputes by Conciliation and Arbitration

<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
<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
<b>Place of Arbitration</b>	:	New Delhi

**Clause 32 : Requirement of Technical Representative(s) and Recovery Rate:**

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	1	Rs.1,00,000/- per Month

				one similar nature of work)		
3	Graduate Engineer Or Diploma Engineer	Civil	<b>Project/Site Engineer</b>	5 or 10 respectively	1	Rs. 50000/- Per month
	Graduate Engineer Or Diploma Engineer	Electrical	<b>Project/Site Engineer</b>	5 or 10 respectively	1	Rs. 50000/- Per month
4	Graduate Engineer	Civil	<b>Quality Engineer</b>	8	1	Rs. 70000/- Per month
	Graduate Engineer	Electrical	<b>Quality Engineer</b>	8	1	Rs. 70000/- Per month
5	Diploma Engineer	Civil	<b>Surveyor</b>	8	1	Rs. 50000/- Per month
6	Graduate Engineer	Civil	<b>Project Planning/Billing</b>	6	1	Rs. 60000/- Per month
	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)	<b>Schedule/statement for determining theoretical quantity of cement &amp; bitumen on the basis (for civil work)</b>	:	Delhi Schedule of Rates 2023 printed by CPWD with upto date correction slip upto last date of bid submission.
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	<b>Schedule/statement for determining theoretical quantity of cement &amp; bitumen on the basis (for Electrical work)</b>	:	Delhi Schedule of Rates 2025 (E&M) printed by CPWD with upto date correction slip upto last date of bid submission.
(ii)	<b>Variations permissible on theoretical quantities:</b>		
(a)	<b>Cement</b>	:	2% plus/minus.
(b)	<b>Bitumen All Works</b>	:	2.5% plus only & nil on minus side.
(c)	<b>Steel Reinforcement and structural steel sections for each diameter, section and category</b>	:	2% plus/minus variation
(d)	<b>All other materials.</b>	:	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-I,  
Civil Construction Unit (CCU),  
Ministry of Environment, Forest & Climate Change (MoEF&CC),  
CGO Complex, Lodhi Road, New Delhi -110003.

**Table - 1****LIST OF EQUIPMENTS 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:

Sl. No.	Equipment	Numbers (Minimum)
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 dia sieves, 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
26.	Motorized sieve shaker	1
27.	Extra Bottom plates for 15 cm cube mould	10

Sl. No.	Equipment	Numbers (Minimum)
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 meter	
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.	

**Note:** The above list is only indicative and not exhaustive. The contractor may be required to provide more equipment's as per the requirement of work and as per the direction of the engineer- in- charge.

**LIST OF MANDATORY MACHINERY, TOOLS & PLANTS TO BE DEPLOYED BY THE CONTRACTOR AT SITE**

Sl. No.	Equipment	Numbers
1.	Builders hoist	1
2.	Centralized concrete batch mix plant of capacity 30 cum per hour (fully automatic with computer control)	1
3.	Excavator cum loader (JCB 3D model or equivalent).	3
4.	Compressor machine minimum 20 CFM with rock Breaker.	1
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.	Screener 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

# **PART B**

## **SPECIAL CONDITIONS, PARTICULAR SPECIFICATION FOR CIVIL & 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.
- 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 CPWD-6. 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 having maximum height of 10 metre or 1/3 height of the proposed building (whichever is higher) or as per direction of the statutory authority to be constructed, 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 height as per direction of engineer in charge and in accordance with the prevalent guidelines issued by statutory authorities in this context, 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 80 sqm area including toilet (as per layout plan to be approved by engineer-in-charge) 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 lights, fans, air conditioners, Generator set, all office utilities, good quality projector in conference room etc. and complete wiring, water supply, sewerage and drainage system 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 including fan, RO etc.
  - ii) The contractor shall provide the office accommodation within Sixty (60) days 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 no. all-in-one desktop (window 10) with 4G/5G enabled internet connection. The contractor shall also provide one number color laser printer (A3 Size). These accessories shall be the property of Engineer-in-Charge. The complete cost of these accessories are deemed to be inclusive in the quoted rates of the agency. No additional payment shall be made to the Contractor on this account. The laptop/computer shall be provided with software with MS-project, Primavera, MS office, Auto Cad, STADD 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 controlling authority 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 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 rating etc. and execution of compliance of any other condition mentioned anywhere in the bid document.
- 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, 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 give ten years guarantee in the prescribed proforma for water proofing items specified in the schedule of quantities. The ten years to be reckoned from the date after the defect liability period prescribed in the contract. In addition to this 10% of the executed cost of items shall be retained either in fixed deposit or in the form of bank guarantee, which shall be released as per existing Rules and as per the provision of CPWD Works Manual 2024 with amendment /modifications upto last date of submission of tender, if no defects are found in water proofing or the defects are made good. This amount shall be adjusted against the expenses incurred on making good the defects if the contractor commits breach of guarantee.
- xviii) 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.
- xix) 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.

- xx) 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.**
- xxi) 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 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 10 digital photographs showing all the parts of construction site along with at least 5 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 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**

- A. 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.
  - i) 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.
  - ii) 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.
    - a) 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.
    - b) Keep entrance and surrounding area clean.

- c) Display layout plan, key plan, building drawings including plans, elevations and sections.
- d) Upto date displays of progress of work in form of Bar chart, CPM and PERT etc.
- e) Keep details of quantities executed, balance quantities to be executed, deviations, possible Extra item, etc.
- f) Keep plastic / cloth mounted one sets of building drawings.
- g) 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) 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**

- i) 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.
- ii) The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.
- iii) Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer in Charge.
- iv) 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.
- v) 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 of office cabin and toilet unit. 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, 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

The contractor shall engage specialized agency for carrying out specialized item such as:

- i) Structural Glazing,
- ii) Expansion Joint Works,
- iii) Waterproofing work,
- iv) Water supply & Plumbing work,
- v) Fire check Doors,

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.

- vi) 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 items/works. 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.
- vii) The 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 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 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.

- viii) 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.
- ix) 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.
- x) It shall be the responsibility of contractor to sort out any dispute / litigation with the specialized agencies without any time & cost overrun to the department. The 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**

- i) 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.
- ii) 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.
- iii) 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.
- iv) 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.
- v) Ready mix plaster shall be executed using pneumatic spray machine of reputed make.
- vi) 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.
- vii) The aluminium door-windows-framework, lamination and lipping on flush doors shall be factory made.
- viii) 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.
- ix) 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.
- x) Wall mounted door stoppers shall be provided to protect the wall where the door handle would run into it.

- xi) 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.
- xii) Fall nets and scaffolding nets for protection from debris / dusts and noise etc. are to be provided during the construction period.
- xiii) Wherever M.S. grill provided in window, weight of grill in each window should not be less than 12 kg/sqm.
- xiv) 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.
- xv) Wherever the doors are required to be fixed to AAC block masonry, the frame shall be fixed in RCC band or concrete block masonry.
- xvi) 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.

**1.57** Jurisdiction of the court shall be **Delhi**.

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

The building shall confirm to minimum 4-Star rating as per GRIHA. norms. The contractor shall follow the all guidelines to achieve minimum 4-star GRIHA rating. The contractor shall be fully responsible for maintaining the desired records / documentation which shall be required for achieving minimum 4-star GRIHA rating. The copies of these records /documentation shall be provided to the appointed GRIHA consultant, GRIHA council and Engineer in charge. The contractor shall provide full cooperation to appointed GRIHA consultant, GRIHA council and Engineer in charge. The contractor shall attend all the site visits / meetings conducted by the appointed GRIHA consultant, GRIHA council and Engineer in charge time to time and shall provide the necessary compliances accordingly at site for this purpose.

### **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 of in any municipality solid waste collection bins.
- iv) Rates are inclusive of disposal of demolished / C&D waste material by mechanical means. Nothing extra shall be payable for disposal of mechanical means at designated locations as directed the Engineer-in-charge.

## **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 Tyers 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 tyers 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. Amount of fine particles (smaller than 0.075mm) may be to 10 -20%. Vehicular speed on site may be limited 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 norms.**

- 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 guidelines. **Deduction/recovery @ 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 from sites, either all waste is reused within the site or sent for recycling. Waste sent off the site to its final destination may be tracked. 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. **Deduction/recovery @ Rs. 500 per day** of delay on non-submission beyond due date 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). 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.
- 2.29 **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 metaled 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 metaled 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&CC 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&CC.
- (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.
- 2.30** 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.
- 2.31** 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.
- 2.32** 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.
- 2.33** 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.
- 2.34** 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.
- 2.35** Wherever required, Contractor shall meet and carry out all activities on site, supplement information, and submittals.
- 2.36 CONSTRUCTION WASTE**
- 2.36.1** 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.
- 2.36.2** 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.
- 2.36.3** 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.

- 2.36.4 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.
- 2.36.5 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.
- 2.36.6 The storage of material shall be as per standard good practices as specified in Part 7, Section 2 in Storage, Stacking and Handling practices, **National Building Construction Standards 2026** 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 maneuverability 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.
- 2.36.7 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.
- 2.36.8 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 material(malba) 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.

## **2.37 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 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. For design-mix concrete, OPC cement with flyash or PPC cement may be used without any cost adjustment. 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:

Size of bar	For consignment below 100ton	For consignment above 100ton
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.

**5. BIM Consultant for Architectural, Structural, and MEP Services**

- 5.1** The BIM Consultant, working under the guidance of the architectural consultancy appointed by the contractor, is required to hold a master's degree or equivalent in a relevant field of engineering or architecture. Additionally, they shall have experience in BIM modelling for similar projects. Documentation that validates these qualifications shall be submitted to the Department for approval at the specified time.
- 5.2** The project shall be executed using Building Information Model (BIM) of minimum LOD 350. The BIM model shall be used for architectural, structural, MEP services and other design and services. The Building Information Model (BIM) will be approved by CCU at different stages.
- 5.3** The agency shall provide a Building Information Model (BIM) at a minimum Level of Development (LOD) 350 during the planning and construction phases. This model will serve as a crucial tool for the integration and coordination of various services such as plumbing systems, sanitary installations, internal electrical installations, firefighting systems, fire alarm systems, HVAC systems, low voltage services, and the design of horticulture and landscaping. Additionally, the agency is tasked with preparing and submitting a Work Breakdown Structure (WBS) for all buildings to ensure clear scheduling and phasing of the construction activities.
- 5.4** The consultancy charges are inclusive of services for the development of the BIM model and the WBS. Therefore, no additional payments will be made for these deliverables.
- 5.5** The consultant's responsibilities encompass comprehensive BIM consultancy services for Architectural, Structural, and MEP services. These responsibilities include:
- 5.5.1 BIM Modelling:** Developing and managing BIM models for all architectural, structural, and MEP services according to project specifications, ensuring integration of all models to facilitate coordination and clash detection.
- 5.5.2 Architectural Services:** Creating detailed BIM models for all architectural elements such as building layout, space planning, and interior finishes, ensuring the models reflect the design intent and meet client requirements.

- 5.5.3 **Structural Services:** Developing BIM models for structural components including foundations, superstructures, and load-bearing elements, ensuring compliance with IS codes and relevant standards.
  - 5.5.4 **MEP Services:** Modelling both internal and external MEP systems such as water supply, plumbing, stormwater drainage, sewerage, STP, HVAC, electrical systems, and firefighting systems, coordinating these with architectural and structural models.
  - 5.5.5 **Quantity Surveying Services:** Providing BIM-based quantity take-offs and cost estimation for all project components, ensuring accuracy and alignment with project specifications.
  - 5.5.6 **Green Building Design:** Modelling building systems to achieve minimum **4-Star GRIHA** rating green building rating, adhering to the guidelines of the Green Rating Manual.
  - 5.5.7 **Civil Components:** Planning, modelling, and executing internal and external services as per attached drawings and project specifications.
  - 5.5.8 **E&M Components:** Modelling electrical, mechanical, and plumbing systems including internal installations, external lighting, service connections, substations, power distribution, and network architecture, accommodating specialized works such as HVAC systems, lifts, fire alarms, PA systems, lightning conductors, and DG-sets.
  - 5.5.9 **Coordination and Collaboration:** Ensuring effective coordination between architectural, structural, and MEP models and collaborating with other specialists to resolve conflicts or issues identified through clash detection and model reviews.
  - 5.5.10 **Documentation and Submission:** Providing comprehensive BIM documentation including design basis reports, model validation reports, and coordination reports, and submitting both hard and soft copies of all relevant documents and models as required.
  - 5.5.11 **Additional Services:** Performing any other services necessary to meet the full project requirements and ensure client satisfaction, even if not explicitly mentioned in the contract documents.
- 5.6 The BIM Consultant is tasked with thorough planning, design, and execution, adhering to all relevant norms and client requirements to ensure a successful project outcome.

## 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 payment of ~~remittance~~ due royalty to concerned statutory authority, as applicable, by taking required permission from concerned Government authority. Nothing extra shall be payable on account of disposal of extra surplus excavated earth. The payment for taking out the surplus earth shall be deducted from the running account bill as per item mention in BOQ.
- (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 or in nearby area wherever permissible. In case, contractor opt for installing of Batch Mix Plant as mentioned in description of items in BOQ then agency **has to install new fully automatic Batch Mix Plant** at site. *The old Batch Mix Plant shall not be permitted, in any case.* If desired by the engineer-in-charge the contractor has to submit the vouchers of new purchased fully automatic Batch Mix Plant. 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 uniformity 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) At least **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 may be used for splicing of reinforcement bars.

- 8.4 Reinforcement TMT bars, to be used for the work, shall be of grade Fe 500D or more and shall conform to criteria corresponding to Bar Set 'H' I of OM No. CSQ/SE(TAS)/Steel/2024/262(H) dated 14.08.2025 of CPWD Directorate.
- 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 Chicken mesh 85gsm or fiber mesh of good quality to 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. with cement concrete of 1:1½:3 (1 Cement: 1½ C & D recycled stone dust: 3 graded stone aggregate 20 mm nominal size) shall be provided. If the C&D waste product are unavailable in market, the conventional products may be used by the contractor at no extra cost to department.
- 9.4 **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 mortar shall be provided @ 30 kg per cum. AAC Block confirming the IS Code – 2185 (Part-3) 1984 (Reaffirmed 2005) shall be used. All type of internal masonry work which is affected by water shall be carried out by using Clay bricks of class designation 7.5 in the building as per CPWD specifications. In rest of the internal masonry work shall be of AAC blocks.**
- Dimensions & Tolerances: Autoclave Aerated Concrete Block shall be made in sizes and shapes to fit different needs.
  - 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.
  - 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.
  - 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/m <sup>3</sup> )	Compressive Strength (N/mm <sup>2</sup> )		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:  $X - 0.6 R >$  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 specifications 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 this specification shall preferably be marked with information-
  - The identification of the manufacture
  - The grade and block density of the unit
  - 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 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. Nothing extra shall be paid on this account.
- 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 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's. 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 damaged 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 uncarted 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:**

- i)** 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.
- ii)** Minimum weight of aluminum section for door, windows and ventilators shall be as per relevant standards.
- iii)** 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.
- iv)** Frames shall be fixed with dash fastener of minimum size 10 x 100 mm as per approved shop drawings.
- v)** 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.
- vi)** The material for the work shall be procured from the approved manufacturer as per list of preferred makes 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.
- vii)** Fabrication: The factory for fabrication and coating of windows/doors/frameworks shall be got approved from Engineer-charge.
- viii)** 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.
- ix)** 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.

- x) 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.
- xi) 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, mitered 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.

**xii) 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.

**xiii) 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.

#### **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 **National Building Construction Standards 2026**.

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 direction of Engineer-in-Charge. Welding shall be done by using organ welding rods and the surface being duly finished and cleaned by K2 passivation, which is nitric acid plus florice acid solution treatment by which the chances of corrosion will be eliminated and any burn out marks 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 in reinforced cement concrete at site of work.

1. The work shall be got executed as per CPWD Specifications and as per the manufacturer's specification through specialized agency as approved by the Engineer-in-charge.

The contractor shall furnish the following particulars immediately after the issue of letter of acceptance by the department.

- a) The name of the specialized firm.
- b) The trade names of the product, which would be used.
- c) List of works where the treatment has been used.
- d) Quantity of chlorides and sulphides used in the product.

### **GUARANTEE FOR WATER PROOFING TREATMENT**

2. The contractor shall be fully responsible for and shall guarantee proper performance of the entire waterproofing system for a period of 10 (Ten) years from the final completion of works. In addition, specific 10 years written guarantee (to be furnished in a non-judicial stamp paper of value not less than Rs.100/-) in approved proforma shall be submitted for the performance of the system, before final payment and shall not in any way limit any other rights the Employer may have under the contract. Guarantee for water proofing shall comprises of all the items described above in particular specification.
3. All water-proofing work shall be carried out through approved specialist agency as per method of working approved by the Engineer-in-charge. However, the contractor shall be solely responsible for waterproofing treatment until the expiry of the above guarantee period.
4. TEN years guarantee in prescribed proforma attached shall be given by the contractor for the water proofing treatment. Towards that 10% (ten percent) of the cost of these items of water proofing under this sub head worked out on prevailing market rate shall be retained as guarantee to watch the

performance of the work executed. However, half of this amount (withheld) would be released after five years from the date of completion of the work, if the performance of the waterproofing works is satisfactory. The remaining withheld amount shall be released after completion of ten years from the date of completion of work, if the performance of the waterproofing work is satisfactory. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days of issuing of notice by the Engineer-in-Charge and, if not attended to, the same shall be got done through other agency at the risk and cost of the contractor and recovery shall be affected from the amount retained towards guarantee. In any case, the contractor and the specialist agency, during the guarantee period, shall inspect and examine the treatment once in every year and make good any defect observed and confirm the same in writing. The security deposit can be released in full, if bank guarantee of equivalent amount, valid for the duration of guarantee period, is produced and deposited with the department.

## **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. 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 **National Building Construction Standards 2026** 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 **National Building Construction Standards 2026** 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 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 stabs 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 not be 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. 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 poly-sulphide sealant appropriate for its application.

**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 **National Building Construction Standards 2026 / CPWD specifications**.
- e) Gully traps: Gully traps shall be fixed in cement concrete mix and a brick masonry chamber 30x30 Centimeter inside in cement mortar 1:5 with 15x15 cms grating inside and 30x30 Centimeter 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, 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 must comply with all applicable local-building regulations and all the safety guidelines particularly specified for facade work as per relevant I.S codes.
- g) 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.
- h) 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.
- i) 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° 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/rn<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-
  - o The 'Monarch' nozzle with pressure gauge and valve as prescribed by AAMA and recommended by CWCT.
  - o 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 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 the work, 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:
  - o Easy removal for maintenance.
  - o Installation after finishes are applied to the column / wall.
  - o Easy removal of internal glazing units for cleaning/ maintenance replacement.
  - o 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, die 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) Die 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.
- g) All other samples as per requirement and direction of engineer in charge.

**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 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
- 22.20 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.
- 22.21 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.
- 22.22 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.
- 22.23 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.
- 22.24 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.

## 22.25 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, dents, 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

**22.26 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.

**22.27 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.

**22.28 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:
  - o 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:
  - o 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 x0.15m 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 x0.6m 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.

**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	ALUMINIUM COMPOSITE PANEL	ALUCOBOND, REYNOBOND, ALSTONE, ALUDECOR
3	ADHESIVE TAPE	3M, NORTON, TESA
4	AAC BLOCK	TATA TISCO BUILD, ULTRATECH (XTRLITE), BIRLA AEROCON, SIPOREX
5	ALUMINIUM SECTIONS FOR DOORS & WINDOWS ETC.	JINDAL, HINDALCO
6	AAC BLOCK ADHESIVE	ULTRATECH, ARDEX ENDURA, WEBER
7	ACOUSTIC SEAL / DOOR SEAL	LORIENT, RAVEN, DORMA, 3M, HAFELE
8	AIR TRANSFER GRILL	RUSKIN, SYSTEM AIR, TROX, TREMCO
9	ACOUSTICAL PANELS, ACOUSTICAL FALSE CELING, ACOUSTICAL CLADDING, ACOUSTICAL CLOUD CEILING, ACOUSTICAL CARPET FLOORING, ACOUSTICAL GLASS FIBER REINFORCED GYPSUM PANEL/ BOARD, ACOUSTICAL SPRAY	ARMSTRONG, GYPTECH, ECOPHON- SAINT GOBAIN
10	BITUMEN MEMBRANE FOR WATERPROOFING, HDPE MEMBRANE FOR WATERPROOFING, POLYUREA MEMBRANE FOR WATERPROOFING	SIKA, <del>SAINT GOBAIN</del> , SOPREMA, FOSROC, <del>PIDILITE</del>
11	BAMBOO DECKING, ROOFING & CLADDING	ECO GREEN FLOORING, LAMIWOOD, EPITOME BAMBOOWOOD
12	BACKER ROD	SUPREME/SYSTRANS
13	CEMENT	ACC, AMBUJA, ULTRATECH, JK CEMENT, WONDER
14	CERAMIC GLAZED TILES	SOMANY, KAJARIA, RAK
15	CRYSTALLIANE CEMENTITIOUS WATER PROOFING COMPOUND	XYPEX, KRYTON
16	CALCIUM SILICATE BOARD FOR FIRE DOOR	PROMOTECH, PROMINA, RAMCO
17	CPVC PIPES	ASTRAL, PRINCE, SFMC
18	CALCIUM SILICATE TILES FALSE CEILING	AEROLITE, RAMCO, HILUX
19	C.P. BRASS FITTING AND ACESSORIES	ROCA, KOHLER, TOTO, GROHE
20	DASH, ANCHORING FASTENERS	HILTI, FISCHER
21	EPDM GASKET	HANU, ANAND, VICTOR
22	EPOXY MORTAR	FOSROC, SIKKA, MYK LATICRETE
23	EXPANSION JOINT	MIGUA, CS, CAMEO
24	ENGINEERED WOODEN FLOORING AND SKIRTING	MIKASA (GREENLAM), TARKETT, HAVWOODS, PARADOR (HIL), PERGO, KAHRIS
25	ENGINEERED MARBLE	HR JOHNSON, KALINGA STONE
26	FIRE SEALANT	HILTI, 3M, MCCOY

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
27	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
28	FIRE CHECK DOORS (METAL/ROLLING/GLAZED)	PACIFIC FIRE CONTROLS, JC FIRE DOOR
29	FLOOR HARDENER, POLYSULPHIDE SEALANT, WATERPROOFING COMPOUND, ADMIXTURES/ CURING COUMPOUND	FORSROC, PIDILITE, SOPREMA
30	FIRE STOP IN CURTAIN WALL SYSTEM	HILTI, 3M, FISCHER, LORIENT
31	FLY ASH BRICKS	SIPOREX, SUNVIK, HIL
32	GYPSON BOARD	SAINT GOBAIN, ARMSTRONG, LAFARGE, GYPTECH
33	GI PIPES	JINDAL HISAR, TATA
34	GI FITTINGS	UNIK, TATA, JINDAL
35	GLASS MOSAIC TILE	ITALIA, CORAL, KAJARIA
36	HIGH PERFORMANCE EPOXY BASED RESIN ANCHOR SYSTEM	HILTI, FOSROC, CICO
37	HDPE PIPES	SUPREME, FINOLEX, ASTRAL, RELIANCE
38	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
39	INTUMESCENT FIRE / SMOKESEAL	ASTRO FLAME, RAVEN, SEALZ, LORIENT
40	MECHANICAL COUPERS	USHA MARTIN, DEXTRA, HALFEN, SANFIELD
41	MS SECTIONS (PIPES, BOXES CHANNELS)	JINDAL HISAR, TATA
42	METAL/ALUMINUM FALSE CEILING	SAINT GOBAIN, HUNTER DOUGLUS, ARMSTRONG, GYPTECH
43	OUTDOOR SIGNAGES	3M, AVERY DENNISON, VEDAAANSHI SIGNS
44	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	GREENLAM, MERINO, CENTURY, DURO, KIT PLY
45	POLYCARBONATE SHEET	DANPALON, SOLALITE, DPI SYSTEM, EVERLITE, CPI
46	POP OUT VENT FOR FAÇADE AND SYSTEM WINDOW HARDWARE	COTSWOLD, SCHUCO, ALUK, REYNAERS
47	PRECAST PAVER BLOCK	ACC, NOVACO, ULTRATECH, MODI COVER BLOCKS
48	READY MIXED CEMENT CONCRETE	ACC, ULTRA TECH, AFCON, LAFARGE (NUVACO)
49	READY MIX GYPSUM PLASTER	SAINT GOBAIN, ULTRATECH
50	READY MIX CEMENT PLASTER	WEBER, ULTRATECH, BIRLA
51	ROLLER BLIND	VISTA, MAC, HUNTER DOUGLUS
52	CORROSION RESISTANT STEEL (TMT FE-500D OR MORE)	TATA., RINL, JINDAL STEEL & POWER LTD, JSW STEEL LTD., SAIL
53	STRUCTURAL STEEL SECTIONS	TATA, JINDAL, SAIL, RINL
54	SILICON SEALANT	GE, DOW CORNING, PIDILITE

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
55	S.S. MATERIAL/HADRAILS/RAILINGS	JINDAL STAINLESS STEEL LTD., TATA STEEL, SAIL
56	SOIL, WASTE, VENT PIPES & FITTINGS	ASTRAL, PRINCE, SFMC, SUPREME
57	SS SINK	NILKANTH, NIRALI, JAYNA
58	SANITARY WARE (URINAL, WASH BASIN, WC ETC.)	GROHE, KOHLER, <del>TOTO</del> , Roca
59	SS TACTILE	EMINENT, FERROTECH, SUNDARAM, JINDAL
60	SLUICE VALVES, GATE / BALL VALVES	ZOLOTO, KIRLOSKAR, LEADER
61	TILE ADHESIVE, STONE ADHESIVE, EPOXY GROUTING COMPOUND	PIDILITE, ARDEX ENDURA, WEBER
62	UPVC WINDOWS	FENESTA, ALUPLAST, KOENMERLING
63	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, RAK
64	VINYL / CONDUCTIVE FLOORING, DADO SKIRTING	FORBO, TARAKETT, ARMSTRONG, GERFLOOR
65	WHITE CEMENT	BIRLA, J.K. WHITE, ULTRATECH
66	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, ICI
67	WOOD ADHESIVE	FEVICOL, 3M, ARALDITE
68	WALL PUTTY	JK, BIRLA, ASAIN PAINT
69	WPC (WOOD POLYMER COMPOSITE) DOOR SHUTTER, FRAME	GREENPLY, CENTURY, RAJSHREE, ALSTONE INDUSTRIES PVT LTD
70	WEATHER/STRUCTURE SILICON SEALANT	WACKER, MCCOY, DOW CORNING
71	AUTOMATIC SLIDING GLASS DOOR WITH COMPLETE MECHANISM	DORMA, AUTO INGRESS, GEZE, GODREJ, HAFELE
72	CUBICLES	GREENLAM, MARINO, CENTURY

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

## TENDER DRAWINGS

<b>S. NO.</b>	<b>DRAWINGS TITLE</b>	<b>DRAWING NO.</b>
1	SITE PLAN	2024-25_003/CPCB/SD/AR/101
2	GROUND FLOOR PLAN	2024-25_003/CPCB/SD/AR/151
3	FIRST FLOOR PLAN	2024-25_003/CPCB/SD/AR/152
4	SECOND FLOOR PLAN	2024-25_003/CPCB/SD/AR/153
5	THIRD FLOOR PLAN	2024-25_003/CPCB/SD/AR/154
6	FOURTH FLOOR PLAN	2024-25_003/CPCB/SD/AR/155
7	FIFTH FLOOR PLAN	2024-25_003/CPCB/SD/AR/156
8	TERRACE AND MUMTY LEVEL FLOOR PLAN	2024-25_003/CPCB/SD/AR/157
9	BASEMENT PLAN	2024-25_003/CPCB/SD/AR/158

# Schedule of Quantity for Civil Work

## SCHEDULE OF QUANTITY

**Name of Work:- Construction of New Building in the existing premises of Parivesh Bhawan,  
CPCB, Delhi (SH: Balance Work).**

SLNo	Description	Qty	Unit	Rate (In Rs.)	Amount (Rs.)
<b>1</b>	<b>EARTH WORK</b>				
1.1	Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including getting out and disposal of excavated earth upto 50 m and lift upto 1.5 m, as directed by Engineer-in- Charge:				
1.1.1	All kinds of soil	3237.00	Sqm	131.43	4,25,439
1.2	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and for all lift, as directed by Engineer-in-charge.				
1.2.1	All kinds of soil	26759.73	cum	179.66	48,07,653
1.3	Excavating trenches by mechanical / manual means 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, within a lead of 50 m :				
1.3.1	All kinds of soil				
1.3.1.1	Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300 mm dia	446.00	metre	356.45	1,58,977

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, lead up to 50 and for all lift.	5352.00	cum	198.39	10,61,783
1.5	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.	358.00	cum	2149.69	7,69,589
1.6	Laying and spreading available excavated earth (excluding rock) in layer are open ground, layer not exciding 20 in depth with all lead and lift all complete as per direction of Engineer In charge.	1024.00	Cum	103.35	1,05,830
1.7	Credit for extra all kind of earth including sand, clay etc. retrived from excavation of basement / foundation from site including loading / unloading and transportation to any location. The retrived extra all kind of earth sand, clay etc. after back filling in foundation etc. shall be property of the contractor. (Nothing extra shall be payable on account of stacking, loading, lifting, transportation, unloading and levelling etc. for all leads and lifts). The contractor shall stake earth required for back filling in foundation etc. or filling any where within the campus at site. If extra earth afte disposal is required at site then agency will bring the earth at site for which nothing extra shall be paid for the earth brought at site at later stage.	18732.00	Cum	-86.40	-16,18,445.00
	<b>Sub Head Total 1 :-</b>				<b>57,10,826</b>
<b>2</b>	<b>CEMENT CONCRETE</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 cement : 5 manufactured sand derived from Recycled Concrete Aggregate (RCA) : 10	524.00	Cum	4971.83	26,05,239

	graded stone aggregate 40 mm nominal size Recycled Aggregate (RA) )				
2.2	Centering and shuttering including strutting, propping etc. and removal of form work for :				
2.2.1	Foundations, footings, bases for columns	242.00	Sqm	396.94	96,059
2.3	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/Ordinary Portland /Portland Slag cement, 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.Note: 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.				
2.3.1	All works upto plinth level :				
2.3.1.1	Concrete of M10 grade with minimum cement content of 220 kg /cum	239.00	Cum	8943.04	21,37,387
	<b>Sub Head Total 2 :-</b>				<b>48,38,685</b>
<b>3</b>	<b>REINFORCED CEMENT CONCRETE</b>				
3.1	Centering and shuttering including strutting, propping etc. and removal of form for				

3.1.1	Foundations, footings, bases of columns, etc. for mass concrete	449.00	sqm	396.94	1,78,226
3.1.2	Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.	5574.00	sqm	852.79	47,53,451
3.1.3	Suspended floors, roofs, landings, balconies and access platform	8837.00	sqm	938.57	82,94,143
3.1.4	Shelves (Cast in situ)	29.00	sqm	938.57	27,219
3.1.5	Columns, Pillars, Piers, Abutments, Posts and Struts	3479.00	sqm	973.04	33,85,206
3.1.6	Stairs, (excluding landings) except spiral-staircases	113.00	sqm	774.29	87,495
3.1.7	Lintels, beams, plinth beams, girders, bressumers and cantilevers with water proof ply 12 mm thick	8559.00	sqm	852.23	72,94,237
3.2	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).				
3.2.1	Suspended floors, roofs, landing, beams and balconies (Plan area to be measured)	3415.00	Sqm	388.99	13,28,401
3.3	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 / Ordinary Portland /Portland Slag cement, 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. Note: 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.				
3.3.1	All works upto plinth level				
3.3.1.1	Concrete of M40 grade with minimum cement content of 390 kg/cum	5008.00	Cum	10079.25	5,04,76,884
3.3.2	All works above plinth level upto floor V level				
3.3.2.1	Concrete of M35 grade with minimum cement content of 370 kg /cum	2819.00	Cum	10286.45	2,89,97,503
3.4	Add for using extra cement in the items of design mix over and above the specified cement content therein.	2997.00	quintal	742.46	22,25,153
3.5	Extra for R.C.C./ B.M.C/ R.M.C. work above floor V level for each four floors or part thereof.	185.00	Cum	359.99	66,598
3.6	Providing and fixing of expansion joint system related with floor location as per drawings and direction of Engineer-In-Charge. The joints system will be of extruded aluminum base members, self aligning / self centering arrangement and support plates etc. as per ASTM B221-02. The system shall be such that it provides floor to floor /floor to wall expansion control system for various vertical localtion in load application areas that accommodates multi directional seismic movement without stress to it's components. System shall consist of metal profiles with an universal aluminum base member designed to accommodate various project conditions and finish floor treatments. The cover plate shall be designed of width and thickness required to satisfy projects movement and loading requirements and secured to base members by utilizing manufacturer's pre-engineered				

	self- centering arrangement that freely rotates / moves in all directions. The Self - centering arrangement shall exhibit circular sphere ends that lock and slide inside the corresponding aluminum extrusion cavity to allow freedom of movement and flexure in all directions including vertical displacement. Provision of Moisture Barrier Membrane in the Joint System to have watertight joint is mandatory requirement all as per the manufactures design and as approved by Engineer -inCharge. (Material shall conform to ASTM 6063).				
3.6.1	Floor Joint of 200 mm gap	210.00	mtr.	10024.59	21,05,164
3.7	Providing and fixing of expansion joint system related with wall joint (internal/external) location as per drawings and direction of Engineer-InCharge. The joints shall be of extruded aluminum base members, self aligning / centering arrangement and support plates as per ASTM B221- 02. The material shall be such that it provides an Expansion Joints System suitable for vertical wall to wall/ wall to corner application, both new and existing construction in office Buildings & complexes with no slipping down tendency amongst the components of the Joint System. The Joint System shall utilize light weight aluminum profiles exhibiting minimal exposed aluminum surfaces mechanically snap locking the multicellular to facilitate movement. (Material shall conform to ASTM 6063).				
3.7.1	Wall Joint of 200 mm gap	92.00	mtr.	6973.18	6,41,533
3.8	Providing and fixing of expansion joint system of approved make and manufactures for various roof locations as per approved drawings and direction of Engineer-In-Charge. The joints				

	<p>shall be of extruded aluminum base members with, self aligning and self centering arrangement support plates as per ASTM B221-02. The system shall be such that it provides watertight roof to roof to corner joint cover expansion control system that is capable of accommodating multidirectional seismic movement without stress to its components. System shall consist of metal profile that incorporates an universal aluminum base member designed to accommodate various project conditions and roof treatments. The cover plate shall be designed of width and thickness required to satisfy movement and loading requirements and secured to base members by utilizing manufacturer's pre-engineered self-centering arrangement that freely rotates / moves in all directions. The Self centering arrangement shall exhibit circular sphere ends that lock and slide inside the corresponding aluminum extrusion cavity to allow freedom of movement and flexure in all directions including vertical displacement. The Joint System shall resist damage or deterioration from the impact of falling ice, exposure to UV, airborne contaminants and occasional foot traffic from maintenance personnel. Provision of Moisture Barrier Membrane in the Joint System to have water tight joint is mandatory requirement. (Material shall conform to ASTM 6063).</p>				
3.8.1	Roof Joint of 200 mm gap	35.00	mtr.	8024.41	2,80,854
3.9	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete in foundation & super structure for all height .				

3.9.1	Corrosion Resistant Thermo-Mechanically Treated bars of grade Fe-500D or more.	1468300.00	kg	117.95	17,31,85,985
	<b>Sub Head Total 3 :-</b>				<b>28,33,28,052</b>
<b>4</b>	<b>MASONRY 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:				
4.1.1	Cement mortar 1:6 (1 cement : 6 coarse sand)	22.00	Cum	7219.35	1,58,826
4.2	Extra for brick work / AAC block masonry / Tile brick masonry in superstructure above floor V level, for each four floors or part thereof by mechanical means.	189.00	Cum	171.52	32,417
4.3	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 :				-
4.3.1	Cement mortar 1:6 (1 cement : 6 coarse sand)	607.00	cum	9206.12	55,88,115
4.4	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 separately).	701.00	cum	8435.42	59,13,229
4.5	Providing and laying precast cement concrete solid block in masonry above or below plinth level of Grade 'C' as per IS 2185 (Part 1) : 2005 with minimum density of 1 800 kg/m <sup>3</sup> and minimum average compressive strength of 7.5 N/mm <sup>2</sup> and cement concrete not leaner than 1:3:6 ( 1 cement: 3 coarse sand : 6 graded stone aggregate 10 mm ) of size 40cm x 20cm x 20cm	12.00	Cum	12956.50	1,55,478

	including hoisting and setting in position with cement mortar 1 :4 ( 1 cement : 4 Coarse sand) including cost of required centering, shuttering, tools and plants, all complete as per directions of Engineer-in-charge.				
	<b>Sub Head Total 4 :-</b>				<b>1,18,48,065</b>
<b>5</b>	<b>CLADDING WORK</b>				
5.1	Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded 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 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.				
5.1.1	Granite stone slab of colour black, Cherry/Ruby red				
5.1.1.1	Area of slab upto 0.50 sqm	88.00	sqm	5479.61	4,82,206
5.1.1.2	Area of slab over 0.50 sqm	46.00	sqm	5199.02	2,39,155
5.2	Extra for fixing marble /granite stone, over and above corresponding basic item, in facia and drops of width upto 150 mm with epoxy resin based adhesive, including cleaning etc. complete.	16.00	Metre	575.49	9,208
5.3	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.	43.00	each	990.65	42,598
5.4	Extra for pre finished nosing to treads of steps of marble stone.	672.00	meter	728.69	4,89,680
	<b>Sub Head Total 5 :-</b>				<b>12,62,847</b>

6	<b>WOOD AND P. V. C. WORK</b>				
6.1	<p>Providing and fixing factory made uPVC glazed/wire mesh windows/doors comprising of lead free uPVC multi-chambered frame, sash and mullion/coupler (where ever required) extruded profiles having minimum wall thickness of 1.70 mm for Series R1 and R2 profiles and 2.10 mm for Series R3 and R4 profiles conforming to EN: 12608 in any shape, colour and design duly reinforced with galvanized mild steel section made of required shape &amp; size as per CPWD Specification, uPVC extruded glazing beads, interlocks and Inline sash adaptor (where ever required) of appropriate dimension, EPDM gasket, hardware, SS 304 grade fasteners of minimum 8 mm dia with countersunk head, comprising of matching polyamide PA6 grade sleeve for fixing frame to finished wall as per IS 1367 : Part 1 to 14, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame, sash &amp; mullion (if required) shall be mitred cut and fusion welded/mechanically jointed duly sealed at all corners, including drilling of holes for fixing hardware and drainage of water etc. 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 approved drawing conforming to CPWD specification &amp; direction of Engineer-in-Charge. Section of steel reinforcement and cross sections of uPVC profiles to be as per design approved by Engineer-in-Charge.</p> <p>Wire mesh / Glazing of plain/ toughened/ laminated/ double glass unit with / without high performance coatings as per</p>				

	design requirements and conforming to IS: 3548 & IS: 16231 shall be paid separately.				
6.1.1	Three track three panels sliding window with Aluminium channel for roller track, wool pile, nylon rollers with SS 304 body.				
6.1.1.1	Using R3 series with frame (98mm & above) x (40mm & above) & sash (30mm & above) x (55mm & above) with zinc alloy (zamak) powder coated handle on two end panels along with multi-point locking system (Height upto 1.8 metre).	314.00	Sqm	8647.93	27,15,450
6.1.2	Fixed window / ventilator with mullion / transom.				
6.1.2.1	Using R2 series with frame (39mm & above ) x (39mm & above) & mullion (39mm & above) x (60mm & above). (Height upto 1.2 metre)	6.00	Sqm	8872.44	53,235
6.2	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid decorative type 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. WPC to be laminated with PVC foil of minimum 14 microns thick of approved design pasted with hot melt adhesive on both faces of shutter and fixing with stainless steel butt hinges of required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In- Charge.				

	(Note: stainless steel butt hinges and necessary S.S screws shall be paid separately)				
6.2.1	35 mm thick	76.00	Sqm	5499.20	4,17,939
6.3	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 5 mm 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.				
6.3.1	Frame size 50 x 100 mm	183.00	Mtr	959.27	1,75,546

6.4	<p>Providing and fixing of ISI marked medium duty hollow metal fire rated doors as per IS 3614: 2021, for 120 min integrity &amp; 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.</p>				
	<p>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 mitered 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</p>				

	material shall be 120 kg/m <sup>3</sup> 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, 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.				
6.4.1	Double leaf partially insulated metal fire rated door set of FD 120 Pl classification with 120 minutes integrity and 30 minutes insulation as per IS 3614:2021 for Staircase/Exit pathway /Refuge area etc.	310.00	Sqm	20533.33	63,65,332
6.5	Providing and fixing 12 mm 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).	76.00	Sqm	5390.94	4,09,711
6.6	Providing and fixing 1mm thick M.S. sheet door with frame of 40x40x6 mm angle iron and 3 mm M.S. gusset plates at the junctions and corners, all necessary fittings				-

	complete, including applying a priming coat of approved steel primer.				
6.6.1	Using M.S. angels 40x40x6 mm for diagonal braces	3.00	Sqm	5875.23	17,626
6.7	Providing and fixing double glazed hermetically sealed glazing in aluminium windows, ventilators and partition etc. with 6 mm thick clear float 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.	319.00	Sqm	5058.73	16,13,735
6.8	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 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.				
6.8.1	of minimum size 900x1300x1995mm	39.00	Each	46698.55	18,21,243
6.9	Providing and fixing of Standard duty Hollow metal doors confirming to IS 16074 & IS 4351 made of pressed galvanized steel confirming to IS 277 with the following specification. Doors shall be manufactured in ISO 9001: 2015 certified company for quality management. Doors shall be with vision glass and louver as a part of complete assembly. Price are inclusive of 3 no.s Hinges Per Leaf & Fasteners. Door frame shall be single rebate grooved profile of size 125 x 55 mm made out of minimum 1.2 mm thick galvanized steel sheet. Frames shall be mitered and field assembled with self-tabs. Frames shall have inbuilt grooved sealing system and shall be site fitted with PVC seal. All provision should be mortised, drilled and tapped for receiving appropriate hardware.	254.00	Sqm	8961.25	22,76,158

	<p>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 non-fire rated puff and the gaps shall be filled with backer rod &amp; silicon sealant. Door frame shall be finished with pure polyester powder coating (minimum 50 micron) and should have passed minimum 500 hours of salt spray test. Door leaf shall be of 46 mm thick fully flush double skin door, with or without vision panel. Door leaf shall be manufactured from minimum 1.2 mm thick galvanized steel sheet. Internal construction of the door should be rigid reinforcement pads type for receiving appropriate hardware. Infill material shall be resin bonded honeycomb core &amp; all doors shall be factory prepared for receiving appropriate hardware and provided with necessary reinforcement for hinges, locks, and door closers. Edges should be interlocked with a bending radius of 1.4 mm. For pair of doors integrated astragals has to be provided on the meeting stile for both active and inactive leaf. Vision panel wherever applicable should be provided as per manufacturers recommendation with a clip-on arrangement. Door Shutter shall be finished with pure polyester powder coating (minimum 50 micron) and shall have passed minimum 500 hours of salt spray test.</p>				
6.10	<p>Providing and fixing Surface door closer, Medium duty EN 2-4 with standard arm, Silver finish with necessary accessories and screws etc. complete.</p>	231.00	Each	2015.5	4,65,581
6.11	<p>Providing &amp; Fixing of Lever Handle with screws in SSS with necessary accessories and screws etc. Complete.</p>	231.00	Each	1208.20	2,79,094

6.12	Providing & Fixing Mortice sash lock, 55mm BS/20mm sq. forend, in SSS with necessary accessories and screws etc. complete.	231.00	Each	3100.80	7,16,285
6.13	Providing & Fixing 300mm Long Tower Bolt with necessary accessories and screws etc. complete.	185.00	Each	420.80	77,848
6.14	Providing and fixing pull Handle (in pair) or equivalent back to back with 350mm CTC, adjustable fixing for glass, wood and metal doors in satin stainless steel. The pull handles should have supporting washer with raised bevelling on the outer surface. Length =450mm, 25mm dia, -SS316 etc. complete as per the direction of Engineer-in-charge.	40.00	Set	3968.05	1,58,722
6.15	Providing and fixing Satin SS Universal Corner Lock Patch with LKP & EPC and Strike Plate of (Model US10 STD, F700 or Equivelant) conforming to IS : 6315, having brand logo embossed on the body etc. complete as per the direction of Engineer-in-charge.	40.00	Nos	5961.40	2,38,456
6.16	Providing and fixing 12 mm thick frameless toughened glass partition system of approved brand and manufacture, including fine edge polish, all fittings & silicon sealent as along with necessary holes etc. for fixing required door/patch/partition fittings etc. all complete as per direction of Engineer-in-charge. All fittings, fixing arrangements (in SS base rail, wall connector, clamps, EPDM Gasket, screws etc.) and installation, materials, making holes, dash fasteners etc are included in this item.	337.00	Sqm	5536.70	18,65,868
6.17	Providing and fixing frosted film of 3 M Crystal or equivalent make having shading coefficient 0.93%, visible light reflection 12%, visible light transmittance 72%, solar heat reflectance 10%, solar heat transmittance 64% and solar	458.00	Sqm	1638.55	7,50,456

	heat absorbance 26% all complete in required pattern as per manufacturer's specification and as per direction of Engineer-in-charge.				
6.18	Providing and fixing 6mm thick High Pressure Interior Compact laminate made out of thermosetting resin treated Kraft as core material and design paper as a finish surface on both sides of required colour, pattern and shade in wall lining fixed over aluminium frame /ply board with adhesive or Metal dash fasteners or rivets colour matching with laminate, or as per site requirement and directions of engineer-in-charge. Compact laminates will be resistant to water immersion through permissible increase on thickness and mass <0.60% and board should have density >1.35kg/cm <sup>3</sup> . Compact should be flame retardant fulfilled the criteria of under BS-476/97 and EN438-6 with classification of BS1D0 standard property with Anti-Viral, Anti-bacterial & Antitermite (under JIS Z2801:2000 certification), Chemical resistance, Scratch resistant ,flame resistance, weather & climatic shock resistance (the contractor will provide 10 years warrantee certificate on any manufacturing and moisture related defects) (Note: Cost of Aluminium frame/ply board will be paid separately).	86.00	Sqm	3768.60	3,24,100
6.19	Providing and fixing 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 ,	2188.00	Kg	1025.05	22,42,809

	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.).				
	<b>Sub Head Total 6 :-</b>				<b>2,29,85,194</b>
<b>7</b>	<b>STEEL WORK</b>				
7.1	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.				
7.1.1	Hot finished welded type tubes	12416.00	kg	196.77	24,43,096
	<b>Sub Head Total 7 :-</b>				<b>24,43,096</b>
<b>8</b>	<b>FLOORING</b>				
8.1	Kota stone slab flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand) :				
8.1.1	25 mm thick	184.00	sqm	1972.04	3,62,855
8.2	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 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including 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, leveling system and rubber mallet for placing the tiles gently and easily.				
8.2.1	Glazed Vitrified tiles Matt/Antiskid finish of size				
8.2.1.1	size of Tile 600 x 600 mm	1494.00	Sqm	1482.74	22,15,214
8.3	Deduct for not using 20 mm thick cement mortar 1:4 (1 cement : 4 coarse sand) bedding in laying of floor tiles and jointing with grey cement slurry @ 3.3 kg/ sqm.	3345.00	sqm	-860.48	-28,78,306
8.4	Fixing glazed/ Ceramic/ Vitrified floor tiles with cement based high polymer modified quick-set tile adhesive (Water based) conforming to IS: 15477, in average 3mm thickness.	3345.00	sqm	762.45	25,50,395
8.5	Providing and fixing Ist quality ceramic glazed wall tiles (300x600 or as per direction of Engineer In charge) conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	751.00	sqm	1283.43	9,63,856
8.6	Providing and laying flamed finish Granite stone flooring 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 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 :				
8.6.1	Flamed finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.	105.00	sqm	3225.62	3,38,690
8.7	Providing and laying Polished Granite stone flooring 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 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	Polished Granite stone slab colour of Black, Cherry/Ruby Red or equivalent	1543.00	sqm	4536.03	69,99,094
8.8	Deduct for not grouting the joints with white cement and matching pigment in the items of fixing of vitrified tiles.	3345.00	sgm	-13.46	-45,024
8.9	Providing and laying glazed Vitrified floor tiles( full body) in different sizes (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 20 mm 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.				
8.9.1	Glazed vitrified tile polished finish of size				
8.9.1.1	Size of Tile 800x1600 mm	1851.00	sqm	2,370.75	43,88,258

8.10	Providing and laying glazed Vitrified tiles full body in different sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, Dado, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement: 3 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joint with white cement & matching pigments etc. Complete				
8.10.1	Glazed vitrified tile polished finish of size				
8.10.1.1	Size of Tile 800 X 1600 mm	186.00	sqm	2454.00	4,56,444
8.11	Grouting the joints of flooring tiles having joints of 3 mm width, using epoxy grout mix of 0.70 kg of organic coated filler of desired shade (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. Note nothing shall be paid for spacer.				
8.11.1	Size of Tile 800 X 1600 mm	3345.00	sqm	254.90	8,52,641
8.12	Providing and laying polished Granite stone slabs 18 mm thick of in risers of steps, skirting, dado and pillars laid on 20 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, with copper pins 7.5 cm long, 6 mm diameter for securing adjacent stones in stone wall lining, including rubbing and polishing complete.				
8.12.1	Polished Granite stone slab colour of Black, Cherry/Ruby Red or equivalent	113.00	sqm	3849.05	4,34,943
	<b>Sub Head Total 8 :-</b>				<b>1,66,39,060</b>
<b>9</b>	<b>ROOFING</b>				
9.1	Designing, providing and fixing multiwall three or more layered polycarbonate sheet panel co-extruded Ultra Violet (UV)				

	<p>protective coating on external surface with standing seam on both the running ends, sheet shall be connected using polycarbonate connectors having grip lock double tooth locking mechanism and provided with endcap at the ends to ensure water and air tightness. The light transmission from transparent or translucent or opaque or in combination polycarbonate sheet, varies from 15 to 85%, shall be decided by engineer in charge as per requirement. The polycarbonate sheet shall have Dart drop impact value more than 60 Joules as per ISI4434:2023 and confirm either flame retardancy of class UL-94HB/94V-0 category as per ISI4434:2023 or category VO &amp; HB as per ASTM D635-18 or BSID0 classification as per EN13501 for fire safety. The yellowness index tested as per ASTM E313 (D1925) or ASTM E313 (D1925) shall be equal to or more than 10 unit or 6 units respectively on a sample after 5000 Hours of exposure of UV / sun light. The cross section ends of poly carbonate sheet shall be provided with self-adhesive aluminium impermeable tape at top and aluminium ventilated tape at bottom of the sheet and covered with polycarbonate / aluminium u-shaped protective profile. The poly carbonate sheet shall be held in position by using stainless steel (SS304 grade) trapezoidal cleat of 1 mm thick having minimum bottom width 35mm and top width 50mm or any other shape and size as per design requirement and manufacturer specification, cleat fixed with 2 or more stainless steel screws of 5 mm diameter with 25mm long with structural steel framework. The cleat shall be tested to withstand pull out force equal to wind speed of 50m/s as per IS: 875 and design</p>				
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	test report shall be submitted to Engineer-in-charge for approval before use. The cost of ridge and gutters of pre-coated galvanized iron sheet of approved specifications and structural steel framework of shall be paid in respective item for separately.				
9.1.1	12 mm thick, 1000 (±10%) wide panel with U value not more than 2.50 W/m <sup>2</sup> K and weight not less than 2.25 kg/sqm.	281.00	sqm	3146.11	8,84,057
9.2	Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) over P.V.C. sheet 1 m x1 m x 400 micron, finished with 12 mm cement plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement, rounding the edges and making and finishing the outlet complete.	11.00	each	301.89	3,321
9.3	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.				
9.3.1	110 mm diameter	288.00	metre	382.01	1,10,019
9.4	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.				
9.4.1	Coupler				
9.4.1.1	110 mm	11.00	each	137.81	1,516
9.4.2	Bend 87.5°				
9.4.2.1	110 mm bend	11.00	each	152.19	1,674
9.4.3	Shoe (Plain)				

9.4.3.1	110 mm Shoe	11.00	each	133.46	1,468
9.5	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.				
9.5.1	110 mm	149.00	each	375.83	55,999
9.6	Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams.	11.00	each	55.37	609
9.7	Providing and fixing false ceiling at all heights with integral densified calcium silicate reinforced with fibre and natural filler false ceiling tiles of Size 595x595 mm of approved texture, design and patterns having NRC (Noise Reduction coefficient) of 0.50 (minimum) as per IS 8225:1987, Light reflectance of 85% (minimum). Non combustible as per BS:476 (part-4), fire performance as per BS:476 (part 6 &7), humidity resistance of 100%, thermal conductivity < 0.043 W/m K as per ASTM 518:1991, in true horizontal level suspended on inter-locking metal powder coated T-Grid of hot dipped galvanised iron section of 0.40 mm thick on Silhouette profile, rotary stitched double webbed white with 6mm reveal profile (white/black), comprising of main-T runners of size 15x42mm of length 3000 mm, cross - T of size 15x42 mm of length 1200 mm and secondary intermediate cross-T of size 15x42 mm of length 600mm to form grid module of size 600 x 600 mm, suspended from ceiling using galvanised mild steel items (galvanizing @ 80 grams per				

	sqm) i.e. 50 mm long, 8 mm outer diameter M-6 dash fasteners, 6 mm dia fully threaded hanger rod upto 1000 mm length and L-shape level adjuster of size 85x25x2 mm. Galvanised iron perimeter wall angle of size 22x19x0.40 mm of length 3000 mm to be fixed on periphery wall / partition with the help of plastic rawl plugs at 450 mm center to center and 40mm long dry wall S.S screws. The work shall be carried out as per specifications, drawing and as per directions of the Engineer-in-Charge.				
9.7.1	With 15 mm thick integral densified micro edge light weight calcium silicate false ceiling tiles	3532.00	Sqm	2662.52	94,04,021
9.8	Providing and fixing GI Clip in Metal Ceiling System of 600x600 mm module which includes providing and fixing 'C' wall angle of size 20x30x20 mm made of 0.5 mm thick pre painted steel along the perimeter of the room with help of nylon sleeves and wooden screws at 300 mm center to centre, suspending the main C carrier of size 10x38x10 mm made of G.I steel 0.7 mm thick from the soffit with help of soffit cleat 37x27x25x1.6 mm, rawl plugs of size 38x12 mm and C carrier suspension clip and main carrier bracket at 1000 mm c/c. Inverted triangle shaped Spring Tee having height of 24 mm and width of 34 mm made of GI steel 0.45 mm thick is then fixed to the main C carrier and in direction perpendicular to it at 600 mm centers with help of suspension brackets. Wherever the main C carrier and spring T have to join, C carrier and spring T connectors have to be used. All sections to be galvanized @ 120 gms/sqm (both side inclusive), fixing with clip in tiles into spring T with :				

9.8.1	GI Metal Ceiling Clip in plain Beveled edge global white color tiles of size 600x600 and 0.5 mm thick with 25 mm height, made of G I sheet having galvanizing of 100 gms/ sqm (both sides inclusive) and 20% perforation area with 1.8 mm dia holes and having NRC of 0.5, electro statically polyester powder coated of thickness 60 microns (minimum), including factory painted after bending and perforation.	413.00	Sqm	2383.40	9,84,344
9.9	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 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 chanel 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 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:				
9.9.1	10 mm thick Calcium Silicate Board made with Calcareous & Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process.	190.00	Sqm	1929.45	3,66,596
	<b>Sub Head Total 9 :-</b>				<b>1,18,13,624</b>
<b>10</b>	<b>FINISHING</b>				
10.1	12 mm cement plaster of mix :				
10.1.1	1:6 (1 cement: 6 coarse sand)	5466.00	sqm	347.85	19,01,348
10.2	15 mm cement plaster on the rough side of single or half brick wall of mix :				
10.2.1	1:6 (1 cement: 6 fine sand)	4840.00	Sqm	387.68	18,76,371
10.3	6 mm cement plaster of mix				
10.3.1	1:3 (1 cement : 3 fine sand)	500.00	Sqm	304.12	1,52,060
10.4	Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete.	5466.00	sqm	265.91	14,53,464
10.5	Finishing walls with textured exterior paint of required shade :				
10.5.1	New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of	1569.00	sqm	226.33	3,55,112

	exterior primer applied @ 2.20kg/10 sqm				
10.6	Finishing walls with Acrylic Smooth exterior paint of required shade :				
10.6.1	New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm)	3271.00	sqm	162.56	5,31,734
10.7	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade :				
10.7.1	Two or more coats on new work	453.00	sqm	157.80	71,483
10.8	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile Organic Compound ) content less than 50 grams/ litre of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.				
10.8.1	Two coats	5466.00	sqm	144.54	7,90,056
10.9	Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.	4840.00	Sqm	157.96	7,64,526
	<b>Sub Head Total 10 :-</b>				<b>78,96,154</b>
<b>11</b>	<b>Demolishing WORK</b>				
11.1	Demolishing cement concrete manually/ by mechanical means including disposal of dismantled material from site to nearest dumping ground for all lead and lift all complete as per direction of Engineer - in - charge.				
11.1.1	Nominal concrete 1:3:6 or richer mix (i/c equivalent design mix)	50.00	Cum	2463.98	1,23,199
11.2	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.				

11.2.1	In cement mortar	30.00	Cum	2085.36	62,561
11.3	Dismantling steel work in built up sections in angles, tees, flats and channels including all gusset plates, bolts, nuts, cutting rivets, welding etc. including dismembering and stacking within 50 metres lead.	5000.00	Kg	5.72	28,600
11.4	Dismantling roofing including ridges, hips, valleys and gutters etc., and stacking the material within 50 metres lead of:				
11.4.1	G.S. Sheet	1000.00	Sqm	166.96	1,66,960
	<b>Sub Head Total 11 :-</b>				<b>3,81,320</b>
<b>12</b>	<b>ROAD WORK</b>				
12.1	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 earth with lead upto 50 metres.	896.00	Sqm	221.57	1,98,527
12.2	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.				
12.2.1	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.	2250.00	per cm length per cm width per meter length	8.76	19,710
12.3	Providing and laying at or near ground level factory made kerb stone (RCA) of M-25 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), including	24.00	Cum	10241.16	2,45,788

	making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured to calculate volume for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).				
12.4	Providing and laying C.C. pavement of mix M-25 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. complete as per specifications and directions of Engineer-in-charge. (The panel shuttering work shall be paid for separately). (Note:- Cement content considered in this item is @ 330 kg/cum. Excess/less cement used as per design mix is payable/recoverable separately).	492.00	Cum	9943.77	48,92,335
12.5	Construction of dry lean cement concrete sub base over a prepared sub-grade with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per specifications, cement content not to be less than 150 Kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, for all leads & lifts, laid with a mechanical paver, compacting with 8-10 tonne vibratory roller, finishing and curing etc. complete as per direction of Engineer-in- charge.	90.00	Cum	4199.31	3,77,938

12.6	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.				
12.6.1	With material conforming to Grade-II (size range 53 mm to 0.075 mm ) having CBR Value-25	135.00	Cum	2960.57	3,99,677
12.7	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 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.	90.00	Sqm	2042.24	1,83,802
12.8	Providing and laying factory made chamfered edge reflective 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.				
12.8.1	60mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.	360.00	Sqm	1058.42	3,81,031
12.9	Making groove of required size 10x50mm in Cement concrete/ RCC pavement by diamond cutter in proper shape and size including filling bitumen hot sealing compound (Using grade 'A' sealing compound) in joints etc. removing left over material (cement concrete etc) complete , as per direction of Engineer in charge.				
12.9.1	Size of groove 50x10 mm	350.00	Metre	128.30	44,905
	<b>Sub Head Total 12 :-</b>				<b>67,43,713</b>
<b>13</b>	<b>Sanitary Installation</b>				
13.1	Providing and fixing Stainless Steel A ISI 304 (18/8) 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 :				
13.1.1	Kitchen sink without drain board				
13.1.1.1	610x510 mm bowl depth 200 mm	1.00	Each	5001.14	5,001
13.2	Providing and fixing wash basin with 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:				
13.2.1	White Vitreous China Wash basin size 630x450 mm with a pair of 15 mm C.P. brass pillar taps	6.00	Each	2681.20	16,087
13.3	Providing and fixing P.V.C. waste pipe for sink or wash basin including P.V.C. waste fittings complete.				
13.3.1	Semi rigid pipe				
13.3.1.1	32 mm dia	6.00	Each	105.17	631

13.4	Providing and fixing CP Brass 32mm size Bottle Trap of approved quality & make and as per the direction of Engineer-in-charge.	68.00	Each	1047.44	71,226
13.5	Providing and fixing toilet paper holder :				
13.5.1	C.P. brass	44.00	Each	813.51	35,794
13.6	Providing and fixing white vitreous china extended wall mounting water closet of size 780x370x690 mm of approved shape including providing & fixing white vitreous china cistern with dual flush fitting, 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.	44.00	Each	15182.32	6,68,022
13.7	Providing and fixing white vitreous china battery based infrared sensor operated urinal of approx. size 610 x 390 x 370 mm 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.	26.00	Each	8076.64	2,09,993
13.8	Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams.	11.00	Each	55.37	609
13.9	Providing and fixing stainless steel grating (of Chilly/ Camry or equivalent) approved quality and colour.				
13.9.1	125 mm dia.	75.00	Each	925.00	69,375
13.10	Providing and fixing Over Counter Wash basin 32 mm bottle trap all complete.	36.00	Each	6954.00	2,50,344
13.11	Providing and fixing 15mm C.P brass Single Lever Basin Mixer for Wash Basin Including cutting and making good the walls wherever required etc. all complete.	42.00	Each	1854.00	77,868
13.12	Providing and fixing 15mm C.P. copper connecting pipe 450mm long with C.P. brass nuts, washers	84.00	Each	289.00	24,276

	complete in all respects. all complete.				
13.13	Providing and fixing C.P. brass 15 mm nominal bore two way bib cock all complete	44.00	Each	2233.00	98,252
13.14	Providing and fixing C.P. cast brass twin coat hooks fixed to PVC rawl plug with SS screws all complete.	44.00	Each	1063.00	46,772
13.15	Providing and fixing health faucet with 1 m long flexible tube and wall hook including all fittings Make all complete.	44.00	Each	1472.00	64,768
13.16	Providing and fixing 15mm C.P brass Sink Mixer for kitchen sink with swinging spout complete. Including cutting and making good the walls wherever required etc. all complete.	1.00	Each	4667.00	4,667
13.17	Providing and fixing liquid soap dispenser including all fittings complete. of make all complete..	42.00	Each	1541.00	64,722
13.18	Providing & fixing SS Grab Bar of SS Grab Rail Euronics Including cutting and making good the walls wherever required etc. all complete..	18.00	Each	7704.00	1,38,672
13.19	Providing and fixing Air Purifier including all fittings complete in all respect.	37.00	Each	1924.00	71,188
13.20	Providing and fixing 150 litre/ hr. cooling and storage capacity, fully stainless steel electric storage type water cooler 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.	8.00	Each	46929.38	3,75,435
13.21	Providing and Fixing of MS body in SS finish Hand Dryer with voltage supply of 220V, with touch free infra red sensor.(For Director Room), all complete.	21.00	Each	7318.00	1,53,678
13.22	Providing and Fixing of Hand Dryer, SS 304 grade, total power 1000W, Hot & cold switch with a air speed of 110m/s, noise level upto 75 DB, Energy efficient.(For	4.00	Each	7318.00	29,272

	Banquet common toilet) all complete.				
13.23	Supply, Installation, Testing and Commissioning of soil, waste, rain water and vent pipe mineral filled 3 layered (PP/PP mineral filled/PP) Polypropylene low noise pipes and fittings of min. density 1.9 gm/cm <sup>3</sup> , pipes of 40 mm – 200 mm including all fittings & accessories such as coupler, elbow, tee, Y, reducer, access door, end cap, cowls, etc. for soil, waste and vent purpose in floors, ceiling suspended, or on walls, with leak proof joints etc. Joining pipes & fittings with rubber sealing rings as per approved manufacturer recommendation. Wall chasing, holes, supporting, clamping, covering back with chicken mesh & plaster and making the wall good as per approved shop drawing. Sound level of less than 19 to 22 dB(A) at flow rate of 4 L/s according to DIN 4109. Should have D-s2, d0 fire classification as per EN 13501 or B2 as per DIN 4102, short term hot water resistance upto 95°C and long term upto 90°C, chemical resistance of pH 2 to pH12 - Should have IAPMO and Green certification.				
13.23.1	110 mm OD	350.00	Metre	243.00	85,050
13.24	Supply, Installation, Testing and Commissioning of soil, waste, rain water and vent pipe mineral filled 3 layered (PP/PP mineral filled/PP) Polypropylene low noise pipes and fittings of min. density 1.9 gm/cm <sup>3</sup> , pipes of 40 mm – 200 mm including all fittings & accessories such as coupler, elbow, tee, Y, reducer, access door, end cap, cowls, etc. for soil, waste and vent purpose in floors, ceiling suspended, or on walls, with leak proof joints etc. Joining pipes & fittings with rubber sealing rings as per				

	approved manufacturer recommendation. Wall chasing, holes, supporting, clamping, covering back with chicken mesh & plaster and making the wall good as per approved shop drawing. Sound level of less than 19 to 22 dB(A) at flow rate of 4 L/s according to DIN 4109. Should have D-s2, d0 fire classification as per EN 13501 or B2 as per DIN 4102, short term hot water resistance upto 95°C and long term upto 90°C, chemical resistance of pH 2 to pH12 - Should have IAPMO and Green certification.				
13.24.1	40 mm OD	80.00	Metre	129.00	10,320
13.24.2	50 mm OD	55.00	Metre	159.00	8,745
13.25	Providing and fixing 100 mm dia PP inlet fitting/ Extension Piece with 2 or 3 inlets of 32 to 50 mm dia, fixed to uPVC trap with Sealent and set in cement concrete as per drawing complete.	30.00	each	310.00	9,300
13.26	Providing and fixing PP trap of self cleansing design with grating with or without vent arm complete, including cost of cutting and making good the walls and floors :	80.00	each	1500.00	1,20,000
13.27	Providing and fixing in position 110x63 mm dia PP floor Drain including fix to floor with cement mortar.	15.00	each	711.00	10,665
13.28	Providing and fixing in position 110 mm dia Clean out plug complete in all respects	25.00	each	88.00	2,200
13.29	Providing and fixing in position 110 mm dia Vent Cowl complete in all respects				
13.29.1	110 mm OD	15.00	each	90.00	1,350
	<b>Sub Head Total 13 :-</b>				<b>27,24,282</b>
<b>14</b>	<b>Water Supply System</b>				
	Providing and placing on terrace (at all floor levels) polyethylene water storage IS : 12701 marked, with cover and suitable locking arrangement and making	2000.00	Per Lit.	11.13	22,260

	necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.				
14.1	Providing and fixing C.P. brass bib cock of approved quality conforming to IS:8931 :				
14.1.1	15 mm nominal bore	10.00	Each	512.99	5,130
14.2	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.				
14.2.1	15 mm nominal bore	1.00	Each	808.71	809
14.3	Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS:8931				
14.3.1	15mm nominal bore	114.00	Each	581.31	66,269
14.4	Providing and fixing C.P. Brass extension nipple (size 15mmx50mm) of approved make and quality as per direction of Engineer-in-charge.	156.00	Each	75.71	11,811
14.5	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 (fitting shall be paid for separately) 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. (The pipe length inserted in the fitting shall not be measured for payment) internal work - exposed on wall				
14.5.1	15 mm outer dia pipe	175.00	Metre	712.65	1,24,714
14.5.2	22 mm outer dia Pipe	210.00	Metre	1037.77	2,17,932
14.5.3	28 mm outer dia Pipe	250.00	Metre	1287.69	3,21,923

14.6	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 (fitting shall be paid for separately) 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. (The pipe length inserted in the fitting shall not be measured for payment) Internal work concealed pipe				
14.6.1	15 mm outer dia Pipe.	330.00	Metre	917.17	3,02,666
14.6.2	22 mm Outer dia pipes	140.00	Metre	1242.24	1,73,914
14.7	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge. Coupling/Socket				
14.7.1	For 15 mm outer dia pipe	181.00	Each	345.62	62,557
14.7.2	For 22 mm outer dia pipe	51.00	Each	432.01	22,033
14.7.3	For 28 mm outer dia pipe	75.00	Each	503.98	37,799
14.8	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge. Reducer				
14.8.1	For 22mm x 15 mm outer dia pipe	108.00	Each	410.40	44,323
14.8.2	For 28 mm x 15 mm outer dia pipe	47.00	Each	496.79	23,349
14.8.3	For 28 mm x 22 mm outer dia pipe	28.00	Each	604.80	16,934

14.9	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Sleeve/Slip Coupling/ Socket				
14.9.1	For 15 mm outer dia pipe	2.00	Each	604.80	1,210
14.9.2	For 22 mm outer dia pipe	2.00	Each	719.99	1,440
14.9.3	For 28 mm outer dia pipe	2.00	Each	835.23	1,670
14.10	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Elbow 90°				
14.10.1	For 15 mm outer dia pipe	783.00	Each	489.61	3,83,365
14.10.2	For 22 mm outer dia pipe	402.00	Each	691.19	2,77,858
14.10.3	For 28 mm outer dia pipe	93.00	Each	921.62	85,711
14.11	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Equal Tee				
14.11.1	For 15 mm outer dia pipe	105.00	Each	806.43	84,675
14.11.2	For 22 mm outer dia pipe	42.00	Each	943.23	39,616
14.12	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				

	Reducing Tee				
14.12.1	For 22mm x 15 mm outer dia pipe	210.00	Each	921.62	1,93,540
14.12.2	For 28 mm x 15 mm outer dia pipe	84.00	Each	1144.81	96,164
14.12.3	For 28 mm x 22 mm outer dia pipe	56.00	Each	1152.00	64,512
14.13	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standard with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Male Thread Connector/ Adapter				
14.13.1	For 15 mm outer dia X 1/2" nominal dia threaded	436.00	Each	648.02	2,82,537
14.13.2	For 22 mm outer dia X 1/2" nominal dia threaded	150.00	Each	770.39	1,15,559
14.13.3	For 22 mm outer dia X 3/4" nominal dia threaded	41.00	Each	813.62	33,358
14.13.4	For 28 mm outer dia X 1" nominal dia threaded	24.00	Each	1065.61	25,575
14.14	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standard with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Female Threaded Elbow 90°				
14.14.1	For 15 mm outer dia X 1/2" nominal dia threaded	587.00	Each	1029.62	6,04,387
14.15	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standard with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Cap				
14.15.1	For 15 mm outer dia pipe	2.00	Each	511.22	1,022
14.15.2	For 22 mm outer dia pipe	2.00	Each	662.39	1,325
14.15.3	For 28 mm outer dia pipe	2.00	Each	827.99	1,656

14.16	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standard with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge. Pipe Bridge				
14.16.1	For 15 mm outer dia pipe	126.00	Each	662.39	83,461
14.17	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standard with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge. Male Union				
14.17.1	For 22mm outer dia X 1/2" nominal dia threaded	77.00	Each	1440.02	1,10,882
14.17.2	For 22mm outer dia X 3/4" nominal dia threaded	41.00	Each	1648.79	67,600
14.17.3	For 28mm outer dia X 1" nominal dia threaded	28.00	Each	2908.79	81,446
14.18	Providing and fixing G.I. pipes complete with G.I. fittings and clamps, i/c cutting and making good the walls etc. Internal work - Exposed on Wall				
14.18.1	20 mm dia nominal bore	30.00	Metre	442.64	13,279
14.18.2	25 mm dia nominal bore	45.00	Metre	558.44	25,130
14.18.3	32 mm dia nominal bore	50.00	Metre	675.15	33,758
14.18.4	40 mm dia nominal bore	45.00	Metre	821.81	36,981
14.18.5	50 mm dia nominal bore	150.00	Metre	1061.15	1,59,173
14.18.6	65 mm dia nominal bore	85.00	Metre	1343.30	1,14,181
14.18.7	80 mm dia nominal bore	100.00	Metre	1529.14	1,52,914
14.19	Constructing masonry Chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement :4 coarse sand) for stop cock, with C. I. surface box 100x100 x75 mm (inside) with hinged cover fixed in reinforced cement concrete slab 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3				

	graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 ( 1 cement : 5 fine sand : 10 graded stone aggregate 40mm nominal size ) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12mm thick, finished with a floating coat of neat cement complete as per standard design :				
14.19.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	6.00	Each	2016.93	12,102
14.20	Constructing masonry Chamber 60x60x75 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100mm top diameter, 160 mm bottom diameter and 180 mm deep ( inside) with chained lid and RCC top slab 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20mm nominal size ) , i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design :				
14.20.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	4.00	Each	10995.05	43,980
14.21	Painting G.I. pipes and fittings with synthetic enamel white paint with two coats over a ready mixed priming coat, both of approved quality for new work :				
14.21.1	20 mm diameter pipe	30.00	Metre	23.53	706
14.21.2	25 mm diameter pipe	45.00	Metre	30.62	1,378
14.21.3	32 mm diameter pipe	50.00	Metre	36.79	1,840
14.21.4	40 mm diameter pipe	45.00	Metre	43.17	1,943
14.21.5	50 mm diameter pipe	150.00	Metre	51.62	7,743

14.22	Providing and fixing G.I. Union in existing G.I. pipe line, cutting and threading the pipe and making long screws, including excavation, refilling the earth or cutting of wall and making good the same complete wherever required :				
14.22.1	20 mm nominal bore	2.00	Each	868.33	1,737
14.22.2	25 mm nominal bore	4.00	Each	961.96	3,848
14.22.3	32 mm nominal bore	4.00	Each	1012.36	4,049
14.22.4	40 mm nominal bore	4.00	Each	1156.35	4,625
14.22.5	50 mm nominal bore	6.00	Each	1539.37	9,236
14.22.6	65 mm nominal bore	2.00	Each	1856.14	3,712
14.22.7	80 mm nominal bore	4.00	Each	1928.16	7,713
14.23	Cutting holes up to 15x15 cm in R.C.C. floors and roofs for passing drain pipe etc. and repairing the hole after insertion of drain pipe etc. with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), including finishing complete so as to make it leak proof.	123.00	Each	456.52	56,152
14.24	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				
14.24.1	65 mm dia	1.00	Each	4759.12	4,759
14.24.2	80 mm dia	4.00	Each	5460.06	21,840
14.25	Providing, installation, testing and commissioning of non-return valve of following sizes conforming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required :				
14.25.1	80 mm dia	3.00	Each	8337.55	25,013
14.26	Painting G.I. pipes and fittings with synthetic enamel white paint with two coats over a ready mixed priming coat, both of approved quality for new work :				
14.26.1	65 mm dia. nominal bore	85.00	Metre	57.00	4,845

14.26.2	80 mm dia. nominal bore	100.00	Metre	66.00	6,600
14.27	Making epoxy coating in all the core cuttings , including finishing complete so as to make it leak proof.	123.00	Each	111.00	13,653
14.28	Providing and fixing forged brass ball valve of brass body with hard chrome plated steel ball inside PTFE (Teflon) seat & ring with chrome plated centre handle with female BSP threads complete in all respects.				
14.28.1	15 mm nominal bore	10.00	Each	401.00	4,010
14.28.2	20 mm nominal bore	60.00	Each	535.00	32,100
14.28.3	25 mm nominal bore	15.00	Each	825.00	12,375
14.28.4	32 mm nominal bore	15.00	Each	1311.00	19,665
14.28.5	40 mm nominal bore	15.00	Each	1975.00	29,625
14.28.6	50 mm nominal bore	3.00	Each	2808.00	8,424
14.29	Providing and fixing Thermoflex or Kaiflex thermal insulation tubing a elastomeric flexible material having hermetic blister closed cell structure of expanded synthetic rubber over pipes of following nominal bores and thickness including all required accessories complete as per specification.				
14.29.1	For 20 mm dia Pipe 6 mm thick (Concealed Pipes)	545.00	Metre	65.00	35,425
14.30	Providing and fixing forged brass single acting air release valve with screwed inlet 25 mm dia.	6.00	Each	970.00	5,820
14.31	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 in all respects.				
14.31.1	32 mm dia.	2.00	Each	22197.00	44,394
14.32	Providing and fixing threaded end brass digital water meter complete in all respect.				

14.32.1	40 mm dia.	2.00	Each	11169.00	22,338
14.33	Providing & laying HDPE pipes confirming to IS: 4984 type PE-80 (10 kg/cm <sup>2</sup> ) including fittings wherever required e.g., tees, bends of any degree, couplings, adapters, plugs, unions etc. and jointing as manufacturer recommendation etc. complete including necessary earth excavation for trenching & refilling. (For Irrigation System.)				
14.33.1	25 mm OD	12.00	Metre	252.00	3,024
14.33.2	32 mm OD	10.00	Metre	287.00	2,870
14.33.3	40 mm OD	355.00	Metre	355.00	1,26,025
	<b>Sub Head Total 14 :-</b>				<b>52,11,977</b>
<b>15</b>	<b>Drainage</b>				
15.1	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) all-round S.W. pipes including bed concrete as per standard design :				
15.1.1	150 mm diameter S.W. pipe	10.00	Metre	1194.26	11,943
15.1.2	250 mm diameter S.W. pipe	225.00	Metre	1609.97	3,62,243
15.2	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) up to haunches of S.W. pipes including bed concrete as per standard design :				
15.2.1	250 mm diameter S.W. pipe	275.00	Metre	1029.32	2,83,063
15.2.2	300 mm diameter S.W. pipe	60.00	Metre	1187.68	71,261
15.3	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:				
15.3.1	180x150 mm size P type				

15.3.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Each	2836.37	5,673
15.4	Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete :				-
15.4.1	250 mm dia. R.C.C. pipe	275.00	Metre	910.79	2,50,467
15.4.2	300 mm dia. R.C.C. pipe	60.00	Metre	1006.44	60,386
15.5	Constructing brick masonry manhole in cement mortar 1:4 ( 1 cement : 4 coarse sand ) with R.C.C. top slab with 1:1.5:3 mix (1 cement : 1.5 coarse sand (zone-III) : 3 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 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 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 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 :				
15.5.1	Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg) :				
15.5.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	10.00	Each	12926.50	1,29,265
15.6	Extra for depth for manholes :				
15.6.1	Size 90x80 cm				
15.6.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	5.00	Metre	8933.17	44,666

15.7	Inside size 120x90 cm and 90 cm deep including C.I. cover with frame (heavy duty) 560 mm internal diameter, total weight of cover and frame to be not less than 208 kg (weight of cover 108 kg and weight of frame 100 kg) :				
15.7.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	10.00	Each	33259.11	3,32,591
15.8	Extra depth for Manholes:				
15.8.1	Size 120x90 cm				
15.8.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	4.00	Metre	10714.77	42,859
15.9	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 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) complete as per design.	62.00	Each	560.46	34,749
15.10	Constructing brick masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 cement : 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame complete as per standard design :				
15.10.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	26.00	Each	6030.66	1,56,797

15.11	Extra for depth beyond 45 cm of brick masonry chamber :				
15.11.1	For 455x610 mm size				
15.11.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Metre	6191.70	12,383
15.12	Providing, laying and jointing HDPE Double Wall Coil (DWC) SN-8 Grade pipes confirming to IS: 16098 including all fittings wherever required e.g., tees, bends of any degree, couplings, adapters, plugs, unions etc. and jointing as manufacturer recommendation etc. including testing of joints etc. complete.				
15.12.1	160 mm OD	10.00	Metre	619.00	6,190
15.12.2	200 mm OD	10.00	Metre	922.00	9,220
15.12.3	250 mm OD	225.00	Metre	1467.00	3,30,075
	<b>Sub Head Total 15 :-</b>				<b>21,43,831</b>
<b>16</b>	<b>Pile work ( Shoring )</b>				
16.1	Boring, providing and installation bored cast-in-situ reinforced cement concrete piles of grade M-25 of specified diameter and length below 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 Crawler mounted, telescopic boom hydraulic piling Rig 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). <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 specified minimum cement content (for M25 as per relevant IS code /	3090.00	Metre	7853.50	2,42,67,315

	CPWD specification), the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
16.1.1	750 mm dia piles				
16.2	Add for using extra cement in the items of design mix over and above the specified cement content therein.	451.00	Quintal	742.46	3,34,849
	<b>Sub Head Total 16 :-</b>				<b>2,46,02,164</b>
<b>17</b>	<b>WATER PROOFING</b>				
17.1	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations: (a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment. (b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs. (c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-				

	in-charge. (d) Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep. (e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. "All above operations to be done in order and as directed and specified by the Engineer-in-Charge":				
17.1.1	With average thickness of 120 mm and minimum thickness at khurra as 65 mm.	863.00	Sqm	1705.17	14,71,562
17.2	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 :				
17.2.1	Serrated with central bulb (225 mm wide, 8-11 mm thick)	200.00	Meter	331.65	66,330
17.3	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.				
17.3.1	For vertical surface two coats @ 0.70 kg per sqm per coat	118.00	Sqm	478.68	56,484
17.3.2	For horizontal surface one coat @1.10 kg per sqm.	34.00	Sqm	367.23	12,486
17.4	Providing and spray applying two component hybrid polyuria polyurethane waterproofing system at all levels for podium garden waterproofing by the manufacturer or his approved applicator consisting of following operations:a) Brushing and Vacuum cleaning the surface to make free from any loose material, oil, grease, burr, dirt, dust etc.b) Repairing the surface if required, as per recommendation of manufacturer or his approved applicator to make it water tight for which nothing extra shall be paid.c) Providing and applying by spray or brush, two component solvent free resin / epoxy primer mixed in proportion by volume / weight as recommended by manufacturer over cement concrete surface in dry condition, having consumption varies from 0.20 to 0.40 kg/sqm depending on the porosity and undulations in the surface.d) Providing and sprinkling washed coarse sand, as recommended by manufacturer, over freshly laid primed tacky surface @ 0.25 to 0.40 kg/sqm as directed by the Engineer-in-Charge.e) Over primed sandy				

	<p>surface, providing and spray applying two component hybrid polyurea polyurethane coating system, which shall be solvent free, mixed in proportion by volume / by weight as recommended by the manufacturer having elongation &gt;400%, Shore A Note: If HDPE Drain cells / Drainmats along with a layer of geotextile having weight of 120 gsm and tensile strength not less than 2.4 kN/m as per ASTM D4595 is provided in place of dimple drain board with inbuilt geotextile, it shall not be paid as extra. Hardness &gt;75 (after 28 days), tensile strength of minimum 10 MPa as per DIN/ASTM and Tear strength minimum 30 N/mm as per DIN 53515 or minimum 45 N/mm as per ASTM D624 and 20 second maximum gel time/reaction time with minimum 1.5 mm dry film thickness of two coats.f) A layer of non woven polypropylene geotextile of minimum mass / unit area of 120 gsm with an overlap of 50 mm shall be laid over the polyurea/polyurethane coating surface, having minimum tensile strength 2.40 KN/m as per ASTM D4595.g) Providing and laying screed of cement concrete 1:1.5:3 (1 Cement : 1.5 Coarse sand : 3 graded stone aggregate 20 mm nominal size) of minimum thickness 50 mm at Khurra with a slope of 1:100 towards Khurra to ridge of roof (Screed shall be paid for separately).h) Providing and laying Dimple drain boards with inbuilt geotextile drainage membrane on top having dimple height of 20-25 mm, average number of dimples 400 per sqm, compressive strength not less than 180 kN/m<sup>2</sup> and geotextile drainage membrane having mass of 120 gsm, laid with minimum overlap of 50 mm.</p>				
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17.4.1	Note: If HDPE Drain cells / Drain mats along with a layer of geotextile having weight of 120 gsm and tensile strength not less than 2.4 kN/m as per ASTM D4595 is provided in place of dimple drain board with inbuilt geotextile, it shall not be paid as extra.				
17.4.1.1	NEW WORK ON HORIZONTAL SURFACES	2505.00	Sqm	2734.95	68,51,050
17.5	Providing and spray applying two component hybrid polyurethane polyurethane waterproofing system at all levels for podium garden waterproofing by the manufacturer or his approved applicator consisting of following operations:a) Brushing and Vacuum cleaning the surface to make free from any loose material, oil, grease, burr, dirt, dust etc.b) Providing and laying coving in concave shape of cement concrete 1:1½:3 (1 cement : 1½ coarse sand : 3 graded stone aggregate 20 mm nominal size) of size 75 mm x 75 mm at the junction of vertical wall and horizontal surface along the length of wall.c) Providing and applying by spray or brush, two component solvent free resin / epoxy primer mixed in proportion by volume / weight as recommended by manufacturer over cement concrete surface in dry condition, having consumption from 0.20 to 0.40 kg/sqm depending on the porosity and undulations in the surface.d) Providing and sprinkling washed coarse sand, as recommended by manufacturer, over freshly laid primed tacky surface @ 0.40 to 0.50 kg/sqm as directed by the Engineer-in-Charge.e) Over primed sandy surface, providing and spray applying two component hybrid polyurethane polyurethane coating system, which shall be solvent free, mixed in proportion by volume / by				

	weight as recommended by the manufacturer having elongation >400%, Shore A Hardness >75 (after 28 days), tensile strength of minimum 10 MPa as per DIN/ASTM and Tear strength minimum 30 N/mm as per DIN 53515 or minimum 45 N/mm as per ASTM D624 and 20 second maximum gel time/reaction time with minimum 1.5 mm dry film thickness of two coats.				
17.5.1	NEW WORK ON VERTICAL SURFACES	85.00	Sqm	2271.10	1,93,044
17.6	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 & graded aggregates additives & acrylic emulsion polymer as a binder. The product consumption shall be at least @ 2kg/sqm. The coating system must have the following characteristics: i) Powder to Liquid Ratio 2:1, ii) Bond Strength with concrete > 2 Mpa, iii) Elongation > 200% 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	148.00	Sqm	618.65	91,560

	manufacturer's recommendations and includes all lead and lift for all materials and labor.				
17.7	<p>Supplying &amp; installing minimum 4mm thick, pre applied, flexible, fully bonded sheet membrane of approved brand before casting of the base RCC slab (below Raft/Footing/Foundation of Retaining wall etc.). Fully bonded sheet membrane can be installed on wet/damp PCC free from ponded water. Fully bonded sheet membrane shall be chemically resistant in all types of soil or water shall be unaffected by ground settlement beneath slabs. The fully bonded sheet membrane shall consist of a multi-layer composite film which consists of high performance SBS and polyester reinforcement and a trafficable weather resistant carbon crystals layer. The fully bonded sheet waterproofing membrane shall have following typical properties: 1) Peel Adhesion to Concrete &gt;3500 N/M (per ASTM D 903) ; 2) Tear Strength MD &gt;600 N (as per ASTM D 5147); 3) Resistance to Hydrostatic Head &gt; 110M (as per ASTM D 5385); 4) Lateral Water Migration Resistance &gt; 110M (as per ASTM D 5385); 5) Puncture Resistance &gt; 670 N (as per ASTM E 154). Fully bonded sheet membrane shall have 120mm duo selvedge, one self-adhesive &amp; other using heat gun. Fully bonded sheet membrane shall be laid over the entire area and returned on to a vertical slab formwork. Membrane should be supplied with original manufacturer's Material Test Certificate (MTC) &amp; CE marking. Third party test report from NABL accredited approved laboratory should be submitted. Test report should not be older than 5 years. All detailing</p>	3820.00	sqm	2241.05	85,60,811

	<p>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.</p>				
17.8	<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. The self-adhesive membrane shall have following minimum properties: (i)Tensile strength (ASTM D 412): &gt; 3.5 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, Longitudinal 165 N and transfer 135. (iv) Puncture Resistance (ASTM E 154) : &gt; 200 N, (v) Lap adhesion (ASTM D 1876) : &gt; 1.8 N/mm. vi) Peel adhesion to prime surface (ASTM D1000): 3N/mm. vii) elongation (ASTM D412: min. 200%The membrane shall be protected by spot bonding 7-8mm thick dimpled HDPE protection board, spot bonded onto the self adhesive membrane with liquid</p>	3489.00	sqm	1336.15	46,61,827

	<p>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 tripartite guarantee for 10 years against any leakage.)</p>				
	<b>Sub Head Total 17 :-</b>				<b>2,19,65,154</b>
<b>18</b>	<b>Rain Water Harvesting System</b>				
18.1	<p>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</p>	42.00	Each	560.46	23,539

	cement concrete block 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) complete as per design.				
18.2	Providing and fixing in position precast RCC manhole cover and frame of required shape and approved quality.				
18.2.1	H D - 20				
18.2.1.1	Circular shape 560 mm internal diameter	4.00	Each	1696.16	6,785
18.3	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 direction of Engineer-in-charge, upto 90 metre depth below ground level.				
18.3.1	All types of soil				
18.3.1.1	400 mm dia.	60.00	Metre	1002.90	60,174
18.4	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.				
18.4.1	200 mm nominal size dia	50.00	Metre	1126.95	56,348
18.5	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.				
18.5.1	200 mm nominal size dia	55.00	Metre	1271.03	69,907
18.6	Supplying, filling, spreading & leveling stone boulders of size	7.00	Cum	1528.24	10,698

	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.				
18.7	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	1557.03	10,899
18.8	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	1557.03	10,899
18.9	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.	6.00	Cum	2049.22	12,295
18.10	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.	50.00	Hours	1098.30	54,915
18.11	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:				
18.11.1	200 mm dia	1.00	Each	325.07	325
18.12	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.				
18.12.1	200 mm clamp.	1.00	Each	2321.66	2,322
	<b>Sub Head Total 18 :-</b>				<b>3,19,106</b>
<b>19</b>	<b>STRUCTURAL GLAZING</b>				
19.1	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.	1540.00	Kg	419.36	6,45,814
19.2	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: (a) Structural analysis & 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	220.00	Sqm	3553.37	7,81,741

	<p>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. 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 separator 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> <p>(e) Making provision for drainage of moisture/ water that enters the</p>				
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	<p>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>Note:- 1. 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</p>				
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	<p>width of grooves) on the external face shall be measured in sqm. up to two decimal places  The NIT approving authority will decide the necessity of testing on the basis of cost of the work, cost of the test and importance of the work. Performance Testing of Structural glazing system Tests to be conducted in the NABL accredited lab or any other accreditation body which operates in accordance with ISO/IEC 17011 and accredits labs as per ISO/IEC 17025</p> <ol style="list-style-type: none"> <li>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 mVhr</li> <li>2. Static Water Penetration Test. (50pa to 1500pa) as per ASTM E-331-09 testing method for a range up to 2000 ml.</li> <li>3. Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range upto 2000 ml</li> <li>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 mm</li> <li>5. Seismic Movement Test (upto 30 mm) as per AAMA 501.4-09 testing method for Qualitative test, Tests to be conducted on site.</li> <li>6. Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ml</li> </ol>				
19.3	<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</p>	201.00	Sqm	3764.11	7,56,586

	<p>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 s(Payment for fixing of IGU Panels in the curtain glazing is included in cost of item No.25.2)hop 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.(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/m2 degree K etc. The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.</p>				
19.4	<p>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,</p>	22.00	Sqm	3716.34	81,759

	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.				
19.5	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.	19.00	Sqm	2186.02	41,534
19.6	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	19.00	Sqm	2480.07	47,121

	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 relevant Item*)."(i) Coloured tinted float glass 6mm thick substrate with reflective soft coating on face # 2, 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/m2 K etc. . The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.				
	<b>Sub Head Total 19 :-</b>				<b>23,54,555</b>
<b>20</b>	<b>HORTICULTURE</b>				
20.1	Supplying and stacking of good earth at site including royalty and carriage including all lead and lift complete (earth measured in stacks will be reduced by 20% for payment).	254.00	Cum	811.79	2,06,195
20.2	Supplying and stacking at site dump manure from approved source, including all lead and lift complete (manure measured in stacks will be reduced by 8% for payment) :				
20.2.1	Screened through sieve of I.S. designation 20 mm	15.00	Cum	395.26	5,929
20.2.2	Screened through sieve of I.S. designation 16 mm	15.00	Cum	451.52	6,773
20.2.3	Screened through sieve of I.S. designation 4.75 mm	15.00	Cum	496.57	7,449
20.3	Spreading of sludge, dump manure and/or good earth in required thickness as per direction of officer-in-charge (cost of sludge, dumpmanure and/ or good earth to be paid separately).	20.00	Cum	80.50	1,610
20.4	Mixing earth and sludge or manure in the required proportion specified or directed by the Officer-in-charge	25.00	Cum	56.26	1,407

20.5	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)				
20.5.1	Holes 60 cm dia, and 60 cm deep	100.00	Each	48.33	4,833
20.5.2	Holes 45 cm dia, and 45 cm deep	120.00	Each	20.86	2,503
20.6	Providing & laying of 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	114.84	91,872
20.7	Plantation of Trees, Shrubs, Hedge, ground covers and seasonal plants at site i/c watering and removal of unserviceable material's as per direction of officer in charge (excluding cost of plant & water).				
20.7.1	Trees Plant	170.00	Each	9.54	1,622
20.7.2	Shrubs Plant	1000.00	Each	4.75	4,750
20.7.3	Hedge Plant/ Ground Cover Plants /Seasonal Plants	1000.00	Each	3.18	3,180
20.8	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-incharge.	20.00	Each	1059.24	21,185
20.9	Providing and stacking of Bottle palm ht. 210-240 cm bottom girth 30- 35 cm well developed in big HDPE bag as per direction of the officer-incharge.	10.00	Each	382.94	3,829

20.10	Providing and stacking of Cassia fistula (Amaltash) height 120-135 cm. in poly bag size 25 cm as per direction of the officer-in-charge.	20.00	Each	70.50	1,410
20.11	Providing and stacking of Delonix regia (Gulmohar) height 150-165 cm. in poly bag size 25 cm as per direction of the officer-in-charge.	10.00	Each	65.65	657
20.12	Providing and stacking of Ficus benjamina (green) height 150-165 cm., bushy with healthy branches and lush green foliage in big size HDPE bag as per direction of the officer-in-charge.	10.00	Each	196.95	1,970
20.13	Providing and stacking of Grevillea Robusta (Silver Oak) height 150-165 cm. in poly bag size 25 cm as per direction of the officer-in-charge.	10.00	Each	54.69	547
20.14	Providing and stacking of Michelia champa (Golden Champa) height 90-105 cm. in earthen pot size 25 cm as per direction of the officer-in-charge.	5.00	Each	98.48	492
20.15	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	38.89	5,834
20.16	Providing and stacking of Vernonia elaeagnifolia (curtain creeper) of height 30 cm to 45 cm. in 20 cm size of Earthen pot / Plastic pot as per direction of the officer-in-charge.	150.00	Each	27.98	4,197
	<b>Sub Head Total 20 :-</b>				<b>3,78,244</b>
	<b>Total of All Sub-heads</b>				<b>43,55,89,949</b>

# **PART-C**

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

## ADDITIONAL CONDITIONS

1. 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, Part -IV (Substation) 2013, General Specification for Electrical works Part-VII (DG set) 2013, General Specification for Heating Ventilation & Air Conditioning (HVAC) 2024, Part V Wet Riser & Sprinkler Systems 2020, Part VI Fire Detection and Alarm System 2018 as amended up to date, and in accordance with Indian Electricity Rules, 1956, India Electricity Act, 2003, ECSBC 2024, and National Building Construction Standard 2026, as amended up to date and as per instructions of the Engineer-in-Charge and nothing extra will be paid.
2. 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.
3. 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.
4. 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.
5. 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.
6. Stage Payment for E&M packages: The following percentage of contract rates shall be payable against the stages of work shown herein:

<b>S. No.</b>	<b>Stage of Work</b>	<b>Payment terms in %</b>
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>

7. **ELIGIBILITY CRITERIA FOR ASSOCIATE AGENCY:** CPWD Enlisted Contractor in Composite category 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 Internal & External Electrical Work (Internal Wiring, DB, MCB, MCCB, LED Lights, Fans, LT & HT Cable, External Lighting, UPS, EV Charging etc):**

CPWD Enlisted Contractor in composite category having valid electric license or the main agency have to associate an agency having valid electrical contractor license and 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 “**Internal & External Electrical Work**”

b) **Eligibility Criteria for Fire Fighting 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 “**Supplying, Installation, Testing & Commissioning of Fire Fighting system**”.

c) **Eligibility Criteria for Fire Alarm 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 **“Supplying, Installation, Testing & Commissioning of Fire Alarm System”**.

d) **Eligibility Criteria for Electrical 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 **“Supplying, Installation, Testing & Commissioning of Electrical Sub Station, 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”**.

e) **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 **“Supplying, Installation, Testing & Commissioning of DG set, 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”**.

f) **Eligibility Criteria for CCTV 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 “**Supplying, Installation, Testing & Commissioning of CCTV System**”

g) **Eligibility Criteria for LAN 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 “**Supplying, Installation, Testing & Commissioning of LAN System**”

h) **Eligibility Criteria for EPABX 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 “**Supplying, Installation, Testing & Commissioning of EPABX System**”

i) **Eligibility Criteria for ETP 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 “**Supplying, Installation, Testing & Commissioning of Effluent Treatment Plant**”

j) **Eligibility Criteria for VRV/ VRF Heating, Ventilation & Air Conditioning 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 “**Supplying, Installation, Testing & Commissioning of VRV/VRF Heating, Ventilation & Air Conditioning system with minimum 80% capacity of Capacity proposed in NIT**”

k) **Eligibility Criteria for Solar PV Power Generation 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 “**Supplying, Installation, testing & commissioning of Solar PV Power Generation System**”

l) **Eligibility Criteria for Hydropneumatics 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 “**Supplying, Installation, Testing & Commissioning of Hydropneumatics system**”

m) **Eligibility Criteria for Stack Parking: -**

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 “**Supplying, Installation, Testing & Commissioning of Stack Parking**”

n) **Eligibility Criteria for Audio-Video 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 “**Supplying, Installation, Testing & Commissioning of Audio-Video System**”

o) **Eligibility Criteria for Passenger 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 “**Supplying, Installation, Testing & Commissioning of Passenger Lifts**”.

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.

Estimated cost put to tender for above mentioned specialized work are as under: -

Sl. No.	Similar work	ECPT (Amount in Rs.)
1	Internal & External Electrical	2,00,44,283/-
2	Sub-Station	1,60,14,863/-
3	DG Set	29,27,769/-
4	Lifts	82,23,420/-
5	EPABX	3,89,441/-
6	LAN System	42,92,839/-
7	CCTV System	39,97,914/-
8	Fire Alarm System	40,23,577/-
9	Fire Fighting System	1,63,56,942/-
10	VRV/ VRF Heating, Ventilation & Air Conditioning System	2,02,31,535/-
11	Solar PV Power Generation System	28,71,210/-
12	Hydropneumatics system	7,72,176/-
13	Stack Parking	1,24,17,452/-
14	Effluent Treatment Plant	9,28,229/-
15	Audio-Video System	2,62,11,163/-

8. 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.
9. 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.
10. 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
11. 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.
12. 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.
13. The size of conduit and wiring shall be got approved from the Engineer-in-Charge before the execution of work.
14. 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.
15. 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.
16. 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.
17. 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.
18. Nothing extra shall be paid for inter connections with thimbles/Wires/Tapes strips etc. used on the work.
19. The contractor has to make his own arrangements for stores and watch and ward and no extra claim for this will be entertained.
20. The contractor shall make his own arrangements for electrical power supply for the construction activities. No extra payments for the same will be made.

21. 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.
22. The rupturing capacity of the MCB's shall be 10KA. The MCB's shall have ISI mark.
23. The insulated copper wire to be used on this work shall be FRLS type of multi stranded.
24. Make of MCB/MCCB shall be the same as the make of MCB DB.
25. 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.
26. 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.
27. 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.
28. 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.
29. 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.
30. The connection between incoming switch/isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.
31. Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and terminals provided with crimped lugs.
32. 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.
33. All hardware items such as nuts/bolts/screws/washers etc. to be used in work shall be of zinc/cadmium plated iron.
34. While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the Engineer-in-charge.
35. 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.

36. Where switches / sockets / regulator / telephone / TV / internet outlets/ GI Box are to be provided, the same shall be of only one make.
37. 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 including all accessories from the manufacturer separately.
38. The contractor shall have to work as per the convenience of the concerned Department.
39. 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.
40. 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"**.
41. 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.
42. 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.
43. 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.
44. 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.

45. 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.
46. 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 (total work done for 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.
47. 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.
48. 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.
49. 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.

50. 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.
51. 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.
52. 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.
53. 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.
54. 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.
55. 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.
- 56. 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. / NABL 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.
  - (d) All expenditure to be incurred for testing of samples e.g. packaging, sealing, transportation, loading, unloading etc. including testing charges shall be borne by the contractor.
57. 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.

58. 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.
59. **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 supplyof equipment. The Engineer- In-charge shall, if he so desires inspect and witness the pre-deliverytests. 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.
60. 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.
61. 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.
62. **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.
63. **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.
64. **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.

65. All electrical & mechanical fittings / fixture / appliances, to be provided for the work, where BEE certification is available should have **5-star rating (of BEE)**.
66. **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.
67. 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.
68. 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 warrantry period of 5 years.

For M/S .....,

.....

(Authorized signatory of manufacturer of LED luminaries)

Counter Signature,

Major contractor

**LIST OF PREFERRED MAKES OF MATERIALS FOR ELECTRICAL WORKS**

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 f) TELEPHONE CABLE	POLYCAB/ KEI/ HAVELLS/ 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, HYDROPHNEUMATICS SYSTEM	KIRLOSKAR /KSB/ GRUNDFOSS/ WILO/ XYLEM/ ARMSTRONG
	<b><u>DG SET</u></b>	
1	DIESEL ENGINE	CUMMINS / CATERPILLER/ PERKINS/ KIRLOSKAR OIL ENGINE LTD.
2	ALTERNATOR	STAMFORD/ KIRLOSKAR ELECTRIC/ CROMPTON
3	PROTECTION RELAYS & CT'S	L&T/ SIEMENS/ SCHNEIDER ELECTRIC
4	BATTERY	EXIDE / AMARON/ AMARAJA/LUMINOUS
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/ LEGRAND
	<b><u>SUB-STATION</u></b>	
1	11 KV VCB PANEL	ABB / SCHNEIDER ELECTRIC/ SIEMENS/ TRICOLITE
2	a) DRY TYPE (11KV/433 VOLT)	

	b) OIL TYPE TRANSFORMER (11KV/433 VOLT)	KIRLOSKAR/ VOLTAMP/ ABB/ CROMPTON GREEVES
3	COMPACT SUB STATION	SCHNEIDER ELECTRIC/ ABB/ SIEMENS/ THEIR AUTHORIZED LICENSE PARTNER
4	ACB	SCHNEIDER ELECTRIC – MASTERPACT NW (6.0A)/ L&T - U POWER OMEGA (MTX3.5)/ SIEMENS 3WL (ETU 45B)/ ABB EMAX (PR122)
5	MCCB	SCHNEIDER – COMPACT NSX/ L&T DU/ ABB TMAX
6	MCB/ RCCB/ ISOLATOR	SCHNEIDER - ACTI9/ HAGER-H3/ SIEMENS BETA GUARD 10KA/ ABB SB200M/ LEGRAND
7	MCB DB	HAGER (H3) / SIEMENS (BETAGARD) /SCHNEIDER (ACTI-9)/ABB (ITUS)/ LEGRAND
8	MAIN LT PANEL/ SUB LT PANELS/ CAPACITOR PANEL/ SYNCHRONIZING PANEL WITH ACCESSORIES/ STARTER PANEL	NEPTUNE/ ADVANCE PANELS & SWITCHGEAR (P) LTD / ADLEC /ASPL/ APPLICATION CONTROL PVT. LTD
9	BUS DUCT, AIR INSULATED COMPACT RISING MAINS, END FEED UNIT, TAP-OFF BOX (PLUG-IN TYPE)	SCHNEIDER ELECTRIC/ LEGRAND / L&T/RR
10	OUTDOOR BUS TRUNKING	SCHNEIDER ELECTRIC/ RR/ NAXSO BBT
11	HT, LT JOINTING KIT & TERMINATION KIT	REYCHEM / 3M / ABB
12	SOFT STARTERS	SIEMENS/ SCHNEIDER/ ABB / L&T
13	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/ ORIENT
2	LED EXIT SIGNAGE	MR. LITE/ PROLITE/ WIPRO/ AGNI/ LIFE GUARD
3	A) LED INDOOR LUMINAIRES B) LED DECORATIVE LIGHT LUMINAIRES C) LED STREET LIGHT D) BOLLARDS & OUTDOOR FITTINGS	PHILIPS/ REGENT/ LIGHTING TECHNOLOGY/ HAVELLS
4	MS DECORATIVE POLE	PHILIPS/ BAJAJ/ HI-LITE/ HAVELLS/ LUSTER/ UTKARSH/ ILEN
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 e) RESPONSE INDICATORS f) MANUAL CALL BOXES & HOOTERS g) INPUT /OUTPUT DEVICES	NOTIFIER (HONEYWELL)/ BOSCH/ SCHNEIDER/ EATON/ NOHMI
	<b>PUBLIC ADDRESS SYSTEM</b>	
1	a) PUBLIC ADDRESS SYSTEM CONSOLE AND ALL ACCESSORIES b) P.A. SPEAKERS c) AMPLIFIERS	BOSCH/ BIAMP/ HONEYWELL
	<b>FIRE FIGHTING SYSTEM</b>	
	a) 2-WAY/4-WAY FIRE BRIGADE CONNECTION	SAFEX/ NEWAGE/ LIFE GUARD/ EXFLAME

1	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	
2	DIESEL ENGINE (FIRE-FIGHTING)	CUMMINS/ KIRLOSKAR / CATER PILLER
3	FIRE EXTINGUISHERS	CEASEFIRE/ MINIMAX/ NEWAGE / SAFEX / KANEX / EXFLAME/ LIFE GUARD
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	VRV/VRF SYSTEM INCLUDING INDOOR & OUTDOOR UNITS	DAIKIN/ HITACHI/ MITSUBISHI/ O-GENERAL/ CARRIER/ TOSHIBA
2	SPLIT TYPE AC	HITACHI/ MITSUBISHI / O-GENERAL
3	REFRIGERANT PIPING	MANDEV / MEXFLOW / RR SHRAMIK
4	CLOSED CELL NITRILE RUBBER INSULATION/ EPDM INSULATION	ARMAFLEX /AEROCELL / ALP
5	INLINE FANS	SYSTEMAIR/ KRUGER/ GREENHECK/ HUMIDIN/ NICOTRAAIR
6	CHILLER	TRAIN/ TROX/ YORK/DAIKEN
7	CHILLER PUMP	ARMSTRONG/ GROUND FOSS/XYLEM
8	AIR HANDLING UNITS/ TREATED FRESH AIR UNITS	SYSTEMAIR/ EDGETECH/ TRANE/ BALANCE/ ZECO / WAVES
9	AIR WASHER	SYSTEMAIR/ EDGETECH / TRANE/ BALANCE/ ZECOW/ WAVES
10	AIR SEPARATOR	XYLEM/ EMERALD/ ANERGY/ KD AGENCIES
11	COOLING TOWERS (CTI/ CERTIFIED)	ADVANCE/ MARLEY/ PAHARPUR/ BELL
12	GI SHEETS DUCTING ETC	SAIL/ TATA/ JINDAL
13	CO2 SENSOR	SCHNEIDER/ HONEYWELL/ SIEMENS
14	PPR PIPE	JINDAL HISSAR / ASTRAL / FUSION

15	CENTRIFUGAL & AXIAL FANS VANE AXIAL IN-LINE FANS AND THEIR MOTORS	KRUGER/ GREENHECK/ NICOTRA/ BALANCE/ TRISTAR WITH MOTOR FROM THEIR APPROVED OEM
16	VIBRATION ISOLATOR RUBBED PAD DUCT SUPPORT ARRANGEMENT	DUNLOP/ RESISTOFLEX/ GERB
17	GRILL DIFFUSER FIRE DAMPERS LOUVERS VOLUME CONTROL DAMPER	SYSTEM AIR/ CARRYAIRE/ COSMOS/ TRISTER / GREENHECK/ BALANCE
18	FLEXIBLE GROOVED FITTINGS COUPLINGS	VICTAULIC/ TYCOGRINNEL/ VIKING
19	PRE-FABRICATED DUCT DUCT FLANGE (WITH GI SHEETS OF MAKES)	ZECO/ ROLLASTAR/ DUCTOFAB/ WAVES
20	VARIABLE FREQUENCY DRIVE	DANFOSS/ ABB / HONEYWELL/ SIEMENS / SCHNEIDER
21	ALUMINUM TAPE	JOHNSON/ BIRLA-3M/ NIPPON INDUSTRIES
22	DRY SCRUBBER	TRION/ RYD AIR/ HUMIDIN/ ESPAIR
<b>LIFT</b>		
1	LIFT	KONE ELEVATORS INDIA PVT. LTD./ MITSUBISHI / SCHINDLER/ OTIS ELEVATOR/ JHONSON
<b>SOLAR POWER</b>		
1	POWER CONDITIONING UNIT (PCU)/ SOLAR INVERTERS	ABB FIMER/ SOLAREEDGE/ FRONIUS
2	SOLAR PV PANEL	TATA SOLAR/ WAAREE ENERGY/ADANI SOLAR
<b>STP/ETP/WTP</b>		
1	PLANT MANUFACTURER	GRANNUS WATER AND ENVIRONMENTAL SOLUTIONS PVT. LTD./ CIMERA ENGINEERS/ SPECTRUM ENGINEERING TECH PVT. LTD. / ION EXCHANGE / ZETA4/ ROHANTA INFRA SOLUTION
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 / PANASONIC
3	WIRELESS AND WIRED MICROPHONE BOUNDARY MICROPHONE GOOSNECK MICEOPHONE WIRELESS CHARGER FOR	SHURE / SENNHEISER / AUDIO TECHNICA

	WIRELESS GOOSNECK MICEOPHONE ANTENNA & SPLITTER/ COMBINER	
4	DIGITAL PODIUM	AHA/ UNI/ MAXHUB/ TECCOM
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/ KRAMER/ LINETEK
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>EV Charging</b>	
1	EV charging	ABB/SCHNEIDER/NEPTUNE
	<b>ACCESS CONTROL SYSTEM</b>	
1	ACCESS CONTROL SYSTEM	SIEMENS/ SCHNEIDER/ GODREJ/HONEYWELL/ BOSCH
	<b>BIKE PARKING</b>	
1	BIKE PARKING SYSTEM	iPARK/ TAR PARKING/
	<b>CAR PARKING</b>	
1	SENSOR BASED CAR PARKING	NEPTUNE AUTOMATIVE PVT. LTD. / ASPL/ DESIGNA / COLDWIRE
	<b>STACK PARKING</b>	
1	STACK TYPE HYDRAULIC PARKING SYSTEM	SYNERGY ACCESS/ KLAUS/ ABSOLUTE AUTOMATION/ SWIS PARK/ TADA AUTO PARK/ SYMTECH INDIA/ SDC AUTOMATION/ RAAD ELECTRICAL & AUTOMATION
2	AUTOMATIC NUMBER PLATE RECOGNISATION	DESIGNA/ ASPA/ NEPTUNE
	<b>BUILDING MANAGEMENT SYSTEM(BMS)</b>	

1	CENTRAL CONTROL BMS SERVER	IBM/ HP/ DELL/ SIEMENS / DELTA/ HONEYWELL EBI/ SCHNEIDER / CARRIER ALC
2	PRINTER	HP/ CANON/ EPSON
3	BUILDING MANAGEMENT SYSTEM	SIEMENS/ CARRIER ALC/ HONEYWELL EBI/ DELTA/ SCHNEIDER
4	BUILDING MANAGEMENT WEB BASED SERVER SOFTWARE	SIEMENS/ CARRIER ALC/ HONEYWELL EBI/ DELTA/ SCHNEIDER
5	PROGRAMMABLE & APPLICATION SPECIFIER CONTROLLER (DDC)	SIEMENS/ CARRIER ALC/ HONEYWELL COMFORT POINT/ DELTA/ SCHNEIDER
6	SYSTEM INTERGRATION UNITS FOR 3RD PARTY SOFTWARE INTEGRATION	SIEMENS/ CARRIER ALC/ HONEYWELL COMFORT POINT/ DELTA/ SCHNEIDER
7	ENCLOSURE FOR DDC CONTROLLER	RITTAL/ SIEMENS/ BCH/ DELTA
<b>SENSOR &amp; FIELD DEVICES</b>		
8	IMMERSION TYPE TEMPERATURE SENSORS	SIEMENS/ HONEYWELL COMFORT POINT/ALC/ DELTA
9	ULTRASONIC BTU METER/FLOW METER	SIEMENS/ HONEYWELL/ BELIMO/ DELTA
10	OUTSIDE T+RH SENSOR	SIEMENS/ HONEYWELL COMFORT POINT/ALC/ DELTA
11	DIFFERENTIAL PRESSURE SWITCH AIR	SIEMENS/ HONEYWELL COMFORT POINT/ ALC/ DELTA
12	DIFFERENTIAL PRESSURE SWITCH WATER	SIEMENS/ HONEYWELL/ DWYER/ DELTA
13	DIFFERENTIAL PRESSURE SENSOR- AIR/WATER	SIEMENS/ HONEYWELL COMFORT POINT/ ALC/ DELTA
14	ROOM/DUCT TYPE TEMP SENSOR	SIEMENS/ HONEYWELL COMFORT POINT/ ALC/ DELTA
15	ROOM/DUCT TYPE TEMP + RH SENSOR	SIEMENS/HONEYWELL COMFORT POINT/ ALC/ DELTA
16	PRESSURE SENSOR WATER	SIEMENS/HONEYWELL COMFORT POINT/ ALC/ DELTA
17	CO2 SENSOR/VOC SENSOR/ PM2. 5&10	SIEMENS/HONEYWELL COMFORT POINT/ ALC/ DELTA
18	WATER LEVEL SWITCHES	VEKSLER/ FLIPRO/ OMICRON/ DWYER
19	FLAME PROOF LEVEL TRANSMITTER	VEKSLER/ FLIPRO/ OMICRON/ DWYER
20	DC VOLTAGE / CURRENT/ POWER FACTOR TRANSDUCER	L&T/ABB/ DWYER/ MECO
21	CURRENT RELAY	L&T/ABB/ DWYER/ MECO
22	VFD DRIVES	SCHNEIDER/ SIEMENS/ ALLEN BRADELY
<b>WIRING &amp; CONDUCTING</b>		
23	SIGNAL CABLE, PVC INSULATED, TINNED COPPER	POLYCAB/ SKYTON/ FINOLEX/ BONTON/ LAPP
24	LAN CABLE	BELDEN/ MOLEX/ PANDUIT
25	NETWORKING PASSIVE	PANDUIT/ AVAYA/ LEGRAND/ HP
26	NETWORKING ACTIVE	CISCO/ HP/ JUNIPER/ EXTREME/ AVAYA/
27	LAN PASSIVE (CABLE /IO'S/ PATCH CORDS/ FACE PLATE/ JACK PANEL) & OFC COMPONENTS	LEVITON/ SYSTIMAX/ PANDUIT/ POLYCOM / LEGRAND
28	CONTROL SOFTWARE, CONTROLLERS	HONEYWELL / SCHNEIDER ELECTRIC/ SIEMENS/ ALC/ SAUTER/ JOHNSON CONTROL
29	TEMP GAUGE, PRGAUGE, FLOW SWITCH, PR SWITCH, ACTUATORS, ROOM THERMOSTAT, HUMIDSTAT, WATER FLOW METER, HARDNESS ANALYSER, PH, CHLORINE, TDS,CO,CO2 SENSORS ETC.	HONEYWELL/ SCHNEIDER ELECTRIC /SIEMENS/ JOHNSON CONTROL/ KELE/ VEKSLER/ L&T/ DANFOSS/GE/ TRANE/ AZBIL

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

# **SCHEDULE OF QUANTITY FOR ELECTRICAL WORK**

**SCHEDULE OF QUANTITY (E&M WORK)**

**Name of Work : Construction of New Building in the Existing Premises of Parivesh Bhawan, CPCB, Delhi (SH: E&M Works) (Balance work)**

Sl. No.	Description	Qty	Unit	Rate including Cost Index @ 1% on DSR 2025	Amount
	<b>SUB-HEAD:I [Internal EI &amp; Fans]</b>				
1	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS/HFFR PVC insulated copper conductor single core cable etc as required.				
a)	Group C	905	Point	2122.01	1920419.05
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/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, and earthing the point with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.				
a)	Group C	617	Point	1258.46	776469.82
3	Wiring for twin control light point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface / recessed steel conduit, 2 way modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS/HFFR PVC insulated copper conductor single core cable etc as required.	13	Point	2264.42	29437.46
4	Wiring for light/ power plug with 2X4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit along with 1 No 4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable for loop earthing as required.	1300	Mtr	484.80	630240.00
5	Wiring for light/ power plug with 4X4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit along with 2 Nos 4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable for loop earthing as required.	2000	Mtr	731.24	1462480.00

6	Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in surface/ recessed steel conduit as required				
a)	2 X 1.5 sq. mm + 1 X 1.5 sq. mm earth wire	700	Mtr	373.70	261590.00
b)	4 x 1.5 Sqmm + 2 x 1.5 Sqmm earth wire (Circuit Wiring & Power Wiring for VRV Indoor Units).	800	Mtr	428.00	342400.00
c)	2 X 4 sq. mm + 1 X4 sq. mm earth wire	30	Mtr	480.76	14422.80
d)	2 X 6 sq. mm + 1 X6 sq. mm earth wire	175	Mtr	658.52	115241.00
e)	4 X 6 sq. mm + 2 X 6 sq. mm earth wire	35	Mtr	1011.01	35385.35
f)	4 X 10 sq. mm + 2 X 6 sq. mm earth wire	130	Mtr	1265.53	164518.90
7	Supplying and drawing following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required. (For DALI)				
a)	2 x 1.5 Sqmm	100	Mtr	77.77	7777.00
8	Supplying and drawing co-axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the existing surface/ recessed steel/ PVC conduit as required. (Upto Terrace/ GF)	255	Mtr	54.54	13907.70
9	Supplying and drawing following pair 0.5 mm dia FRLS/HFFR PVC insulated annealed copper conductor, unarmoured telephone cable in the existing surface/ recessed steel/ PVC conduit as required.				
a)	2 Pair	1600	Mtr	39.39	63024.00
b)	10 Pair	70	Mtr	151.00	10570.00
10	Supplying and drawing 20 Pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmoured telephone cable in the existing surface/ recessed steel/ PVC Conduit etc. complete as required.	40	Mtr	347.44	13897.60
11	Supplying, drawing, Installation, Testing and commissioning of Cat6A UTP 4 pair, 23 AWG solid copper cable in existing conduit/ on surface, U/FTP, LSZH, Non-Plenum, Horizontal(solid) Cable suitable for high speed data networking application supporting upto 10Gbps over a 100 meter channel. The 4 Unshielded Twisted Pairs (UTP) cable with color coded insulation for easy identification should have FLAMEPROPERTIES i.e. Flammability Test - IEC 60332-1, Smoke				

	Density - IEC 61034, LSZH standards compliance: ANSI/TIA-568 C.2, ISO/IEC 11801, IEEE 802.3an, RoHS. Delay Skew should be < 45NS. The outer Cable Diameter should be 7.5 +2 mm. Cable should have been tested and verified by UL/ ETL.				
a)	1 run of cable	1000	Mtr	62.62	62620.00
b)	2 run of cable	510	Mtr	99.99	50994.90
c)	3 run of cable	1300	Mtr	138.37	179881.00
12	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
a)	20 mm (For Fire Alarm System)	800	Mtr	256.54	205232.00
b)	25 mm (For LAN, TV cable)	3000	Mtr	291.89	875670.00
13	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.				
a)	Telephone socket outlet	331	Each	169.68	56164.08
b)	TV antenna socket outlet	5	Each	169.68	848.40
c)	5/6 Amps Switch	490	Each	122.21	59882.90
d)	3 pin 5/6 amp socket outlet	490	Each	137.36	67306.40
14	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as required.	70	Each	47.47	3322.90
15	Supplying, Installation, Testing and commissioning of CAT6ACopper Information Outlet (IO) with face plate of color as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D. All copper Cable and Components should be from same OEM to maintain compatibility and interoperability.	307	Each	305.02	93641.14
16	Supplying and fixing call bell/ buzzer suitable for single phase, 230 volts, complete as required.	15	Each	113.12	1696.80
17	Supplying and fixing following size/ modules, GI box along with modular base & cover plate for modular switches in recess etc as required.				
a)	1 or 2 Module (75mmX75mm)	200	Each	357.54	71508.00

18	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 amps modular socket outlet and 5/6 amps modular switch, connection etc. as required. (For light plugs to be used in non residential buildings).	198	Each	550.45	108989.10
19	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 amps modular socket outlet and 15/16 amps modular switch, connection etc. as required.	324	Each	665.59	215651.16
20	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 2 Nos. 5/6 A modular switch, connections etc. as required. (For light plugs to be used in non residential buildings).	10	Each	764.57	7645.70
21	Supplying & fixing suitable size GI box with modular plate and cover in front on surface or in recess including providing and fixing 25/ 32 A modular socket outlet and 25/ 32 A modular SP MCB, "C" curve including connections, painting etc. as required. (For Geyser & STAC Units)	56	Each	815.07	45643.92
22	Supplying and fixing 30 amps, 415 volts, TPN industrial type, socket outlet, with 4 pole and earth, metal enclosed plug top alongwith 30 amps "C" curve, TPMCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket outlet and complete with connections, testing and commissioning etc. as required.	21	Each	4401.58	92433.18
23	Supply and fixing of slim design 8 (2 x 4) module metal <b>pop-up type flush mounting box</b> in desired color finish including fixing on floor/furniture table etc complete as required	5	Each	6724.00	33620.00
24	Supplying installation testing and commissioning of following pair <b>MS powder painted Krone Tag Box IP44</b> , i/c Krone module complete including slide lock/unlock system, connections testing and commissioning etc. as required				
a)	10 Pair	2	Each	818.00	1636.00
b)	20 Pair	2	Each	956.00	1912.00
c)	100 Pair	1	Each	1699.00	1699.00

25	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 volts, 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)				
a)	6 Way, Double Door	1	Each	2413.90	2413.90
b)	8 way, Double door	1	Each	2800.73	2800.73
c)	12 way, Double door	1	Each	2899.71	2899.71
d)	16 way, Double door	20	Each	3400.67	68013.40
26	Supplying and fixing following way, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 volts, 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)				
a)	4 way (4 + 12), Double door	7	Each	4420.77	30945.39
b)	8 way (4 + 24), Double door	13	Each	6400.37	83204.81
c)	12 Way (4+ 36), Double Door	23	Each	9853.00	226619.00
27	Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 volts, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 amps tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCB's (but without MCB's and incomer ) as required . (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.)				
a)	4 Way (4 + 12), Double Door	2	Each	8030.51	16061.02
b)	8 way (4 + 24), Double door	14	Each	10831.24	151637.36
28	Supplying and fixing Cable End Box (Loose wire box)(IP 43) 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.				
a)	For 6 Way, Double Door SPN MCB DB	1	Each	842.34	842.34
b)	For 10 Way, Double Door SPN MCB DB	1	Each	903.95	903.95
c)	For 14 Way, Double Door SPN MCB DB	21	Each	999.90	20997.90
29	Supplying and fixing Cable End Box (Loose wire box)(IP 43) suitable for following triple pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete				

	with testing and commissioning etc. as required.				
a)	For 4 Way, Double Door TPN MCB DB	7	Each	1188.77	8321.39
b)	For 8 Way, Double Door TPN MCB DB	13	Each	1462.48	19012.24
c)	For 12 Way, Double Door TPN MCB DB	23	Each	3582.00	82386.00
30	Supplying and fixing Cable End Box (Loose wire box) 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.	16	Each	1283.71	20539.36
31	Supplying and fixing following rating, double pole, (single phase and neutral), 240 volts, residual current circuit breaker (RCCB), having a sensitivity current upto 300 milliamperes in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a)	25 Amp	1	Each	2162.41	2162.41
b)	40 Amp	22	Each	2537.12	55816.64
32	Supplying and fixing following rating, four pole, (three phase and neutral), 415 volts, residual current circuit breaker (RCCB), having a sensitivity current upto 300 milliamperes in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a)	40 Amp	7	Each	3486.52	24405.64
b)	63 Amp	36	Each	3632.97	130786.92
33	Supplying and fixing 5 amps to 63 amps 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.				
a)	Single Pole	1478	Each	287.85	425442.30
b)	Double pole	23	Each	702.96	16168.08
c)	Triple Pole	43	Each	1080.70	46470.10

34	LED Panel light 2x2 ft. (System lumen efficacy $\geq 105$ <120 lm/Watt) Supplying, installation, Testing & Commissioning of Panel light 2x2 ft., of following body material and construction as per IS: 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, freq 50/60 hz, Operating temp range -5 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection, THD < 10% , P. F. $\geq 0.95$ , IP20, CRI $\geq 80$ , UGR (Unified Glare Rating) < 19, Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K/ 5700°K /6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq. mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy $\geq 105$ <120 lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Powder Coated CRCA Sheet Body (Thickness > 0.50 mm)				
a	36 watt	457	Each	2079.59	950372.63
35	Supply, Installation, Testing and Commissioning of 20 watt LED type industrial hanging light Energy saving, environmental friendly, long life, corrosion resistant, impact proof, surface mounting IP66 luminaire with PC housing & opal finish cover suitable for wet location. LEDs used as light source. having minimum 2000 lumens output with system efficacy of 100 Lm/Watt or better, Aluminium/ CRCA housing prismatic/ PMMA difuser, SDCM $\leq 5$ , PF $\geq 0.95$ , CRI>80, THD $\leq 10\%$ , Service life of 50,000 hrs @ L70, , 5700/6500K CCT with inbuilt	150	Each	1477.00	221550.00

	Driver, i/c connections etc complete as required at site. (With 5 Years warranty)				
36	<p>LED Batten light (System lumen efficacy <math>\geq 105</math> &lt;math&gt;&lt;120&lt;/math&gt; lm/Watt)  Supplying, installation, Testing &amp; Commissioning of LED surface mounted Batten light of following body material and construction as per IS: 10322 with driver (Replaceable) as per the requirement with Driver efficiency &gt;85% ,Operating voltage AC 140-270 Volt, freq 50/60 hz, Operating temp range -5 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short &amp; Open circuit protection, THD &lt; 10%, P. F. <math>\geq 0.95</math>, IP20, CRI <math>\geq 80</math>, Flicker free, (flicker should be below 5 %), life time (LED, Driver &amp; electrical circuitry), of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) &lt;3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq. mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy <math>\geq 105</math> &lt;math&gt;&lt;120&lt;/math&gt; lm/Watt output. LM79 &amp; LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).  Powder Coated CRCA Sheet Body (Thickness &gt; 0.50 mm)</p>				
a	18-22 watt	4	Each	635.29	2541.16
37	<p>Supply, Installation, Testing and Commissioning of surface mounting LED Batten Mirror light having minimum 1000 lumens output with system efficacy of 100 Lm/Watt or better, Aluminium/ CRCA housing prismatic/ PMMA difuser, SDCM <math>\leq 5</math>, PF <math>\geq 0.95</math>, CRI &gt;80, THD <math>\leq 10\%</math>, Service life of 50,000 hrs @ L70, , 5700/6500K CCT with</p>	50	Each	632.00	31600.00

	inbuilt Driver, i/c connections etc complete as required at site. (With 5 Years warranty)				
38	Supplying, installation, testing and commissioning of Microwave technology based occupancy sensor having high performance, non regulating programmable type, suitable for connected load upto 10Amp, for mounting height up to 2.6 mtr and for 5m X 20m coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	60	Each	12640.15	758409.00
39	LED Down lighter (SMD Type) (System lumen efficacy $\geq 105 < 120$ lm/Watt) Supplying, installation, Testing & Commissioning of LED Recessed/ surface Down lighter (Round/ square/ Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS: 10322 with driver as per the requirement with Driver efficiency $>85\%$ , Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -5 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection, THD $< 10\%$ , P. F. $\geq 0.95$ , IP20, CRI $\geq 80$ , UGR (Unified Glare Rating) $< 19$ , Flicker free (flicker should be below 5%), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends , CCT 3000°K / 4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) $< 3$ , Maximum power consumption should not more than the specified rating and Fixture shall be confirming to relevant BIS standards and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c external connections with 1.5 sq. mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy $\geq 105 < 120$ lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED				

	junction temperature shall not rise above 90°C). Powder coated die cast/ Extruded aluminium Body including trim				
a	12 -15 watt	180	Each	722.15	129987.00
b	18 watt	534	Each	929.20	496192.80
40	Supply, Installation, Testing and Commissioning of bulkhead luminaire having minimum 1000 lumens output with system efficacy of 100 Lm/Watt or better, Aluminium/ CRCA housing prismatic/ PMMA difuser, SDCM ≤ 5, PF≥0.95, CRI>80, THD≤10%, Service life of 50,000 hrs @ L70, , 5700/6500K CCT with inbuilt Driver, i/c connections etc complete as required at site. (With 5 Years warranty)	46	Each	1231.00	56626.00
41	Supplying and installation of <b>single arm fancy wall bracket Luminaire</b> made out of stainless steel/ powder painted MS complete including glass diffuser, B-22 base, providing and fixing of 1 no. 9W LED lamp (Philips/Havells make) complete including connection etc, as reqd. (With 5 Year Warranty.)	2	Each	1191.00	2382.00
42	Supply, installation, testing and commissioning of <b>Emergency light</b> of 16 watt twin UL listed High Intensity LED fitted Lamps with adjustable swivel type Beam Lights fitted upon Power Coated CRCA/ MS sheet Sleek Electronic Cabinet with Customized Signage fitted with 12V, 7AH SMF Battery giving Battery Backup of Upto 5 Hours provided with feature of Trickle Charging facilitating Overcharging and Low Battery protection. 4 nos. UL certified Dual Tone LEDs with CRI Index greater than 90 provide maximum Smoke Penetration from each Lamp. Certificate of UL listed LED used are provided with each unit of Emergency Light. Electrical Supply is suitable for 230V 50Hz AC fitted with fuse safety complete including connections with 1.5 Sqmm FR2LS PVC insulated copper conductor single core cable, earthing etc. as required.	42	Each	4456.00	187152.00

43	Supplying and fixing of <b>Engagement Light Luminaire consisting of two no. (1 no. Red and 1 no. Green/White colour) over door modular lights and 1 no. modular electronic chime (ding-dong)</b> complete including providing and fixing 6 module GI box alongwith modular base & cover plate, in recess etc, including connections, earthing etc. as required (for officer's room)	13	Each	1374.00	17862.00
44	Brush Less Direct Current (BLDC) Fan without Remote Supply, Installation, Testing and Commissioning of ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation: B, 3 nos. metal( Aluminium alloy) blades, 30 cm long down rod, 2 nos. canopies, shackle kit, safety rope, copper winding, steel/Al body Power Factor not less than 0.9, Service Value (CM/M/W) minimum as below, 350 RPM (tolerance as per IS : 374-2019), THD (Total Harmonic Distortion) less than 10%, suitable for operation with regulator for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise=75 degree C (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC Ceiling Fan compliant to IS 374:2019 fan Supply, earthing etc. complete as req.				
a	1200mm, service value $\geq 6.0$ CM/Min/Watt, air delivery 210 CM/Min (Minimum)	5	Each	2721.95	13609.75
45	Supplying and fixing extra down rod of 10 cm length G.I. pipe, 15 mm dia, heavy gauge including painting etc. as required. (Note : More than 5 cm length shall be rounded to the nearest 10 cm and 5 cm or less shall be ignored)	900	Each	53.53	48177.00
46	Providing and fixing <b>circular/ hexagonal GI Box</b> for ceiling fan clamp, of internal dia. 140mm, 73mm height, top lid of 1.5mm thick GI Sheet with its top surface hacked for proper bonding, top lid shall be screwed into the GI box by means of 3.3mm dia round headed screws, one lock at the corners. Clamp shall be made of 12mm dia. M.S. bar bent to shape as per standard drawing	5	Each	220.65	1103.25

47	Supplying and installation of heavy duty <b>exhaust fan of following sweep</b> , (copper wound), preferably 900 RPM, with metal blades, GI louver/shutter & stainless steel bird screen, medium to heavy duty in the existing opening i/c connection, providing & fixing suitable size minimum 8 mm thick phenolic sheet, with circular opening of the size of exhaust fan sweep, to cover the opening including fixing the exhaust fan and louver/shutter on the phenolic sheet, testing and commissioning etc. complete as required [Make: Havell's-Turboforce / similar in Crompton / Orient /Almonard]				
a)	300 mm Sweep	2	Each	2538.00	5076.00
b)	450 mm Sweep	5	Each	4851.00	24255.00
48	Supplying and installation of <b>250 mm Sweep PVC Fresh Air Fan</b> with integrated louver/shutter, suitable for operating on 230V±10%, 50 Hz, 1-Φ AC supply in the existing opening including connections, testing, commissioning etc., complete as required [Make: Almonard / Crompton / Havell's / Orient]	60	Each	1579.00	94740.00
49	Supplying, installing on wall, testing and commissioning of following capacity Air Insulated Compact Type Rising Mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with enclosure made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos aluminium bus bars, necessary joints & expansion joints, fire barrier at each floor, provision of tapping at every metre, continuous earthing with 2 Nos aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, angle iron bracket, steel fasteners, connecting to earthing system etc. as required				
a)	200 A (Isc = 15kA for 1 second)	40	Mtr	8529.45	341178.00
b)	315 A (Isc = 25 kA for 1 second)	40	Mtr	9947.49	397899.60
50	Supplying, installing, connecting to existing Air Insulated Compact Type bus trunking/ rising mains, testing and commissioning of following capacity End Feed Unit for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply made with 1.6mm thick steel sheet enclosure 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				
a)	200 Amps 15KA SC for 1 Second	2	Each	8987.99	17975.98
b)	315 Amps 25KA SC for 1 Second	2	Each	10825.18	21650.36
51	Supplying, installing, connecting to existing Air Insulated Compact Type bus trunking/ rising mains, testing and commissioning of following capacity Plug In/ Tap Off Box for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with 1.6mm thick steel sheet enclosure duly powder coated with provision of MCCB (but without MCCB) complete etc. as required				
a)	125 Amps 15KA SC for 1 Second	10	Each	9195.04	91950.40
b)	200 Amps 25KA SC for 1 Second (On Terrace for VRV)	10	Each	9195.04	91950.40
52	Providing and fixing following rating and breaking capacity and pole MCCB in existing cubicle panel board including drilling holes in cubicle panel, making connections, etc. as required.[Ics= 100% Icu]				
a)	100 Amp, 30 KA, FPMCCB	15	Each	8208.27	123124.05
b)	125 Amp, 36 KA FP MCCB	15	Each	8730.44	130956.60
c)	200 Amp, 36 KA FP MCCB	15	Each	16115.56	241733.40
d)	400 Amp, 50 KA FP MCCB	1	Each	45109.63	45109.63
53	Earthing with G.I. 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 metre long etc. with charcoal/ coke and salt as required. (Note: For Lightning Protection and Rising Mains)	14	Set	8434.51	118083.14
54	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	30	Mtr	762.55	22876.50
55	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	130	Mtr	289.87	37683.10

56	Providing and fixing of 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.	26	Each	615.09	15992.34
57	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required. (For horizontal run)	315	Mtr	149.48	47086.20
58	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required. (For vertical run)	175	Mtr	240.38	42066.50
59	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.	5	Each	141.40	707.00
60	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.	25	Each	140.39	3509.75
61	Providing and laying G.I. tape 32 mm X 6 mm from earth electrode directly in ground as required.	40	Mtr	223.21	8928.40
<b>TOTAL SUB-HEAD:-I</b>					<b>14380726.79</b>
<b>SUB-HEAD:-II [External Lighting]</b>					
1	Supplying, installing, testing and commissioning of <b>3.0 metre height (Nominal) hot dipped mild steel step pole</b> , in two sections, bottom section made out of not less than 139 mm dia. $\geq$ 4.8 mm thick MS pipe (1000mm approx) and top section made out of not less than 76 mm (NS) dia. $\geq$ 3.5 mm thick MS pipe (2000 mm approx) with nipple at top of suitable size for mounting post-top luminaire, complete with decorative aluminium/CI embellishment at the junction, base plate of not less than 300 mm x 300 mm x 12 mm thickness, builtin termination box with 10A, 10KA DP MCB, DIN bar, 4 No. connectors suitable for minimum 16 A rating, shorting links etc., duly factory painted with UV resistant PU paint in glossy graphite / Black colour finish, matching with the post top luminaire; GI Foundation bolts ('J' bolts) of 16mm $\Phi$ , GI nuts and washers, anchor plate complete including RCC foundation of 450mm (L) x 450mm (B) x 1000mm deep	24	Each	19256.00	462144.00

	[850mm below ground+150mm above ground] including plastering with 1:4 (1 cement : 4 course sand) cement mortar, laying of 2 nos. DWC, HDPE pipe of 63 mm OD in foundation, and painting the same in weather proof paint in requisite colour, providing a GI sheet canopy, in trepezium shape, to cover the foundation bolts and base plate of approximately 300mm height, made out of 16/14 SWG thick GI sheet steel duly factory painted with UV resistant PU paint in glossy graphite / Black colour finish matching with the pole, as required				
	<i>Note:</i>				
	<i>1. Only hot dip galvanized pipe of size and thickness mentioned shall be used for manufacturing the approved model of the Pole. Higher dia &amp; thickness MS pipes in the Poles shall, however, be acceptable without any extra cost.</i>				
2	Supplying, Installation, Testing and Commissioning of Min. 40 Watt stylish, LED decorative post top lantern fitting having Aluminum die Cast Housing and Polycarbonate diffuser, CRI ≥ 70,CCT 3000/4000/5700/6500K(as per direction of Engineer in Charge), IP65/66 protection, to be mounted on existing 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.(With 5 Year Warranty.)	24	Each	7015.00	168360.00
3	Supplying, installing, testing and commissioning of <b>10-12 W LED LED Bollard</b> of 800-1000mm height, having extruded aluminium housing, duly painted with weather proof PU, in approved colour, optical grade diffuser, with replaceable constant current electronic driver, colour temperature-4000K, THD<10%, PF≥ 0.9, built-in surge protection, Ingress Protection ≥ IP66, suitable for operation on 140-270V, 1-Φ, 50 Hz AC supply, including, foundation, connections etc. as required.	20	Each	2886.00	57720.00

4	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.				
a)	63mm dia (OD-63mm & ID-51mm nominal)	540	Mtr	291.89	157620.60
5	Supplying & laying of following size of <b>XLPE insulated, armoured, power cable of 1.1 KV grade, duly ISI marked, with aluminum conductor, conforming to IS:7098 (Part-1)</b> in the existing RCC/HUME/ METAL/ DWC HDPE pipe as required				
a)	3 C x 10 Sqmm	581	Mtr	369.00	214389.00
6	Supplying & laying of following size of <b>XLPE insulated, armoured, power cable of 1.1 KV grade, duly ISI marked, with aluminum conductor, conforming to IS:7098 (Part-1)</b> in the existing masonry open duct/ loose in the panel as required				
a)	3 C x 10 Sqmm	8	Mtr	358.00	2864.00
7	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)	3 X 10 sq. mm (22mm)	4	Set	315.12	1260.48
8	<b>Supplying and drawing following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required.</b>				
a)	3 x 1.5 Sqmm	52.8	Mtr	105.04	5546.11
9	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 volts, 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)				
a)	16 Way, Double Door	1	Each	3400.67	3400.67

10	Supplying and fixing Cable End Box (Loose wire box)(IP 43) 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.				
a)	For 16 Way, Double Door SPN MCB DB	1	Each	999.90	999.90
11	Supplying and fixing 5 amps to 32 amps 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.				
a)	Triple pole and neutral	1	Each	1314.01	1314.01
b)	Single Pole	3	Each	287.85	863.55
c)	Analog Time switch (Horizontal) with 100 hr. working reserve, Accuracy $\pm 5$ Minutes	1	Each	4967.00	4967.00
d)	3P Contactor of $\geq 20A$ AC1 rating (DIN mounting type) (220-240V AC coil)	1	Each	2013.00	2013.00
12	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	589	Mtr	84.84	49970.76
<b>TOTAL SUB-HEAD:-II</b>			<b>Rs.</b>	<b>1133433.08</b>	
<b>SUB HEAD - III (Sub Station)</b>					
<b>[Dismantling and Reinstallation of Sub-Station Equipment]</b>					
1	Shifting the following existing sub-station equipments including disconnection, dismantling from foundation, shifting within the same complex (maximum lead of 100 mtr) including all hardware, masonry work, thimbling, re-installation, connection/terminations, HT/LT cable joint & termination testing and commissioning etc. complete for all lifts and leads etc. as required				
<i>Note:</i>					
<i>1. The work shall include the cost of all hardware, T&amp;P, machinery like Hydra etc.</i>					
<i>2. The equipment shall be properly packed to avoid any damage during transit. Any damage caused to the equipment will have to be made good by the contractor at his own risk and cost.</i>					
<i>3. The work includes all HV &amp; LV tests, dielectric strength test of transformer oil, polarity test and calibration of CT's and Relays/Releases which shall be mandatory before commissioning the HV &amp; LV equipment as per the Indian Electricity Rules.</i>					

	<i>4. It is proposed to use existing HT cables &amp; terminations and therefore the terminations and laying of existin HT cable in the open trench is deemed included.</i>				
a)	1000 KVA, 11/0.433 KV, DYn11, ONAN Transformer	2	Job	19710.00	39420.00
b)	3 Panel HV Panel Board	1	Job	26563.00	26563.00
2	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 metre long etc. with charcoal/ coke and salt as required.	6	Set	15154.04	90924.24
3	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.	30	Mtr	1654.38	49631.40
4	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	30	Mtr	1258.46	37753.80
5	Supply of aluminium conductor 11 kV (E) , armoured XLPE insulated Power Cables of conforming to IS:7098, Part-2 of following size as required				
a)	3 x 240 sqmm	55	Mtr	3812.00	209660.00
6	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/ DWC pipe as required.				
a)	Above 120 sq. mm and upto 400 sq. mm	20	Mtr	171.70	3434.00
7	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.				
a)	Above 120 sq. mm and upto 400 sq. mm	23	Mtr	147.46	3391.58
8	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 :				
a)	240 sq. mm	6	set	24497.55	146985.30

9	Providing, laying and fixing following dia G.I. pipe (medium class) in ground complete with G.I. fittings including trenching (75 cm deep) and re-filling etc as required				
a)	150 mm dia	20	Mtr.	2922.94	58458.80
	<b>[LT Panels]</b>				
1	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 900 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
	<b><u>Main LT Distribution Panel (For New Block)</u></b>				
	<b>Note:-</b>				
	<i>All incoming ACBs shall have microprocessor based releases with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. ACB's shall be arranged in single tier arrangement. ACB shall be with ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position &amp; R/ Y/ B indicating lamps with protection SP MCB of 2A 10 KA rating</i>				
	<i>All outgoing MCCB's shall have microprocessor based releases (unless otherwise specified) with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. All outgoing feeders shall be with ON/ OFF indicating lamps with protection SP MCB of 2A 10 KA rating</i>				

	<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have Ics=100% Icu</i>				
	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				
	<b>Incoming - 02 Nos. each having the following:</b>				
	1 No. 1000 Amp, 4 Pole ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 1000A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 1000A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 1000/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required				
	<b>Bus Coupler</b>				
	1000 Amp, 4 Pole ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				

	3 Nos. 1000A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 1000A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, interlocking with other incomers etc. complete as required				
	<b>Bus-Bars</b>				
	4 strip Electrolytic grade Aluminium bus bars of 1600 Amps, 50 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				
	<b>Outgoing</b>				
	400 Amps, TPN 50 KA MCCB - 04 nos.				
	250 Amps, TPN 35 KA MCCB - 02 nos.				
	200 Amps, TPN 35 KA MCCB - 03 nos.				
	160 Amps, TPN 25 KA MCCB - 05 nos.				
	100 Amps, TPN 25 KA MCCB - 02 nos.	1	Job	1251596.00	1251596.00
2.0	<b><u>Main LT Panel</u></b>				
	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 900 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				

	<i>Note:- The LT Panels are to be integrated with the existing Main LT Panel in the Sub-Station by way of extension of bus-bar on either side of the Bus-coupler. They shall therefore be of the same height and colour as the existing LT Panel. The design shall be straight or 'L' shape depending on the dimensions at site. The bus-bar size and material shall be same as in the existing LT Panel</i>				
	<i>All ACB's shall have microprocessor based releases (unless otherwise specified) with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings</i>				
	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				
	<b>OUTGOING</b>				
i)	2 Nos. 1000 Amp, 4 Pole ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	<i>3 Nos. 1000A/5A, 15VA, 5P10 cast resin CTs for protection</i>				
	<i>3 Nos. 1000A/5A, 15VA, Class 1.0 cast resin CTs for Metering</i>				
	<i>Multi Function Meter with LED Display and RS485 Communication Port</i>				
	<i>R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set</i>				
	<i>ON/OFF/Trip/ Spring Charged &amp; Trip circuit healthy indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set</i>				
	<i>Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required</i>				
	<b>Bus-Bars</b>				

	4-Strip Electrolytic grade Aluminium bus bars of 1600 Amps, 63 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports [Note: The size shall not be less than size and material as the existing main LT Panel in the sub-station]	2	Job	497255.00	994510.00
3.0	<b>Essential Supply Panel (For New Block)</b>				
	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 900 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
	<b>NOTE:</b>				
	<i>All incoming ACBs shall have microprocessor based releases with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. ACB's shall be arranged in single tier arrangement. ACB shall be with ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position &amp; R/ Y/ B indicating lamps with protection SP MCB of 2A 10 KA rating</i>				
	<i>All outgoing MCCB's shall have Thermo-magnetic releases (unless otherwise specified) with overload, short circuit, earth fault, protections with adjustable settings. MCCB's shall be with ON/ OFF indicating lamps</i>				
	<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have Ics=100% Icu</i>				
	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				

	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				
	<b>INCOMING</b>				
	2 Nos. 630 Amp, 50 KA, 4 Pole ACB having microprocessor based programmable trip setting releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port, interlocked with each other so that only one of the two remains 'ON' at any one time with auto sensing of supply (Break before make analogy) etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 630A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 630A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 630/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required				
	<b>Bus-Bars</b>				
	4 strip electrolytic grade aluminium bus-bars of 800 Amps, 50 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				
	<b>Outgoing</b>				
	250 Amps, TPN 35 KA MCCB - 01 Nos.				
	200 Amps, TPN 35 KA MCCB - 03 Nos.				
	100 Amps, TPN 25 KA MCCB - 07 Nos.				
	63 Amps, TPN 25 KA MCCB - 03 Nos.	1	Job	782745.00	782745.00

4.0	<b>Synchronization Panel</b>				
	<p>Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 900 mm, totally dust and vermin proof i/c cleaning &amp; finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom</p>				
	<b>NOTE:</b>				
	<i>All ACB's shall have microprocessor based releases (unless otherwise specified) with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings</i>				
	<i>All MCCB's shall have microprocessor based releases (unless otherwise specified) with overload, short circuit, earth fault, instantaneous protections with adjustable settings</i>				
	<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have <math>I_{cs}=100\% I_{cu}</math></i>				
	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for</i>				

	<i>meeting the scheme are deemed included in the scope of work</i>				
	<i>The Panel shall have the feature of manual over-ride of operation of DG sets through synchronization of supplies. All incomers from DG Sets shall be with synchronization relay and reverse power protection relays. In no case normal supply and DG supply incomers operate in parallel. Necessary time delay relays shall be provided in addition to the PLC, woodworth relay for added safety</i>				
	<b>Incoming</b>				
i)	<b>From LT Panel --- 02 Nos. each having the following:</b>				
	1 Nos. 800 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port, interlocked with other incomer so that only one of the two remains 'ON' at any one time with auto sensing of supply (Break before make analogy) etc.				
	<i>Under voltage, Overvoltage, Overload, Over current &amp; Earth fault &amp; instantaneous Protection with time delay settings</i>				
	<i>3 Nos. 800A/5A, 15VA, 5P10 cast resin CTs for protection</i>				
	<i>3 Nos. 800A/5A, 15VA, Class 1.0 cast resin CTs for Metering</i>				
	<i>Multi Function Meter with LED Display and RS485 Communication Port</i>				
	<i>R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set</i>				
	<i>ON/OFF/Trip/ Spring Charged &amp; Trip circuit healthy indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set</i>				
	<i>Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required</i>				
ii)	<b>From 500 KVA DG Set --- 01 No. having the following:</b>				
	1 No. 800 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Over current &amp; Earth fault &amp; instantaneous Protection with time delay settings</i>				

	3 Nos. 800A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 800A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/OFF/Trip/ Spring Charged & Trip circuit healthy indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required				
iii)	<b>From 320 KVA DG Set --- 01 No. having the following:</b>				
	1 No. 630 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 500A/5, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 500A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 500/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required				
iv)	<b>From 200 KVA DG Set --- 01 No. having the following:</b>				
	1 No. 630 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 315A/5A, 15VA, 5P10 cast resin CTs for protection				

	3 Nos. 315A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 315/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required				
	<b>PLC &amp; Woodworth/ similar Relay for synchronization of DG Sets for parallel operation, auto load selection &amp; operation:</b>				
	1 No. 64-bit microprocessor based PLC with MMI, Woodworth/similar Relay, synchronization relay, reverse power relay etc. for auto load Management of DG Sets, Sensing & Signalling, AMF operation, Selection of Master DG Sets, operation (Opening/closing) as required incomers ACB's interlocking etc as required, interlocking of two normal supply incomers, AMF commencement for operation of DG Set(s), interfacing with DG Set Control Modules and coordination with Controller and DG Sets, auto Load selection & sharing for selection of DG Set and synchronized operation of DG Sets etc.				
	<b>Bus-Bars</b>				
	4 strip electrolytic grade aluminium bus-bars of 1200 Amps, 50 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				
	<b>Outgoing</b>				
	5 No. 630 Amp, 50 KA, 4 Pole ACB having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc. each having the following:				
	Under voltage, Overvoltage, Overload, Over current & Earth fault & instantaneous Protection with adjustable settings				
	3 Nos. 630A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 630A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 630/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				

	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch	1	Job	2696395.00	2696395.00
5.0	<b><u>EV Charging Panel</u></b>				
	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 300 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
	<i>All incoming MCCBs shall have microprocessor based releases with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. ACB's shall be arranged in single tier arrangement unless otherwise required</i>				
	<i>All MCCB's shall have Thermo-magnetic releases (unless otherwise specified) with overload, short circuit, earth fault, protections with adjustable settings</i>				
	<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have <math>I_{cs}=100\% I_{cu}</math></i>				
	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				

	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				
	<b>Incoming (From Main LT Distribution Panel (New Block)</b>				
	1 No. 160 Amp, 35 KA, 4 Pole MCCB with RS-485 communication port				
	3 Nos. 160A/5A, 10VA, Class 1.0 cast resin CTs for Metering				
	(0-500V) Digital Voltmeter with VSS				
	(0-200A) Digital Amperemeter with SS				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	<b>Bus-Bars</b>				
	4 strip electrolytic grade aluminium bus-bars of 200 Amps, 36 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				
	<b>Outgoing</b>				
	40 Amps, 16/25 KA, TPN MCCB - 06 Nos.	2	Job	126769.00	253538.00
6.0	<b>250 KVAR Capacity APFC Panel (Hybrid type)</b>				
	HYBRID Power Factor Correction System Supply, Installation, testing and commissioning of HYBRID APFC Panel, 3 phase 4 wire, 415 V, 50 Hz AC System for Ambient temperature -5°C to +40°C of following capacity with passive solution of 60% capacity and active solution of 40% capacity, 3Phase 4 wire Hybrid Power Factor Correction Solution (with arrangement for neutral current balance) to achieve >0.99 lag and TDDI/THDV values within IEEE recommended limits. APFC should be designed as per IS 16636 Or IEC 61921. The active section and passive section shall work in sync to give optimized output. The degree of protection of passive section should be IP 42, and of active section should be minimum IP 21. The switching device for APFC passive section should be through capacitor duty contactor and for the active compensation				

	<p>system shall be IGBT based with 3 level topology having 12 IGBT in inverter circuit. The active compensation system should filter harmonics from 2nd to 50th individual harmonic order and shall be selectable for the entire range. The active compensation system should have feature to improve PF correction and harmonic filtration having response time &lt; 100 Micro second. The hybrid panel shall be indoor type floor mounted free standing totally enclosed, extensible, fabricated in compartmentalised designed made of CRCA sheet steel of 2.0mm thick for framework &amp;</p>				
	<p>covers, 3 mm thick for gland plate i/c cleaning &amp; finishing complete with 9 tank process for powder coated of approved shade ( RAL 7032-Siemens gray or as approved by Engineer-in-Charge), having front section (switch gear and control accessories) and rear section (capacitor and reactor), front and rear access, having suitable current carrying capacity, extensible TPN Aluminium alloy bus bar of high conductivity, DMC/SMC bus bar supports, bottom base channel of MS Section, fabrication shall be done in transportable section, entire panel shall have common copper earth bar of minimum size of 25mm x 5mm with 2 nos. earth studs, the earth terminals provided on the body of capacitor bank shall also be bonded to the main capacitor panel earth bus with 2 nos. 8 SWG or 6 SWG GI earth wires/ equivalent size of copper conductor cable, forced ventilation for maintaining temperature rise not more than 5°C from ambient, interconnections, connections with 14% detuned reactor and heavy duty 525 V ISI marked Impregnated MPP(Metalized Polypropylene) Capacitor (IS 13340 Part -1 &amp; 2) APFC Panel shall be in compliance with IS :16636 &amp; CPWD Specifications etc. as per below details. (A) Incomers</p>				
	<p>Suitable capacity MCCB/ACB (Upto 300 KVAR, MCCB and above 300 KVAR, ACB ) Microprocessor base with O/C, S/C, E/L release of TPN 50KA breaking capacity (Ics=Icu), ON, OFF, Trip, R, Y, B - LED Indicating Lamp set alongwith required Instruments and accessories with extended rotary handel and door interlocking arrangement. Current rating of the Incomer in ampere shall be APFC Panel rating in KVAR x 1.4 x 1.5 or Nearest higher standards rating. (B) Instruments &amp; Indications a) For Passive Section : i) 3-Phase current sensing APFC</p>				

	microprocessor relay/controller , advance 12/16 stages (12 stages for over all capacity of panel (active + passive) below 500 KVAR and 16 stages 500 KVAR & above) and having display of Phase wise V, A, PF, Cos-Phi, KW, KVA, KVAR, THD-V , THD-I, harmonics up to 31 level. ii) Auto Manual Selector switch, auxiliary contactors with timer for delay in manual mode. iii) Digital Multi function meter with LED Display for V,				
	A, PF, KW, KVA, KVAR, THD-V & I, Frequency. iv) Suitable rating control transformer shall be provided for control and indication circuit. v) All components like control transformer, meter, relay and indicating lamp shall be protected by using suitable rating individual MCB's. vi) Wiring of the control circuit shall be done by using 2.5 sq mm, FRLS/HFFR 1100 V grade, PVC insulated multi stranded copper control wire. vii) Communication Ethernet/RS485/SNMP port open protocol for BMS integration as per approved by Engineering in charge. b) For Active Section : Dedicated HMI (Human Machine Interface) (Minimum 7 inch display) for controlling and communication and having display of Phase wise V, A, PF, Cos-Phi, KW, KVA, KVAR, THDV , THD-I, harmonics up to 50th level. Communication Ethernet/RS485/SNMP port open protocol for BMS integration as per approved by Engineering in charge.	2	Job	1378941.89	2757883.78
a	250 KVAR	2	Job	1378941.89	2757883.78
7.0	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.				
a)	630 amps 50KA SC for 1 sec	14	Mtr	20427.25	285981.50
b)	800 amps 50KA SC for 1 sec	13	Mtr	23069.41	299902.33
c)	1000 amps 50KA SC for 1 sec	15	Mtr	25670.16	385052.40

d)	1600 amps 50KA SC for 1 sec	54	Mtr	33303.74	1798401.96
8.0	Supply of aluminium conductor, GI strip armoured XLPE insulated Power Cables of 1.1 KV grade, conforming to IS:7098, Part-1 of following size as required				
a)	3.5 C X 300 Sqmm	336	Mtr	3344.00	1123584.00
b)	3.5 C X 240 Sqmm	100	Mtr	2697.00	269700.00
c)	3.5 C X 150 Sqmm	60	Mtr	1672.00	100320.00
d)	3.5 C X 120 Sqmm	154	Mtr	1434.00	220836.00
e)	3.5 C X 95 Sqmm	211	Mtr	1144.00	241384.00
f)	3.5 C X 70 Sqmm	328	Mtr	903.00	296184.00
g)	3.5 C X 35 Sqmm	225	Mtr	497.00	111825.00
h)	4.0 C X 25 Sqmm	486	Mtr	414.00	201204.00
9.0	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL/ DWC pipe as required.				
a)	Upto 35 Sqmm	265	Mtr	47.47	12579.55
b)	Above 35 Sqmm and upto 95 Sqmm	255	Mtr	72.72	18543.60
c)	Above 95 Sqmm and upto 185 Sqmm	110	Mtr	97.97	10776.70
d)	Above 185 Sqmm and upto 400 Sqmm	232	Mtr	171.70	39834.40
10.0	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 Sqmm (clamped with 1 mm thick saddle)	144	Mtr	53.53	7708.32
b)	Above 35 Sqmm and upto 95 Sqmm (clamped with 25 x 3 mm MS flat clamp)	72	Mtr	110.09	7926.48
c)	Above 95 Sqmm and upto 185 Sqmm (clamped with 25/40 x 3 mm MS flat clamp)	84	Mtr	139.38	11707.92
d)	Above 185 Sqmm and upto 400 Sqmm (clamped with 40 x 3 mm MS flat clamp)	56	Mtr	228.26	12782.56
11.0	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing masonry open duct as required.				
a)	Upto 35 Sqmm	78	Mtr	36.36	2836.08
b)	Above 35 Sqmm and upto 95 Sqmm	72	Mtr	58.58	4217.76
c)	Above 95 Sqmm and upto 185 Sqmm	84	Mtr	80.80	6787.20
d)	Above 185 Sqmm and upto 400 Sqmm	108	Mtr	147.46	15925.68
12.0	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required.				

a)	Upto 35 Sqmm (clamped with 1mm thick saddle)	224	Mtr	64.64	14479.36
b)	Above 35 Sqmm and upto 95 Sqmm (clamped with 25x3mm MS flat clamp)	40	Mtr	152.51	6100.40
c)	Above 95 Sqmm and upto 185 Sqmm (clamped with 25/40x3mm MS flat clamp)	20	Mtr	181.80	3636.00
d)	Above 185 Sqmm and upto 400 Sqmm (clamped with 40x3mm MS flat clamp)	40	Mtr	273.71	10948.40
13.0	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)	3.5 C X 300 Sqmm (70mm)	12	Each	1349.36	16192.32
b)	3.5 C X 240 Sqmm (62mm)	10	Each	1171.60	11716.00
c)	3.5 C X 150 Sqmm (50mm)	6	Each	805.98	4835.88
d)	3.5 C X 120 Sqmm (45mm)	4	Each	717.10	2868.40
e)	3.5 C X 95 Sqmm (45mm)	4	Each	690.84	2763.36
f)	3.5 C X 70 Sqmm (38mm)	8	Each	547.42	4379.36
g)	3.5 C X 35 Sqmm (32mm)	8	Each	441.37	3530.96
h)	4 X 25 Sqmm (28mm)	50	Each	376.73	18836.50
14.0	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.				
a)	63 mm dia (OD-63 mm & ID-51 mm nominal)	300	Mtr	291.89	87567.00
b)	120 mm dia (OD-120 mm & ID-103 mm nominal)	50	Mtr	421.17	21058.50
15.0	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including base of suitable size GI angle, GI bolts & nuts, fastner etc as required.				
a)	300 mm width X 62.5 mm depth X 2.0 mm thickness	160	Mtr	1311.99	209918.40
b)	450 mm width X 62.5 mm depth X 2.0 mm thickness	100	Mtr	1730.13	173013.00
c)	600 mm width X 62.5 mm depth X 2.0 mm thickness	50	Mtr	2084.64	104232.00

16.0	Earthing with G.I. 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 metre long etc. with charcoal/ coke and salt as required.	4	Set	8434.51	33738.04
17.0	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	32	Mtr	762.55	24401.60
18.0	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	60	Mtr	289.87	17392.20
19.0	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	3800	Mtr	84.84	322392.00
20.0	Supplying, installation, Testing and commissioning of ANTI SKID RUBBER MAT ISI Marked, ERDA & CPRI type tested insulating mats Class-C category maximum usage voltage 33kv, 1 mtr x 2 mtr. 3mm thick etc. as required.	8	nos.	780.00	6240.00
21.0	Supplying, installation, Testing and commissioning of Fire Bucket stand made from 24 swg. GI Sheet similar to IS: 2546 of M S angle suitable for and with 4 Nos Fire Buckets of 9.5 Ltrs capacity	2	Each	9613.00	19226.00
22.0	Supplying, installation, Testing and commissioning of First Aid Box including materials as approved by Indian Red Cross Society conforming to IS : 2217 etc. as required.	2	Each	2089.00	4178.00
23.0	Supplying, installation, Testing and commissioning of Shock Treatment Chart (prescribed under I.E.rules) duly framed with glass and supported from back with hard board with supply of all material labour T & P etc for proper completion of work. (Approx front area = 1.20 sq M)	2	Each	1164.00	2328.00
	<b>TOTAL OF SUB-HEAD:- III</b>				<b>16014863.02</b>
	<b>SUB-HEAD: IV [DG Set]</b>				

1	<p>Supply, installation, Testing &amp; Commissioning of 'Silent Type Diesel Generating set as per CPCB IV + or better norms along with having Prime Power Rating of KVA as below, 415 volts at 1500 RPM, 0.8 lagging power factor at 415 V suitable for 50 Hz, 3 phase system &amp; for 0.85 Load Factor, including testing at factory and site with fuel, load for test and other necessary arrangements Complete as per CPWD specifications, should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. and consisting of the followings:</p> <p>(A) Diesel Engine: Turbo charged Diesel engine 4 stroke water cooled, multi cylinder, dynamically balanced fly wheel, electric start of suitable BHP at 1500 RPM suitable for above output of alternator at 40 Degree C, 50% RH &amp; at 1000 Meter MSL , capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine will be with Electronic governor, Dry type Air filter with service indicator, first filling of engine fuel (after commissioning) lubricating Oil, Coolant and other consumables complete with all the required accessories, the Electronic governor shall be as per ISO 8528. The engine shall comply to the latest CPCB norms (CPCB IV + or better) and Conforming to BS 5514, BS 649, IS 10000, IS 10002, IS 13018 and as per CPWD specifications.</p>				
	<p>(B) Engine mounted Instrument Panel fitted with and having digital display Plate for following:</p> <ul style="list-style-type: none"> <li>(i) Start-stop switch with key</li> <li>(ii) Water temperature indication</li> <li>(iii) Lubrication oil pressure indication</li> <li>(iv) Lubrication oil temperature indication</li> <li>(v) Battery charging indication and Voltage indication</li> <li>(vi) RPM indication</li> <li>(vii) Over speed indication</li> <li>(viii) Low lubrication Oil trip indication</li> <li>(ix) Engine Running Hours indication</li> <li>(x) Fuel Level</li> </ul> <p>(C) Alternator: Synchronous alternator rated of appropriate KVA, 415 volts at 1500 RPM, 3 phase 50 Hz, AC supply with 0.8 lagging power factor at 40 Degree C, 50% RH &amp; at 1000 Meter MSL. The alternator shall be having Screen Protected Drip Proof (SPDP) enclosure IP23, brushless, continuous duty, dynamically balanced rotor, capable of taking 10% over</p>				

	loading for one hour after 12 hours of continuous operation, self cooled, self-excited and self-regulated through AVR conforming to IS13364(Part 2)/IS: 4722/BS 2613 suitable for tropical conditions and with class- H insulation.				
	(D) Base Frame & Foundation: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.(E) FUEL TANK:Daily service fuel tank of suitable litres capacity as per CPWD Specifications, fabricated out of 3 mm thick M.S. sheet complete with all standard accessories and fuel piping between fuel tank and diesel engine with MS class ‘C’ pipes of suitable dia. Complete with valves, level indications & accessories as required as per specifications.(F) Exhaust System:Dry exhaust manifold with hospital type exhaust silencer and catalytic convertor.(G) Starting System:12V/24V DC starting system comprising of starter motors: voltage regulator and arrangement for initial excitation complete with suitable numbers of batteries (180 AH capacity lead acid SMF type) as required as per specifications. The battery shall be housed inside the acoustic enclosure of DG Set.(H) 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 and the temperature rise inside the enclosure, noise level outside enclosure. The acoustic enclosure should be suitable for cable connection/connection through bus-trunking. Such arrangements on acoustic enclosure should be water proof & dust-proof conforming to IP-65 protection. The enclosure shall be as per CPCB IV + or better norms etc. and as per CPWD specifications.				
	(I) AMF Panel: Free standing floor mounted IP 42 automatic mains failure control panel including auto bypass, suitable for KVA as below for silent type DG set complete with relays, timers, set of CTs for metering & protection and energy analyser to indicate currents, phase and line voltages, frequency, power factor, KWH, Kilo Volt Ampere Reative Hour (KVARH), KVA (Phase & Total), KW & provision for overload, short circuit, restricted earth fault, under frequency, power (aluminium) and				

	<p>control (copper) cabling of suitable size upto 15 meter between AMF panel, LT Panel and DG Set including connection interconnection etc. as required, all complete and inter locking and communication/ Ethernet /RS485/SNMP port open protocol for BMS integration including suitable software, the panel shall be of DG Set OEM make etc. as per approved by Engineering in charge and including the following:</p> <ol style="list-style-type: none"> <li>1. Suitable numbers and appropriate capacity 4 pole motorised electrically operated draw out with cradle type 3 position ACB/ MCCB with electronic release for O/C &amp; E/F and shunt trip.</li> <li>2. Auto/Manual/Test/Off selector switch</li> <li>3. Protection for under and over voltage phase reversal (2 nos Over voltage relay, 2 Nos. reverse power relay and 2 Nos. under voltage relay).</li> <li>4. 3 Sets of current transformers 15 P 10 accuracy for protection and 15 VA class-I for metering</li> <li>5. Energy analyser unit to indicate current, Voltage( L-N &amp; L_L), kW, kVA (Phase &amp; Total), Frequency, KWH, PF.</li> <li>6. LED Indicating lamps for load on mains and load on set</li> <li>7. Fuse/ MCB for instruments</li> </ol>				
	<ol style="list-style-type: none"> <li>8. Battery charger, complete with transformer/rectifier, D.C. voltmeter and ammeter, selector switch for trickle, off and boost and current adjustment.</li> <li>9. Main supply failure monitor</li> <li>10. Supply failure timer</li> <li>11. Restoration timer</li> <li>12. Control unit with three impulse automatic engine start/stop and failure to start lockout.</li> <li>13. Impulse counter with locking and reset facility.</li> <li>14. ON/OFF/Control circuit switch with indicator</li> <li>15. Audio/Video annunciation for <ol style="list-style-type: none"> <li>(i) High water temperature</li> <li>(ii) Low lubricating oil pressure</li> <li>(iii) Engine over speed</li> <li>(iv) Engine fails to start</li> <li>(v) Full load/maximum load warning</li> </ol> </li> <li>16. Protection for over/under Frequency, Loss of AC sensing, Over Current, Unbalancing load with suitable number of relays and accessories</li> <li>17. Maintenance notification based on Engine Run Hour &amp; due date.</li> <li>18. Load Management through PLC to achieve auto opening and closing of incomer</li> </ol>				

	breakers, bus coupler switching of essential panel, interlocking providing signal to AMF Panel for load status and AMF shall give command to DG Set to auto start / auto stop depending upon load status and requirement etc. and necessary hardware and software required to perform the operation shall be provided by the contractor including all control wiring.				
a	<b>320 KVA</b>	1	Each	2471872.99	2471872.99
2	Supply, installation, testing and commissioning of exhaust pipe fabricated out of $\geq 6$ mm thick welded black MS, 'C' 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 gauge aluminium sheet including all support as required				
a)	150 mm dia.	20	Mtr	4618.00	92360.00
3	Structural steel work single section, fixed with or without connecting plate, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	150	Kg	117.35	17602.50
4	Supplying and laying of one number aluminium conductor, armoured, XLPE power cable of 1.1 KV grade, conforming to IS:7098, Part-1, of following size, in the				

	existing RCC/ HUME/DWC HDPE/ METAL pipe as required				
a)	3.5 x 300 Sqmm	32	Mtr	3752.00	120064.00
5	Supplying, laying and fixing of one number aluminium conductor, armoured XLPE power cable of 1.1 KV grade, conforming to IS:7098, Part-1, of following size, on cable tray as required (Clamped with 40x3 mm MS flat clamp)				
a)	3.5 x 300 Sqmm	16	Mtr	3800.00	60800.00
6	Supplying and laying of one number 12 Core 2.5 Sqmm multistranded bright electrolytic grade anealed bare copper conductor PVC insulated and PVC sheathed, round, flexible, unarmoured control cable of voltage grade 300/500 Volt in the existing RCC/ HUME/DWC HDPE/ METAL pipe as required	10	Mtr	830.00	8300.00
7	Supplying, laying and fixing of one number 12 Core 2.5 Sqmm multistranded bright electrolytic grade anealed bare copper conductor PVC insulated and PVC sheathed, round, flexible, unarmoured control cable of voltage grade 300/500 Volt on cable tray as required (Clamped with 1mm thick saddles)	8	Mtr	835.00	6680.00
8	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.				
a)	200 mm dia (OD-200 mm & ID-175 mm nominal)	20	Mtr	740.33	14806.60
9	Providing, laying and fixing following dia G.I. pipe (medium class) in ground complete with G.I. fittings including trenching (75 cm deep)and re-filling etc as required				
a)	150 mm dia	12	Mtr.	2922.94	35075.28
10	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)	12 Core 2.5 Sqmm (25 mm - 28 mm)	2	Each	406.00	812.00
b)	3½ X 300 Sqmm (70 mm)	4	Each	1349.36	5397.44
11	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including base of suitable size GI angle, GI bolts & nuts, fastner etc. as required.				
a)	300 mm width X 50 mm depth X 1.6 mm thickness	8	Mtr	1072.62	8580.96
12	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 metre long etc. with charcoal/ coke and salt as required.	2	Set	15154.04	30308.08
13	Earthing with G.I. 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 metre long etc. with charcoal/ coke and salt as required. <i>(Note: For Lightning Protection and Rising Mains)</i>	2	Set	8434.51	16869.02
14	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.	10	Mtr	1654.38	16543.80
15	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	8	Mtr	762.55	6100.40
16	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	5	Mtr	1258.46	6292.30
17	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	4	Mtr	289.87	1159.48
18	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	96	Mtr	84.84	8144.64

	<b>TOTAL SUB-HEAD:-IV</b>				<b>2927769.49</b>
	<b>SUB-HEAD: V [Lifts]</b>				
1	<p>Supplying, installation, testing &amp; commissioning of <b>13/14 Passenger (884 kg) lift, MRL type</b>, having contract speed of 1.5 MPS, serving eleven floors (B2, B1, GF, 1st floor, 2nd floor, 3rd Floor, 4th Floor, 5th Floor, 6th Floor, 7th Floor &amp; 8th Floor) as per detailed specifications and technical particulars</p> <p><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 specifications or not)</i></p>				
	<b>Speed:</b> 1.5 MPS				
	<b>Floors:</b> Seven floors (Double Height Basement + G+5)				
	<b>Travel:</b> 28 mtr (approx. height of Shaft)				
	<b>Stops &amp; opening:</b> 7 & 7				
	<b>Controller:</b> VVVF Regenerative (Closed Loop)				
	<b>ARD:</b> Automatic Rescue Device complete with dry maintenance free SMF batteries shall be provided				
	<b>Operation:</b> Microprocessor based duplex selective collective with/without attendant in a group of two lifts installed adjacently.				
	<b>Power:</b> 415V, 3-Phase, 50 Hz, 4-Wires System				
	<b>Phase Reversal protection:</b> Shall have auto phase corrector 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 bne provided in the controller which can be used for the building management system.				
	<b>Type of Doors:</b>				
	<b>Car entrance door:</b>				
	<b>(a) Number:</b> 1 No. (Centre Opening)				
	<b>(b) Size:</b> 900mm centre opening.				
	<b>(c) Type of doors:</b> Power operated, centre opening, horizontal sliding with VVVF controller, stainless steel in scratch proof finish (Honeycomb/ moonrock) {Fire rating of $\geq$ 120 minutes}				
	<b>b. Landing doors:</b> Centre opening, horizontal sliding, stainless steel, scratch proof finish (Honeycomb/moonrock) [Fire rating of $\geq$ 120 minutes]				
	<b>Lift Car:</b>				

	<b>a, Lift car Size: 1500mm X 1500mm</b>				
	<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 three rows of LED luminaires and ventilation grills				
	<b>d. Ventilation:</b> Suitable ventilation from ceiling with no noise high quality ventilation (fans) with two rows of louvers along the depth of the car				
	<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, Emergeny Car light unit, Emergency Alarm Button, Door Open/ Close Button, Manual Rescue Opertion, Belt Inspection Drive.				
	<b>n.</b> Provision of IP based CCTV camera inside car along with 30 days backup complete with NVR.				
	<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	2055855.00	8223420.00
	<b>TOTAL SUB-HEAD:-V</b>				<b>8223420.00</b>

	<b>SUB-HEAD:- VI [Online UPS]</b>				
1	<p>Online UPS- Input supply: Three Phase, Output supply: Three Phase Supplying, installation, Testing &amp; Commissioning of of following capacity at full load (Unity Power Factor) at operating temperature 0 to 40 deg C, Relative humidity 0 to 95%, Online double conversion true sine wave Uninterrupted hot swappable(allow for the replacement or addition of battery modules without shutting down the entire system) modular Power Supply (UPS)system with N+1 modules (N denotes total number of modules required for rated capacity). The UPS shall include a Rectifier, inverter, battery bank suitable for 30 minutes back up (Battery VAH capacity shall not be less than 1600 VAH per KVA of UPS rating per Hour backup time) on full load (Battery shall be VRLA, SMF in ABS Container) and Static Bypass switch along with provision for manual bypass, suitable isolation transformer for additional protection against neutral faults etc. UPS shall have inbuilt phase sequence correction. The UPS systems offered are to be of the latest technology with Digital Control Microprocessor based for reliable operation using Insulated Gate Bipolar Transistor (IGBT)'s both for the rectifier &amp; inverter(3 Level) with PWM (Pulse Width Modulation). The quality of design, manufacturing and inspection process should confirm to the relevant Inter-national standards such as IEC/EN/VDE. The operating efficiency of the UPS systems shall be &gt;96% while operating on battery mode and delivering quality power to the100% non-linear loads. Current total harmonic effect(ITHD) on the input grid shall be &lt; 5% at 50 %load. (The required LC (inductor (L) and a capacitor (C)) filters shall be included in UPS cost), extreme power factor kit to be included to limit the input power factor (PF) to 0.99 and output power factor shall be unity (i.e. kw rating of the UPS shall be kva rating x 1), however UPS</p>				
	<p>shall be suitable to take load at 0.7 lagging to 0.7 leading power factor loads. UPS shall be suitable for incoming supply AC :3Phase 400V +/-20%, 50 Hz +/-5 Hz, AC Output voltage:3Phase 415 Volt, 50 Hz +/- 0.2Hz, Overload capacity of 120%for 10 mins, Sine wave output. Non condensing, noise level less than 60db at 1 meter distance, protections: Input Under voltage over voltage, abnormal out voltage, battery overcharging, output over current, short circuit protection, battery deep</p>				

	<p>discharge protection, 10KV surge. UPS must comply with low voltage electromagnetic compatibility (EMC) achieved as per EN 6204, EN6204 Part I and Part 2, it shall be a Voltage and Frequency Independent (VFI)-type UPS. Communication RS232/RS485/SNMP port open protocol for BMS integration, all hardware &amp; software for IoT Communication as per approved by Engineering in charge. Required battery racks and interconnecting copper conductor cables of suitable size and connectors and all required accessories are inclusive of the cost). This system must provide a means for logging and alarming of all monitored points plus email notification. Forced air-cooling with integral inbuilt fans with redundancy (if one fan fail UPS should be able to handle at least 80% of the load, Noise Level 65 DB at 1 meter distance. The system shall be in compliance IEC 62040- 1, 2 &amp; 3, IS: 16242 and CPWD Specification. Display Panel (minimum) (In-build 5 inch or more LC Display / LED ) to display : a) Input: Voltage, current, Frequency. b) Bypass: Voltage, Frequency. c) Output: Voltage, frequency, Current. d) Battery: Voltage, Capacity. e) Load: KVA, KW, Percentage. f) Temperature: STS, Inverter, PFC. g) Event Logging &amp; Statistical Data (On LCD/LED): UPS should capture and display up to 3000 events like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc. h) Statistical Data: No. of power failures / Transfers to Bypass / Total Running time, etc. i) Mains Mode of Operation / Battery Mode of Operation / Bypass feeding the load / UPS Fault / Battery charging and discharging, overload, battery voltage and battery capacity. j) Audible Alarms: Mains Failure, Battery Low Alarm, UPS Overload, Fault, Shutdown, Input Over, Under Voltage, Output Over, Under Voltage, Battery Over, Under Voltage, Over Load and short-circuit, Over Temperature. The UPS should have QR code which should contain drawing, test report OEM manual, Geo-Tag of manufacturing location etc.</p>				
a)	30 KVA (Each Power module shall be $\leq$ 10 KVA)	3	Each	510805.48	1532416.44
b)	20 KVA (Each Power module shall be $\leq$ 10 KVA)	8	Each	345189.72	2761517.76
	<b>TOTAL SUB-HEAD:-VI</b>		<b>Rs.</b>		<b>4293934.20</b>
	<b>SUB-HEAD:VII [EPABX]</b>				

1	Supply, Installation, Testing & Commissioning of Analog phones having standard features like 16 digit LCD display, 2 way speaker, caller ID and number storage facility etc. complete as required.	141.00	Each	1559.44	219881.04
2	Supplying and laying of one number 100 Pair Jelly-Filled Telephone Armoured Cable as per DOT specification 0.5 mm dia. annealed Copper conductor, in the existing RCC/HUME/ METAL/ DWC HDPE pipe as required	20	Mtr	1678.00	33560.00
3	Supplying and laying of one number 100 Pair Jelly-Filled Telephone Armoured Cable as per DOT specification 0.5 mm dia. annealed Copper conductor, on the surface of wall/cable tray etc. as required	80	Mtr	1700.00	136000.00
	<b>TOTAL SUB-HEAD:-VII</b>				<b>389441.04</b>
	<b>SUB-HEAD:VIII [LAN System]</b>				
1	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including base of suitable size G.I. angle, G.I. bolts & nuts, fastner etc. as required.				
a)	300 mm width X 50 mm depth X 1.6 mm thickness	100	Mtr	1072.62	107262.00
b)	450 mm width X 50 mm depth X 2.0 mm thickness	130	Mtr	1453.39	188940.70
2	Supply and fixing of following size Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm with 'U' Marking, Minimum 2 cable entry/exit provision at Top and bottom with rubber protection, Front 5mm Toughened Glass with lock, wall mounting kit, Powder coated Color- RAL- 7035, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.				
a)	6U Rack	5	Each	7008.39	35041.95

3	Supply and fixing 24U Rack with 4 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.25mm CRCA Sheet with removable side panels, L-Shape adjustable Vertical Mounting Rail of 2mm with 'U' Marking completely knocked-down condition (CKD) Shape, fitted with 4 number cooling fans, minimum 5 nos two line cable entry/exit provision at top and bottom with rubber protection, Front door 5mm Toughened Glass with MS frame or MS perforated with lock, Rear MS vented or perforated door, Powder coated Color- RAL-7035 or black, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.	1	Each	21413.01	21413.01
4	Supplying, installation, Testing and commissioning of following capacity 24 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: At least 24 X RJ-45 Gigabit Ethernet Ports and additional 2 X 10GBase -T with 4 X SFP Ports with non-blocking architecture by having Switching capacity of min. 168Gbps and packet forwarding rate of 125Mpps or higher, 16K MAC table. Console Port, USB port, Stacking support of min. 8 units per stack. Internal dual AC Power supply, STP, RSTP, MSTP, BPDU Filter, BPDU Restriction, Min. 9K Jumbo Frame, LBD, IGMP Snooping V1/V2/V3, MLD Snooping V1/V2. IGMP/ MLD Groups 1K or more, IPv4/ IPv6 Loopback Interface, 16 L3 IP Interface, Ipv6 ND, VRRPv3, UDP Helper, ECMP. VLAN:802.1Q, Port based, Q-in-Q, Multicast VLAN, Protocol VLAN, VLAN Trunking, DHCP Snooping, Server, server Screening. RADIUS , TACACS+ Authentication, QoS: 802.1P, 8 queues per port, QoS : WRR, Strict + WRR, WRED, 802.1p. ACL: MAC based, IPv4C IPv6, TCP/UDP Port number, time based ACL, TFTP Client, SNMP V1, v2c, v3, SNMP traps, RMON, DHCP server, relay, client, LLDP, LLDP-MED, OAM, Dying Gasp, 802.3ah, sflow, RIP, OSPF v2/v3, policy based route, SSL, SSH. 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: UL, CE, FCC, RoHS, MTCTE, OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required.				

a)	24 port PoE Layer 2 Network Switch with PoE Support of 370W or higher with each cooper port supporting 802.3at PoE+ min.	30	Each	126646.93	3799407.90
5	Supplying, Installation, Testing and commissioning of smallform-Pluggable (SFP) for Network Switches. Must be hotPluggable, RoHS Complaint, etc. complete as required.				
a)	1G SFP Single Mode/Multi Mode	30	Each	4253.11	127593.30
6	Supplying and drawing following core Multi mode Fibre Optic Cable having corrugated steel armoring, lesser optimize 50/125µm with HDPE jacket, LSZH (Low smoke Zero Halogen), Tight buffered or loose tube, maximum attenuation: ≤ 3.5 dB/km at850 nm, ≤ 1.5 dB/km at 1300 nm, bandwidth ≥ 2000 MHz-km at 850 nm, ≥ 500 MHz-km at 1300 nm compliance and certifications: ISO/IEC 11801 Ed. 2.2, ANSI/TIA-568-C.3, ITU-TG.651.1 RoHS compliant. Multi Mode Fibre shall be Central loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-RECG.652D and Telecordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS) and HDPE Sheath, Operating ambient Temperature should be - 5 deg C to +50 deg C and Storage Temperature should be - 5 deg +50 deg C, Maximum Attenuation ± 3.5 db / km at Operational Wavelength 850 nm and ± 1.5 db / km at Operational Wavelength 1300 nm, type of fibre should be 50/125 / G.652D & Refractive Index should be 1.483/1.478,The value for Mode-filed, Cladding Diameter 50 ± 2.5 µm and125 ± 1µm correspondingly etc complete as required.				
a)	Single Mode 6 Core Optical fibre cable	150	Mtr	87.87	13180.50
	<b>TOTAL SUB-HEAD:-VIII</b>		<b>Rs.</b>		<b>4292839.36</b>
	<b>SUB-HEAD: IX [CCTV System]</b>				
1	Supply Installation Testing and Commissioning of 2 MP IP IR Dome Camera having following specifications and features etc:- 1) Signal System: PAL/NTSC, Signal to Noise Ratio: >50 dB, Camera should display Camera title, Date & Time in live & recorded video 2) Image Sensor: 1/2.8" or better progressive Scan CMOS to get color image even at night condition(Minimum Illumination: 0.006 Lux @ F1.4, AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with auto switch,				

	<p>Integrated IR Source (Auto, Manual)- Inbuilt IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control , White Balance-Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.</p> <p>3) Compression (Minimum):-Video:- H.265 or better, H.264H, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723</p> <p>4) Wide Dynamic Range:- WDR (120db or more)</p> <p>5) Digital Noise Reduction:- DNR (3D) On/Off</p> <p>6) Video Streaming &amp; Frame Rates :- Triple streaming, configurable (Main stream: 2MP (1920 × 1080) @25/30 fps, Sub streams minimum: 720P @25/30 fps).</p> <p>7) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection</p> <p>8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, syslog, video encryption, IP/MAC filtering, HTTPS, trusted upgrade, trusted boot.</p>				
	<p>9) On board Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.10) Recording Management: Format SD, overwrite, storage management, video to NAS device11) Alarm Trigger: Motion/tampering detection; audio detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection 12) Network Protocol: SFTP, IPv6, IPv4, DNS,RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast13) System Capability: ONVIF, Camera shall support open source VMS14) Ethernet: 1 RJ 45 10/100 Ethernet port15) Audio: It should support 1 x Built-In Mic and 1/1 Alarm In/ Out for External Mic. and Speakers as per site requirement.16) Power Input: The camera should support simultaneous dual power input - 12 VDC (via power adapter) and PoE (802.3af) - to ensure continuous operation in the event of a failure in one power source.17) Power Requirement: 12VDC/24V DC/PoE (802.3af)/ePoE18) Housing/ Enclosure:- IP67</p>				

	weather proof, IK10, Metallic body) 19) Operating Condition:- Ambient Temperature:- (-) 05°C to 50°C, humidity 95% (max) (non-condensing) 20) IR life: 40000 hours or higher 21) Video Bit rate: 32 KBPS - 8 MBPS or better 22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS				
a)	2MP @ 25/30fps@1080P (1920×1080) Dome Camera with 2.7mm ~13.5mm Motorized lens, Vari Focal (view Angle for H: 104°–29°; V: 54°–16°; D: 125°–34°)	117	Each	19993.96	2339293.32
2	Supplying Installation Testing and Commissioning of 2MP Fixed Lens IP IR Outdoor Bullet Camera having following specifications and features etc :- 1) Signal System: PAL/NTSC, Signal to Noise Ratio: > 50 dB, Camera should display Camera title, Date & Time in live & recorded video 2) Image Sensor: 1/2.8" or better progressive Scan CMOS to get color image even at night condition(Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with auto switch, Integrated IR Source (Auto, Manual)- Inbuilt Smart IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control , White Balance-Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking. 3) Compression (Minimum):-Video:- H.265 or better, H.264H, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723 4) Wide Dynamic Range:- WDR (120db or more) 5) Digital Noise Reduction:- DNR (3D) On/Off 6) Video Streaming & Frame Rates :- Triple streaming , configurable (Main stream: 2MP (1920 × 1080)@25/30 fps Sub streams minimum: 720P@25/30 fps). 7) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection 8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, syslog, video encryption, IP/MAC filtering, HTTPS, trusted upgrade, trusted boot.				

	<p>9) On board Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.</p> <p>10) Recording Management: Format SD, overwrite, storage management, video to NAS device,</p> <p>11) Alarm Trigger: Motion/tampering detection; audio detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection.</p> <p>12) Network Protocol: SFTP, IPv6, IPv4, DNS,RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,</p> <p>13) System Capability: ONVIF, Camera shall support open source VMS</p> <p>14) Ethernet: 1 RJ 45 10/100 Ethernet port</p> <p>15) Audio: It should support 1 x Built-In Mic and 1/1 Alarm In/ Out for External Mic. and Speakers as per site requirement.</p> <p>16) Power Input: The camera should support simultaneous dual power input - 12 VDC (via power adapter) and PoE (802.3af) - to ensure continuous operation in the event of a failure in one power source.</p> <p>17) Power Requirement: 12VDC/24V DC/PoE (802.3af)/ePoE</p> <p>18) Housing/ Enclosure:- IP67 weather proof, IK10, Metallic body</p> <p>19) Operating Condition:- Ambient Temperature:- (-) 05°C to 50°C, humidity 95% (max) (non-condensing)</p> <p>20) IR life: 40000 hours or higher</p> <p>21) Video Bit rate: 32 KBPS - 8 MBPS or better</p> <p>22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS</p>				
a)	2MP @ 25/30fps@1080P (1920×1080) Outdoor Bullet Camera with 2.7mm~13.5mm Motorized lens, Vari Focal (view Angle for H: 97°–28°; V: 52°–16°; D: 117°–32°)	5	Each	19993.96	99969.80
3	<p>Supplying Installation Testing and Commissioning of PTZ (Pan, Tilt and Zoom) IP IR Camera having following specifications and features etc :-PTZ (Pan, Tilt and Zoom) IP IR Camera having following specifications and features etc :-1) IP IR PTZ Camera: Motorized PAN TILT ZOOM with IR2) Image Sensor: 1/2.8" or better progressive Scan CMOS3)Signal System: PAL/NTSC4) Minimum Illumination: 0.008 Lux@ F1.6, AGC ON, 0 lux with IR, or better5) Imaging: 1/1s to 1/30000s, Auto Gain Control, White Balance- Auto, Back Light Compensation,</p>				

	<p>Image Rotation, Multi zone Privacy Masking (Upto 24 Area), HLC, Defog, Region Of Interest and EIS features.6) On Screen Display: Camera should display Camera title, Date &amp; Time in live &amp; recorded video both.7) Signal to Noise Ratio: &gt; 50 dB8) Event Notification: Through Relays, E-Mails or FTP9) Day &amp; Night: True Day &amp; Night High Performance Mechanical IR cut filter with auto switch, IR Source- Inbuilt IR LED's with effective distance. The camera should have IR LED's and cover distance up to 150 meter or above10) Auto Tracking: The camera should be equipped with Deep learning- based auto tracking function using simultaneously all of the panning, tilting and zooming should be available. When a motion is detected in a registered monitoring area, the camera should track the motion (object) and capture it.11) Pre/Post Event Buffering: The camera should support at least of 5 seconds of pre &amp; post event buffering.12) Pre-sets: 300 Pre-sets13) Video Compression (Minimum): H.265 or better, H.265, H.264H, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.72314) Wide Dynamic Range: WDR (120db or more), HLC &amp; BLC15) Digital Noise Reduction: DNR (2D+3D) On/Off16) Image Setting: Rotate Mode, ROI ,EIS, Defog, saturation, brightness, contrast, sharpness adjustable through client software or web browser17) Profile Management: User configuration import, export</p>				
	<p>lockout, video encryption, IP/MAC filtering, trusted boot, trusted upgrade, trusted execution 19) On board Storage: Camera should support built in Micro SD/SDHC/SDXC Card slot upto 512 GB . It should be supplied with minimum 128GB Memory. 20) Recording Management: Format SD, overwrite, storage management, video to NAS device, remote archive access via FTP login 21) Edge based Video Analytics &amp; Alarm Trigger: Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection, Tripwire, Intrusion, Object Abandon/ Missing, SMD, Face Detection 22) Network Protocol: SFTP, IPv6, IPv4, DNS,NTP, HTTP, HTTPS, SNMP, TCP/IP, PPPoE, NFS, ICMP, DHCP, SMTP, RTSPS. 23) System Capability: ONVIF Profile S, G &amp; T. CCTV Camera OEM should be fulltime member of ONVIF and quoted models should be listed on ONVIF official website (All the certifications &amp; Credentials</p>				

	<p>should be valid on the date of technical evaluation). 24) VMS: Camera shall support open source VMS 25) Connectivity: 1x LAN RJ-45 (10/100Base-T) 26) Audio Support: Audio Interface : The camera should have 1/1 Audio In/Out to connect External Mic and Speaker Audio Compression : PCM, G.711U/A, G.711MU, G.726, MPEG2-Layer2, G.722.1 27) Alarm In/Out : Alarm In/out- 7/2 Ch In/Out 28) Power Input: The camera should support simultaneous dual power input - DC/ AC (via power adapter) and PoE (802.3af) - to ensure continuous operation in the event of a failure in one power source. 29) Power Requirement: 24 VDC, 2.5 A (± 25%), PoE+ (802.3at) 30) Enclosure &amp; Weather Proof Standard: IP67 weather proof and IK10, TVS 8000V lightning proof, surge protection, voltage transient protection 31) Operating Condition:- Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non-condensing) 32) IR life: 40000 hours or higher 33) Video Bit rate: 32 KBPS - 8 MBPS or better 34) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS</p>				
a)	<p>2 MP IP IR motorized PTZ (1920 × 1080 @ 25/30fps or better)camera, Triple streaming , configurable on resolution Mainstream: 1080p@25/30 fps Sub streams :1080p@25/30 fps &amp; D1@25/30 fps or better, varifocal lens 4.3-137 mm or better with Automatic &amp; manual Focus Adjustment provisions, 32x Optical zoom and 12x Digital zoom with angle of view 57°–2.4° , PAN Travel: Pan: 0° ~ 360°endless,Manual Pan: 260° /s, Pre-set : 300° /s, Tilt, Travel: Tilt:-20° ~ 90°, auto flip 180°, Manual Tilt: 120° /s, Pre-set : 200° /s</p>	2	Each	70812.11	141624.22

4	<p>Supplying Installation Testing and Commissioning of following Channel Network Video Recorder (NVR) with camera licenses to record for all channels having specifications and features etc as mentioned below :1) Network Video Recorder Embedded/ Installed OS (Linux) along with Camera Licenses to record per NVR and to provide a live view, storage and simultaneously Multi-channel playback of all IP camera or more and must be ONVIF with minimum support of 384 Mbps incoming Bandwidth.2) NVR should support video compressions : H.265 or better, H.264, MJPEG.3) Must support 1 channel RCA Input, 2 channel RCA Output for Two-way Talk with G.711U/A, G.711u, PCM, G726 audio compressions.4) Intelligent auto power on when power resumes after power outage.5) Storage: It should support minimum 8 SATA Slots with 20TB capacity/ Slot and RAID support of RAID 0/1/5/6/10.6) Connectivity Interface : 2 Nos. x 10/100/1000 Mbps Ethernet Ports, 1x RS485, 1x RS232, 1x eSATA Port7) Backup Interface : Its should have 4 Nos USB port (2x USB3.0, 2xUSB2.0)8) Video Output Ports: 2x HDMI and 2 VGA9) Alarm Ports: It should have 16/8 Ch In/ Out ports to connect various type of external sensors and output devices like hooter/ Siren etc.10) Email &amp; SMS Alert options: Option for SMS/ Email Alerts to minimum 5 designated mobile number for power failure, HDD failure, vandalism, tempering, network disconnection and panic11) Web &amp; Mobile Application: Web, Mobile app ( For iPhone, iPad, Android Phone) for alerts and viewing.12) Protocols: HTTP, HTTPS, TCP/IP, IPv4/IPv6, UDP, DHCP, DNS, SMTP, UPnP, IP Filter, PPPoE, FTP, DDNS, Alarm Server, IP Search, Multicast, Auto Registration, ONVIF 21.12 (Profile T, Profile S, Profile G), CGI, SDK and OEM Cloud for remote monitoring without any public IP need.13) Standards: CE, FCC, RoHS, BIS Certified14) Power Supply : Should support AC100-240V, 50/60Hz Power supply.</p>				
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	<p>15) Operating Condition : -5°C to 50°C, humidity 90% (max) (non-condensing)</p> <p>16) The VMS application shall support all the features &amp; functionalities of the offered cameras.</p> <p>17) VMS should consist Licenses for all channels to record Cameras with General, motion detection, intelligent, alarm and POS recording modes. VMS should be provided with Camera Licenses , with no dependency of VMS licenses by binding with the MAC address of the cameras to achieve the functionality.</p> <p>18) The NVR OEM shall be responsible for providing a mobile application compatible with both Android and iOS devices, enabling remote monitoring and playback of cameras/NVR footage.</p> <p>19) The OEM must provide its own DDNS server hosted in India, eliminating the need for a public IP address for remote monitoring over the Internet.</p> <p>20) Must support Continuous, Alarm, Motion, Instant, Panic Recording Mode</p> <p>21) It should support Resolution: 32MP; 24MP; 16MP; 12MP; 8MP; 5MP; 4MP; 1080p; 720p; D1; CIF; QCIF</p> <p>22) When alarm recording is enabled and an event occurs, you can click the alarm icon on monitoring page to view the alert details. The snapshot function is supported on monitoring and playback page</p> <p>23) The Network Video Recorder (NVR) shall be configured to send email whenever a system message is created or an alarm event occurs. The email server shall be a valid SMTP server. Each recipient email address shall be configured to receive any combination of critical, warning, or informational messages or alarm notifications. When an alarm occurs, the email message includes the NVR name, time of alarm and a list of camera that is configured to record upon alarm</p> <p>24) It should have Web and GUI interface.</p> <p>25) Built-In Artificial Intelligence: NVR should have built-in AI :- 2 Channel face detection and recognition, - Minimum 4 Channel perimeter protection, - Minimum 8 Channel Smart Motion Detection</p>				
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	<p>26) Face Recognition Database Capacity: It should support total Blacklist and Whitelist capacity of Minimum 20,000 Faces or more with Face Detection speed of 12 face images/sec and facility to add Name, gender, birthday, address, credential type, credential No., countries &amp; regions and state to each face image.</p> <p>27) Face &amp; Human Attributes Search: Search Pictures/ Video by Gender, age group, glasses, expressions, face mask, beard, Top color, top type, hat, bag, age, gender and umbrella.</p> <p>28) ANPR Capability: It should support ANPR Camera with License plate, plate color, vehicle body, vehicle model, vehicle logo, calling, seatbelt, vehicle registration location etc vehicle attributes.</p> <p>29) Alarm Notifications based on: Motion detection, video tampering, video loss, scene changing, PIR alarm, Camera external alarm, Face detection, face recognition, perimeter protection (intrusion and tripwire), ANPR, people counting, stereo analysis, crowd distribution, heat map, Disk Full, Storage Error, IP Conflict and abnormal behaviour of fan, cybersecurity exception</p> <p>30) Alarm Notification should be linked with Recording, snapshots, Camera external alarm output, buzzer, logs, pre-sets and email.</p> <p>31) General AI Based Search: Search Pictures by channel, time, event type, target classification (Fall Detection, People Approach Detection, People No. Exception Detection, People Staying Detection, Violence Detection.</p> <p>32) Smart playback function: Should support smart search for the selected area in the video and smart playback to improve the playback efficiency</p> <p>33) VCA (Video Content Analytic): Should support multiple video contented analytics based on camera analytics</p> <p>34) Analytics by NVR: Perimeter protection and face recognition</p>				
a)	64 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16/25/36/64, 2nd screen: 1/4/8/9/16	2	Each	83426.00	166852.00
5	Supplying, installation, Testing and commissioning of following capacity 8 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: Minimum 8 XRJ-45 Gigabit Ethernet Ports and additional 2 X 1G SFP Ports with non-blocking architecture by having Switching capacity of minimum				

	20Gbps and packet forwarding rate of 14Mpps or higher, 8K MAC table. Internal dual AC Power supply with operating temperature of -5 degree Celsius to +50 degree Celsius. Jumbo frame: 10KB or higher, IGMP Snooping, IGMP snooping querier and support for IGMP Snooping Fast Leave, Should create 250 or more MLD groups, MLD Snooping, Per VLAN MLD Snooping C MLD Snooping Fast Leave, STP, RSTP, MSTP, Loopback detection, Multicast filtering, VLAN Tagging, QoS: 8 Que per port, WRR, IPv4/ IPv6 Interface: minimum 100 IPv4 static route entries and minimum 50 IPv6 static route entries, 700 Access Control entries, SSH CSSL for IPv4 and IPv6, 802.1x, ARP Spoofing, DHCP Snooping and server screening, IP+MAC+Port Binding, Per Port Bandwidth Control, 802.1X Authentication (Supports local/ RADIUS database, Port-based Access Control and EAP, OTP, TLS, TTLS, PEAP Support) Cable Diagnostic feature, LLDP, LLDPMED, SNT/ NTP, RMON, SNMP v1, v2c, v3 and SNMP Traps. Certifications: UL, CE, FCC, RoHS, MTCTE, OEM/ Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required.				
a)	8 port PoE Layer 2 Network Switch with PoE Support of 130W or higher with each copper port supporting 802.3at PoE+.	20	Each	35441.91	708838.20
6	Supplying, installation, Testing and commissioning of following capacity 24 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: At least 24 X RJ-45 Gigabit Ethernet Ports and additional 2 X 10GBase-T with 4 X SFP Ports with non-blocking architecture by having Switching capacity of min. 168Gbps and packet forwarding rate of 125Mpps or higher, 16K MAC table. Console Port, USB port, Stacking support of min. 8 units per stack. Internal dual AC Power supply, STP, RSTP, MSTP, BPDU Filter, BPDU Restriction, Min. 9K Jumbo Frame, LBD, IGMP Snooping V1/V2/V3, MLD Snooping V1/V2. IGMP/ MLD Groups 1K or more, IPv4/ IPv6 Loopback Interface, 16 L3 IP Interface, Ipv6 ND, VRRPv3, UDP Helper, ECMP. VLAN: 802.1Q, Port based, Q-in-Q, Multicast VLAN, Protocol VLAN, VLAN Trunking, DHCP Snooping, Server, server Screening. RADIUS, TACACS+ Authentication, QoS: 802.1P, 8 queues per port, QoS : WRR, Strict + WRR, WRED,				

	802.1p. ACL: MAC based, IPv4 IPv6, TCP/UDP Port number, time based ACL, TFTP Client, SNMP V1, v2c, v3, SNMP traps, RMON, DHCP server, relay, client, LLDP, LLDP-MED, OAM, Dying Gasp, 802.3ah, sflow, RIP, OSPF v2/v3, policy based route, SSL, SSH. 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: UL, CE, FCC, RoHS, MTCTE, OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required.				
a)	24 port PoE Layer 2 Network Switch with PoE Support of 370W or higher with each copper port supporting 802.3at PoE+ min.	1	Each	126646.93	126646.93
7	Supply and fixing of following size Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm with 'U' Marking, Minimum 2 cable entry/exit provision at Top and bottom with rubber protection, Front 5mm Toughened Glass with lock, wall mounting kit, Powder coated Color- RAL- 7035, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.				
a)	6U Rack	10	Each	7008.39	70083.90
8	Supply and fixing of following size Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm with 'U' Marking, Minimum 2 cable entry/exit provision at Top and bottom with rubber protection, Front 5mm Toughened Glass with lock, wall mounting kit, Powder coated Color- RAL- 7035, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.				
a)	15U Rack	1	Each	13463.30	13463.30
9	LED Display Supplying, Installation, Testing and Commissioning of following size LED display (LED monitor) industrial grade with 3840x2160 resolution or better, USB playback, Bluetooth and miracast connectivity, 4X HDMI 2.0, DP 1.2, HDR 10/10+, brightness: 500-nits or better, Video wall mode should be available, contrast ratio:				

	1200:1, OPS slot, viewing angle (H/V):170°/170°, response time less than 12ms, Display control shall be on monitor screen and programmable with remote (remote shall be supplied with system), Key Board, Optical Mouse, etc.as required.				
a)	55 inch or larger	2	Each	82877.57	165755.14
10	Supplying, drawing, Installation, Testing and commissioning of CAT6 UTP LSZH 23AWG Twisted Pair Cable in existing conduit/ on surface, Category 6 Unshielded Twisted Pair, 4 pair should be complied as per UL/ETL verification program for compliance with ANSI/TIA-568.2-D standard. Outer diameter should be in the range of 6.1mm nominal with Operating Temperature Range : -5° to +60°C. Bending Radius: < 4 X Cable Diameter at – 5°C ± 1°C and Pulling Force : 11.5 Kg				
a)	1 Run of cable	650	Mtr	60.60	39390.00
b)	2 Run of cable	450	Mtr	96.96	43632.00
c)	3 Run of cable	350	Mtr	132.31	46308.50
11	Supplying, Installation, Testing and commissioning of following CAT6 Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D				
a)	Copper Patch Cords of length 1m (3ft)	150	Each	152.51	22876.50
12	Supplying and drawing following core Multi mode Fibre Optic Cable having corrugated steel armoring, lesser optimize 50/125µm with HDPE jacket, LSZH (Low smoke Zero Halogen), Tight buffered or loose tube, maximum attenuation: ≤ 3.5 dB/km at 850 nm, ≤ 1.5 dB/km at 1300 nm, bandwidth ≥ 2000 MHz-km at 850 nm, ≥ 500 MHz-km at 1300 nm compliance and certifications: ISO/IEC 11801 Ed. 2.2, ANSI/TIA-568-C.3, ITU-TG.651.1 RoHS compliant. Multi Mode Fibre shall be Central loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-RECG.652D and Telecordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS) and HDPE Sheath, Operating ambient Temperature should be - 5 deg C to +50 deg C and Storage Temperature should be - 5 deg +50 deg C, Maximum Attenuation ± 3.5 db / km at Operational Wavelength 850 nm and ± 1.5 db / km at Operational Wavelength 1300 nm, type of fibre should be 50/125 / G.652D &				

	Refractive Index should be 1.483/1.478, The value for Mode-fiber, Cladding Diameter $50 \pm 2.5 \mu\text{m}$ and $125 \pm 1 \mu\text{m}$ correspondingly etc complete as required.				
a)	6 Core Multi Mode Optical Fibre Cable	150	Mtr	87.87	13180.50
			<b>Rs.</b>		<b>3997914.31</b>
	<b>SUB-HEAD:X [Fire Alarm System]</b>				
1	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 ( $230 \pm 5\% \text{ V}$ , 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.				
a)	Ten Loop Panel	1	Each	481661.93	481661.93
2	Supplying, installation, testing & commissioning of <b>central graphical fire alarm management system</b> to centrally monitor and operate the fire alarm system complete as required	1	Each	212366.64	212366.64
3	Supplying, installation, testing & commissioning of <b>repeater panel</b> with 320 character/ Touch screen LCD display with inbuilt reset, acknowledge and silence switches complete as required	1	Each	114871.34	114871.34
4	Supplying, installation, testing & commissioning of intelligent analog addressable photothermal detector complete with mounting base complete as required.	354	Each	3034.04	1074050.16

5	Supplying, installation, testing & commissioning of intelligent addressable thermal detector with rate of rise cum fixed temperature thermistor complete with base as required.	4	Each	2894.66	11578.64
6	Supplying, installation, testing & commissioning of addressable manual call point complete as required.	28	Each	4103.63	114901.64
7	Supplying, installation, testing & commissioning of response indicator on surface/recessed MS Box having two LED, metallic cover complete with all connections etc as required.	177	Each	309.06	54703.62
8	Supplying, installation, testing & commissioning of addressable horn cum strobe complete as required.	31	Each	3718.82	115283.42
9	Supplying, installation, testing & commissioning of intelligent addressable programmable sounder complete as required.	1	Each	2814.87	2814.87
10	Supplying, installation, testing & commissioning of fault isolator complete with base as required.	42	Each	3468.34	145670.28
11	Supplying, installation, testing & commissioning of addressable fire control module complete as required.	28	Each	3187.56	89251.68
12	Supplying, installation, testing & commissioning of fire fighter telephone handset complete as required.	22	Each	6076.16	133675.52
13	Supplying, installation, testing & commissioning of fire fighter phone jack complete as required.	31	Each	1705.89	52882.59
14	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 an extruded layer of Cross Linkable Ethylene Propylene Rubber (EPR) insulation and LSZH inner bedding, steel wire armouring & LSZH outer sheath complete as required.	1200	Mtr.	389.86	467832.00
<b>PUBLIC ADDRESS SYSTEM</b>					

15	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	133436.15	133436.15
16	Supplying, installation, testing & commissioning of 6 inches dia, 2 watts, 70/100 volts ceiling/ wall mount speaker complete as required.	216	Nos	1958.39	423012.24
17	Supplying, installation, testing & commissioning of digital audio amplifier 75 Watt, 25V rms operating at 240 Volt AC Supply complete as required.	1	No	153891.68	153891.68
18	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	800	mtr	61.61	49288.00
19	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
a)	20 mm	750	mtr	256.54	192405.00
	<b>TOTAL SUB-HEAD:-X</b>				<b>4023577.40</b>
-	<b><u>SUBHEAD- XI (Fire Fighting System)</u></b>	-	-	-	-
1	<b>FIRE PUMPS - ELECTRICAL</b>				
	(A) 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: (B) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520. (C) 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. (D) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required. (E) Suitable cement concrete foundation duly plastered with anti vibration pads.				
a)	2850 lpm at 88 m Head	2	Each	480143.90	960287.80

2	(A) 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) (B) Horizontal type, multistage, centrifugal pump of cast iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS: 1520. (C) 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. (D) M.S.fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required. (E) Suitable cement concrete foundation duly plastered and with anti vibration pads.				
a	180 lpm at 88 m Head	2	Each	135512.71	271025.42
3	<b>FIRE PUMPS - DIESEL</b>				
	(A) 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) (B) Horizontal type, multistage, centrifugal pump of cast of iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520. (C) 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. (D) M.S fabricated, common base plate, coupling, coupling guard, foundation bolts etc. as required. (E) Suitable cement concrete foundation duly plastered and with anti vibration pads.				
a	2850 lpm at 88 m Head	1	Each	725429.47	725429.47
4	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	5	Each	1686.70	8433.50

5	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.	5	Each	19596.02	97980.10
	<b>Fire Hose Cabinet</b>				
6	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 :				
a	Single headed Stainless steel	14	Each	6698.32	93776.48
7	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:				
a	Single headed Stainless steel	10	Each	6698.32	66983.20
8	Supplying and fixing first-aid Hose Reel with MS construction spray painted in post office red, 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.				
a)	30 m	14	Each	9534.40	133481.60
9	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:				
a)	Stainless steel (Grade 304)	28	Each	4713.67	131982.76
10	Supplying & fixing 63 mm dia gun metal 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:				
a	Stainless steel (Grade 304)	14	Each	1773.56	24829.84

11	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/cm <sup>2</sup> complete as required.	25	Each	1438.24	35956.00
12	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:				
a	4 way - 150 mm dia M.S. Pipe	3	Set	14968.20	44904.60
b	2 way-100 mm dia M.S. Pipe	1	Set	7334.62	7334.62
13	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:				
a	150 mm dia.pipe	6	Each	24328.88	145973.28
14	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.				
a	150 mm dia.	2	Each	11798.82	23597.64
15	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:				
a	80 mm dia	7	Each	8337.55	58362.85
b	100 mm dia	2	Each	11971.53	23943.06
c	150 mm dia	15	Each	19072.84	286092.60
16	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 :				
a	80 mm dia	30	Each	5460.06	163801.80
b	100 mm dia	2	Each	7343.71	14687.42
c	150 mm dia	18	Each	9834.37	177018.66
d	200 mm dia	1	Each	16410.48	16410.48
17	Providing and fixing in position the industrial type pressure gauge with Gun metal/ brass valves complete as required	30	Each	1505.91	45177.30

18	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 welding, 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 nominal bore (class C)	120	Metre	5155.04	618604.80
19	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including Welding, 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:				
a	250 mm nominal bore (class C) - (wall thickness 6.3 mm)	25.00	Metre	8103.23	202580.75
b	200 mm nominal bore (class C) - (wall thickness 6.3 mm)	25.00	Metre	6686.20	167155.00
c	150 mm nominal bore (class C)	400.00	Metre	4341.99	1736796.00
d	100 mm nominal bore (class C)	200.00	Metre	3107.77	621554.00
e	80 mm nominal bore (class C)	625.00	Metre	2299.77	1437356.25
f	65 mm nominal bore (class C)	350.00	Metre	1974.55	691092.50
g	50 mm nominal bore (class C)	405.00	Metre	1572.57	636890.85
h	40 mm nominal bore (class C)	420.00	Metre	1271.59	534067.80
i	32 mm nominal bore (class C)	145.00	Metre	1049.39	152161.55
J	25 mm nominal bore (class C)	2500.00	Metre	929.20	2323000.00
20	Providing, fixing, testing & commissioning of 15mm dia quartzoid bulb type sprinklers of rating 68 degree centigrade with required accessories :				
a	Pendent Sprinkler	450	Each	604.99	272245.50
b	Upright Sprinkler	890	Each	604.99	538441.10
c	Horizontal side wall sprinkler	30	Each	705.99	21179.70
d	Concealed sprinkler	10	Each	1568.53	15685.30
21	Providing & fixing flow switch in following sizes M.S. pipe including connection etc as required.				
a	150mm dia	11	Each	9740.44	107144.84
22	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	11	Each	1686.70	18553.70
23	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				
a	150mm dia	2	Each	51313.05	102626.10
24	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.				
a	1200mm	230	Set	1818.00	418140.00
b	1500mm	230	Set	1988.69	457398.70
25	Providing, installation, testing & commissioning of adjustable rosette plate for 15mm dia in white finish UL Listed or FM approved complete as required.	708	Each	266.64	188781.12
26	Providing and fixing carbon-di-oxide type fire extinguishers consisting of pressure tested single cast cylinder with rotary discharge valve and high pressure discharge tube of minimum 1 m length, discharge horn, suspension bracket conforming to IS:15683 finished externally with red enamel paint and fixed to wall with brackets complete with internal charge (Halon Free Gas)				
a	Capacity 4.5 kg	61	Each	7835.00	477935.00
27	Providing and fixing ABC Powder type fire extinguishers consisting of welded M.S. cylindrical body, squeeze lever discharge valve fitted with pressure indicating guage internal discharge tube 30 cms long high pressure discharge hose, discharge nozzle, suspension bracket conforming to IS:15683 finished externally with red enamel paint and fixed to wall with brackets complete with internal charge. (Halon Free Gas)				
a	Capacity 6.0 Kg.	61	Each	3282.00	200202.00
28	Providing and fixing <b>mechanical foam</b> type Trolley Mounted Fire Extinguisher of bearing to IS:10568/IS13385/IS13386 with dis				
a	Capacity 45 Lit.	3	Each	15246.00	45738.00
29	Providing and fixing carbon-di-oxide fire extinguishers trolley mounted with all accessories internal discharge tube,high pressure discharge hose,discharge nozzle, ISI				

	marked as per IS:2878 finished externally with red enamel paint. (Halon Free Gas)				
a	Capacity 22.5 kg.	3	Each	33880.00	101640.00
30	Providing and fixing ceiling mounted type modular automatic extinguishing system with CLEAN AGENT HFC - 236 type, made of MS body treated against corrosion with heat sensitive glass bulb sprinkler heads (68deg/79deg C), pressure indicator, arrangement for fixing to the ceiling pressurized with nitrogen gas to 15 kgf/cm2 suitable for covering 13.25 cu.mt (465 cuft) volume.				
a	6 Kgs Capacity	2	Each	29645.00	59290.00
31	Providing and fixing MS partly glazed single/double hung lockable shutter fabricated from MS section as required with 5 mm thick glass for fire station complete including stove enamelled painting of door and frame and words "Fire Hydrant" written on glass, suitable to accommodate 2 Hydrant landing valves, 1 fire hose reel, 2 nos.15m long 63 mm dia hose,1-branch pipe, 1no. fire man's axe, fire extinguishers 2 nos, including suitably mounted on a raised masonry platform as required. (Approx.size 0.90 m x 2.1m )	14	Each	16940.00	237160.00
32	Providing and fixing of Weather proof hose cabinets fabricated from 14 g M.S. Sheet with full glass door and mortise locking arrangement , suitable to accommodate one Hydrant landing valve, 2 nos. 15 M long hose and 1 No branch pipe. The cabinet shall be painted with one coat of primer and finished stove enamelled "Fire Red", "Fire Hose" written on front including suitably mounted on a raised masonry platform as required. (Approx 0.75mx0.6 m x 0.25 m).	10	Each	6776.00	67760.00
33	Providing and fixing of Fire Axe	28	Each	741.00	20748.00
34	Providing, fixing, testing and commissioning of full way level operated forged brass ball valve of brass body with forged brass hard chrome plated steel ball tested to a pressure not less than 15 kg/sq.cm with threaded/flanged complete with nuts, bolts, gaskets, washers etc. as required complete as per direction of Engineer incharge.				
a	25 mm NB	10	Each	1071.00	10710.00
b	50 mm NB	2	Each	3847.00	7694.00

35	Fabrication, supply, Insallation testing & commissioning of Electrical control panel of cubical construction, floor mounted type, fabricated out of 2mm thick CRCA sheet, compartmentalised with hinged lockable doors, dust and vermin proof, powder coated of approved shade after 7 tank treatment process, cable alley, inter-connection with suitable size copper conductor cable/solid copper strip, having switchgears and accessories, mountings and internal wiring, earth terminals, numbering etc. complete in all respect, suitable for main fire pump, pressurisation pump & diesel pump set complete as per CPWD specification with following in coming and Outgoings, suitable for operation on 415V, 3 phase, 50Hz Ac Supply with enclosure protection class IP 42 as required:				
a)	<p>INCOMING  400A, 50kA 4 Pole MCCB, Ics=100% Icu rating  Digital Voltmeter 0-500V with selector switch  Ammeter (0-400 A) with selector swtich &amp; CTs etc.  LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps  Set of Copper Bus Bar 500A  OUTGOING  (Note: All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps)  MAIN FIRE PUMP  200 A, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 75 hp pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.</p>				

	<p><b>JOCKEY PUMP</b>  100 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.</p> <p><b>DIESEL ENGINE CONTROL</b>  Control for diesel engine comprising - Automatic/Manual selector switch &amp; 3 attempt starting device, timers and relays as required, push buttons, start/stop in manual mode Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication</p> <p>Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter</p> <p>All standard relays and accessories for automatic operation of diesel engine</p> <p><b>SYSTEM CONTROLLER</b>  Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specifications.</p>	1	Each	309138.78	309138.78
	<b>TOTAL SUB HEAD :- XI</b>				<b>16356941.82</b>
	<b>SH:-XII [VRV/ VRF Heating, Ventilation &amp; Air Conditioning System]</b>				
	<b><u>VRV SYSTEM</u></b>				
<b><u>1</u></b>	<b><u>OUTDOOR UNITS (HEAT PUMP TYPE)</u></b>				

1	<p>Supply, Installation, Testing &amp; Commissioning of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating having 100%hermetically sealed inverter type twin Rotary/Scroll Compressor(s),minimum two compressors (with individual separate PCB) for above 14HP modules, microprocessor based Controller, top discharge type condensing unit(s), withR-410-A Refrigerant or equivalent, vibration Isolators with suitable foundation etc. complete as required. To have better efficiency condenser fan shall be capable to operate at different speed with respect to load. The unit shall deliver therated capacity and in confirmation as per IS 18728:2024 and CPWD Specifications and work even at 50°C ambient temperature without tripping. The system shall be able to deliver 100% of the rated capacity upto 39 Degree Celcius. The unit shall be suitable to work on 400V +/- 10%, 3Phase, 50Hz AC power supply and BMS compatible. The units shall be filled with first charge of the refrigerant and ready for use as required. The condenser should be coated with a hydrophilic film to prevent water accumulation on the surface of the heat exchanger, enhance water dispersion, and reduce the risk of degradation, thereby improving overall performance and durability. The Indian Seasonal Energy Efficiency Ratio(ISEER) of the unit shall be as per Energy Conservation and Sustainable Building Code (ECSBC) 2024 as below and complete as per CPWD specification, connections, interconnections etc. as required. (For capacity &lt;40 kWr ISEER6.4, Capacity &gt; 40 and &lt;70 ISEER 6.5, Capacity &gt; 70 ISEER6.6 for ECSBC+ Building) For Cooling or Heating or Both</p>				
a)	10 HP to 12 HP	60	HP	21636.22	1298173.20
b)	14 HP to 22 HP	260	HP	20588.85	5353101.00
-	<b><u>INDOOR UNITS</u></b>				
2	<p>Supply, Installation, Testing and Commissioning of following minimum capacity 4 way VRV/ VRF Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation,</p>				

	Corded remote control etc., suitable for operation on single phase 230 V ± 10%, 50HzAC supply, complete, as required. The Indoor units must shutdown upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement in auto mode. The cooling capacity of indoor unit will be at air inlet conditions of 27 Degree C DB and 19Degree C WB temperature. (Make will be same as of Outdoor)				
a)	1.0 TR	18	Each	28158.80	506858.40
b)	1.2 TR	12	Each	38987.01	467844.12
c)	1.6 TR	22	Each	39858.64	876890.08
d)	2.0 TR	58	Each	40131.34	2327617.72
e)	2.6 TR	19	Each	41222.14	783220.66
3	Supply, Installation, Testing and Commissioning of following minimum capacity Double way VRV/VRF Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230V ± 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a signal from the /Fire Signals. The cooling capacity of indoor unit will be at air inlet conditions of 27 Degree C DB and 19 Degree CWB temperature. (Make will be same as of Outdoor)				
a)	2.0 TR	4	Each	57798.26	231193.04
4	Supply, Installation, Testing and Commissioning of following minimum capacity 4-way compact VRV/VRF Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230V ± 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement automatically. The				

	cooling capacity of indoor unit will be at air inlet conditions of 27Degree C DB and 19 Degree C WB temperature. (Make will be same as of Outdoor)				
a)	0.6 TR	10	Each	22836.10	228361.00
b)	0.8 TR	6	Each	25373.22	152239.32
5	Supply, Installation, Testing and Commissioning of Y/T/Multi Joints. Joints shall be of same Original Equipment Manufacturer (OEM) make as of ODUs and IDUs				
a)	Indoor Units.	113	Nos	4580.35	517579.55
b)	Outdoor Multi Joint.	32	Nos	8178.98	261727.36
6	Supply, Installation, testing and commissioning including vaccumiazation and Nitrogen testing of following nominal sizes of soft/hard drawn copper refrigerant piping for VRV/VRF system, complete with fittings, with suitable adjustable ring type hanger supports, jointing/brazing including accessories, insulated with XPLE Class-O tubular insulation/with Class-O closed cell elastomeric nitrile rubber tubular sleeves sections of 19 mm thick insulation as given below for Suction and Liquid lines, all accessories as per specifications etc. as required :				
a	6.4 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	130	Meter	258.56	33612.80
b	9.5 mm dia (OD) (Softdrawn) with tube thickness 1.2 mm	250	Meter	349.46	87365.00
c	12.7 mm dia (OD) (Softdrawn) with tube thickness 1.2 mm	230	Meter	491.87	113130.10
d	15.86 mm dia (OD) (Softdrawn) with tube thickness 1.2 mm	292	Meter	621.15	181375.80
e	19 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	240	Meter	746.39	179133.60
f	22.2mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	82	Meter	913.04	74869.28
g	25.4 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	20	Meter	1078.68	21573.60
h	28.58 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	160	Meter	1168.57	186971.20
i	31.8 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm	15	Meter	1234.22	18513.30
j	34.9 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm	82	Meter	1298.86	106506.52
k	38.1 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm	5	Meter	1335.22	6676.10
l	41.27 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm	30	Meter	1381.68	41450.40

7.0	Supply, installation, testing, termination and commissioning of control cum transmission wiring (should be shielded cable in PVC Pipe) of 2C x 1.5 Sqmm Cu between indoor unit and out door unit and indoor units and its remote controller.				
a	2C x 1.5 Sqmm Cu Cable	1100	RM	118.00	129800.00
8	Supply Installation Testing Commissioning of following Field Devices including connection etc. as required				
a	Air DP Switch	2	Each	2957.28	5914.56
9	Providing and fixing of uPVC drain pipe of 6 Kg /cm <sup>2</sup> pressure rating complete with 6mm thick closed cell nitrile rubber insulation, fittings, supports, valves as per specifications & drawings.				
a	25 mm dia	400	RM	264.00	105600.00
b	32 mm dia	120	RM	398.00	47760.00
c	40 mm dia	50	RM	224.00	11200.00
d	50 mm dia	35	RM	262.00	9170.00
10	Supplying, fabricating, installing and testing of fire retardent double Canvas Flexible Connection 150mm wide for constructed of standard material as per the drawings/specifications.	6	Sqm	2986.00	17916.00
	<b>Mechanical Ventilation System</b>				
11	Supply, installation, testing and commissioning of ducted AMCA Certified Inline Fans of GSS construction (rectangular box type above 900cfm for upto 25 mm WG S.P and circular type for 10 mm WG SP upto 850cfm) with centrifugal blower and motor encased in sheet metal casing, canvas connection etc. The Fan motor shall be suitable for operation on 220 V± 10%, 50 Hz, 1 phase AC supply upto 2500cfm and above 400 V 3phase. noise level not more than 65dBA from 1 m The Fan assembly shall conform to specifications and in accordance with requirements of drawings and Schedule of Quantities.				
a	200-300 cfm capacity with 10 mm static pressure	13	Nos.	4569.00	59397.00
b	400 to 500 CFM, 7-10 mm SP WG with Single phase motor with three speed	1	Nos.	7614.00	7614.00
c	1100 CFM, 12-15mm SP WG with Single phase motor with three speed	1	Nos.	10036.00	10036.00

12	SITC of AMCA Certified (For Air and Sound Performance) tube axial flow fan of different capacity as mentioned below in standard M.S.construction. Entire fan model & AMCA Seal shall appear in technical submittal of fan. All the fans are synthetic enamelled painted/hot dip galvanized with minimum 220 GSM Zinc Coating and complete with bird screen at inlet and fire retardent flexible connections at inlet/outlet. The electric motor coupler shall be squirrel cage induction motor (IE-3 type) confirming to IS - 325-IP - 55 with class 'H' insulation. Motor shall be of high temperature resistance "Class H Smoke Spill" 250° C for 2 hrs. Fan shall be EN 12101-3 Certified & CE/UL Listed for high temperature. Fan efficiency should not be less than 70 %, noise level should not be more than 80 db @ 3 m distance when measured in hemispherical reverberant room conditions for Normal mode Fans and noise level should not be more than 85 db @ 3 m distance when measured in hemispherical reverberant room conditions for Emergency mode Fans. Fans should be as per specification and drawings (As per Vent. Fan Schedule ). Normal/Smoke Exhaust fans at St. Press. of 30 mmWG				
a	2000 CFM Normal & smoke extract,	1	Nos.	26647.00	26647.00
b	32000 CFM smoke extract	4	Nos.	145349.00	581396.00
c	35500 CFM Normal & smoke extract parking	1	Nos.	176495.00	176495.00
d	45500 CFM Normal & smoke extract parking	1	Nos.	231866.00	231866.00
13	SITC of AMCA Certified (For Air and Sound Performance) tube axial flow fan of different capacity as mentioned below in standard M.S.construction. Entire fan model & AMCA Seal shall appear in technical submittal of fan. All the fans are synthetic enamelled painted/hot dip galvanized with minimum 220 GSM Zinc Coating and complete with bird screen at inlet and fire retardent flexible connections at inlet/outlet. The electric motor coupler shall be squirrel cage induction motor (IE-3 type) confirming to IS - 325-IP - 55 with class 'F' insulation. Fan efficiency should not be less than 70 %, noise level should not be more than 85 db @ 3 m distance when measured in hemispherical reverberant room conditions. Fans should be as per specification and drawings. (As per Vent. Fan Schedule ) (Makeup Air & Pressurization Fans with St. Press. of 40 mmWG/Make Up Air Fan at 30mm WG)				
a	10500 CFM for Lift well pressurization, 40 mm S.P.	1	Nos.	50180.00	50180.00
b	12000 CFM for pressurization, 40 mm S.P.	1	Nos.	65753.00	65753.00

c	19500 CFM for pressurization, 40 mm S.P.	1	Nos.	100360.00	100360.00
d	27500 CFM for pressurization, 40 mm S.P.	1	Nos.	134967.00	134967.00
e	45500 CFM Normal & smoke Make Up Air parking	1	Nos.	231866.00	231866.00
14	Supply , Install, test and commission <b>double skin Evaporative air washer</b> as per specifications , suitable for the following capacity given below at 90% efficiency of evaporative medium. The fan shall be of DIDW centrifugal construction. Packaged Type				
a	3000 CFM, 40 mm (WG) static pressure, Floor mounted with weather proof enclouser (For Kitchen), <b>Cost to be inclusive of unit isolator</b>	1	Nos.	48450.00	48450.00
<b>15</b>	<b>Air Scrubber (DRY Type)</b>				
	<b>DIDW FAN : Kitchen Exhaust</b>				
<b>15.1</b>	Supply, installation, testing and commissioning of DIDW Backward curved horizontal floor mounted fan unit comprising of accurately cut scroll & side plates, heavy gauge with all welded construction, sheet steel fabricated impeller, drive with blower pulley, motor pulley, V-belts, squirrel cage motor complete as per specification (fan-motor efficiency exceeding ASHRAE 90.1-2007 Criteria). (The bidder shall submit fan performance curves for all fans).				
	The item should be all complete in line with relevant standards, technical specifications of the standards and direction of engineer in charge.				
<b>a</b>	3500 CFM / 75 mm WG SP (For Kitchen at UG Blocks),Cost to be inclusive of unit isolator	1	No.	65753.00	65753.00
<b>15.2</b>	<b>DRY SCRUBBER : Kitchen Exhaust</b>				
	Supply, Installation, Testing and Commissioning of Dry Scrubber comprising of extract air intake section, electrostatic precipitation technology, dry type air cleaner to remove odour, smoke and fumes from exhaust air.				

	Electrostatic section shall be made of 16 gauge galvanised sheet,high bake epoxy powder coated, washable type aluminium mesh filters, stainless steel spiked ionizers to create high voltage DC field, Stainless Steel 316 collector plates which should be alternatively charged positive and negative with large collecting area with 14" deep cell, to work as magnet for charged smoke and oil particles. Average efficiency of 95% and more in single pass as per DOP test method. Electrostatic Precipitator should be able to charge particles from 0.01 micron to 10 microns through solid state power supply. The system should be fitted with interlock switch for safety. The system should allow connection to a fan section to achieve 500 FPM velocity across the air cleaner.				
<b>a</b>	3500 CFM / 75 mm WG SP (For Kitchen at UG Blocks),Cost to be inclusive of unit isolator	1	No.	68176.00	68176.00
16	Supply, installation, testing and commissioning of CO sensors . The car park ventilation systems shall be controlled by an individual CO-Monitoring system for entire car park located on each level to optimize efficiency. The contactors within the motor control panel shall be controlled by a Carbon Monoxide monitoring panel which shall contain DDCs (Direct Digital Controllers) where the pre-determined switching strategy and logic shall be loaded. The CO monitoring panel shall receive signals from CO sensors located throughout the levels at a spacing of no. more than 1 per 350 m2. The 24Vac power supply for the CO sensors shall be mounted in the same panel. The power supply shall be looped across the CO sensors. The proposed CO sensor shall provide a 0-10 VDC signal for measuring the CO level in the car park area. CO monitoring devices shall be mounted remotely throughout the car parks. The devices shall be mounted in accordance with the manufacturers guidelines but no greater than 1.5 m above FFL. CO Sensor shall be suitable for wall mount & capable of following features: (As per 350 sqm covered area) for Basement ventilation. Digital display of the CO level : 0 to 200 ppm Analog output : 4 to 20 mA / 0-10VDC Low Voltage operation : 24 VAC / VDC Test Switch : Provides mode for system self test. Automatic Calibration (Field Calibration Kit)	10	Nos.	15573.00	155730.00

	Over-range indication. Start-up mode : steps display and output through test ranges. Solid – Stat sensor : Life expectancy of 7 to 10 years. Multiple sensors with one power supply.				
	<b>AIR DISTRIBUTION SYSTEM</b>				
17.0	Supply, installation, balancing and commissioning of site 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.				
a)	Thickness 0.63 mm sheet	250	sq.m	1225.13	306282.50
b)	Thickness 0.80 mm sheet	380	sq.m	1429.15	543077.00
c)	Thickness 1.00 mm sheet	300	sq.m	1869.51	560853.00
18	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.				
a	Thickness 0.63 mm sheet	60	sq.m	1202.91	72174.60
b	Thickness 0.80 mm sheet	250	sq.m	1395.82	348955.00
c	Thickness 1.00 mm sheet	100	sq.m	1502.88	150288.00
19	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.	1	sq.m	7655.80	7655.80
20	Supplying & fixing of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers as per specifications	5	sq.m	9719.23	48596.15
21	Supplying & fixing of powder coated extruded aluminium Return Air Grills with louvers but without volume control dampers complete as required.	5	sq.m	6347.85	31739.25
22	Supply, installation and balancing of extruded aluminium powder coated air louvers complete with aluminium wire mesh bird screen as per specifications.	25	Sqm.	6997.00	174925.00

23	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.				
a	Fire damper	10	sq.m	11468.55	114685.50
b	Actuator	10	Each	10751.45	107514.50
<b>24.0</b>	Supply, Installation, Testing and commissioning of doble layer canvas connection with 2 hr. fire rating as per specification.	5	SqM	2986.00	14930.00
25	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 two coats of cold setting adhesive (CPRX compound). The joints shall sealed with 50 mm wide and 3 mm thick self adhesive nitrile rubber tape insulation complete as per specifications and as required.				
a	19 mm	75	sq.m	818.10	61357.50
26	Supply and fixing of acoustic lining of supply air duct and plenum with 25 mm thick resin bonded glass wool having density of 32 kg/m <sup>3</sup> , with 25 mm X 25 mm GI section of 1.25 mm thick, at 600 mm 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.	2	sq.m	898.90	1797.80
	<b>ASSOCIATED ELECTRICAL WORKS</b>				
<b>27.0</b>	<b>Fan Panel</b>				
	Design, fabrication, assembling, wiring, supply, installation, testing and commissioning of following LT panels fabricated out of 14 guage CRCA sheet steel, 9 tank process in approved shade cubical formationwith reinforcement of suitable size angle iron and channel T iron flats. All steel material used in the construction of panels shall be powder coated. A solid busbar shall be provided at the bottom of the panel with two connecting eyes for termination. The boards shall be suitable for 415 volts, 50 Hz, 3 phase , 4 wire supply system. All the hardware used in the fabrication of the panel				

	shall be galvanized with zinc passivation. The panel shall be compartmentalized to accommodate one feeder in each compartment. A vertical cable alley of suitable width shall be provided to serve on or two vertical feeder sections. Also the opening between the busbar chamber and the feeder section shall be shrouded with bakelite / hylam sheet with min.3 mm thickness.				
	<b>The panel drawing shall be approved before taking up the fabrication and compitable BMS.</b>				
	<b>In All panel Each starter should have remote control and interlocking facilities including auto manual switch, NO/NC contacts for control and must have auto manual operation suitable to take signal from fire alarm panel for automatic operation of fan in case of fire. All smoke /vent. fan panel the starters shall have suitable facility to operate with fire sensing control modules.</b>				
a	<b>HVAC Fan Panel VMCC-1,2 (LB)</b>				
	<b><u>Incoming</u></b>				
	1 no. 100 amp 4P, 36 KA MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	125 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	2 nos. 25-40 A,TP MPCB (with VFD Space Provision )	2	Nos	31146.00	62292.00
b	<b>HVAC Fan Panel VMCC-3 (UB)</b>				
	1 no. 63 amp 25 KA 4P MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	100 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	2 nos. 20-25 A,TP MPCB (with VFD Space Provision)				
	1 nos. 2.5-4 A,TP MPCB (with VFD Space Provision)	1	Nos	38068.00	38068.00
c	<b>HVAC Fan Panel VMCC-4 (UB)</b>				

	<b><u>Incoming</u></b>				
	1 no. 100 amp 4P 36 KA MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	150 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	2 nos. 13-18 A,TP MPCB (with DOL starter )	1	Nos	38068.00	38068.00
d	<b>HVAC Fan Panel VMCC-5 (1st)</b>				
	<b><u>Incoming</u></b>				
	1 no. 32 amp 4P MCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	63 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	1 nos. 2.5-4 A,TP MPCB (with VFD Space Provision,)				
	1 nos. 4-6.3 A,TP MPCB (with VFD Space Provision)	1	Nos	22494.00	22494.00
e	<b>HVAC Fan Panel VMCC-6 (Terrace)</b>				
	<b><u>Incoming</u></b>				
	1 no. 125 amp 4P 36 KA MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	150 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	1 nos. 9-14 A,TP MPCB (with DOL starter )				
	2 nos. 6-10 A,TP MPCB (with DOL starter )				
	2 nos. 20-25 A,TP MPCB (with Star Delta starter )	1	Nos	96899.00	96899.00
f	<b>HVAC Fan Panel VMCC-7 (Terrace)</b>				
	<b><u>Incoming</u></b>				
	1 no. 100 amp 4P 25 KA MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	125 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				

	1 nos. 9-14 A,TP MPCB (with DOL starter )				
	2 nos. 6-10 A,TP MPCB (with DOL starter )				
	1 nos. 20-25 A,TP MPCB (with Star Delta starter )	1	Nos	84787.00	84787.00
28	<b>METER BOARD / SUB PANEL'S</b>				
	Supplying, Installation, Testing and Commissioning of dust, damp and vermin proof free floor standing / wall mounted factory built sheet steel enclosed modular construction extendable panel, suitable for operation on 415 + 10% volts, 50 Hz AC 3 phase 4 wire system fabricated out of suitable sized square tubular section and covered with 2.0mm thick CRCA sheet, hinged doors of 2mm thick CRCA sheet, duly painted complete with aluminium bus bars, interconnection with solid copper conductor wires / aluminium strips, neutral links, earth bus etc. necessary metering protections & indications and mounted with the following as per drawing and technical specifications attached etc. complete as required.				
a	<b>ODU's Panel-MCC-01</b>				
	Same as above item but outdoor Panel with following accessories.				
	<b>INCOMING:</b>				
	1 No. 630 amps, 415V TPN MCCB with overcurrent and short circuit releases, all indication, push button etc.				
	Coloured (Red, Yellow, Blue) phase indicating lamp - 1 set				
	(0 - 630 A) CT operated Ammeter with selector switch & 3 nos. CTs ratio 630/5A , 15VA burden & accuracy class of 1.0 - 1 set				
	0-500 V Voltmeter with selector switch - 1 set				
	LED indication lamp with control fuse				
	<b>BUSBAR:</b>				
	800 Amp. TPN, 35 kA Al. Bus Bar				
	<b>OUTGOINGS:</b>				
	80A, TPN ELCB with 100mA - 11 Nos. (Incl. 1No. Spare)				
	63A, TPN ELCB with 100mA -11 Nos. (Incl. 1No. Spare)				
	<b>ODU Panel</b> Described as above/As per Manufacturer ODU Configuration.	1	Nos.	169574.00	169574.00
	<b>CABLING (POWER )</b>				

29	Supply, installation, testing & commissioning of Copper conductor cables PVC sheathed, armoured cables of 1.1 KV grade with identification tags, clamps and saddles etc. All Cables should be FRLS type				
a	4Cx06 Sqmm	900	Rmt	510.00	459000.00
b	4Cx04 Sqmm	250	Rmt	368.00	92000.00
	<b>Control Cabling</b>				
30	Supply, installation, testing & commissioning of Copper conductor , PVC insulated, PVC sheathed armoured cable of 1.1 KV grade (Which is Interconnecting wiring for the fire alarm system with the AHU and the smoke dampers & Touch screen controller ).				
a	5C x 1.5 Sqmm	20	RM	209.00	4180.00
31	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including base of suitable size G.I. angle, G.I. bolts & nuts,, fastner etc. as required.				
a	150 mm. Width x 50mm. Depth x 1.6mm. Thickness.	240	Meter.	811.03	194647.20
b	300 mm. Width x 62.5mm. Depth x 2mm. Thickness.	20	Meter.	1311.99	26239.80
32	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	5	Meter.	84.84	424.20
	<b>TOTAL SUB HEAD :- XII</b>				<b>20231534.51</b>
	<b>SUB-HEAD:XIII [Solar PV Power Generation System]</b>				

1	<p>Supply, Installation, Testing and Commissioning of on-grid Solar Photovoltaic Power Plant conforming to various applicable standards BIS, IEC, MNRE guidelines, the Central Electricity Authority Regulations and CPWD Specifications as amended up to date, consisting of Mono/Poly Crystalline silicon solar cells module, net metering facility, necessary control, protections, earthing, cabling, mounting structure, junction boxes, power conditioning units, Real time online web interfaced Data Monitoring System, Distribution panels, grid connecting arrangement, conduits, pipes, cable trays and other accessories etc. as required.</p> <p>a) High Energy Efficiency Solar Photovoltaic Module of capacity 330 Wp or above, manufactured in India, conforming to IS 14286/IEC 61215, IS/IEC 61730-Part-1, IS/IEC 61730-Part-2. Solar Photovoltaic Module conversion efficiency shall not be less than 23% at STC with temperature coefficient of Pmax better than -0.30% per degree Celsius. PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. Solar Modules shall be designed to operate in relative humidity upto 100% with temperature between -10 Deg C and +85 Deg C. Further, each PV module used in any solar power project must have Radio frequency identification tag with information such as name of manufacturer, month and year of manufacturing, country of origin (separately for Solar cell and module), I-V curve, Unique Serial No and Model No of the module, Wattage, Im, Vm and FF, name of test lab issuing IEC certificate.</p>				
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<p>b) Power Conditioning Unit (PCU) of 350-800 V DC Input voltage range and 415 V AC, three phase, 4 wire, 50Hz +/- 2.5 Hz, output voltage suitable to generate AC with a variation of 10% at nominal voltage. Power with efficiency not less than 97%, total harmonic distortion less than 3% and suitable for ambient temperature from 0 to 50 degree C , Minimum IP-65 for outdoor and Minimum IP 21 for indoor, Built-in meter and data logger, MPPT, switching devices IGBT/MOSFETs and controller Microprocessor /DSP . PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization &amp; shutdown. The PCU shall be able to withstand unbalanced load conforming to IEC standard with shutdown/standby mode. It must be provided with grid islanding along with manual disconnect pole isolation switch besides automatic disconnection. Minimum protections: Mains Under/ Over Voltage, Over current, Over/Under grid frequency, Over temperature, Surge voltage induced at output due to external source, Short circuit, Lightning, Anti Islanding (for grid synch. Mode) and other protections as per applicable standards. LCD/LED display of minimum parameters: DC input voltage, DC current, AC Voltage and current (all 3 phases, in case of 3 phase), Instantaneous &amp; cumulative AC output power, Daily DC energy produced and other parameters applicable standard. Communication interface RS 485/ RS 232. c) Module mounting structure: The roof top solar plant generation units shall be installed by using supporting Aluminium/Galvanized MS structure (mass of zinc coating shall be as per IS4759 ) having minimum head room clearance of 2.4 meter above the terrace level / ground level. The mounting structure would be designed to sustain wind load and seismic parameter of the site of installation. All the structure shall be design as per applicable BIS code and the material shall also confirm the applicable BIS Code. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. The suitable arrangements for maintenance and cleaning shall be provided.</p>				
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	<p>d) Real time online web interfaced Data Monitoring System complete with accessories for various parameters such as Solar Irradiance, temperature, AC Output Voltage and current, Output Power, Power factor, DC Input Voltage and Current, Time Active, Time disabled, Time Idle, Power produced and other parameters as per standard practices.</p> <p>e) Array junction box &amp; Main junction box with IP 65 protection and termination arrangement for incoming and outgoing cable along with glands, lugs and other accessories etc. as required. Each junction box shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy with full dust, water &amp; vermin proof arrangement with High quality Suitable capacity Metal Oxide Varistors(MOVs) (semiconductor diode with resistant applied voltage)/ surge arrestors and suitable Reverse Blocking Diodes, isolation switches isolate the DC input to Inverter, copper bus bar etc.</p> <p>f) Lightning ,surge voltage protection, earthing protection and grid islanding.</p> <p>g) Cables: Connections &amp; Interconnections by required size IR/UV protected XLPE insulated copper conductor 1.1 kV grade armoured power and control cables(ISI Marked) along with supplying &amp; fixing of necessary channel/conduit, GI cable trays, supports, lugs, thimble and other accessories etc. as required.</p> <p>h) DC Distribution Board And AC Distribution Panel Board: IP65, free standing, metal cladded, having copper bus bar, having required protection and control gears, connection interconnection, etc. as required.</p>	50	KWp	54822.80	2741140.00
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..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.				
a)	90 mm dia (OD-90 mm & ID-76 mm nominal)	70	Meter.	339.36	23755.20
3	<b>Supplying Laying of one number XLPE insulated stranded aluminium 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 requiremen at site)				

a)	4 x 25 Sqmm				
4	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.)				
a)	4 x 25 Sqmm (28 mm)				
5	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)	4 x 25 Sqmm (28 mm)	2	Each	376.73	753.46
6	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 metre long etc. with charcoal/ coke and salt as required..	4	Set	15154.04	60616.16
7	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	20	Meter.	762.55	15251.00
8	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	350	Meter.	84.84	29694.00
<b>TOTAL SUB HEAD :- XIII</b>					<b>2871209.82</b>
<b>SH:- XIV [Hydropneumatics System]</b>					
1	<b>Domestic Water Transfer Pumps</b>				
	Supplying & supervision of testing & commissioning of package vertical Hydropneumatics system, comprising of 2.0 nos. (1 duty + 1 stand by) Electrical Driven inline pumping sets each of 5.0 LPS to a head to 70 meter with all accessories, Pumps shall be with C.I. Base, S.S 304, impeller, shaft, mechanical seal, S.S. Shaft directly coupled to motor suitable for operation on 400/440 volts, 3 phase 2900 RPM. TEFC electronic motor mounted on a common channel baseplate 150mm dia pressure gauge, GM isolation cock and cement concrete foundation with plaster with dunlop cushy foot mountings with all accessories such as NRVs, valves, pressure switch, common suction and delivery header,				

	bellows on suction and delivery side complete in all respects.				
	Pump mounted or wall mounted microprocessor based controller, Electronic control panel IP 54 with frequency inverter, logic controller relays, pressure sensor, pressure sensor transmitter, pressure tank, float switch, VFD, electrical wiring, cabling from panel to pumps, level controller, two lined LCD display, diodes to indicate pump ready, pump running and fault capable to communicate with toher RS 485 interface. with Power box equipped with fuses or isolators or circuit breakers as required. complete with all accessories as per manufacturer specifications.				
	Suction & Delivery Header - SS 304				
	Control Valve On suction and Delivery - Ball Valve Only (No Butterfly Valve Accepted).				
	Flow Prevention - Only Check Valve				
	One Number Variable frequency Drive				
	Impeller : Stainless Steel				
	Shaft : Stainless Steel				
	RPM : 2900.				
	Mover : Electric Motor				
	HP - As required.				
	Necessary foundation with bolts				
	Ball valve on suction & delivery				
	Including all electrical panel and cabling works.				
	NRV on delivery				
	Dust & vermin proof cubicle type motor control centre fabricated from powder coated 16 SWG MS sheet suitable to automatic working of above mentioned pumps.	1	Set	361682.00	361682.00
2	Supply, installing, testing and commissioning of submersible dewatering single stage single entry pumps with C.I.body and C.I. two vane enclosed type impeller, SS-304 shaft connected to TEFC submersible motor for 415 ± 10% volts, 3 phase, 50 cycles A.C. power supply with mechanical seal, pump connector unit with rubber diaphragm and bend, vertical discharge pipe, guide pipe and chain in built level controller, sequence running controller, arrangement for both pumps running together in case of emergency, audible hooter for failure or flooding, dry running Protection complete in all respects.				
	<b>(1W + 1S)</b>				
	<b>Pump Room Drainage Pumps and basement</b>				

	(Pumps to be suitable to handle solids upto 30 mm size)				
	Capacity - 4.0 LPS (Each)				
	Head - 15.0 M				
	H.P. - 2.5 HP Approx.	2	Set	65673.00	131346.00
3	<b>Electric Panel For Water Supply Pumps at Water Supply Pump Room</b>				
	Design, manufacture, supplying, installation, testing and commissioning of indoor cubical panel minimum depth 300mm made out of 2mm thick MS sheet, 9 tank process, powder coated, with IP42 protection with hinged and lockable doors complete with approved shade interconnections, tinned copper crimping lugs, bonding to earth and painting, suitable for use at 415 volts, 3 phase 4 wire 50 Hz system and suitable for a fault level of 25 MVA symmetrical at 415 volts. (minimum size 600mm x 600mm)				
	<b>INCOMING</b>				
a	63 A, 16KA FP, 415V MCCB with heavy duty solid neutral link with				
b	(0-100A) ammeter with 3 CT and selector switch - 1 set				
c	(0 - 500 V) voltmeter with selector switch - 1set				
d	LED indication light with protection fuse. - 01 Set (3 Nos.)				
e	100A 4 strip Al. busbar with DMC support - 1set				
	<b>OUTGOING</b>				
f	40A ,10 KA TPN MCB - 2 Nos. (outgoing to water booster pump set)				
g	40A, 10 KA TPN MCB - 2 Nos. (Spare)				
h	32A, 10 KA TPN MCB - 4 Nos. (2 nos. outgoing to waste water pump & 2 nos. spare)	1	Set	35962.00	35962.00
4	<b>SUB - PANELS FOR 2.0 HP WASTE WATER SUMP PUMPS.</b>				
	Design, manufacture, supplying, installation, testing and commissioning of indoor cubical panel, minimum depth 300mm, made out of 2mm thick MS sheet, 9 tank process, powder coated, with IP42 protection with hinged and lockable doors complete with approved shade interconnections, tinned copper crimping lugs, bonding to earth and painting, suitable for use at 415 volts, 3 phase 4 wire 50 Hz system and suitable for a fault level of 25 MVA symmetrical at 415 volts. (minimum size 600mm x 600mm)				
	<b>INCOMER</b>				
	40 A TPN MCB - 1 No.				
	(0-40A) ammeter with 3 CT and selector switch - 1 set				

	(0 - 500 V) voltmeter with selector switch - 1 set				
	LED indication light with protection fuse. - 01 Set (3 nos.)				
	<b>OUTGOINGS</b>				
	32A, 10KA TP MCB - 2 Nos.				
	DOL starter upto 5 HP, overload relay, start / stop push buttons, phase indication lights with protection fuse, on / off / trip indication lights with protection fuse, including single phase preventer. - 02 Nos				
	NOTE :				
	i) All the drainage pumps shall be work cyclic process i.e. in first operation duty pump work on duty and stand by pump duty pump work on stand by and stand by pump work as duty pump.				
	ii) The drainage Stand by pumps automatically work as drainage assist pump for Duty pump when level of water rises in drainage sump pumps i.e. Both pumps can work at a time & operation shall be controlled with the help of level controllers and float switches.	2	set	29002.00	58004.00
5	Providing, laying, testing & commissioning of 'B' class medium duty G.I. pipe conforming to IS 1239 including welding, 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 :				
a	65 mm	10	Metre	1343.30	13433.00
b	80 mm	10	Metre	1529.14	15291.40
c	100 mm	10	Metre	1944.25	19442.50
d	150 mm	15	Metre	2659.33	39889.95
6	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 :				
a	65 mm dia	2	Each	4759.12	9518.24
b	80 mm dia	2	Each	5460.06	10920.12
c	100 mm dia	2	Each	7343.71	14687.42
7	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:				
a	65 mm dia	2	Each	6982.13	13964.26

b	80 mm dia	4	Each	8337.55	33350.20
8	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.				
a	100 mm dia.	2	Each	7342.70	14685.40
<b>TOTAL SUB HEAD :- XIV</b>					<b>772176.49</b>
<b>SH:-XV [Stack Parking]</b>					
<b>1</b>	<b>Boom Barrier</b> Supply, installation, testing and commissioning of Automatic Boom Barrier (up to 6 mtr) for outdoor, Electromechanical drive, 24V DC Power Supply, CE Certified, IP-55 or better, extruded aluminium white colour boom arm, reflective red stickers, all housing and internal parts will be rust and corrosion free metal of high strength .The boom barrier will be suitable for operation automatically by RFID card/tags, ANPR cameras, remote from Guard Room with wired and wireless arrangement & manually, 100% intensive duty cycle, opening- closing time max 6 seconds(adjustable ), with in built reverse on contact protection, manual override, push button, Loop Detector for Auto Closing, Integration with Smart card and proximity reader etc, MCBF 12, Million cycles. (Note:- the items i/c all civil & electrical works i/c control cables) The Motor & Controller should be minimum IP55 rating.	2	Nos.	135555.00	271110.00
<b>2</b>	Supply, Installation, Testing & Commissioning of Automatic Number Plate Reorganisation (ANPR) a) TCP/IP enable Color Camera b) High Resolution c) inbuilt OCR Engine d) integrated with PMS e) IP 67 or above f) additional illumination light g) Mounting Pole (SS or GI) h) Adjustedable lens i) High performance 4 core processor j) ANPR processor 1.4 ghz ARM quad core k) Range 4 m-20 mtr l) certificate CE/ UL/ FC/ OnViF with mounting pole and integrated with barrier for access control system of vehicle.	2	Nos.	131945.00	263890.00

3	<p>SITC of Combo device of <b>Ultrasound Detector &amp; LED Indicator (Red/Green)</b> : To sense the vehicle occupancy with automatic detection. Ultrasonic detection sensing with RS485 as communication protocol.</p> <p>(a) Detectable range: 0.5m to 3.5m, Scope of detection: 15 deg,</p> <p>(b) Operating temp:20 to +60 Degree Celsius.</p> <p>(c) Working Voltage: DC 15- 24V</p> <p>(d) Working Current: 2 mA</p> <p>(e) Communication:RS485@9600Bps</p> <p>(f) Programmable range adjustable</p> <p>(g) Power Consumption-&lt;3W</p> <p>(h) Dimension:120X120X75</p> <p>(i) Certification:CE</p> <p>LED indicator should have common anode double color light design. The unit should have single module with standard baud rate &amp; housing material should be ABS with all required mounting connectors &amp; Accessories. Complete as per technical specification</p>	108	Nos.	4482.00	484056.00
4	<p>SITC of <b>DIRECTIONAL LED DISPLAY</b> (For indicating total vacant slots at respective floor Entry Floor/Level).a)Number of dynamic digit -4 with arrowb) Height of Character height 160 mmc) LED Type-5mm SMD ultra bright Multi color LEDd) Every line will have seperate address in case of multiple linese) Power Supply - 230VACf) Communication through RS 485g) Out door display with weatherproof enclosure.h) MS Powder coated Panel with all required accessories for mountingi)Visibility: 120 mtrj) IP Rating 65</p>	10	Nos.	21998.00	219980.00
5	<p>SITC of <b>SINGLE ROW FLOOR LED DISPLAY</b> (For indicating total vacant slots at respective floor Entry</p> <p>a)Number of dynamic digit -4</p> <p>b) Height of Character height 160 mm</p> <p>c) LED Type-5mm SMD ultra bright Multi color LED</p> <p>d) Every line will have seperate address in case of multiple lines</p> <p>e) Power Supply - 230VAC</p> <p>f) Communication through TCP-IP/RS 485</p> <p>g) Out door display with weatherproof enclosure.</p> <p>h) MS Powder coated Panel with all required accessories for mounting</p> <p>i) IP Rating- 65</p>	2	Nos.	21998.00	43996.00

6	<p><b>Main Display</b> at Entry Gate Of Building : 2 ROWS MULTICOLOR LED DISPLAY (For indicating total vacant slots at respective Floor/level).(Installation of the said display unit is at entrance of Parking main gate) (minimum size 30"x60" i/c all mounting accessories i.e. required 80mm dia 3 mtr. length GI pipe pole 2 nos. i/c painting &amp; foundation of pole)</p> <p>a) Number of dynamic digit -4  b) Height of Character height 160 mm  c) LED Type-5mm SMD ultra bright Multi color LED  d) Every line will have separate address in case of multiple lines  e) Power Supply - 230VAC  f) Communication through TCP-IP/RS 485  g) Out door display with weatherproof enclosure.  h) MS Powder coated Panel with all required accessories for mounting  i) IP Rating- 65</p>	1	Nos.	50327.00	50327.00
7	<p><b>SITC of ZONE CONTROLLER:</b> Equipped with communication protocol: RS485, with Standard Baud rate, Maximum load quantity 28 units of UD. Maximum Communication distance: 800 mtrs, Working temp range: 5 deg C to 50 deg C. The above shall be housed in a vandal proof, lockable &amp; secure PVC Cabinets to be supplied along with the Controllers and its necessary accessories.</p> <p>(a) Working Voltage: 24 Vdc  (b) Current Rating:45mA  (c) Power consumption:&lt;10W  (d) Communication: RS485@9600 Bps  (e) Maximum Load Capacity:-28 units of UD  (f) Maximum Communication Distance:800 mtr  (g) Display:LED indicator  (h) IP Rating: IP 54  (i) Certification :CE  Complete as per technical specification</p>	4	Nos.	33412.00	133648.00

8	<p>SITC of <b>FLOOR CONTROLLER/ MASTER CONTROLLER:</b> Operating voltage :AC220V± 10%, Communication protocol : RS485, with Standard Baud rate &amp; the above shall be housed in a vandal proof, lockable &amp; secure PVC Cabinets. To be supplied along with the Controllers &amp; all other Required Necessary Accessories..Baud Rate:9600 Bps.CPU:32 bit microprocessor.Rate: Half duplex.Voltage rating:AC 230V - 50Hz.Current rating:45 mA.Power Consumption:10W.Display Indicator: Red Power, Green ON.RAM:256K bytes. ROM:1 MB flash.Input Port Type:Upto 16 Channels TCP/IP &amp; RS485 interface.Speed:10/100 Mbps (Auto Detect).Protocol:ARP, IP, ICMP, UDP, TCP, HTTP, DHCP.Mode:TCP Server/TCP Client/UDP/Virtual Com/Pairing.Setup:HTTP Browser Setup.Security:Login Password.RS-485 Pins:Data+, Data- (Surge Protected) Built-in RS-485 pull high/low resistor 15KV ESD protection for all signals.Certification:CE.Complete as per technical specification</p>	2	Nos.	39960.00	79920.00
9	<p><b>Server &amp; Software</b>Supplying, installation, testing &amp; commissioning of Parking Guidance System Server with real time monitoring PGS application the following Characteristicsa) Type: Rack Mountableb) size: 1Uc)Processor Speed : 3.3 GHzd) Processor Type : Intel Core i7/ Xeon e) Hard disk : 1 x 1TB SSD 7.2K RPM SATA 6Gbpsf) RAM: 1 x 32GB g) OS: Windows 11 Pro with software license h) 24 inch LED display with HDMIParking Guidance System with Software license Parking Guidance Software should have the following featuresParking Graphical representation Long stay vehicle indicationAverage parking time Parking area with alarm and event monitoring Report Management Graphical representation based on actual layout DrawingReport Management for better parking operations Average traffic flow daily, weekly, monthly Different Color indication on software as per time spent in parking Manage and control each parking guidance device through software Floor wise parking count status, Vacancy status Additional hardware integration possibility</p>	1	Set	291931.00	291931.00
10	<p>Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and</p>				

	making good the same in case of recessed conduit as required.				
<b>a</b>	20mm dia	300	Mtr.	256.54	76962.00
<b>b</b>	25mm dia	200	Mtr.	291.89	58378.00
<b>11</b>	Supplying and drawing following sizes of control cable in the existing surface/ recessed steel/ PVC conduit as required.				
<b>a</b>	3C x 1.5 Sqmm Cu Cable	300	Mtr.	1290.00	387000.00
<b>b</b>	4C x 1.5 Sqmm Cu Cable	200	Mtr.	13.00	2600.00
<b>12</b>	Supplying, drawing, Installation, Testing and commissioning of CAT6 UTP LSZH 23AWG Twisted Pair Cable in existing conduit/ on surface, Category 6 Unshielded Twisted Pair, 4 pair should be complied as per UL/ETL verification program for compliance with ANSI/TIA-568.2-D standard. Outer diameter should be in the range of 6.1mm nominal with Operating Temperature Range : -5° to +60°C. Bending Radius: < 4 X Cable Diameter at – 5°C ± 1°C and Pulling Force : 11.5 Kg				
<b>a</b>	1 run of cable	500	Mtr.	60.60	30300.00
<b>13</b>	Supplying, installation, testing and commissioning of indoor type 2 Post (G+1) Stack Type Hydraulic Parking System complete with all standard accessories and as per the following minimum technical specifications: Lifting Capacity: Not less than 2000 Kg ± 10% per pallet, Lifting Height: Approximately 1750 mm, Platform Width: Pallet size 4000mm x 2200 mm clear usable, Pallet thickness: 1.6 mm 90 GSM Galvanized, Drive Mode: Hydraulic drive with power pack and required cylinders, Operation: Push button type control panel with Up/Down/Stop functions, Power Requirement: 220/380V, 50 Hz, 3-Phase AC supply, Safety Features: Multi-level mechanical locking system, Anti-fall hook / anti-drop protection, Limit switches for upper and lower travel limits, Overload protection, Emergency lowering system, Safety locking during power failure, Finish: All structural components to have powder-coated corrosion-resistant paint Complete in all respects including internal wiring, interconnections as directed by Engineer-in-Charge complete with warranty of 3 years etc. as required.				

	The scope of work will include planning, designing, approval from department, supplying, installation, testing and commissioning etc for a 2-level stack vehicle parking system for minimum 260 ECS, complying to the relevant Indian and or international standards. Being able to lift vehicles up allows them to be stacked vertically. Making use of vertical space allows vehicles to be parked in the most efficient manner possible. The platform is moved by a hydraulic / electric motor based lifting system. Before lowering the platform, lower vehicle will be required to be moved out. This system enables two vehicles to be stacked one above the other. It is a hydraulic / electric motor mechanism which shall work very smooth, quiet and reliable. The work will include all items required for the work, which will include the MS structure, required civil works, power distribution cabling, control cabling, control and switching arrangements, panels, safety features, consumables, marking, signages etc complete as required.				
	Stack car parking system to be installed at basement level/s as per the Architectural layouts or as approved by the department to meet the requirement of the car parking system as per NIT and also in compliance to the local body.	69	Nos.	145266.00	10023354.00
	<b>TOTAL SUB HEAD :- XV</b>				<b>12417452.00</b>
	<b>SUB HEAD :- XVI (EV Charging)</b>				
<b>1</b>	Supply, Installation, Testing and commissioning of EV charging station As per specifications and in Compliance to relevant IS codes etc.				
a)	Light EV AC Charger (Mode-3)Power : 7 kW, Input power supply: 1phase 230 +10% Volt, output supply: 230 Volt AC, Frequency:50 Hz +/-3%, Operational temperature range : -25 to 55 degree C (outdoor), -5 to 55 degree C(Indoor), RH upto 95%, Charging Device as per IS-17017-22-1 EV-EVSE Communication: as per relevant IS Codes, Bluetooth Low Energy, one Charge Point Plug/ Socket as per IS-60309 and IS-17017-2, Vehicle Inlet/ Connector As per EV manufacturer, suitable for 2 Wheelers and 4 wheelers. Indoor use: at least IP41; Outdoor use: at least IP44. Mechanical Strength :protection of the external enclosure against mechanical impact shall be IK08 according to IEC 62262.O/L,S/C protection. Insulation Resistance > 1 M Ω. Cable Length: 7.5 m.	10	Each	23618.85	236188.50

	RCD having a rated residual operating current not exceeding 30 mA; Separate RCD for multiple outputs. Telecommunication port of the EV supply equipment according to IS 13252 (Part 1) : 2010. OCPP (Open charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevant IS Codes.				
	<b>TOTAL SUB HEAD :- XVI</b>			<b>Rs.</b>	<b>236189.00</b>
	<b>SH: - XVII [Effluent Treatment Plant]</b>				
<b>A</b>	Supplying, installation, testing & commissioning of Effluent Treatment Plant for the following duty with on site 3 years warranty:				
	<b>Daily Avg. Flow = 5 cum/Day</b>				
	<b>Reuse of ETP treated water after treatment. Horticulture, Landscaping, irrigation etc. (for flushing after GRA-OUT)</b>				
	<b>Influent Characteristics (considered)</b>				
	pH - 2 to 10				
	BOD5 - 400-500 mg/l				
	S. Solids - 250-300 mg/l				
	COD - 700-1000 mg/l				
	Oil & Grease - 6.5 mg/liter				
	<b>Effluent discharge standard after treatment:</b>				
	pH - 6.5 - 8.0				
	BOD5 - Less than 10 mg/liter				
	S. Solids - Less than 10 mg/liter				
	COD - Less than 50 mg/liter				
	Oil & Grease - < 1 mg/l				
<b>1</b>	Mild Steel Suitable Sized Manually operated Bar Screen made of Mild Steel in RCC screen channel as per following specifications	1	No.	6777.00	6777.00
	Size: 300 mm x400 mm				
	Angle of inclination: 60 degree (Or as per site)				
	Bar spacing: 10-12 mm				

2	Providing and Fixing of compact monoblock dry motor Raw Effluent transfer pumps of suitable rating with non-clog free flow open impeller, solid handling capacity of upto at least 30 mm suitable for operation on 415 V +10% , 3 Phase ,50 Hz, AC supply, speed 2900 rpm including oil chamber, guide wire for lifting & lowering of pump , MS galvanized lifting chain, complete with all aspects.	2	Nos.	15649.00	31298.00
	Flow: 0.5 m3/hr.				
	Head: 8-10 m				
	Power rating: 0.75 KW				
3	Supply, Installation, testing & commissioning of physico-chemical treatment, the system shall be comprising of followings:-				
	<b>Alum Dosing System with Automation</b>				
	(a) Dosing pump, Cap: 0-6 LPH, Pressure: 4 Kg/cm2 with pipes, fitting and accessories for necessary provision of Automatic dosing				
	Type: Metering pumps				
	(b) Dosing Tank, Cap: 100 Litres				
	MoC: HDPE/LDPE				
	<b>Lime Dosing System</b>				
	(a) Dosing pump, Cap: 0-6 LPH, Pressure: 4 Kg/cm2 with pipes, fitting and accessories for necessary provision of Automatic dosing				
	Type: Metering pumps				
	(b) Dosing Tank, Cap: 100 Litres				
	MoC: HDPE/LDPE				
	<b>Poly Dosing System</b>				
	(a) Dosing pump, Cap: 0-6 LPH, Pressure: 4 Kg/cm2 with pipes, fitting and accessories for necessary provision of Automatic dosing				
	Type: Metering pumps				
	(b) Dosing Tank, Cap: 100 Litres				
	MoC: HDPE/LDPE				
	<b>Tube deck media for Pre settling Tank along with supports and structures</b>	1	Job	71037.00	71037.00
4	<b>Piping, Valves and accessories for ETP</b>				
(a)	Providing and fixing uPVC pipes conforming to IS, suitable for hot & cold water supply, including all fittings, including trenching, refilling & testing of joints complete as per direction of Engineer in-Charge.				
(i)	25 mm dia nominal bore	20	Metre	65.00	1300.00
(ii)	32 mm dia nominal bore	15	Metre	129.00	1935.00
(iii)	40 mm dia Noinal Bore	10	Metre	240.00	2400.00

(b)	Providing, laying, testing & commissioning of 'B' class medium duty G.I. pipe conforming to IS 1239 including welding, 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 :				
(i)	25 mm	10	Metre	718.11	7181.10
(ii)	32 mm	30	Metre	792.85	23785.50
(iii)	40 mm	20	Metre	975.66	19513.20
(c)	Supplying, fixing, testing and commissioning of following size valves, gauges and strainers for condenser water circulation as per specifications.				
	BUTTERFLY VALVE (MANUAL) with C I body SS disc nitrile sheet & O-ring & PN 16 pressure rating as specified.				
(i)	40 mm dia	6	Each	3134.03	18804.18
<b>5</b>	Providing and fixing of Gun Metal NON - RETURN VALVE- Horizontal (Screwed End)				
	Size : DN 25 mm	2	No.	474.00	948.00
	Size : DN 32 mm	2	No.	644.00	1288.00
	Size : DN 40 mm	2	No.	780.00	1560.00
<b>6</b>	Supply, Installation, Testing & Commissioning of compact monoblock dry motor SBR Feed pumps of suitable rating with Self priming with adequate solid handling capacity of upto at least 5-10 mm suitable for operation on 415 V +10% , 3 Phase ,50 Hz, 50 Hz FREQUENCY, THREE PHASE A.C. POWER SUPPLY	2	Nos.	8934.00	17868.00
	Flow: 0.5 m3/hr.				
	Head: 8-10 m				
	Casing: CI, Impeller: CI, Shaft: C-40				
	RPM: 2900				
	Power rating: 0.37 KW, 0.5 HP				
<b>7</b>	<b>SBR PACKAGE</b>				
	Supply, Installation, Testing & Commissioning of Twin Lobe type Air Blowers for providing aeration to the SBR tank - 2 Nos				
	Air Flow: 10 m3/hr.				
	Pressure: 4000 mmwc				

	Power Rating: 1.5 KW				
	Supply, Installation, Testing & Commissioning of Air Diffusers for Equalization tank and SBR tank				
	Coarse bubble diffusers - 4 Nos.				
	Fine bubble diffusers - 4 Nos.				
	SBR GRA-Auto Decanting system equipped with Automation features based on times based pre-designed PLC - 1 Nos.				
	Pipes and fittings for Air piping and Air Grid				
	Providing and fixing uPVC pipes complete with fittings				
	25 mm dia nominal bore - 10 Mtr.				
	32 mm dia nominal bore - 10 Mtr.				
	50 mm dia Nominal Bore - 10 Mtr.	1	Job	254304.00	254304.00
<b>8</b>	Supply, Installation, Testing & Commissioning of Horizontal centrifugal type Filter Feed Pumps for feeding water from Intermediate Water tank to filters (MGF and ACF)	2	Nos	8934.00	17868.00
	Flow: 0.25 m3/hr.				
	Head: 20-30 m				
	RPM: 2900				
	Impeller: CI				
	Shaft: CI				
	suitable for operation on 415V				
	Power Rating: 0.75 KW				
<b>9</b>	Supply, Installation, Testing & Commissioning of compact monoblock dry motor Sludge transfer/recirculation pumps of suitable rating with Self priming with adequate solid handling capacity of upto at least 7-10 mm suitable for operation on 415 V +10% , 3 Phase ,50 Hz, 50 Hz FREQUENCY, THREE PHASE A.C. POWER SUPPLY	1	Nos.	13555.00	13555.00
	Flow: 0.5 m3/hr.				
	Head: 8-10 m				
	Power rating: 0.37 KW, 0.5 HP				
<b>10</b>	Supply, Installation, Testing & Commissioning of Chlorine dosing system, it shall be comprising of dosing pump, dosing tank.				
	<b>1- Chlorine Dosing System</b>				
	a - Dosing pump, Cap: 0-6 LPH, Pressure: 2 Kg/cm2				
	Type: Metering pumps				
	<b>b- Dosing Tank, Cap: 100 Litres</b>	1	Job	9223.00	9223.00

	MoC: HDPE/LDPE				
<b>11</b>	Supplying of <b>Sludge Bag</b> System of suitable size for the dewatering of sludge generated per day.	1	Set	7109.00	7109.00
<b>12</b>	Supplying of <b>FRP vessel</b> filter with distribution system and other required accessories:				
	<b>Multigrade Filter</b>				
	<u>Dia : 200 mm</u>				
	<u>HOS: 1350</u>				
	Filter media: Fine and coarse sand, pebbles and gravels				
	<b>Activated Carbon Filter</b>				
	<u>Dia : 200 mm</u>				
	<u>HOS: 1350</u>				
	Filter media: Fine and coarse sand, Activated Carbon, pebbles and gravels	1	Set	32287.00	32287.00
<b>13</b>	Providing & Fixing, testing and commissioning of indoor Electrical Panel IP42 rating minimum 250mm depth and powder quoted paint with approved shade, for ETP, SEMI compartmentalised fabricated out of 16 gauge CRCA sheet steel minimum 7 tank process with 4 strip 100A aluminium busbar with DMC/ SMC support i/c interconnection with FRLS copper conductor wire, plates shall be provided on top as well as at the bottom of panels along with required cabling and accessories required to complete the system i/c followings switchgears: (Approx. size 1000mm x 1000mm)				
	<b><u>INCOMING</u></b>				
	TPN MCB 63A - 1 No.				
	SP MCB 6A - 3 Nos.				
	METERING CT 60/5A - 1 Set				
	DIGITAL VOLT METER WITH SELECTOR SWITCH - 1 set				
	DIGITAL AMMETER WITH SELECTOR SWITCH - 1 set				
	LED INDICATION LIGHT RYB - 1 set				
	<b><u>OUTGOING</u></b>				
	<b>RAW EFFLUENT TRF. PUMP 0.75KW - 2 Nos.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 2.5-4A - 2 Nos.				
	POWER CONTACTOR 9A- 2 Nos.				
	PUSH BUTTON WITH ELEMENT - 4 Nos.				
	INDICATION LIGHTS - 4 nos				

	SPP - 2 Nos.				
	<b>SBR FEED PUMP 0.37 KW - 2 Nos.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 1.6-2.5A - 2 Nos.				
	POWER CONTACTOR 9A - 2 Nos.				
	PUSH BUTTON WITH ELEMENT - 4 Nos.				
	INDICATION LIGHTS - 4 nos				
	SPP - 2 Nos.				
	<b>AIR BLOWER 1.5 KW - 2 Nos.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 1.6-2.5A - 2 Nos.				
	OWER CONTACTOR 9A - 2 Nos.				
	PUSH BUTTON WITH ELEMENT - 4 Nos.				
	INDICATION LIGHTS - 4 nos				
	SPP - 2 Nos.				
	<b>FILTER FEED PUMP 0.75 KW - 2 Nos.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 2.5-4A - 2 Nos.				
	POWER CONTACTOR 9A - 2 Nos.				
	PUSH BUTTON WITH ELEMENT - 4 Nos.				
	A/M SELECTOR SWITCH - 2 Nos.				
	INDICATION LIGHTS - 4 nos				
	ADDON BLOCK - 2 Nos.				
	SPP - 2 Nos.				
	<b>SLUDGE REC. PUMP 0.37 KW - 1 No.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 1.6-2.5A - 1 Nos.				
	POWER CONTACTOR 9A - 1 Nos.				
	PUSH BUTTON WITH ELEMENT - 2 Nos.				
	INDICATION LIGHTS - 2 nos				
	A/M SELECTOR SWITCH - 1 Nos.				
	SPP - 1 Nos.				
	<b>Spare - 1 No.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 1.6-2.5A - 1 Nos.				
	POWER CONTACTOR 9A - 1 Nos.				
	PUSH BUTTON WITH ELEMENT - 2 Nos.				
	INDICATION LIGHTS - 2 nos				
	A/M SELECTOR SWITCH - 1 Nos.				
	SPP - 1 Nos.				
	<b>Provision for fixing PLC SYSTEM - 1 No. i/c wiring, programing, testing &amp; commissioning.</b>				
	PLC-DI/DO-30 - 1 No.				
	HMI 7" - 1 No.				
	POWER SUPPLY 1.1A - 1 No.				

	PLC PROGRAMMING AT YOUR OFFICE				
	RELAY CARD - 2 No.				
	EMG STOP - 1 No.				
	FAN 4" - 1 No.	1	Job	36967.00	36967.00
	<b>Cabling</b>				
14	Supply, installation, testing and commissioning of Copper Cable of following specification				
a	3C X 6 sqmm	25	Mtr	199.00	4975.00
15	Supply, installation, testing and commissioning Copper Cable of the following specification				
a	2C x 1.5 sqmm	15	Mtr	39.00	585.00
16	<b>MS TANKS</b>				
	Supply of following Tanks In MSEP/HDPE				
	<b>MSEP Tanks</b>				
	<b>Physico-chemical Treatment with Flash Mixer/Flocculation Tank/Settling Tank+SBR</b>				
	Total Weight app. 3500 Kgs - 1 No.				
	<b>HDPE tanks</b>				
	Intermediate water tank - 1000 Ltr. - 1 No.				
	Break Tank - 1000 Ltr. - 1 No.				
	Treated Water Tank - 1000 Ltr. - 1 No.	1	Job	345661.00	345661.00
	<b>TOTAL SUB HEAD :- XVII</b>				<b>928228.98</b>
	<b>SUB HEAD- XVIII [Audio-Video System]</b>				
<b>A</b>	<b>Conference Room - 108 Pax (54 feet x 37 feet)</b>				
	<b>Audio System</b>				
1	Supply, Installation, Testing & Commissioning of two-way, full-range Ceiling-mount loudspeaker with back can, Frequency range / Response- 90Hz to 20kHz or better, Rated RMS Power - 30Watts or better, Sensitivity-88 dB SPL or better, Coverage Angle-105° conical or better, Maximum SPL Continuous/Peak-101dB/107dB or better, Rated Impedance - 8Ω/16Ω. Transformer Tapping ( 70V & 100V ) - 30, 15, 7.5, 3 watts or Similar, Transducer - LF - 6.0-inch woofer or better, HF- 0.7-inch dome tweeter or better coaxially mounted with LF transducer, Input and Parallel connector - Euroblock, Grille - Powder coated metal material, Back can - Steel . Compliances - UL1480, UL2043 etc. Ceiling mounting accessories i.e., rails and rings should be included.	18	Each	18174.00	327132.00

2	<p>Supply, Installation, Testing &amp; Commissioning of Eight-Channel Class-D Network Amplifier with DSP processing. Supported Network Protocols - Dante/AES67 or Similar as per the quoted DSP. Per Channel Power @ 8Ω, 4Ω, 70V and 100V - 125W or better, Amplifier shall support Bridge / Parallel modes for combining multiple for higher power requirements. Freq response - 20 Hz - 20 kHz or better, THD - 0.05% or better, Signal to Noise ratio - &gt;110 dB or better. Damping factor - &gt;160 dB or better, Inbuilt DSP Processing. Network Routable Line Inputs - 4 or more GPIO Ports for external control. Network port - 2 or more for Audio and Control Signal Transportation and redundancy. Better to have Front Panel Display/LED Status and controls. The Amplifier shall be compatible with the quoted DSP processor etc. complete as required.</p>	1	Each	356206.00	356206.00
3	<p>Supply of Server/Modular based, Open Architecture Digital Signal Processor. Should support 128x128 Network Audio Channels via Dante/AES67 or similar protocol to integrate network Microphones, Speakers, I/O Expanders and Amplifiers. AEC Channels – 60 or more with 200ms tail length for Analog, Network Microphones. Should support minimum 52 Analog Mic/Line inputs and minimum 4 Analog Line Outputs through Network audio I/O interface. USB-B / USB-C Ports - for providing USB-Audio and USB-Video driver to the connected PC/Laptop for Web based video conferencing application i.e., MS Teams, Zoom, Google Meet etc. Default Dante channels - minimum 8x8 or more. VOIP Softphone instance 6 or more for Audio Conferencing. Ethernet Ports - Dual Gigabit for Audio Transpiration and Audio &amp; Network Redundancy. Should have 48x48 GPIO Inputs &amp; Outputs. Dual Independent Gigabit network ports for segregation of network services such as VoIP, SNMP, LLDP, LDAP and WAN Media streaming etc. The Processor should have processing capabilities for Video Conferencing (AEC), Voice Lift and Voice activated camera switching and Preset recall. i/c onsite warranty of 3 years etc. complete as required.</p> <p>Note: Required hardware/accessories/expander with perpetual software license should be quoted to meet the minimum specification to fulfil the requirements.</p>	1	Each	1726507.00	1726507.00

4	Supply, Installation, Testing & Commissioning of 18" Gooseneck Mic with Pre Amp, Mute Switch with LED indicator and desktop base, Frequency Response - 50 to 17,000 Hz, Output Impedance (at 1,000 Hz) - Rated at 150 Ohm (180 Ohm actual), Open Circuit Sensitivity (At 1 kHz) - 33.5 dBV (21.1 mV), Maximum SPL (1kHz at 1% THD, 1 kOhm load) – 124.2 dB, Equivalent Output Noise (A-weighted) - 28.0 dB SPL, Dynamic Range with 1 kOhm load – 96.2 dB or better , Common Mode Rejection - 40.0 dB minimum, Mute Switch Attenuation - 50.0 dB minimum etc. complete as required.	1	Each	41600.00	41600.00
5	Supply, Installation, Testing & Commissioning of Boundary microphone with programmable mute button. The microphone shall be a Flush mounted, black, electret condenser microphone with a omnidirectional polar pattern. Microphone should include a programmable mute button with a touchsensitive for muting the microphone. The microphone shall include a logic controlled, bi-coloured status indicator ring. The visible diameter and height of the microphone above the mounting surface shall be 1 ¼ " (32mm) and 5/8" (24 mm) or lesser. The microphone shall be resistant to RF interference from portable mobile and handheld devices. The frequency response range shall be 50 Hz to 17 kHz and the sensitivity 42 mV/Pa. Maximum SPL: 114 dB. Equivalent Output Noise: 21 dB SPL. Signal-to-Noise Ratio: 70 dB or More. Dynamic Range: 93 dB or better etc. complete as required.	48	Each	81782.00	3925536.00
6	Supply, Installation, Testing & Commissioning of Audio Network Interface with Mic/Line Inputs. Inputs-4xMic/Line with +48VDC Phantom Power, Power-PoE and Aux, Frequency Response-20 Hz to 20 kHz, Input/Output Dynamic Range - >102dB, Sample rate- 48 kHz, Bit depth-24 bit, Mounting - Surface- and wall-mountable hardware included.	13	Each	109043.00	1417559.00
7	Supply, Installation, Testing & Commissioning of Audio Network Interface with Line Outputs. Outputs-4x Line Outputs with +48VDC Phantom Power, Power-PoE and Aux, Frequency Response-20 Hz to 20 kHz, Input/Output Dynamic Range - >102dB, Sample rate- 48 kHz, Bit depth-24 bit, Mounting - Surface- and wall-mountable hardware included.	1	Each	109043.00	109043.00
8	Supply of Digital Wireless bodypack transmitter with with 3.5 mm jack connector,	1	Each	99047.00	99047.00

	condenser omnidirectional clip-on microphone, Sensitivity: 17 mV/Pa, Sound pressure level: 130 dB SPL, Frequency response: 20Hz - 20KHz, System latency: 1.9 ms, Dynamic range: 130 dB, 10mW RF power with up to 100m/328ft working range, Programmable mute switch along with battery backup of 12 hours. etc. complete as required.				
	<b>Display System</b>				
9	Supply of minimum 130" All In One LED Wall with Pixel pitch of 1.5-1.6 mm, Pixel Configuration: 3 in1 SMD or better, aspect ratio 16:9 , with diecast aluminum cabinets, Minimum Resolution Full HD/1920x1080 or better, with inbuilt controller and speakers of 20Watts or better. LED lifespan:100,000 hrs or better. Minimum inputs combination of 2 x HDMI 2.0 (or more), 1 x DP, 2 x USB (or more), RS232/LAN for ethernet , Bit depth 16 bit or more, Max Brightness 600 nits or better with HDR, Refresh rate 3840 Hz or better, Contrast 6,000:1 or better, 160 x 160 Viewing Angle, Colour Temperature 3000 to 10000 Adjustable or more, Brightness Uniformity 97 % or better, Inbuilt OS Windows/ Android/ Tizen/WebOS with remote control , Standby power mode supported to save energy and Max load should not be more than 2.0 KW with Plug & play power cable. (Certification : CE/UL/BIS). Should be supplied with suitable floor/wall mounts stands (from same OEM) and interconnecting cables and with complete accessories as required for installation With 3 year on site warranty for complete item etc. complete as required.	1	Each	3752881.00	3752881.00
	<b>Switching &amp; Interface</b>				
10	Supply, Installation, Testing & Commissioning of customisable Digital Interactive Podium with a metallic frame and wooden top, equipped with a 18-inch Full HD interactive display with a motorised tilting mechanism for the interactive panel. The podium shall include provisions for installing a gooseneck microphone, interactive panel, keyboard tray, and space for storing AV equipment. The interactive display shall have a Full Screen Size: 22 inches (21.5" viewable) Resolution: 1920 x 1080 pixels (Full HD), Brightness: 250 cd/m <sup>2</sup> , Contrast Ratio: 1000:1 (Dynamic contrast: 50,000,000:1), Response Time: 7 ms, Viewing Angle: 178° horizontal and vertical. The top connectivity plate shall provide 1x HDMI, 1xUSB-C3.2, 1x USB ports, and a power socket for connecting an external laptop. The system shall include a	1	Each	408910.00	408910.00

	built-in 4x2 HDMI matrix switcher supporting 4K@60Hz (4:4:4, 8-bit), 16-bit Deep Colour, HDR, 3D content, HD audio, and all other features defined by the HDMI 2.0 specification, along with an audio de-embedder for internal connectivity as per the technical specifications. etc. complete as required.				
11	Supply, Installation, Testing & Commissioning of Network Video Endpoint configured as Encoder. Minimum Inputs – 1 x HDMI Input and 1 x USB-C 2.0 or Better for single cable connectivity for Video encoding, AV USB Bridging - emulating webcam video and AEC speakerphone audio driver for Software based Video Conferencing and for 65w charging the connected device. Local - Output – 1x HDMI with Scaling , HDMI audio embedding and deembedding, Network Audio supported via Dante/AES67 or similar protocol, Video Resolution – 4K60 4:4:4 or better. Power – PoE and AUX, Control Port – RS232 or better, Mounting hardware included. Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.	2	Each	218085.00	436170.00
12	Supply, Installation, Testing & Commissioning of Network Video Endpoint configured as Decoder. Outputs -1xHDMI with scaling or better. Local Inputs – 1xHDMI and 1xUSB-C for local switching. Audio embedding and deembedding, Network Audio supported via Dante/AES67 or similar protocol. Video Resolution – 4K60 4:4:4 or better. Power – PoE and AUX, Control Port – RS232 or better, Mounting hardware included. Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.	1	Each	218085.00	218085.00
	<b>VC System</b>				
13	Supply, Installation, Testing & Commissioning of 4K Network PTZ Conference camera with minimum 20X optical zoom & 55-degree horizontal coverage. Low Noise CMOS 4K image sensor with User-configurable resolution and quality for IP streams (up to 1080p). HDMI resolutions up to 4K30 or better and SDI-3G resolution up to 1080p60 or better. Image rotation controls to allow for inverted mounting using ceiling bracket. Minimum Illumination - 0.5 Lux @ (F1.8, AGC ON) or	1	Each	590647.00	590647.00

	better, Horizontal Rotation Range - $\pm 170^\circ$ , Vertical Rotation Range - $-30^\circ$ to $+90^\circ$ or better, White Balance controls- Auto, indoor, outdoor, one-push, manual, specified color temperature or better. Camera should be able to transmit video via network to USB endpoint connected for video conferencing. Power – PoE & AUX. Shall include wall mounting bracket included. (With 5 year on site warranty) etc complete as required.				
14	Supply, Installation, Testing & Commissioning of 4K Network PTZ Conference camera with minimum 12X optical zoom & 70-degree horizontal coverage. Low Noise CMOS 4K image sensor with User-configurable resolution and quality for IP streams (up to 1080p). HDMI resolutions up to 4K30 or better and SDI-3G resolution up to 1080p60 or better. Image rotation controls to allow for inverted mounting using ceiling bracket. Minimum Illumination - 0.5 Lux @ (F1.8, AGC ON) or better, Horizontal Rotation Range - $\pm 170^\circ$ , Vertical Rotation Range - $-30^\circ$ to $+90^\circ$ or better, White Balance controls- Auto, indoor, outdoor, one-push, manual, specified color temperature or better. Camera should be able to transmit video via network to USB endpoint connected for video conferencing. Power – PoE & AUX. Shall include wall mounting bracket included. (With 5 year on site warranty) etc complete as required.	1	Each	458887.00	458887.00
15	Supply, Installation, Testing & Commissioning of Recording, Streaming & Webcasting Hardware simultaneously, Built-in HDMI inputs 2 or more/SDI & IP Inputs with 2x Line Inputs, 1x HDMI or more outputs. The system should be capable to record upto any two inputs simultaneously in a single frame and as well as individual sources simultaneously. Should have minimum 1TB inbuilt storage and can be connected to local NAS storage. The system should be able to support minimum 2 unicast streams. The recorded files should have the option of time and date stamp. The device should be controlled and managed through centralized software on network. Quoted model should be CE, FCC & RoHS Certified with Test Lab Reports with all mounting accessories etc. complete as required.	1	Each	345301.00	345301.00
	<b>CONTROL SYSTEM</b>				

16	Supply, Installation, Testing & Commissioning of Software or Hardware based control system with High Definition, Multi-touch Touch Screen Controller with 24-bit color display. Viewable Screen Dimensions (diagonal) – 10-inch or better, Resolution - 1280 × 800 or better, Brightness - 350 Nits or better, Aspect ratio – 16:10 or better, Power – PoE or better, Mounting – Wall and Tabletop, Orientation - Vertical / horizontal. Configurable LED's on both side or similar for status indication. Sensors - Ambient Light Sensor, Proximity Detection or better etc. complete as required.	1	Each	354388.00	354388.00
17	Supply, Installation, Testing & Commissioning of Wireless Access Points for WiFi Network for connectivity etc. complete as required.	1	Each	18174.00	18174.00
18	Supply, Installation, Testing & Commissioning of Pre-Configured Gigabit Network Switch for AVoverIP deployments. Ports - 26 - 10/100/1000 Mbps half/full duplex ports on RJ45 connections, 24-PoE++ (BT) ports with up to 1440 Watts total power budget. 4-Gigabit SFP ports. Layer 2 and Layer 3 managed (non-blocking) and preconfigured with appropriate quality of service (QoS) for Dante, AES67, Control traffic. IGMP snooping and IGMP querying for networked audio and video multicast traffic. Inbuilt DHCP Server. Compliances - UL/cUL/IEC/CE/RoHS, WEEE, REACH etc. Mounting hardware included permitting the network switch to be mounted ports forward (flush), ports forward (recessed), or ports rearward etc. complete as required.	1	Each	408910.00	408910.00
	<b>CABLE, CONNECTORS, ACCESSORIES</b>				
19	Supply, Installation, Testing and Commissioning of 32U Equipment rack with standard accessories etc. complete as required.	1	Each	45434.00	45434.00
20	Supply, Installation, Testing and Commissioning of 6' , 10' HDMI Cable supporting resolution upto 4K@60Hz 4:4:4 etc. complete as required.	20	Each	3180.00	63600.00
21	Supply, Installation, Testing and Commissioning of 6' , 10' USB A-B, USB C-C (20 Gbps or better, DPAlt Mode and 65W Charging support or better) Cables etc. complete as required.	10	Each	4543.00	45430.00
22	Supply, Installation, Testing and Commissioning of 2.5 sqmm shielded speaker cable etc. complete as required.	400	Mtrs.	218.00	87200.00
23	Supply, Installation, Testing and Commissioning of Microphone Cable 23/0.76 ATC PVC Sheathed etc. complete as required.	100	Mtrs.	200.00	20000.00

24	Supply, Installation, Testing and Commissioning of shielded CAT6A cable. Complete with installation as per the site requirement.	500	Mtrs.	192.00	96000.00
25	Supply, Installation, Testing and Commissioning of Loudspeaker and microphone connector boxes as per specs with amphpenol / neutrik connectors etc. complete as required.	1	Each	36348.00	36348.00
26	Supply, Installation, Testing and Commissioning of AV Accessories, Mounts etc. complete as required.	1	Set	18174.00	18174.00
<b>B</b>	<b>Conference Room - 25 Person (34 feet x 24 .5 feet) &amp; 22 person (30 feet x 24.5 feet)</b>				
	<b>Audio System</b>				
1	Supply, Installation, Testing & Commissioning of two-way, full-range Ceiling-mount loudspeaker with back can, Frequency range / Response- 90Hz to 20kHz or better, Rated RMS Power - 30Watts or better, Sensitivity-88 dB SPL or better, Coverage Angle-105° conical or better, Maximum SPL Continuous/Peak-101dB/107dB or better, Rated Impedance - 8Ω/16Ω. Transformer Tapping ( 70V & 100V ) - 30, 15, 7.5, 3 watts or Similar, Transducer - LF - 6.0-inch woofer or better, HF- 0.7-inch dome tweeter or better coaxially mounted with LF transducer, Input and Parallel connector - Euroblock, Grille - Powder coated metal material, Back can - Steel . Compliances - UL1480, UL2043 etc. Ceiling mounting accessories i.e., rails and rings should be included.	16	Each	18174.00	290784.00
2	Supply, Installation, Testing & Commissioning of Quad Channel Class-D amplifier. Per Channel Power 60 - 75W @8Ω, 4Ω or better. 70V, 100V support or better. Power Sharing or Bridge/Parallel modes for better power distribution. Frequency Response- 22 Hz – 20 kH or better. Signal to Noise ratio -> 100 dB or better, Cooling - fanless or noiseless fan operation, Gain - 22 dB or better, GPI port for external volume controller, Indicators for Power, signal, limit, mute or better. Better to have Remote standby and Power saving features - Auto-standby. Quoted Speakers, Amplifier should from the same OEM for interoperability and smooth integration. (with 5 years warranty)	2	Each	127216.00	254432.00

3	<p>Supply, Installation, Testing &amp; Commissioning of Open Architecture Digital Signal Processor. Fixed/Modular/Server based with minimum 20 Mic/Line inputs and 8 or more Line outputs. Shall support phantom power on each microphone input. AEC channels - 20 or more with 200ms tail length for Analog and Networked Microphones. Minimum 8x8 Dante channels and support for up to 128x128 Network audio channels via Dante /AES67 or similar protocol. 14x GPIO Inputs and 14x GPIO Outputs for microphones. SIP Softphone integration for Audio conferencing. USB-B / USB-C port for software or web-based conferencing applications emulating and providing USB Audio (Speakerphone) and USB Video (Camera) driver. 24 bit-A/D-D/A converters or better, 48 kHz Sample rate or better, Input frequency response of 22 Hz to 20 kHz or better, Input dynamic range &gt; 108 dB or better. Control Ports : RS232, Ethernet etc. complete as required. Note: Required hardware / accessories / expanders / perpetual software license should be quoted to meet the minimum specification to fulfil the requirements</p>	2	EAch	817819.00	1635638.00
4	<p>Supply, Installation, Testing &amp; Commissioning of Boundary microphone with programmable mute button. The microphone shall be a Flush mounted, black, electret condenser microphone with a omnidirectional polar pattern. Microphone should include a programmable mute button with a touch sensitive for muting the microphone. The microphone shall include a logic controlled, bi-coloured status indicator ring. The visible diameter and height of the microphone above the mounting surface shall be 1 ¼ “ (32mm) and 5/8” (24 mm) or lesser. The microphone shall be resistant to RF interference from portable mobile and handheld devices. The frequency response range shall be 50 Hz to 17 kHz and the sensitivity 42 mV/Pa. Maximum SPL: 114 dB. Equivalent Output Noise: 21 dB SPL. Signal-to-Noise Ratio: 70 dB or More. Dynamic Range: 93 dB or better etc. complete as required.</p>	27	Each	81782.00	2208114.00
	<b>Display System</b>				

5	<p>Supply, Installation, Testing &amp; Commissioning of 98" or Higher, LED Back Lit Panel, Panel Technology - (IPS/ VA/ ADS), Native Resolution- 3840 x 2160 (UHD), Brightness -500cd/m2 or better, Contrast Ratio- 1200 : 1 or better, Haze: 25% or better, Dynamic CR- 500,000 : 1 or better, Operating System- WebOS/ Tizen/ Android, Orientation -Portrait &amp; Landscape, Viewing Angle(H x V) -178 x 178, Response Time- 8 ms or better, Operation Hours- 24 Hrs , Connectivity - Input Ports -Digital HDMI(2 or more)/Display Port(1), External Control RS232C(1), RJ45(1), IR(1, Internal), USB -1, Output Ports- Audio Out-1, AUDIO -Audio Power 20W(10W x 2), Additional feature Inbuilt : Internal Memory 8 GB or better, Wi-Fi, Screen Sharing feature with all devices, Media Player, Local Key Operation, Picture in Picture (Optional), Environment Conditions ,Operation Temperature- 0 °C to 40 °C or better, Operation Humidity - 10 % to 80 % or better, POWER - Power Supply 100- 240V~, 50/60Hz, Power Type- Built-In Power, Speakers - 20W(10W x 2) , Power Supply 100 – 240 V, 50/60 Hz, Certifications UL/BIS, Warranty - 3 years, with Wall mount accessories as per site requirement, Remote control, Standard cable etc. complete as required.</p>	2	Each	772385.00	1544770.00
<b>Switching &amp; Interface</b>					
6	<p>Supply, Installation, Testing &amp; Commissioning of Network Video Endpoint configured as Encoder. Minimum Inputs – 1 x HDMI Input and 1 x USB-C 2.0 or Better for single cable connectivity for Video encoding, AV USB Bridging - emulating webcam video and AEC speakerphone audio driver for Software based Video Conferencing and for 65w charging the connected device. Local - Output – 1x HDMI with Scaling , HDMI audio embedding and deembedding, Network Audio supported via Dante/AES67 or similar protocol, Video Resolution – 4K60 4:4:4 or better. Power – PoE and AUX, Control Port – RS232 or better, Mounting hardware included.</p> <p>Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.</p>	4	Each	218085.00	872340.00

7	Supply, Installation, Testing & Commissioning of Network Video Endpoint configured as Decoder. Outputs -1xHDMI with scaling or better. Local Inputs – 1xHDMI and 1xUSB-C for local switching. Audio embedding and deembedding, Network Audio supported via Dante/AES67 or similar protocol. Video Resolution – 4K60 4:4:4 or better. Power – PoE and AUX, Control Port – RS232 or better, Mounting hardware included. Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.	2	Each	218085.00	436170.00
8	Table Mount Enclosure : - Supply, Installation, Testing & Commissioning of Table Mount enclosure with 1xHDMI, 1xUSB-C 3.2 and 1xUSB-A passthrough cables and 2 nos. x 3 pin universal Power sockets. Manually open and close lid with Black and Clear anodize color options. (With 5 year on site warranty), Should be CE, FCC compliant. etc complete as required.	4	Each	136303.00	545212.00
<b>VC System</b>					
9	Supply, Installation, Testing & Commissioning of 4K Network PTZ Conference camera with minimum 12X optical zoom & 70-degree horizontal coverage. Low Noise CMOS 4K image sensor with User-configurable resolution and quality for IP streams (up to 1080p). HDMI resolutions up to 4K30 or better and SDI-3G resolution up to 1080p60 or better. Image rotation controls to allow for inverted mounting using ceiling bracket. Minimum Illumination - 0.5 Lux @ (F1.8, AGC ON) or better, Horizontal Rotation Range - ±170°, Vertical Rotation Range - -30° to +90° or better, White Balance controls- Auto, indoor, outdoor, one-push, manual, specified color temperature or better. Camera should be able to transmit video via network to USB endpoint connected for video conferencing. Power – PoE & AUX. Shall include wall mounting bracket included. (With 5 year on site warranty) etc complete as required.	2	Each	458887.00	917774.00
<b>CONTROL SYSTEM</b>					

10	Supply, Installation, Testing & Commissioning of Software or Hardware based control system with High Definition, Multi-touch Touch Screen Controller with 24-bit color display. Viewable Screen Dimensions (diagonal) – 7-inch or better, Resolution - 1280 × 800 or better, Brightness - 350 Nits or better, Aspect ratio – 16:10 or better, Power – PoE or better, Mounting – Wall and Tabletop, Orientation - Vertical / horizontal. Configurable LED's on both side or similar for status indication. Sensors - Ambient Light Sensor, Proximity Detection or better etc. complete as required.	2	Each	354388.00	708776.00
11	Supply, Installation, Testing & Commissioning of Wireless Access Points for WiFi Network for connectivity etc. complete as required.	2	Each	18174.00	36348.00
12	Supply, Installation, Testing & Commissioning of Pre-Configured Gigabit Network Switch for AVoverIP deployments. Ports - 26 - 10/100/1000 Mbps half/full duplex ports on RJ45 connections, 24-PoE++ (BT) ports with up to 1440 Watts total power budget. 4-Gigabit SFP ports. Layer 2 and Layer 3 managed (non-blocking) and preconfigured with appropriate quality of service (QoS) for Dante, AES67, Control traffic. IGMP snooping and IGMP querying for networked audio and video multicast traffic. Inbuilt DHCP Server. Compliances - UL/cUL/IEC/CE/RoHS, WEEE, REACH etc. Mounting hardware included permitting the network switch to be mounted ports forward (flush), ports forward (recessed), or ports rearward etc. complete as required.	2	Each	408910.00	817820.00
	<b>CABLE, CONNECTORS, ACCESSORIES</b>				
13	Supply, Installation, Testing and Commissioning of 32U Equipment rack with standard accessories etc. complete as required.	2	Each	27261.00	54522.00
14	Supply, Installation, Testing and Commissioning of 6' , 10' HDMI Cable supporting resolution upto 4K@60Hz 4:4:4 etc. complete as required.	16	Each	3180.00	50880.00
15	Supply, Installation, Testing and Commissioning of 6' , 10' USB A-B, USB C-C (20 Gbps or better, DPAlt Mode and 65W Charging support or better) Cables etc. complete as required.	8	Each	4543.00	36344.00
16	Supply, Installation, Testing and Commissioning of 2.5 sqmm shielded speaker cable etc. complete as required.	400	Mtrs.	218.00	87200.00
17	Supply, Installation, Testing and Commissioning of Microphone Cable 23/0.76	600	Mtrs.	200.00	120000.00

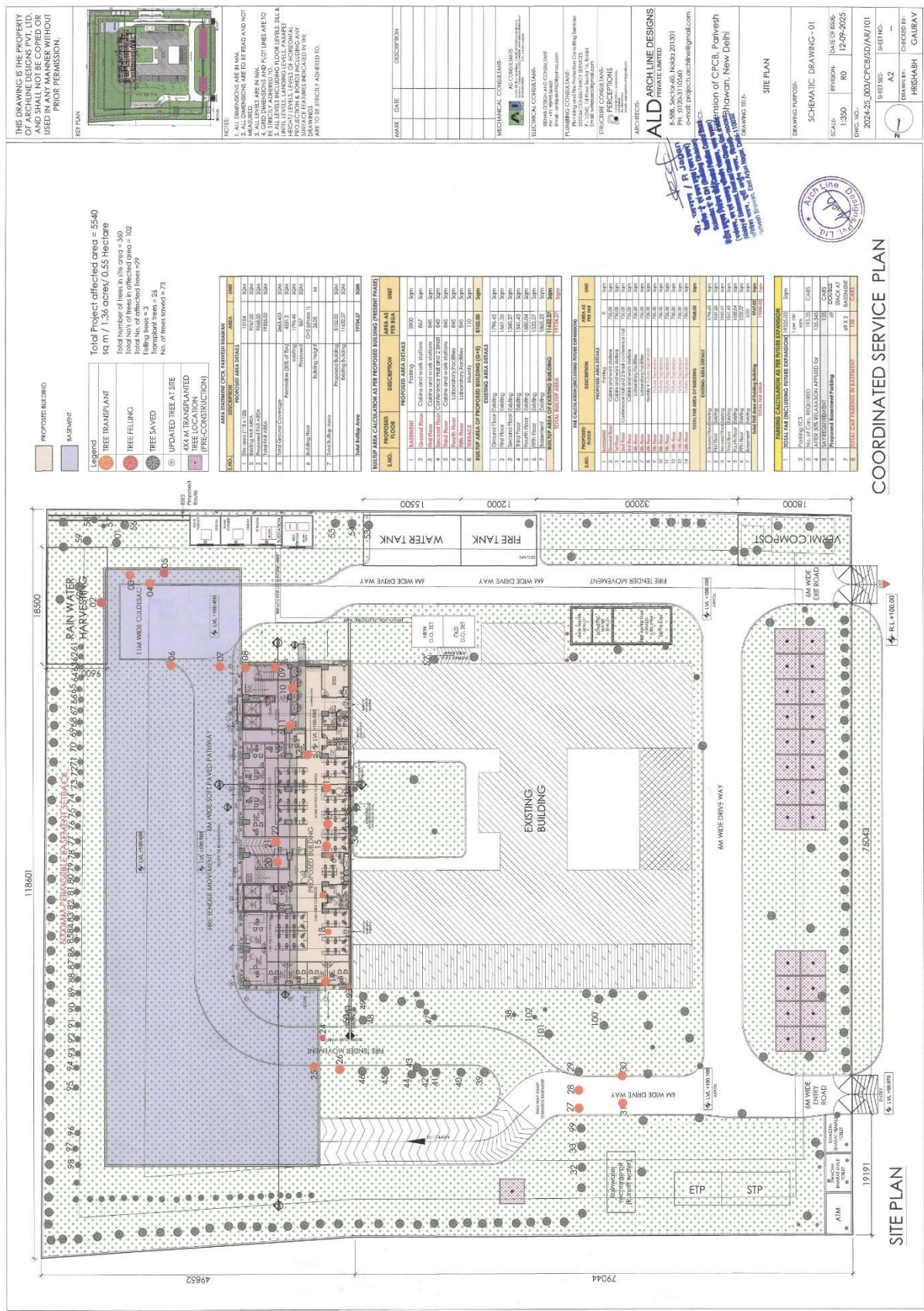
	ATC PVC Sheathed etc. complete as required.				
18	Supply, Installation, Testing and Commissioning of shielded CAT6A cable. complete with installation as per the site requirement.	500	Mtrs.	192.00	96000.00
19	Supply, Installation, Testing and Commissioning of Loudspeaker and microphone connector boxes as per specs with amphpenol / neutrik connectors etc. complete as required.	2	Each	27261.00	54522.00
20	Supply, Installation, Testing and Commissioning of AV Accessories, Mounts etc. complete as required.	2	Set	18174.00	36348.00
	<b>TOTAL SUB HEAD:- XVIII</b>				<b>26211163.00</b>
	<b>GRAND TOTAL</b>				<b>139702814.31</b>
	<b>SAY</b>				<b>139702814.00</b>

# **FINANCIAL BID**

<b>CIVIL CONSTRUCTION UNIT</b>					
<b>NIT NO. 03/2026-27/CE/CCU/CED-I/New Delhi</b>					
<b>Name of work : Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi (SH: Balance Work).</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 or 'At par'</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. 57,52,92,763/-</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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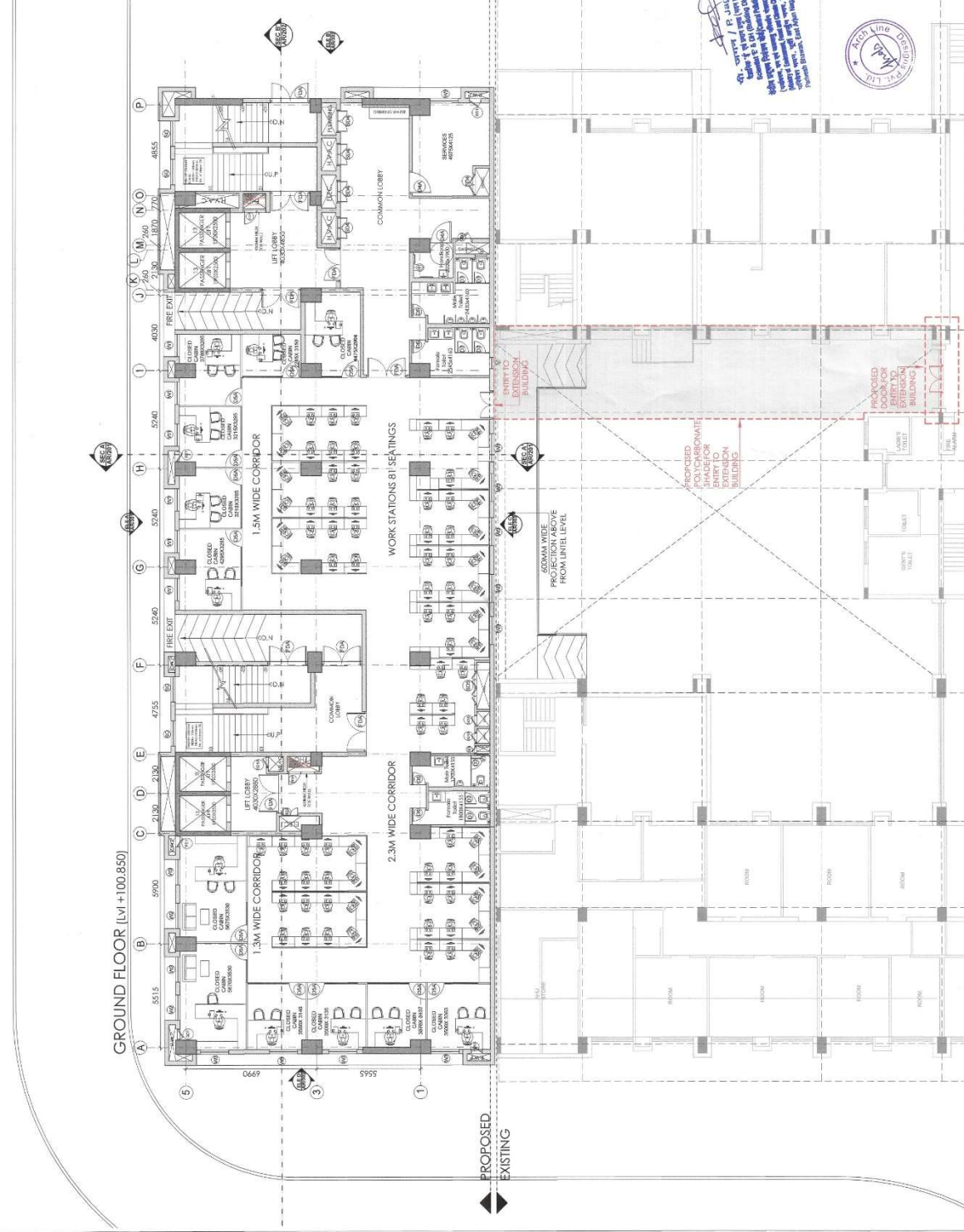
- NOTES:
1. ALL DIMENSIONS ARE IN MM.
  2. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.
  3. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.
  4. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.
  5. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.
  6. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.
  7. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.
  8. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.
  9. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.
  10. ALL DIMENSIONS ARE TO BE FINISH AND NOT UNFINISHED DIMENSIONS.

MARK	DATE	DESCRIPTION

MECHANICAL CONSULTANT:  
 AD CONSULTANT  
 ELECTRICAL CONSULTANT:  
 AD CONSULTANT  
 PLUMBING CONSULTANT:  
 AD CONSULTANT  
 STRUCTURAL CONSULTANT:  
 AD CONSULTANT  
 ARCHITECTS:  
 ARCHITECTS

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GROUND FLOOR PLAN  
 DRAWING PARTS:  
 SCHEMATIC DRAWING - 01  
 SCALE: 1:125  
 REVISION: R0  
 DATE OF ISSUE: 12-09-2025  
 DWG. NO.: 2024-25\_003/CPCB/SD/AR/151  
 SHEET NO.: A2  
 CHECKED BY: HRISHABH CAURAV





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KEY PLAN



- NOTES:
1. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED. SET IN MARK.
  2. GRID DIMENSIONS AND FOOTINGS ARE TO BE READ AND NOT MEASURED. SET IN MARK.
  3. ALL LEVELS INCLUDING FLOOR LEVELS, SILL & FINISH LEVELS, FINISH LEVELS OF FLOORING, FINISH LEVELS OF ROOFING, FINISH LEVELS OF TERRACE, FINISH LEVELS OF BALCONY, FINISH LEVELS OF STAIRS, FINISH LEVELS OF PLUMBING ARE TO BE EXACTLY ADHERED TO.

MARK	DATE	DESCRIPTION

**MACHANICAL CONSULTANT:**  
**AD CONSULTANT**  
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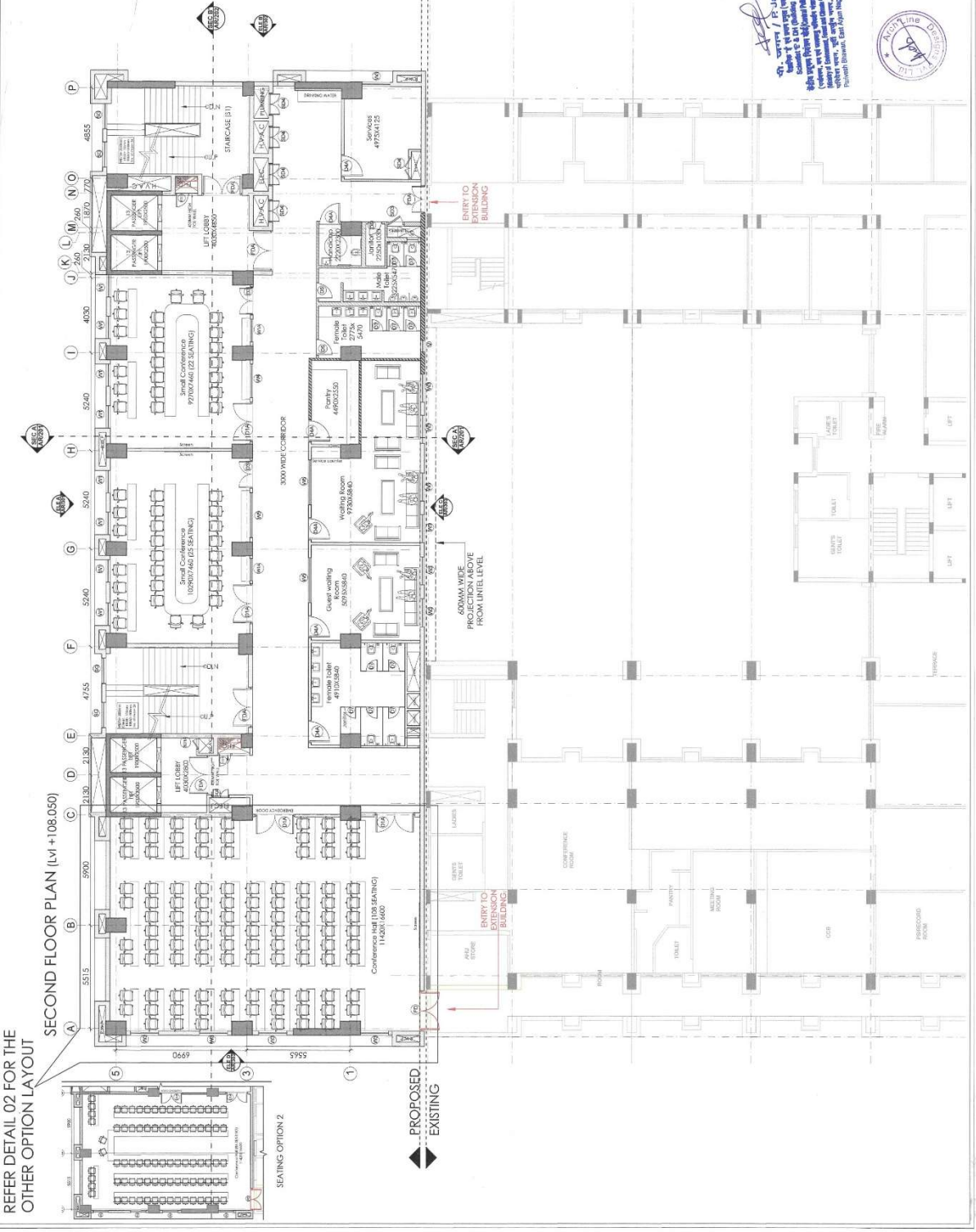
**ARCHITECTS:**  
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**SCHEMATIC DRAWING - 01**

SCALE:	1:125	DATE OF ISSUE:	12-09-2023
REVISION:	RO	DWG. NO.:	2024-25_003/CFCB/SD/R/153
SHEET NO.:	A2	CHECKED BY:	HRISHABH GAURAV
DRAWN BY:	HRISHABH GAURAV		

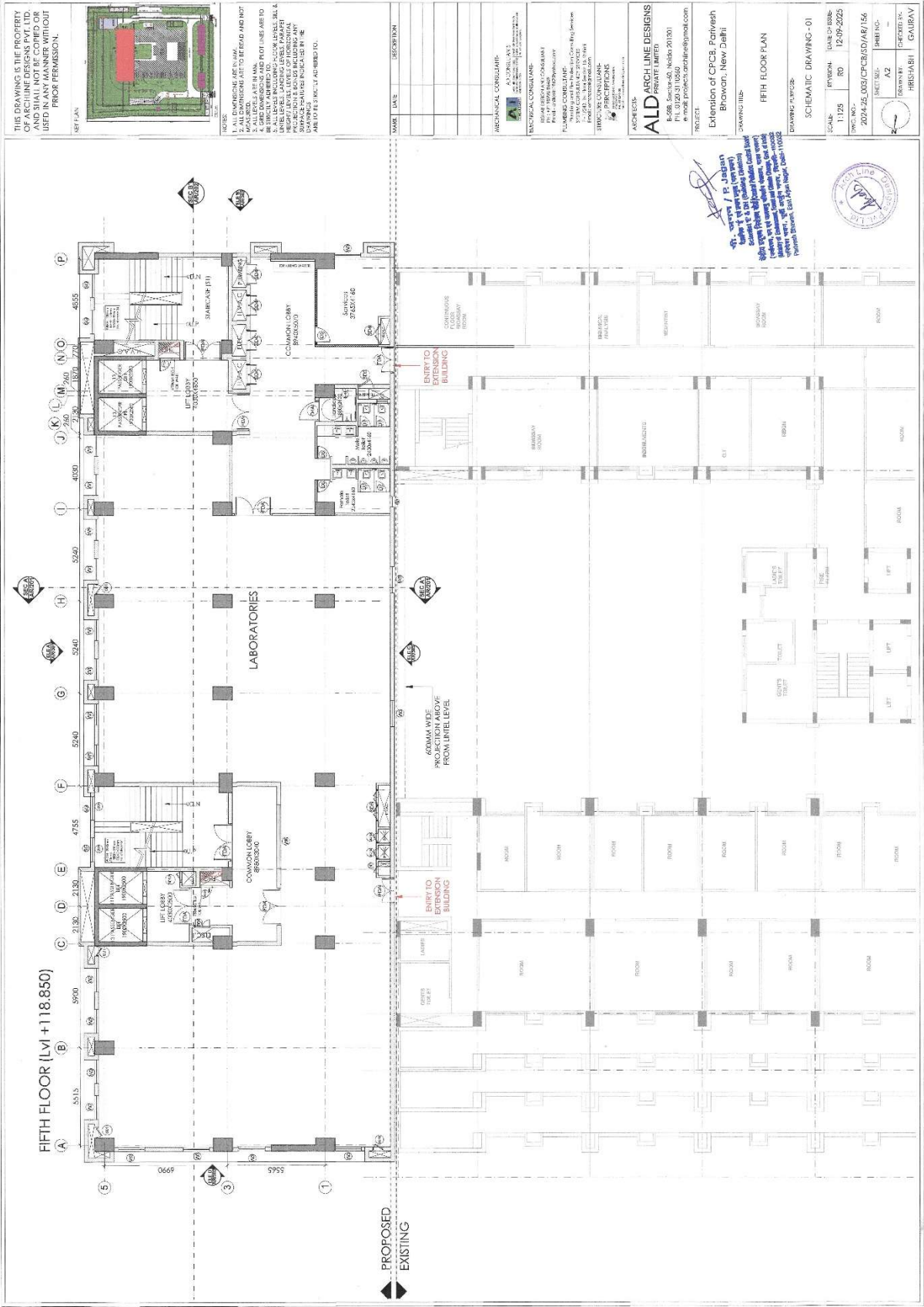


REFER DETAIL 02 FOR THE OTHER OPTION LAYOUT

**SECOND FLOOR PLAN (Lvl + 108.050)**







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REF PLAN

- INDEX:
1. WORKING SET TO BE READ AND NOT TO BE USED IN ISOLATION.
  2. ALL DIMENSIONS ARE TO BE READ AND NOT TO BE USED IN ISOLATION.
  3. ALL LEVELS ARE IN MM.
  4. GRID DIMENSIONS AND NOT LINE ARE TO BE USED IN ISOLATION.
  5. ALL LEVELS INCLUDING FLOOR LEVELS, BAL & CEILING LEVELS, SHALL BE INDICATED IN THE DRAWING.
  6. ALL LEVELS INCLUDING FLOOR LEVELS, BAL & CEILING LEVELS, SHALL BE INDICATED IN THE DRAWING.
  7. ALL LEVELS INCLUDING FLOOR LEVELS, BAL & CEILING LEVELS, SHALL BE INDICATED IN THE DRAWING.
  8. ALL LEVELS INCLUDING FLOOR LEVELS, BAL & CEILING LEVELS, SHALL BE INDICATED IN THE DRAWING.
  9. ALL LEVELS INCLUDING FLOOR LEVELS, BAL & CEILING LEVELS, SHALL BE INDICATED IN THE DRAWING.
  10. ALL LEVELS INCLUDING FLOOR LEVELS, BAL & CEILING LEVELS, SHALL BE INDICATED IN THE DRAWING.

NO.	DATE	DESCRIPTION

MECHANICAL CONSULTANT: AID ARCH LINE DESIGNS

ELECTRICAL CONSULTANT: AID ARCH LINE DESIGNS

STRUCTURAL CONSULTANT: AID ARCH LINE DESIGNS

PLUMBING CONSULTANT: AID ARCH LINE DESIGNS

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ARCHITECT: AID ARCH LINE DESIGNS  
DRAWN BY: HRESHABH GAURAV  
CHECKED BY: HRESHABH GAURAV

SCALE: 1:125  
DATE OF ISSUE: 12-09-2025  
SHEET NO.: 2024-25-003/CPCLSD/AR/156  
SHEET SIZE: A2  
DRAWING NO.: 2024-25-003/CPCLSD/AR/156

SCHEMATIC DRAWING - 01  
FIFTH FLOOR PLAN

Dr. Virendra / 12 January 2025  
I hereby certify that the above mentioned drawing is a true and correct copy of the original drawing as per the specifications mentioned therein. I am not responsible for any errors or omissions in the drawing. My signature is valid only for the purpose mentioned above. My signature is valid only for the purpose mentioned above.



