

PART- C

(Electrical Work)

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PROFORMA OF SCHEDULES

(Separated Performa for Civil, Elect. & Hort. Works in case of composite tenders)

Name of Work:- **Construction of Grain Godown, Family Welfare Centre and Primary School including E & M at GC CRPF Trishundi, Amethi (U.P.).**

SCHEDULE 'A'

Schedule of Quantities (as per PWD-3)

Attached page No. 156 to 176

SCHEDULE 'D'

Extra schedule for specific requirements/document for the work, if any: **Nil**

SCHEDULE 'E'

Reference to General Conditions of contract – **Applicable GCC is GCC for Construction works 2023**, as modified and corrected up to previous day of last date of submission of bids.

Name of Work: **Construction of Grain Godown, Family Welfare Centre and Primary School including E & M at GC CRPF Trishundi, Amethi (U.P.).**

Estimated cost of work: Electrical Work **Rs. 1,20,45,216/-**

i) Earnest money: **Included in schedules of Civil component**

ii) Performance Guarantee: **Included in schedules of Civil component**

iii) Security deposit: 2.5% of Tendered value of work.

SCHEDULE 'F'

General rules and direction

Officer inviting tender

Executive Engineer, Raebareli, CPWD, Raebareli.

Definitions:

2(vii) **Engineer-in-Charge**

Electrical items of work

Civil items of work

Executive Engineer (E), Gorakhpur Electrical, CPWD, Gorakhpur.

Executive Engineer, Raebareli, CPWD, Raebareli.

2(viii) **Accepting Authority**

Chief Engineer (Lucknow), CPWD, Lucknow

2(ix) **Percentage on cost of materials and labour to cover all overheads and profits**

15%

2(x) **Standard Schedule of Rates:**

Electrical items of Work:

DSR 2025 & M/R

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2(xi) Department: Central Public Works Department
 9(ii) Standard CPWD contract Form: **GCC 2023** for Construction Works, CPWD Form-7/8 as amended/modified up to previous day of last date of submission of the bids.

- Clause 1**
- i) Time allowed for submission of Performance Guarantee from the date of issue of letter of acceptance As prescribed in Civil component.
 - ii) Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period as provided in (i) above As prescribed in Civil component.
- Clause 2** Authority for fixing Compensation under Clause 2 **Chief Engineer (Lucknow), CPWD, Lucknow**
- Clause 5**
- i) Number of days from the date of issue of letter of acceptance for reckoning date of start **As prescribed in Civil component.**
 - ii) Time allowed for execution of work **As prescribed in Civil component.**

Authority to decide:-

- (i) Authority to convey the decision of shifting of mile stone and extension of time- **Executive Engineer (E), LED, C.P.W.D., Gorakhpur.**
- (ii) Authority to decide rescheduling of mile stone and extension of time- **Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.**
- (iii) Shifting of date of start in case of delay in handing over of site- **Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.**

PROFORMA OF SCHEDULE Clause 5 schedule of handing over of site:

Part	Portion of site	Description	Time period for handing over reckoned from date of issue of letter of intent
Part-A	Portion without any hindrance	Full site	As per civil component
Part-B	Portion with encumbrances	NA	As per civil component
Part-C	Portion dependent on work of other agencies	NA	As per civil component

Clause 6 : Computerized Measurement Book/ Electronic Mode of Measurement : **EMB through CPWD ERP Portal.**

Clause 7 Gross work to be done together with net payment/Adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment **Rs. 10.03 Lacs**

Clause 7A Whether clause 7A shall be applicable. **As per Civil Component**

Clause 8 Competent Authorities to inspect and issue Part/Final Completion Certificate **As per Civil Component**

Clause 8A Authority to decide compensation on account if contractor fails to submit completion plans. **As prescribed in Civil Component**

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25%

Clause 10 CC	Not Applicable
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~~Clause 10CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column~~

~~12 Months~~

Component of material expressed as percentage of value of work (X_m)

~~75%~~

~~Component of labour expressed as percentage of value of work (X_L)~~

25%

~~Component of P.O.L expressed as percent of total value of work.~~

~~Nil~~

Clause 11

Specification to be followed for execution of work:

CPWD General Specifications for Electrical Works Part I Internal - 2023, General specification for external electrical work Part II -2023, Part III- Lift & Escalators-2003, Part IV- Sub-station- 2013, Part-V- Wet riser & Sprinkler systems-2020, Part-VI – Fire Detection & Alarm system-2018, Part VII- DG sets-2013, Part VIII- Gas Based Fire Extinguishing system-2013, Heating, Ventilation & Air- Conditioning (HVAC)- 2024 as amended last date previous to date of submission of tender.

Clause 12

Type of work	Construction Work
12.2	Deviation limit beyond which Clause 12.2 shall apply for building work:
	100%

Clause 16	Competent Authority for Deciding reduced rates:	
	For Electrical items of work	Chief Engineer (Lucknow), CPWD, Lucknow
Clause 18	List of mandatory machinery, tools & plants to be deployed by the contractor at site.	As per list enclosed and as required.
Clause 19 C	Authority to decide penalty for each default	As prescribed in civil component
Clause 19 D	Authority to decide penalty for each default	As prescribed in civil component
Clause 19 G	Authority to decide penalty for each default	As prescribed in civil component
Clause 19 K	Employment of skilled / semi-skilled workers.	As prescribed in civil component

Clause 25 Conciliator /Arbitrator

(i) Conciliator	:	
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(ii) Arbitrator Appointing Authority	:	As per Civil Component
(iii) Place of Arbitration	:	

Clause 32	Requirement of Technical Representative(s) and Recovery Rate
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Sl. No.	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	
						Figures	Words
1	Graduate Engineer	Electrical	Project Planning /quality/ billing Engineer	2 Or 5 respectively	1	Rs. 15,000/- per month per person	Rs. Fifteen Thousand per month per person

Note.

- (i) Nothing extra need to be added while preparing M/R justified amount of the work if stipulation is made as per above recommended scale of requirement of technical staff.
- (ii) Requirement of technical staff and their experience can be varied depending upon nature of work and contract period determined.
- (iii) In event requirement of technical staff is varied and estimated expenditure on technical staff worked out on the basis of 75% of the rate of recovery exceed 1% of the cost of work ,excess may be added while preparing M/R justified amount of the work .

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers. Diploma holder with minimum 10year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

Clause 38

- i) a) Schedule/ statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of **Rates 2023 printed** by CPWD
- ii) **Variations permissible on theoretical quantities**
 - a) Cement for works with estimated cost put to tender not more than **Rs. 25 lakhs.**
For works with estimated cost put to Tender is more than **Rs. 25 lakhs**
 - b) Bitumen all works
 - c) Steel reinforcement and structural steel Sections for diameter, section and category.
 - d) All other materials

As per Civil Component

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ANNEXUREClause- 10 –A & 18

List of mandatory machinery, tools and plants & testing Equipment to be deployed by the contractor at site, these equipment shall be available in the test room at site.

- | | | |
|-----|--|---------|
| 1. | Steel/Aluminium Ladder 1.5 m to 8 m. | 2 Nos. |
| 2. | Chase cutting machines. | 4 Nos. |
| 3. | Electrical wire drawing equipment. | 3 Set. |
| 4. | Torque wrench for nut/bolt/screws. | 5 Nos. |
| 5. | Conduit die set. | 3 Set. |
| 6. | Pipe vice. | 2 Nos. |
| 7. | Bench vice. | 2 Nos. |
| 8. | L.T.Megger 500/1000 volts. | 2 Nos. |
| 9. | Tong Tester. | 2 Nos. |
| 10. | Multimeter. | 2 Nos. |
| 11. | Hydraulically operated & hand operated crimping machine. | 1+1 No. |
| 12. | Earth tester. | 2 Nos. |
| 13. | Portable Ordinary drilling machine. | 4 Nos. |
| 14. | Portable Hammer drilling machine. | 2 Nos. |
| 15. | Overhead conduit puller. | 1 No. |
| 16. | Vernier caliper | 2 Nos. |
| 17. | Screw gauge | 2 Nos. |

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Annexure-II**ON NON-JUDICIAL STAMP PAPER OF MINIMUM RS. 100****(Guarantee offered by Bank to CPWD in connection with the execution of contracts)****Form of Bank Guarantee for Earnest Money Deposit /Performance Guarantee/Security****Deposit/Mobilization Advance**

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

2. We, (indicate the name of the bank) (herein after referred to as "the Bank"), hereby undertake to pay to the Government an amount not exceeding Rs. (Rupees..... only) on demand by the Government within 10 days of the demand.
3. We,(indicate the name of the Bank), do here by undertake to pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said Contractor. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. (Rupeesonly)
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

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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.....

Name and address

Authorized signatory

Name

Designation

Staff code no.

2. Signature

Name and address

Bank seal

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

**In paragraph 1, strike out the portion not applicable. Bank Guarantee will be made either for earnest money or for performance guarantee/security deposit/mobilization advance, as the case may be.

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Name of Work: Construction of Grain Godown, Family Welfare Centre and Primary School including E & M at GC CRPF Trishundi, Amethi (U.P.).

Eligibility condition for Associate agency for execution of Pdg. E.I. & Fans, compound light & cable work

The associate agency shall be registered/enlisted in CPWD in composite category in appropriate class and should have a valid electrical license or shall associate a firm having valid license. The Registration/enlistment shall be valid on the date of MOU entered between main agency and associate agency.

The main contractor/agency has to submit detail of such agency to be associated to the Engineer-in-charge (of E.I. & Fans) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (of E.I. & Fans work). In case the main contractor intends to change associated agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-charge (of E.I.. & Fans Work). The new agency/agencies shall also have to satisfy the laid down eligibility criteria mentioned above. In case Engineer-in-charge is not satisfied with the performance of any agency, he can direct the main contractor to change the agency executing such items of work and this shall be binding on the contractor. Main agency/associate agency has to under go tripartite agreement between for each material supplied by him.

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Eligibility condition for Associate agency for execution of SITC of Fire Alarm System [Part-C2]

The main agency has to associate the specialized agency of Fire Alarm System.

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

(i) Three similar works each of value not less than 40% of estimated cost of Fire Alarm work.

OR

(ii) Two similar works each of value not less than 60% of estimated cost of Fire Alarm work.

OR

(iii) One similar works each of value not less than 80% of estimated cost of Fire Alarm work.

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 tender.

Similar work shall mean works of "SITC Fire Alarm System".

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (SITC of Fire Alarm System) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (SITC of Fire Alarm System). In case the main contractor intends to change any of the above agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-charge (SITC of Fire Alarm System). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also be carry out himself work without associating any specialized agency provided: -

He fulfils the prescribed eligibility criteria respectively for these work(s).

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**Eligibility condition for Associate agency for execution of
SITC of Fire Fighting System [Part – C3]**

The main agency has to associate the specialized agency of **Fire Fighting System**.

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

(i) Three similar works each of value not less than **40% of estimated cost of Fire fighting work**.

OR

(ii) Two similar works each of value not less than **60% of estimated cost of Fire fighting work**.

OR

(iii) One similar works each of value not less than **80% of estimated cost of Fire fighting work**.

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 tender.

Similar work shall mean works of “SITC Fire Fighting System”.

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (SITC of **Fire Fighting System**) within fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (SITC of **Fire Fighting System**). In case the main contractor intends to change any of the above agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-charge (SITC of **Fire Fighting System**). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also carry out himself work without associating any specialized agency provided: -

He fulfils the prescribed eligibility criteria respectively for these work(s).

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Part- C2, C3
MEMORANDUM OF UNDERSTANDING [M.O.U] BETWEEN

- 1] M/S [Name of the firm with full address]
 Enlistment Status
 Valid Upto:
 [Henceforth called the main contractor]
- And
- 2] M/S [Name of the firm with full address]
 Enlistment Status
 Valid Upto:

[Henceforth, called Associated Contractor]

Name of Work:- Construction of Grain Godown, Family Welfare Centre and Primary School including E & M at GC CRPF Trishundi, Amethi (U.P.).

[Electrical Component only] as per schedule, specifications, terms and conditions of the tender.

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 (CPWD) 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 of this MOU allows. Both the parties shall be paid consequent to the execution as per agreement to the extent this MOU permits.

We have agreed as under :

- 1- The associated contractor shall be liable for disciplinary action if he failed to discharge the action(s) and other legal action as per agreement besides forfeiture of the security deposit.
- 2- All the material, machinery and equipments, tools and tackles required for execution of the electrical works as per agreement shall be the responsibility of the associated contractor.
- 3- The site staff required for the electrical 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

COUNTERSIGNED
EXECUTIVE ENGINEER (E)

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Part- C2, C3**WILLINGNESS CERTIFICATE**

Name of Work: Construction of Grain Godown, Family Welfare Centre and Primary School including E & M at GC CRPF Trishundi, Amethi (U.P.).

I hereby give my willingness to work as associated contractor for the above mentioned work.

I will execute the work as per specifications and conditions for the agreement and as per direction of the Engineer-in-charge. Also I will employ full time technically qualified supervisor for the works. I will attend inspection of officers of the department as and when required.

Date :

Signature of Contractor

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Additional Conditions for E.I. & Fans work.

- 1- The work shall be carried out strictly in accordance with CPWD General Specifications for Internal Electrical Works Part I Internal - 2023, General specification for External Electrical work Part II -2023, Part III- Lift & Escalators-2003, Part IV- Sub-station- 2013, Part-V- Wet riser & Sprinkler systems-2020, Part-VI – Fire Detection & Alarm system-2018, Part VII- DG sets-2013, Part VIII- Gas Based Fire Extinguishing system-2013, as amended last date previous to date of submission of tender. as amended upto date and as per instructions of the Engineer-in-Charge including as below and nothing will be paid extra.
- (a) All material shall be got approved from Engineer-in-Charge before use. One sample flat/Bay /Room shall be made for approval of final location of switch boards/ fittings etc. and then only work shall be executed in other flats/bays/Room.
All damages done to the building during 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. Any expenditure incurred by the department in this condition shall be recovered from the contractor and decision of the Engineer-in-Charge about recovery shall be final.
- (b) All hardware items such as screws, thimbles, G.I. wires etc. which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned. All hardware materials such as nuts/bolts/screws/ washers etc. to be used in the work shall be zinc/cadmium plated iron.
- (c) CONDUIT LAYOUT shall be prepared by contractor and got approved before execution of work. Minimum No. of Junctions to be kept, & if required junctions to be kept underneath the fitting locations in corridor/rooms so that junctions are not visible after fittings are fixed/in position. Drop of conduit shall be well planned w.r.t. location of fitting/D.B. and criss crossing to be avoided. All chases in walls shall be cut using wall grooving machine. For this purpose electricity shall be arranged by contractor.
- (d) Any conduit which is not to be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently. Nothing extra shall be paid for the same. Termination of multi-stranded conductors shall be done using crimping type thimbles at both the ends. Nothing extra shall be paid for the same.
- (e) For Submain Wiring, Colour Code for different phases and Neutral (R.Y.B. black) to be maintained. While circuit wiring, wiring for fan point, wiring for light point shall be done with different colours for easy identification. Wiring for neutral shall be done with black colour and all connections to fans & fittings wherever visible shall be made with white PVC insulated copper wire or wherever cover sleeve may be provided. At Switch board, Switch shall be fixed in a logical manner w.r.t. fittings layout.
- (f) Unless specifically approved by Executive Engineer (E.), loose wire box, above DB shall not be provided however DB's shall have loose wire box of same make.
All connections to MCB's shall be made using thimble/lugs.
- (g) All DB's i/c incoming & outgoing MCB's shall be suitably numbered for location/circuits. DB shall be fixed in recess suitably (30 mm. approx. projected from unplastered wall) to ease opening of door. Top of DB to match with door frame height as per site conditions.
- (h) Phenolic laminated sheet shall be of Egg white colour, and shall be filed/rounded at edges and of minimum 3mm thick wherever required.
- (i) All fittings and fans should be properly earthed through the protective conductor.

Provision of earth bars in main boards, earth terminal block in DB's & earth studs in all metal boxes shall be made, connection to this stud shall be crimped.

A clamp type termination should be made in the termination of earth strips (where provided) to pipe electrodes to provide surface type contact.

- (j) The earthing shall be carried out in the presence of the Engineer-in-charge or his authorized representative.

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- (k) The size at switch box for providing Modular Plate type Switch/Sockets shall be properly settled to take care of all necessary switches/screws/fan regulators. Blanking plate if required shall also be provided at no extra cost.
- (l) For point wiring in steel conduit all piano type switch or all modular type switches/sockets/telephone outlets/T.V. outlets shall be of only one make.
- (m) The contractor shall make his own arrangement at his own cost for electrical/ general tools and plants required for the work.
- (n) All LED light fittings should have minimum 5 years warranty, warranty certificate to be submitted by agency on OEM letter head regarding this.
- 2- The work shall be carried out according to approved drawings/details which shall be subsequently issued to the successful tenderer for execution of work and as per instructions of the Engineer-in-Charge who will have the right to change the layout as per requirement at site and the contractor shall not have any claim due to change in layout. The work shall be carried out in engineering like manner. The bad workmanship will not be accepted and defects shall be rectified at contractor's cost to the satisfaction of the Engineer-in-Charge. The programme of electrical works are to be co-ordinated in accordance with the building work and no claim for idle labour will stipulated in the tender, electrical work shall have to be completed alongwith completion of civil work. 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. Similarly any rejected material should be immediately cleared off from the site by the contractor. Watch and ward of the material/equipment shall be the responsibility of the contractor till handing over of installation to the department. The contractor or his representative is bound to sign the site order book as and when required by the Engineer-in-Charge and to comply with the remarks therein.
- 3- The entire installation shall be at the risk and responsibility of the contractor until these are tested and handed over to the department. However, if there is any delay in construction from the department side, the installation may be taken over in parts, but the decision on the same shall rest with Engineer-in-Charge which shall be a binding on the contractor.
- 4- Issue of material to the contractor wherever stipulated, shall be according to the requirement at site from time to time depending upon the program of work.
- 5- The contractor shall have to return the surplus/unused material supplied by the department for use on work at the place of original supply failing which the recovery shall be made at the recovery rate as given the list stipulated materials, if applicable.
- 6- Cement for this bonafied work is to be arranged and used by the contractor himself and nothing extra will be paid on this account.
- 7- The contractor shall make his own arrangement at his own cost for electrical / general tools and plants required for the work.
- 8- The rates of all items of work shall unless clearly specified otherwise, includes the cost of all labour, materials and other input involved in the execution of work.
- 9- Central / State Sales Tax / Contract Tax / GST etc. should be included in the rates tendered. Statutory deductions of contract tax at source shall be made while releasing payment through running/final bills. A certificate specifying the rate and amount of deduction shall however be issued. No Form 31/32 (road permit) shall be issued by the department. The road permit shall be arranged by the tenderer at his own.
- 10- All U.G. Cable work shall be got inspected and measurements lest checked by the Assistant Engineer in charge of work and his authorized representative before filling up the trenches, failing which work remain subject to 100% recheck at the risk and cost of the contractor.
- 11- All U.G. Cables before laying shall be got tested for continuity in presence of the authorized representative of the Engineer-in-Charge.
- 12- Route of the U.G. Cables shall be got approved from the Engineer-in-Charge or his authorized representative.
- 13- Earthing shall invariably be done in the presence of the Engineer-in-Charge pr his authorized representative.

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- 14- Contractor shall preserve the copies of invoices, test certificates; gate passes etc. to prove the genuineness of material / purchases which are used at site as per agreement
- 15- Notwithstanding the schedule of quantities, all items of interrelated works consider necessary to make the installation complete and operative are deemed to be included shall be provided by the contractor at no extra cost.
- 16- The secured advance as applicable shall be allowed.
- 17- **Completion Plan & Test Certificate:** Contractor shall submit completion plan for Internal and External electrical services (**in triplicate**) failing which a recovery 0.1% of tendered amount shall be made from final bill. Contractor has to submit SLDs & layout plan in triplicate in Dwd. pdf & A0 size hard copies in triplicate duly signed and checked by the concerned JE/AE.
Test certificate for the work carried out shall also be submitted failing which recovery @3% of tender amount subject to maximum of Rs.500000/- shall be made from final bill.
- 18- **Panels:** Drawing of panel shall be submitted for approval within 30 days from award of work and fabrication to be taken up only after approval of such drawing.
- 19- Quantities indicated in Schedule of work are only tentative, contractor shall consult AE-in-Charge before procurement. Payment shall be made only for the quantities actually executed and measured.
- 20- **Time Period:** Contractor has to plan his activities, so that electrical work is to be carried out in close co-ordination with CIVIL work and in no case CIVIL work be delayed because of delay in electrical work and the work has to be completed accordingly.
- 21- The makes for items shall be as per list attached.
- 22- **Storage :-** Responsibility for storage space for execution of work shall be of main contractor.
- 23- **Power & Water Supply:-** Responsibility for supply of power & water for execution of work shall be of main contractor.

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ADDITIONAL CONDITIONS FOR FIRE FIGHTING SYSTEM.

- 1- **Specification:-** The work shall be executed as per CPWD's general specification for Electrical Works part-I (Internal)-2023, Part-II (External)-2023, Part-V (Wet Riser System for Fire Fighting Installation)- 2020, amended upto date and as per direction of Engineer-in-Charge. The additional specifications are to be read with above and in case of any variations; specifications given along with the tender shall apply.
- 2- **Location:-** The work is to be executed at **GC, CRPF Trishundi, Amethi (UP).** The Contractor is advised to visit the site before submission of their tender.
- 3- **Approval from CFO:-** The Contractor shall be required to obtain Pre NOC and final NOC from Chief Fire Officer and work shall be deemed to be completed only after receiving NOC from CFO & rectification if any. Statutory fee if any shall be paid by department. However, all liasoning work / arranging inspection of CFO shall be the responsibility of contractor.
- 4- **Storage:** - Responsibility for storage space for execution of work shall be of main contractor.
- 5- **Power & Water Supply:** - Responsibility for supply of power & water for execution of work shall be of main contractor.
6. The material in required quantity to be used in the work shall be got approved from the Engineer-in-charge before its use at site. The Engineer-in-charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not as per specifications.
7. Contractor shall preserve the copies of invoices, test certificates; gate passes etc. to prove the genuineness of material/purchases. The responsibility of procurement, genuine material of specialized works shall rest with the contractor.
8. **No inspection outside the country is permissible if required so the same will be deemed to be waived off and necessary test reports shall be submitted before the dispatch of equipment.**
9. **Payment Terms:** - The Following percentage of contract rates shall be payable against the stages of work shown herein:

S.no.	Stage of work	Panels, Fire fighting pumps	All other items
i	After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis.	75 %	70 %
ii	On completion of pro-rata installation	15 %	20 %
iii	On testing, Commissioning and handing over.	10 %	10 %

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ADDITIONAL CONDITIONS FOR FIRE ALARM SYSTEM

- 1- **Specification:-** The work shall be executed as per CPWD's general specification for Electrical Works Part – I (Internal), Part-VI Fire Detection and Alarm System – 2018. The additional specifications are to be read with above and in case of any discrepancy; technical specifications given along with the tender shall apply.
- 2- **Location:-** The work is to be executed at **GC, CRPF Trishundi, Amethi (UP)**. The contractor is advised to visit the site before submission of their tender and ensure that equipment being offered by them shall be accommodated in the spaces available.
- 3- **Acceptance of Tender:-** The department reserve the right to reject any or all the tenders without assigning any reason.
- 4- **Rates:-** The rates shall be inclusive of all taxes, levies, packing, transportation, handling etc. Nothing extra shall be paid.
- 5- **Storage:-** Responsibility for storage space for execution of work shall be of main contractor.
- 6- **Power & Water Supply:-** Responsibility for supply of power & water for execution of work shall be of main contractor.
- 7- **T&P:-** The department will not issue any T&P for execution of the work.
- 8- **Pre-commissioning test:-** Before commissioning of the installation, all tests as per CPWD's specifications and or respective manufacturer's recommendations shall be carried out and result submitted.
- 9- **Acceptable make:-** The acceptable make of various equipment are indicated in the list attached. Alternative or equivalent make will not be accepted.
- 10- **Care of Building:-** The contractor will have to ensure that no damage is caused to the building during execution of the work. The contractor will have to repair any damage caused during execution of the work, failure of which the department will repair the same at the risk & cost of the contractor.
- 11- **Approval of Drawings:** After award of the work, the contractor will have to submit following drawings: - (i) Single Line Diagram of Fire Alarm System. (ii) Drawings of Fire Alarm System. (iii) Any other drawing considered necessary by Engineer-in-Charge. Work will be started after getting the above drawings approved by the Engineer-in-charge.
- 12- **Payment Terms:-** The Following percentage of contract rates shall be payable against the stages of work shown herein:

S.no.	Stage of work	Panels, Detectors & Devices	All other items
i	After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis.	75 %	70 %
ii	On completion of pro-rata installation	15 %	20 %

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iii	On testing, Commissioning and handing over.	10 %	10 %
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- 13- **Final inspection:-** After completion of the work, the contractor will demonstrate trouble free operation of the system to the Engineer-in-Charge. In case any deficiencies are noticed during the demonstration, the same will be attended by the contractor promptly.
- 14- **Completeness of Tender:** All sundry materials such as Foundation Bolts, Hardware Items, Junction Boxes, Sleeves, Flexible conduit etc. which are not specifically mentioned in the tender but are required for completion of the work, will be deemed to be included and the contractor will be bound to provide the same without any extra cost.
- 15- **Minor Building Work:** Minor building work such as Foundation, making opening in Walls/Slab for passage of pipe, making chases, fixing suspenders in Slab/Walls and furnishing the damages to the building to the satisfaction of Engineer-in-Charge etc. are to be executed by the contractor as a part of the work and nothing extra shall be paid for the same.
- 16- **Indemnity:** The contractor will be fully responsible for any accident taking place during execution of the work. The department will not take any responsibility for the same.
- 17- **Completion Plan/Drawings:** After completion of the work the contractor will submit completion plans, wiring drawings of equipment, catalogue etc. which are required for maintenance of the system.
- 18- Payment shall be released only after submission of PAN No. and valid GST TIN No. of the state where work is to be executed. If payment is delayed due to non- submission of PAN No. and valid GST TIN No. then, responsibility for the same will lie on the part of the contractor and no claim/interest etc. will be paid by the department on this account.
- 19- The contractor shall make payment to the worker through Cheque/RTGS/D.D. and a proof of making payment through Cheque/RTGS/D.D. may be submitted along with running account bill of contractor.
- 20- **Approval from CFO:-** The Contractor shall be required to obtain Pre NOC and final NOC from Chief Fire Officer, and work shall be deemed to be completed only after receiving NOC from CFO & rectification if any. Statutory fee if any shall be paid by department. However all liasoning work / arranging inspection of CFO shall be the responsibility of contractor.
- 21- The material in required quantity to be used in the work shall be got approved from the Engineer-in-charge before its use at site. The Engineer-in-charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not as per specifications.
22. Contractor shall preserve the copies of invoices, test certificates, gate passes etc. to prove the genuineness of material/purchases. The responsibility of procurement, genuine material of specialized works shall rest with the contractor.
23. **No inspection out side the country is permissible if required so the same will be deemed to be waived off and necessary test reports shall be submitted before the dispatch of equipment.**

TECHNICAL SPECIFICATION FOR FIRE ALARM SYSTEM

1.0 ANALOGUE ADDRESSABLE FIRE ALARM SYSTEM

1.1 SCOPE OF WORK

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- 1.1.1 The scope of work under this heading shall include designing supplying and installing, Testing and commissioning of Analogue Addressable Fire Detection and Alarm System. The work under this system shall consist of furnishing all materials, equipment, appliances and labour necessary to install the complete Fire Detection and Alarm System, complete with Main Fire Alarm Control Panel, Sensors, Sounders, Strobes, Manual Call Stations, Relays etc. for interfacing with other systems.
- 1.1.2 It shall include laying of cabling/wiring/conduiting and power supply etc., necessary for installation of the system with supply of sensors and devices as appropriate and as indicated in the Specification and Bill of Quantities. Any openings/chasing in the wall/ceiling required for the installation shall be made good in appropriate manner.
- 1.1.3 The Bidder shall also undertake to control and monitor the ventilation and other systems from the Fire Alarm Panel through the use of Addressable Output / Input Modules.
- 1.1.4 The Building should be designated as multiple fire zones with each area forming one or more software programmed zones. All wiring shall be done using 2 x 1.5 mm² twisted pair shielded PVC insulated copper cable while exposed and in PVC/MS Conduits in concealed in concrete.

1.2.1 GLOSSARY OF TERMS

- 1.2.1.1 **FIRE ALARM CONTROL PANEL (FACP)** This refers to the microprocessor-based panel that shall be connected to the various sensors/devices by means of 2 wire loops. The FACP shall be able to supervise individual detectors for proper performance as well as to give pinpoint location of Fire or Fault Alarm and initiate Alarms as well as facility for cutting off of AHU's and Electrical Power is also to be included. The panel shall also have the provision of through volt-free contact to activate an Auto-Dialer to dial selected phone numbers in case of fire.
- 1.2.1.2 **LOOP** A loop shall mean a 2-wire circuit which is capable of monitoring and controlling detector/devices. The loop card shall have built-in short circuit isolators to accommodate Class A wiring.
- 1.2.1.3 **ADDRESSABLE DEVICES** This term indicates the complete group of addressable devices such as Sensors or Detectors, Manual Call Stations, Addressable Output / Input Modules etc.
- 1.2.1.4 **SENSORS OR DETECTORS** The Sensors or Detectors shall be Analogue Addressable type. The chamber should be easily removable for the purpose of easy maintenance. The address programming shall be done through the decade switch in the Detector. The Detectors shall have a common base to allow easy interchange of various types of Detectors.
- 1.2.1.5 **MANUAL CALL STATION** The Manual Call Station shall be addressable type with Input Modules to define the address for each station. The function shall be similar to that of conventional Manual Call Point and should be reset table without replacing the glass.
- 1.2.1.6 **OUTPUT MODULE** Output module shall mean Addressable points from the FACP with potential free contacts for tripping of AHUs, power supply etc. as required. Any module shall operate two relay outputs powered from the loop and preferably consuming single address on the loop. The system shall also be able to handle separate modules to interface the speakers of the Public Address System.

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- 1.2.1.7 **INPUT MODULE** The input modules shall be of dual/single channel type. The dual channel module shall be selectable for Normally Open or Normally Close by a 2 bit DIL switch.
- 1.2.1.8 **FAULT ISOLATOR** This unit shall be placed on the loop preferably after every 20 devices and shall be able to isolate electrical short circuit in the wiring. All the other detectors shall remain functional because of the Class A wiring of the loop. The isolator shall not utilize an address and shall be built into the detector base wherever required.
- 1.2.1.9 **SOUNDERS/HOOTERS** Each sounder shall be of addressable type. It shall be capable of being directly mounted on the wall/ceiling or along with the detector. The sounder shall be programmed to activate in event of an alarm from a single detector/device or a group of detectors/ devices.

1.3 SPECIFICATION

- 1.3.1 A general line diagram showing the circuit and spacing of detectors is to be enclosed. The quantity mentioned in the Price Schedule shall be quoted for. Unit rates shall apply in the event of any variance.

1.4 FIRE ALARM SYSTEM

- 1.4.1 The Fire Alarm System shall confirm to EN54, BS: 5839-1:2013 in respect of design and installation, and it shall give Audio/Visual Alarm Signals when there is rise in temperature in case of Heat Detector or while measuring Smoke Density in case of Smoke Detector, while it exceeds the pre-set limit. The system shall give pinpoint location of fire with warning system and voice communication for commands and instruction if required.
- 1.4.2 Annunciation facility shall also be inbuilt into the FACP, the panel being able to initiate alarm signal for any particular zone.
- 1.4.3 The system shall be fully supervised for all fault conditions with distinctive alarm operated for fault and fire conditions. Test buttons and software features shall be provided to test the electronic circuits and Detector health.
- 1.4.4 The FACP shall have facility to connect addressable Input / Output Devices in the peripheral RS 485 bus.
- 1.4.5 The system shall be based on an "Open Protocol" to ensure flexibility of using Sensors / Detectors of an alternate manufacturer, in case the user requires such an option at a later date.

1.5 FIRE ALARM CONTROL PANEL (FACP)

- 1.5.1 The Fire Alarm Control Panel shall be micro processor based fully Analogue Addressable, Analogue Control Unit which shall control all Analogue Addressable Detectors, Manual Call Stations and Switching Systems (for disconnecting AHU and power supply) connected to it.
- 1.5.2 All addressable units shall be connected to the FACP through the Loop Cards and shall be addressed through individual numbers. The FACP shall be able to obtain analogue value for all detectors in the circuit through a pulsed digitalized current data. The FACP shall be able to analyze all analogue inputs from all addressable units, and through its own software and ambient level screening the FACP shall be able to identify fire, possible fire or fault conditions. The unit supervision shall be dynamic and continuous.

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- 1.5.3 The FACP shall itself have one loop card built in. The loop shall be able to address Detector/Devices as per BOQ .All the networked panels shall display all the events occurring anywhere in the system. Each FACP on the network shall effectively function as a repeater panel as well.
- 1.5.4 The FACP shall also give adequate warning signal whenever there is dust accumulation in detectors, and up to the point of its replacement it should be possible to change the level of ambient alarm calibration condition either by the use of software program operable by the owner or by resetting the detector.
- 1.5.5 Short / Open circuit units shall also be reported at the FACP In such cases, the system through the use of fault isolators shall be able to isolate that segment between the two fault isolators. The missing Detectors/Devices shall also be reported at the FACP with identification of the location.
- 1.5.6 The FACP shall have the facility to set sensitivity of each smoke sensor remotely.
- 1.5.7 When an alarm condition is sensed at the FACP from a smoke or heat detector, a delay time/alarm verification period shall be stated. If the sensor is still in alarm after the delay time expires, an alarm condition is reported. The delay time shall be adjustable from 0 to 990 sec's.
- 1.5.8 The FACP shall have the facility to perform walk test such that an operation can be periodically checked out for all initiating devices. As each device is placed into alarm the FACP shall print the condition and automatically rest the device. Audible devices shall be initiated, if required at a preprogrammed time. If a zone is inadvertently left in walk test mode, it shall automatically reset to normal after the idle time is exceeded. During the walk test the zones other than the programmed zones shall be under continues supervision (normal mode). In case of any alarm initiated by detector/devices the walk test shall get terminated automatically.
- 1.5.9 Programming functions shall include alarm/trouble type assignment, point descriptor assignment, alarm message assignment, etc.
- 1.5.10 Programming may be carried out from the FACP keyboard or utilizing the approved PC setup software via laptop/desktop computer.
- 1.5.11 The FACP shall have a Liquid Crystal Display of Alphanumeric type to indicate immediately all conditions. The display should be high resolution, backlit 80 character. In case of testing of the system from the FACP the Display shall be able to give readouts of analogue value of all detectors being tested. The FACP shall also be able to carry out continuous self-monitoring when in normal condition.
- 1.5.12 The FACP shall have facility for in-built or external printer coupled to the FACP, which shall log all events with time. The printout shall clearly indicate the event - Fire/Pre Alarm/Fault etc. With the unit address and time.
- 1.5.13 The FACP shall also be able to discriminate between false alarms and fire conditions, as well as priority selection of alarm in case alarm activate in two or more remotely located units simultaneously. In such cases, the Manual Call stations shall have the highest priority.
- 1.5.14 The FACP also is able to actuate switches automatically in case of Fire condition that of AHU's and power supply or other systems such as Gas Extinguishing Systems.

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- 1.5.15 In this respect the bidder is required to take note of clause relating to cutting off of AHU's given above. The bidder shall note that the Client shall provide no additional facilities for completion of this mechanism other than that specified in clause 1.4.6.
- 1.5.16 The System shall be fail safe and adequate safe guards should be under taken that in the event of a failure of a part of the System it shall not handicap the complete System. The Loop Cards shall be of Modular Construction.
- 1.5.17 The Bidder shall undertake the responsibility of the complete installation, commissioning, user trials, training and maintenance of the System as required. The Bidder shall take all responsibility for preparation and installation of System Software into the FACP. The Software shall be such so as to be easily operated by the Client's Personnel and secured against Software errors, ability to be upgraded so as to incorporate more features at a later date.
- 1.5.18 The FACP shall have its own Battery Backup of a minimum of 48 hours in normal condition and then half an hour in alarm condition. The back up time calculation shall be done as per IS 2189 standards.
- 1.5.19 It shall be able to withstand temperature variations from 00 centigrade to 550 centigrade. Further, Relative Humidity (non-condensing type) up to 95% shall not hamper its performance. The voltage rating shall be from 15V DC to 32V DC, though the voltage may be change depending upon the working voltages of a proprietary FACP.
- 1.5.20 The logic circuitry shall be based on high noise immunity solid state hardware employing modular construction. Logic cards shall be of epoxy fiber glass construction.
- 1.5.21 The FACP shall be capable of being networked (future expansion) with other similar FACPs located at different part of the premises through a single RS485 bus.
- 1.5.22 The FACP shall have provision for interfacing with the Public Address System.
- 1.5.23 The panel should have the facility to interface with an automatic two-channel programmable speech dialer for verbal reporting of fire. It shall be able to call four telephone numbers per channel. The programmable speech dialer shall have two alarm inputs and shall provide listen-in capabilities through the built-in microphone. The dialer shall have a built-in keypad for easy operation, programming and voice recording.

1.6 ADDRESSABLE DETECTORS

A. SMOKE DETECTOR

- 1.6.1. All detectors are fitted with plug-in system type connections, from the maintenance and compatibility point of views. An alarm release will not effect a detector's good functioning. After resetting the alarm, the detector will resume operations without readjustment of any kind.
- 1.6.2. The detector shall be high performance optical type. Detectors using radioactive elements shall have BARC approval.
- 1.6.3 The detector shall be able to sense incipient fire by detecting the presence of visible and invisible products of combustion. The detector shall be suitable for low voltage (15 to 32 V DC) two wires supply. The detector shall be provided with Twin LED indication and the sensitivity of the detector shall not vary with change in ambient temperature, humidity, pressure or voltage variation.

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- 1.6.4 Neither its performance shall be affected by air current up to 1.52mtr per second. The detector shall be suitably protected against dust accumulation/ ingress and it shall be free from maintenance and functionally tested at intervals. All detectors shall be identical in construction design and characteristic to facilitate easy replacement.
- 1.6.5 The coverage per smoke detector shall strictly follow IS 2189 standards. It shall be possible to connect Smoke Detector with Heat Detector or Manual Push Button in the same circuit. The sensitivity of detector shall be set from the FACP to suit the site requirement.
- 1.6.6 It shall have in-built locking mechanism to check the removal and pilferage of the detector.
- 1.6.7 The Photoelectric type Smoke Detector shall be Analogue Addressable type and be able to send analogue output to the FACP regarding its condition. It shall be able to communicate with the FACP by the pulses emitted from the FACP. The detector should be programmed using a decade or rotary switch.
- 1.6.8 The base of the Detector shall be electronics free and interchangeable with other smoke or heat detectors.
- 1.6.9 It shall be able to withstand temperature variations from - 10 degree centigrade to 50 degree centigrade. Further, Relative Humidity (non-condensing type) up to 80% shall not hamper its performance. The voltage rating shall be from 15V -32V DC though the voltage may be changed depending upon the working voltages of a proprietary FACP.
- 1.6.10 It shall be possible to test the Detectors working both from the FACP as well as locally by means of a magnet to simulate a Functional Test Condition.
- 1.6.11 It shall be possible to mount the detectors in Duct Casting Unit for sampling of Supplying Air from the AHUs. Secondary response indicators shall be provided for all the Above False Ceiling Detectors.
- 1.6.12 The detector shall have twin LED's for 360 degree viewing angle. LED on the detector shall blink each time the sensor is scanned by the FACP. If the FACP determines that the sensor is in alarm, the FACP will command the sensor LED to remain on to indicate the same. Each sensor will be capable of being tested for alarm via command from the FACP. Each sensor shall respond to FACP scan with the information about its type for identification.
- 1.6.13 It shall be possible to connect loop powered base sounders on the detector loop. The sounder shall not require a separate cable for power supply.

B. HEAT DETECTOR

- 1.6.14 Heat detector shall provide temperature measurement when it reaches pre-alarm in normal course. However the operator shall have the option of calling up the temperature measured by the specific detector as and when required.
- 1.6.15 It shall have in-built locking mechanism to check the removal and pilferage of the detector.
- 1.6.16 The heat detector shall be Analogue Addressable type and be able to send analogue output to the FACP regarding its condition. It shall be able to communicate with the FACP by the pulses emitted from the FACP. The detector should be programmed using a decade or rotary switch.

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- 1.6.17 The base of the Detector shall be electronics free and interchangeable with other smoke or heat detectors
- 1.6.18 It shall be able to withstand temperature variations from - 10 degree centigrade to 50 degree centigrade. Further, Relative Humidity (non-condensing type) up to 80% shall not hamper its performance. The voltage rating shall be from 15V -32V DC though the voltage may be changed depending upon the working voltages of a proprietary FACP.
- 1.6.19 It shall be possible to test the Detectors working both from the FACP as well as locally by means of magnet to do a Functional Test.
- 1.6.20 The detector shall have twin LED's for 360 degree viewing angle. LED on the detector shall blink each time the sensor is scanned by the FACP. If the FACP determines that the sensor is in alarm, the FACP will command the sensor LED to remain on to indicate the same. Each sensor will be capable of being tested for alarm via command from the FACP. Each sensor shall respond to FACP scan with the information about its type for identification.
- 1.6.21 It shall be possible to connect loop powered base sounders on the detector loop.

1.7 MANUAL CALL STATIONS

- 1.7.1 The manual station shall be a press to break type. The device shall be red in color and suitable for surface or flush mounting. Manual stations shall be inter faceable to an addressable input module that can be accommodated within the device. The manual station shall have normally open fire alarm and annunciator contacts and these contacts shall close on activate. Contacts shall remain closed until station is manually reset.
- 1.7.2 The Manual Call Station shall be fully addressable with its own addressable module and operated by digitized signals from the FACP. The voltage range shall be from 15V to 32V. It shall have protection as per IP33. The operating temperature range shall be from -10 degree C to 50 degree C. Relative Humidity (non condensing) range of performance parameters shall be between 10 to 93%.

1.8 FIRE ALARM REPEATER / ANNUNCIATOR PANEL

- 1.8.1. The Alarm Repeater/Annunciator Panel shall display fire/fault messages simultaneously with the FACP. It shall be capable of interfacing with the FACP on a single RS 485 Bus.
- 1.8.2. The panel shall have a 80 character backlit alphanumeric LCD display, which shall display date, time & description of alarm/trouble events that are displayed in the FACP with an inbuilt buzzer to indicate fault/fire alarm.
- 1.8.3. The panel shall be powered from the FACP.
- 1.8.4. It shall have control keys for Sound, Silence, Mute and to reset the FACP from the repeater station.
- 1.8.5. The repeater panel shall have the following LED,,s indications a. Supply b. Fault c. Mute d. Silent e. Disabled f. Fire

1.9 SOUNDER/HOOTERS CUM STROBES

- 1.9.1 The sounder shall be electronic type and shall give discontinuous/ intermittent audible alarm whenever any detector or MCP operates.

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- 1.9.2 The sound output from the Hooter should be as per IS 2189.
- 1.9.3 The sounder/Hooter shall be powered from either 2 wire detector loop.
- 1.9.4 The horn/strobe shall be listed to UL 1971/ UL 464/LPCB and shall be Approved for fire protective service. The horn/strobe shall be wired as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1 Hz over the strobes entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. The horn shall have three audibility options and an option to switch between a Temporal 3 pattern and a Non-Temporal (continuous) pattern. These options are set by a multiple position switch. On four-wire products, the strobe shall be powered independently of the sounder. The horn on horn/strobe models shall operate on a coded or non-coded power supply.

1.10 DUCT CASTING UNIT The Duct Casting Units are to be directly installed in the return Air conditioning ducts for detecting any hazardous quantity of products of combustion be carried through the ducts. The complete unit shall consist of Polycarbonate housing to accommodate Photo Electric Detector with plug - in facility and sampling tubes, one for Air inlet and other as the air outlet. The Inlet tube shall extend into and across the duct width (from 0.5 meter to 3.0 meter); the outlet tube shall be of fixed length of 7.5-cm length. When the AHU blower fans shall operate a continuous cross sectional Sampling of air from the duct shall flow through the housing containing the Detector. The outlet tube shall return the sampled air into the duct. The functional requirements of the Duct Casting Unit shall be: i) Uniform Sensitivity - irrespective of air velocity - up to 1200 meters per minute. ii) It shall function on the Venturi principle, with Aluminum Venturi tubes. iii) The Duct Casting Unit shall be compact, easy to install and with the facility to dismantle the cover or Detector for maintenance purposes. iv) The housing shall be mounted outside the duct; the probe tubes shall be inserted through the duct by cutting precision sized holes into the duct and sealed with rubber gaskets. v) The Duct Casting Unit shall be LPCB/UL Approved.

1.11 ADDRESSABLE MONITOR MODULE

- 1.11.1 The monitor module shall provide an addressable input for N.O. or N.C. Contact devices such as manual stations, Water flow switches, sprinkler Supervisory devices, etc.
- 1.11.2 It shall provide a supervised initiating circuit. An open-circuit fault shall be Annunciated at the Fire Alarm panel (Subsequent alarm shall be reported.)
- 1.11.3 The device shall contain an LED, which blinks upon being scanned by the Fire alarm panel. Upon determination of an alarm condition of an alarm condition, the LED shall be latched on.
- 1.11.4 The device shall have a selectable inbuilt fault isolator.

1.12 ADDRESSABLE CONTROL MODULE

- 1.12.1 Addressable Control Module shall be provided to operate dry contacts for switching ON OFF pressurization fans, AHU's etc. in case of fire etc.
- 1.12.3 It shall have a built in type identification to automatically identify this Device to the control panel.
- 1.12.4 It shall have internal circuitry & relay powered directly by two-wire loop.

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1.12.5 It shall have a selectable inbuilt fault isolator.

1.13 FAULT ISOLATOR MODULE

1.13.1 The Fault Isolator Device shall detect and isolate a short-circuited segment of a Fault-tolerant loop.

1.13.2 The device shall automatically determine a return to normal condition of the Loop and restore the isolated segment.

1.13.3 The fault isolator device shall be placed 20-30 devices as per IS 2189 to limit the Number lost in the event of a short-circuit/wiring fault.

1.14 GRAPHIC MONITORING SOFTWARE

1.14.1 The Graphic Software shall Provide both Alarm Management and system maintenance tool.

1.14.2 All the information is available on a single screen allowing quick Assessment, whilst any actions can be taken by accessing the Built-in menus. Building Evacuation, Alarm Silencing and Reset are available to any users with suitable security clearance.

1.14.3 System maintenance can be performed on any device or zone whether the workstation is connected to a single panel or a series of networked panels. From a single location simple checks can be performed to assess the status of individual devices, whilst devices and zones can easily be temporarily isolated for on-site works to be performed. Advanced functionality is available to users with level 3 access permitting the maintenance of PC software security passwords, Time & Date setting and control of the workstation functionality.

1.14.4 The schematic view offers users the site plan. It can be configured to provide a number of levels representing the overall site, individual floor plans, small sections of the floor plans or even individual rooms. Each plan is independently named and can be configured to show all devices as installed on the site.

1.14.5 The event log details a complete history of the activity of the fire system. All major control actions are recorded with date, time, user and an Optional comment field. Entries are colour coded to help easy Identification of specific types of events.

1.15 FIRE ALARM SYSTEM TESTING

1.15.1. FACP

a. The FACP shall be checked for basic tests such as visually checking input voltage and amperage. All zones one by one shall be de wired to check for fault signal indication in the FACP.

b. The Power Source shall be cut off and checked for stand by Supply from the Batteries. After six hours the FACP Source shall be switched on to check for auto switch over to the Mains mode.

c. Tests shall be conducted for AC fail, charger fail, DC fail, Battery Disconnect or Battery fail. In all such cases the relevant L E D should glow and the piezo sound shall also give sound output.

1.15.2 SMOKE DETECTOR

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- a. The testing shall be carried out for each loop / zone, initially one detector in a zone and subsequently 2 or more disassociated detectors in each zone with time lapse between the detectors to test for Alarm Priority, Alarm Queuing and Call Logging.
- b. An identified detector will be subjected to smoke aspiration from burning paper/cigarette puffs, rubber and other materials which give dense smoke held at 0.3 M distance from the detector. The FACP should indicate increased analogue output for that address and after the programmed delay time, a fire alarm signal shall be indicated. This delay shall be utilised for alarm verification.
- c. The same test shall be carried out for two detectors in the same Loop but in different rooms. The FACP shall indicate Pre Alarm higher analogue levels for both detectors in its display with separate identification for both fires. One of the detectors in question is subjected too higher and longer levels of smoke aspiration. The FACP should give priority alarm for this address. The printout shall indicate individual addresses of the detectors with achieved analogue values and the time of event.
- d. This test shall be carried out for different Loops as well as for 2 Loops simultaneously.

1.15.3 HEAT DETECTOR

- a. The same tests in the same sequence shall be carried out for this Detector but with the application of hot air from a hair dryer held at approximately 60 cm distance.

1.15.4 COMBINED TEST

- a. The next test will be in combination of Photoelectric / Heat Detectors simultaneously with time lapse between application of smoke or heat or as required by the Client.

1.15.5 ADDITIONAL TEST

- a. One detector of each type will be disconnected and subjected to slow dust build - up by means as desired by the Bidder and again connected in the circuit.
- b. The FACP shall indicate the changed ambient levels and automatically adjust the analogue values for the same. These Detectors are to be replaced by new Detectors of identical type and the FACP shall then be programmed accordingly and checked. The Bidder will take custody of the removed detectors without additional cost to the Owner.
- c. Any part of the Loop shall be short-circuited. The FACP shall indicate the communication failure of all the devices connected in the short-circuited segment. After the short circuit is corrected, the Fault Isolator shall return to its normal status automatically, this being reflected in the FACP. The Loop shall then be in normal operation again. Any part of the Loop shall be de wired and tested as given above.

1.15.6 All other tests as required by the client at the time of handing over.

FIRE ALARM CONTROL PANEL

Type	:	Analog Addressable
Type of display	:	LCD
Display of	:	ALL EVENTS
Addressable capability	:	As per BOQ
Intelligent capability	:	Yes
Fault-isolation capability	:	Yes
Alarm delay capability	:	Yes
Sensor-self-test capability	:	Yes
LCD display type	:	Minimum 80 character on each line
BAS integration capability	:	Yes through Modbus
Stand-by battery with charger:	:	Yes
Voltage requirement	:	230 V 50 HZ – Ac

MULTICRITERIA/MULTISENSOR DETECTOR

Type : Analog Addressable

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Twin LED indication	:	Yes
Blinking LED facility	:	Yes
Addressable capability	:	Yes
Intelligent capability	:	Yes
Remote / Local test capability:		Yes
Sensor Coverage	:	Spot Detection
Programming of detector	:	By Decade or Rotary Switch
Operating Temperature Deg C :		-10° C to 50° C
Operating RH at 40° C	:	10% - 93% RH
Operating Voltage	:	15 - 32 V DC
Sensors	:	Optical and thermal type
Sensitivity settings	:	minimum 2 Nos.
Photo thermal sensitivity settings :		minimum 3 Nos.
Detection Mode	:	Combines or Thermal Only.

LAZER SMOKE DETECTOR

Type	:	Analog Addressable
Twin LED indication	:	Yes
Blinking LED facility	:	Yes
Addressable capability	:	Yes
Intelligent capability	:	Yes
Remote / Local test capability :		Yes
Sensor Coverage	:	Spot Detection
Programming of detector	:	By Decade or Rotary Switch
Operating Temperature Deg C:		-10° C to 50° C
Operating RH at 40° C	:	10% - 93% RH
Operating Voltage	:	15 - 32 V DC

OPTICAL SMOKE DETECTOR

Type	:	Analog Addressable
Twin LED indication	:	Yes
Blinking LED facility	:	Yes
Addressable capability	:	Yes
Intelligent capability	:	Yes
Remote / Local test capability:		Yes
Sensor Coverage	:	Spot Detection
Programming of detector	:	By Decade or Rotary Switch
Operating Temperature Deg C :		-10° C to 50° C
Operating RH at 40° C	:	10% - 93% RH
Operating Voltage	:	15 - 32 V DC

FIXED/ ROR TYPE HEAT DETECTOR

Type	:	Analog Addressable
Dual Thermistor	:	Yes
Twin LED indication	:	Yes
Blinking LED facility	:	Yes
Addressable capability	:	Yes
Intelligent capability	:	Yes
Remote / Local test capability :		Yes
Sensor Coverage	:	Spot Detection
Programming of detector	:	By Decade or Rotary Switch
Operating Temperature Deg C:		-10° C to 50° C
Operating RH at 40° C	:	10% - 93% RH
Operating Voltage	:	15 - 32 V DC

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MANUAL CALL POINT

Type	:	Analog Addressable, Resettable type
LED indication	:	Yes
Operating Voltage	:	15V - 32 V
Dimensions	:	Semi-flush mounting: 89 x 93 x 27.5 (WxHxD)/
Surface mounting	:	89 x 93 x 59.5 (WxHxD)
Weight : Semi Flush	:	110g/Surface: 160g
IP Rating	:	IP24D
Operating Temperature:	:	-10°C to +50°C
Relative Humidity	:	0% - 95% non-condensing
Operating Voltage	:	15V to 30Vdc max

REPEATER ALARM PENAL

Type	:	Active Type
Controls	:	System Reset, Accept, Mute, Silence & Self Test
LCD Display	:	80 Characters
Power Supply	:	External Type 24 VDC
Operating Current	:	90MA

ADDRESSABLE MONITOR MODULE

Mounting Option	:	DIN Rail or Surface Mount
Status Indication	:	Tri Colour LED
Address Setting	:	Through Selector Switch
Operating Temperature :	:	-10 deg c- +50 deg c
Humidity	:	0 – 95 % Maximum Non Condensing
Operating Voltage	:	15-30 VDC
Type	:	Single Channel

ADDRESSABLE CONTROL/OUTPUT MODULE

Mounting Option	:	DIN Rail or Surface Mount
Status Indication	:	Tri Colour LED
Address Setting	:	Through Selector Switch
Operating Temperature :	:	-10 deg c- +50 deg c
Humidity	:	0 – 95 % Maximum Non Condensing
Operating Voltage	:	15-30 VDC
Type	:	Single Channel
Relay Type	:	Form C

FAULT ISOLATOR MODULE

Mounting Option	:	DIN Rail or Surface Mount
Status Indication	:	Tri Colour LED
Address Setting	:	Through Selector Switch
Operating Temperature :	:	-10 deg c- +50 deg c
Humidity	:	0 – 95 % Maximum Non Condensing
Operating Voltage	:	15-30 VDC
Fault detection Delay :	:	100 to 400 ms

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Acceptable Makes for E&M works

Preferred makes of materials to be used in the work are as under. In case of non availability of these makes, the Engineer-in-charge may allow use of alternative BIS makes of materials in the work. Non BIS marked materials may be permitted by the Engineer-in-charge.

Sl.	Details of Materials/Equipment	Manufacturer's Name
I.E.I, MCBDB & MCB, Cables and Wires		
1	FRLS PVC insulated copper conduct or single core cable for wiring. (ISI marked)	Finolex/ RR Kabel/ KEI/ Havells/ Polycab/ Grandlay/ Plaza Cables/ Anchor/ Bonton/ Paramount cables/ AKG/ Gloster/ Rallison
2	Modular switches, socket/ telephone socket/ cable TV socket/ data outlet socket/ fan regulator /GI boxes etc (Wiring accessories) /regulators etc.	Legrand/ Schneider electric/ Wipro/Hager/M.K (Honeywell)/ Havells/ ABB/ Anchorby Panasonic Indoasian
3	MS Conduit (ISI marked) with heavy duty MS conduit pipe accessories	BEC / AKG / RMCON (Note: The make of accessories shall be same that of conduit pipe and will comply to IS/4768 part 22003)
4	MCB, Isolator, Industrial plug Socket, RCCB, RCBO's, ELCB (ISI Marked/ IEC Compliant)	Schneider Electric/ Legrand/ Hager/ L&T (LAURITZ KNUDSEN)/ ABB /Siemens/ IndoAsian/ C&S/ Anchor by Panasonic /Havells
5	MCBDB & Loose Wire Box	Schneider Electric/ Legrand/ Hager /L&T (LAURITZ KNUDSEN)/ ABB/Siemens/ IndoAsian/ C&S/ Havells
6	Change Over Switch	L&T (LAURITZ KNUDSEN)/ Havells/Hager/C&S
7	Automatic Transfer Switch(ATS)	Asco/ Russel/ Socomac/ Hager/ ABB/L&T (LAURITZ KNUDSEN)
8	Armoured/ Unarmoured Telephone cable, Coaxial Cable	Delton/ Finolex/ RRRKabel/ Havells/ Grandlay/ Plaza Cables/ Anchor/ Bonton/ Paramount cables/ JMW Kable/ AKG/ Rallison
9	PVC conduit (ISI marked) with heavy duty PVC conduit pipe accessories	AKG/ Norpack/ BEC/ Polypack/ Precision/ Anchor/ Polycab/ Pressfit
10	Selector Switch & Toggle Switch	Salzer/(L&T (LAURITZ KNUDSEN)/ Siemens/ Kaycee/ Rishabh/ ABB
11	PVC Trunking	MK (Honeywell) /Schneider Electric/ Legrand/ Pressfit
12	GI Pipe	Tata/Jindal(Hissar)/Prakash Surya
13	Paints	ICI/ Asian/ Berger
14	Terminal Blocks & Connectors	Elmax/ Wago/ Hensel/ Connect well
15	Phenolic Laminated Sheet/Bakelite sheet	Hylam/ Formica (P-IGrade)/ Mylam/ Greenlam
16	Cat-6/ 6A Cable, Co-Axial cables, Telephone Wires & cable	Amp, Avaya /Beldon/ Legrand/ Molex/ Schneider/ Anchor / Plaza Cables/ Bonton/ AKG/ Rallison/ Agilon
Fans & Fittings		
1	LED Fittings (ISI Marked/BEE Certified)	Wipro/ Phillips/ Crompton Greaves/Havells/ Bajaj/ Trilux/ Lighting Technology/ Orient Electric/ Jaquar/ Regent
2	Exhaust fan/Fresh Air Fan	Havells/ Crompton/ CG Power/ USHA/ Almonard/ Halonix/ Bajaj/ Polycab/ Orient Electric

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3	BLDC Ceiling Fan/Wall Fan (ISI Marked /BEE Certified)	Havells /Crompton /CG Power/ USHA/ Anchorby Panasonic/ Halonix /Bajaj/ Polycab/ Orient Electric
4	Wall Bracket Fitting	Havells/ Crompton Greaves / Decon / Phillips/ Lighting Technology/ Luster/ Jaquar/ Anchor Panasonic/ Orient Electric/ Halonix/ Regent
5	LED lamp	Wipro/ Phillips/ Crompton Greaves/Havells/ Osram /Jaquar / Bajaj/ Polycab/ Orient Electric
6	Mirror Light	Jaquar / Philips/ Havells/ Crompton Greaves / Decon/ Wipro/ Regent
7	Geysers(BEE Certified)	Racold/ CG/ Havells/ Usha/ Venus/ AOSmith/ Jaquar/ Anchor by Panasonic/Bajaj
Street Lighting		
1	LED post Top fitting	Wipro/ Phillips/ Crompton Greaves / Havells/ Keselec Schreder/ Lighting Technology /Bajaj/ Polycab/ Orient Electric/ Regent
2	LED Street light fitting	Wipro/ Phillips/ Crompton Greaves / Havells/ Keselec Schreder/ Lighting Technology/ Bajaj/ Polycab/ Orient Electric
3	LED street lights with inbuilt Solar panel and controller	Wipro/ Phillips/ Crompton greaves/ Havells/ Lighting Technology/ Bajaj/ Jaquar /Insta Power
4	Ornamental MS & G.I pole (factory finish)	Keselec Schreder- Ecopole3m ATG in GI with base plate/ Valmont/ Wipro/ Phillips/ Crompton greaves/ Bajaj/ Paruthi Engineers Pvt. Ltd./Luster/ Twinkle
5	Hot Dipped Galvanized Octagonal Pole (Factory finish)	Valmont/ Wipro/ Phillips/ Crompton Greaves /Bajaj/ Paruthi Engineers Pvt. Ltd./ Consoul / VSTP .
6	Polycarbonate Junction Box/ Enclosure	Hensel/ Spelsberg/ Naptune-Bals
7	XLPE Insulated PVC Sheathed Alum./Copper Conductor Armored Cable of 1.1 KV Grade	Finloex/ RR Kabel /KEI/ Havells/ Polycab/ Nicco/ Grandlay/ Paramount cables/ Gloster/ Plaza Cables/ AKG/ Bonton/ Rallison
Sub Station Equipment's		
1	LT panel/ Meter Panel Board/Outdoor Feeder Pillar/APFC panels /Bus ducts	Tricolite Electrical Industries/ C&S/Application/ Sterling & Wilson/ MILESTONE/ Adlec Control System Pvt. Ltd./ Advance Panels & Switchgears Pvt. Ltd./ Indo Asian /Associated Switchgears & Projects Ltd/ Allied Engineers/ Shalabh/ Engineers & Engineers/ Pristine/ Excel Control System/ Expert Engineers/ R.P. Controls/ Coronet Engineers Pvt. Ltd./ Havells/ NEC/ SPC Electrotech Pvt Ltd/ ASSES /MAK E-Products Pvt. Ltd./ Prestige Switchgears Pvt. Ltd./ Modern Switchgears (India)/ Asian Switchgear Pvt. Ltd./ Precision System Control
2	TTA Panels (LT distribution) (OEM or their system integrator)	Legrand, Schneider, Siemens, ABB, L&T (LAURITZ KNUDSEN)
3	Air insulated Rising Main/Bus Trunking	C&S/L&T (LAURITZ KNUDSEN)/ Schneider /Legrand /ABB/Siemens
4	Sandwich type bus Trunking/ Rising Main	C&S/L&T (LAURITZ KNUDSEN)/ Schneider /Legrand /ABB/Siemens
5	Moulded Case Circuit Breaker (MCCB) Thermal Release/	Schneider electric/ Legrand/ L&T (LAURITZ KNUDSEN) /ABB/ Siemens/ C&S / Havells

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	Microprocessor Based (Ics = Icu =100%)	/Indoasian
6	Power/Aux.Contactor3/4Pole	Schneider Electric/ Legrand/ Hager/ L&T (LAURITZ KNUDSEN)/ ABB/ Siemens /C&S/ BCH
7	Potential transformers /Current Transformers	Automatic Electric/ Gilbert & Maxwell/ Matrix/ Precise/ L&T (LAURITZ KNUDSEN)/ Kappa/ ESENNAR
8	LED Type Indicating Lamps/Push button	Schneider electric/ L&T (LAURITZ KNUDSEN)/ Siemens/ C&S /Vaishno/ Syska
9	Overload relays	Schneider Electric/ L&T (LAURITZ KNUDSEN)/ Siemens/ C&S /ABB
10	Conventional/ Electronic Digital Meters (A/V/PF/Hz/KW/KWH)	Conzerv/ L&T (LAURITZ KNUDSEN)/ Secure/ AE/ C&S
11	Timer	Schneider Electric/ Legrand/ Hager/ L&T(LAURITZ KNUDSEN) / ABB / Siemens/ C&S
12	Fasteners/GI Clamps	Hilti/ AFT/ Fisher/ Chilli/ GMGR
13	D.W. Corrugated HDPE Pipe(ISI Marked)	REX/ Triputi/ Duraline/ Gemini/ Durton/ Kisan/ Jain Irrigation/ Raksha
14	Transformer (Oil/Dry pipe)	Crompton /ABB/ Schneider/ Siemens/ VOLTAMP/ ESENNAR
15	HT Panel/ Ring main Unit	Compton/ Siemens/ ABB/ L&T (LAURITZ KNUDSEN) / Schneider
16	H.T. Cable (ISI marked)	KEI/ Havells/ Polycab/ Gloster/ Nicco/ Grandlay/ Finolex/ RR KABEL/ Rallison
17	HT End Termination/Cable Joining Kit	Reychem/ Denson/ CabSeal/ Safekei/ 3M
18	ACBs with Display	Schneider Elecric (MVS)/ Legrand (DMX3MP4)/ L&T (LAURITZ KNUDSEN) (U-Power-OMEGA)/ ABB (Emax) PR122/ Seimens /C&S (WinMaster)
19	Rubber mat	Jyoti/ Deep Jyoti/ Premier (Duly ISI Marked)
20	Ammeter	Rishabh/ L&T (LAURITZ KNUDSEN)/ AE/ C&S
21	Voltmeter	Rishabh/ L&T (LAURITZ KNUDSEN)/ AE/ C&S
22	All Type Fire Extinguishers (ISI Marked)	Atasee/ Kalpex/ Lifeguard/ Ceasefire/ Minimax/ Safex/ GETECH
23	Capacitor and Reactors/APFC Relay	EPCOS/ L&T (LAURITZ KNUDSEN) /DUCATI/ ABB/ Siemens/ Schneider
24	XLPE Insulated PVC Sheathed Alum./Copper Conductor Armored/ Unarmored Cable of 1.1KV Grade	Finloex/ RR Kabel /KEI/ Havells/ Polycab/ Paragon (Electron)/ Universal /Nicco/ Grandlay/ Paramount cables/ V-marc/ JMW Kabel/ Gloster/ Plaza Cables/ AKG/ Bonton/ Rallison
25	Cable Glands Double Compression with Earthing Links	Baliga Lighting/Comet/Cosmos /Dowells/ Gripwell
26	Bimetallic Cable Lug	Comet/ Dowells (Biller India)/ HexBrass (Copper Alloy India)/ Jainson/ Action
27	MS/GI Cable Tray	Pilco/ Slotco/ Pasco/ MEM/ BEC/ Steelways /Legrand/ RMCON/ Trueleader/ R.P. Controls/ Prestige Switchgears Pvt. Ltd.
28	Programmable Logic Controller (PLC)	Siemens/ Allen Bradley/ L&T (LAURITZ KNUDSEN) /ABB
29	Compact type sub station close along with Transformer, HT/LT	ABB/ SIEMENS/ SCHNEIDER/ CROMPTON/ L&T (LAURITZ KNUDSEN) /VOLTAMP

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	switchgears, all functional & control/ Indicating equipments/ assemblies /Sub assemblies	
	Fire Fighting Equipments	
1	MS pipe	Tata/ Jindal (Hisar)/ Parkash Surya
2	GI Pipe	Tata/ Jinda l(Hisar)/ Parkash Surya
3	Forged Steel Fittings/flanges	Johnsons Industries/VS Forge/JK Forging/ Trueforge
4	Forged Steel Fittings and flanges (for welding joints)	VS Forge/ Rohini/ Kanwalforge/ Jhonson/ Trueforge
5	Pipe hangers	Chilli/ Hilti/ GMGR
6	Gun metal/ Brass Valve (ISI marked)/(Full way Globe valve/ Non return valve)	Sant/ Leader/ Advance/ Zoloto/ Kirloskar/ GETECH/ Kartar
7	Butterfly/Sluice Valve (ISI marked)	Audco / Sant/ Leader/ Advance/ Zoloto/ Kirloskar/ GETECH/ Kartar
8	Check Valve (ISI marked)	Audco/ Sant/ Leader/ Advance/ Zoloto/ Kirloskar/ GETECH/ Kartar
9	Foot Valve (Cast Iron/Gun Metal)	Audco/Sant/ Leader/ Advance/ Zoloto/ Kirloskar/ GETECH/ Kartar
10	Y-Type Strainer	Audco/ Sant/ Leader /Zoloto/ Kirloskar/ GETECH/ Kartar
11	Fire/Sprinkler Pump/Terrace Fire Pump	Kirloskar/ KSB/ Grundfos/ WiloMather & Platt
12	Electrical Motor	ABB/ Siemens /Kirloskar/ Grundfos/ Crompton/ NGEF
13	Diesel Engine for fire pump	Cummins India/ Ashok Leyland/ KOEL/ Greaves
14	Couplings(Type-Type)	Lovejoy/ Fenner/ Dunlop
15	Anti Vibration Mounting	Kanwal Industrial Corporation/ Dunlop/ GERB/ Resistoflex
16	Pressure Switch (ISI marked)	SystemSensor/ Infoss/Danfoss/ Switzer/ Honeywell & Siemens
17	Pressure Guage (ISI marked)	HGuru/Fiebig/Dwyer
18	Double/Single Headed Landing Value (ISI marked)	Minimax/ NewAge/ Safeguard/ Lifeguard/ Padmini/ Omex/ Andex/ KalpEX/ Atasee/ GETECH/ Armorfire/ Kartar
19	Male Female Fire Hose Coupling (SS304)(ISI marked)	Minimax/ NewAge/ Safeguard/ Lifeguard/ Padmini/ Omex/ Andex/ KalpEX/ Atasee/ GETECH/ Kartar
20	First Aid Drum/ Fire Hose reels/Shutoff Nozzle (Gunmetal/ ABS)(ISI marked)	Minimax/ NewAge/ Safeguard/ Lifeguard/ Eversafe/ Padmini/ Omex/ Andex/ KalpEX/ Atasee/ GETECH/ Kartar
21	SS 304/ Gun metal Branch Pipe & Nozzle (ISI marked)	Minimax/ New Age/ Safeguard/ Lifeguard/ Padmini/ Omex /Andex/ Atasee/ GETECH/ Armorfire/ Kartar
22	Fireman Axe	Minimax/ New Age/ Safeguard/ GETECH
23	Water Flow Switch (FM/UL listed)	System Sensor/ Rapid Control/ Potter/ Switzer
24	Rust preventive polymeric 4mm thick tape for pipes directly buried in ground pipe protection pypcoat (AW4) wrapping (ISI marked)	Pypcoat/ Marphalt/ Rustech /Safex
25	Level controller & indicator (water) (ISI marked)	Auto Pump/ Cirrus Engineering/ Techtrol
26	Fire brigade inlet connection (ISI marked)	Minimax/ New Age / Safeguard / Lifeguard/ Padmini/ Omex/ Eversafe/ KalpEX/ Atasee/

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		GETECH/ Armorfire
27	Thermoplastic pipe for first aid hose reel (ISI marked)	New Age / Safeguard/ Lifeguard/ Padmini/ Omex / Eversafe/ KalpEX/ Atasee/ GETECH/ Kartar
28	Fire Sealent	Promat/ Birla 3M/ Hilti
29	Overload relays	Schneider Electric / Larsen & Toubro/ Siemens/ C&S / ABB
30	Power/ Aux. Contractor 3 /4 pole	Schneider Electric / Legrand /Hager/ L&T (LAURITZ KNUDSEN)/ABB/ Seimens/ C&S/ BCH
31	LED Type Indicating lamps/ Push Button	Schneider Electric / L&T (LAURITZ KNUDSEN)/ Siemens/ C&S/ ABB
32	LT jointing Kit/Termination	Raychem/ Denson/ Cap Seal/ Safekei/ 3M
33	RRL hose pipe (ISI Marked)	New Age/ Safeguard /Lifeguard/ Padmini/ Omex/ KalpEX/ Atasee/ GETECH/ Armorfire/ Kartar
34	Dry Battery	Exide/ Amar Raja/ HBL/ Pulse/Amco
35	Battery Charger	Statcon /Amar raja/ CDC/ AE/ Expofyn/ Thycon India
36	Epoxy Paint	ICI/ Asian/ Berger/ Nerolac
37	Air release Valve	Rb/ Tbs/ Cimbrio/ Zoloto
38	Analogue/digital Measuring Instruments (Voltmeter/Ammeter/ Energy meter/KW /PF/Multi-Function Meter)	AE/ Rishab/ L&T (LAURITZ KNUDSEN)/ C&S/ Conzerve
39	Aluminum/Copper power Cable/ Control cable (Armored /Unarmored)	Finloex/ RR Kabel /KEI/ Havells/ Polycab/ Nicco/ Grandlay/ Paramount cables/ Gloster/ Plaza Cables/ AKG/ Bonton/ Rallison
40	Cable gland and Lugs	Comet/ Dowells /Hax brass (Copper Alloy India) /Jainson/ Action
41	Solenoid Valve/Spray nozzle	Perker / HD / Tyco/ Emersion/ Kartar
42	Sprinkler	HD/Tyco/ Reliable/ Wormald/ Viking/ Atasee/ GETECH/ Kartar
43	Sprinkler head/Water Curtain Nozzle	Tyco/Viking/ Omex/ Newage/ Lifeguard/ GETECH/ Kartar
44	Steel Flexible Extension	Omex/ Newage/ Tyco / Lifeguard/ GETECH/ Kartar
45	Vibration Eliminator	Resistoflex/D waren/ Kanwal
46	Welding Electrodes	Advani/ ESAB/ L&T (LAURITZ KNUDSEN)
47	Deluge Valve	Tyco/ Viking/ HD
48	Cast Iron Valve	Kirloskar/ Kartar/ Kalpana/ Joloto /Audco/ Advance/ GETECH
Fire Alarm System		
1	Addressable Manual call box	Notifier/ Johnson Control/ Honeywell /Siemens/ Bosch/ EST/ASES (Agni Suraksha) / Notofire
2	Addressable Type fault isolator	Johnson Control/ Honeywell/ Siemen/ Bosch/ EST (Edwards) /ASES (Agni Suraksha)/ Notofire
3	Strobe lights cum hooter	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch /EST/ASES (Agni Suraksha)/ Notofire
4	Addressable control modules for hooter	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch / EST /ASES (Agni Suraksha)/ Notofire
5	Addressable monitor module for flow switch	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch / EST/ASES (Agni Suraksha)/ Notofire

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6	Addressable type fire alarm control panel	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch / EST /ASES (Agni Suraksha)/ Notofire
7	Network repeater panel	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch / EST/ ASES (Agni Suraksha)/ Notofire
8	Addressable multi sensing fire detector (combination of optical type smoke detector & ROR type heat Detector)	Notifier/ Johnson Control /Honeywell/ Siemens/ Bosch /EST /ASES (Agni Suraksha)/ Notofire
9	Fire Alarm / Fire Survival Cable	AKG/ Grandlay/ plaza/ Bonton/ Notofire/ Finolex RR Cable/ KEI/ Havells/ Rallison
10	Response Indicator	Notifier/ Johnson Control/ Honeywell/ Siemens /Bosch /EST/ASES (Agni Suraksha)
Water Supply Pump Sets		
1	Mono Submersible Pump Set	KSB/ CG/ Kirloskar/ Grundfoss
2	Submersible Pump Set	KSB/ CG/ Kirloskar/ Grundfoss
3	GI pipe	Tata/ Jindal Hisar/Prakash Surya
4	Sluice Valve/ Check Valve/ Butterfly valve/Non Return Valve	Kirloskar/ Sant/ Leader/ Joloto/ Audco/ Advance
5	Submersible Cable	Fionlex/ RR Kable /KEI/ Havells/ Polycab/ AKG/ Grandlay/ Plaza/ Rallison
EPABX System/ IP Based PBX System		
1	EPABX System	Siemens/ Cisco/ Alcatel/ Coral/ Panasonic/ Avaya
2	Master console phone	Siemens/ Cisco/ Alcatel/ Coral/ Panasonic/ Avaya
3	Telephone instrument	Beetal/ Tata/ Panasonic/ Coral
4	18SWGsheet(Chrono Box)	Topaz/ Coral/ Crown
5	Constant voltage transformer	Topaz/ Bhurji/ Delta/ Servokon
6	Unarmoured telephone wire	Delton/ Finolex/ RR Kabel/ Havells / Rallison
7	Cat-6cable, Wires & Fiber optic cable	Amp/ Avaya/ Beldon/ Legrand/ Molex/ Schneider /AKG/ Rallison
8	IP Based PBX System	Matrix/ Panasonic/ NEC/ CISCO/ Alcatel/ Ericsson /Siemens/ Tadiran
9	Managed Network Switches	CISCO/ Allied Tellies/ HP/ Netgear/ Juniper
10	Rack(Network/Server)	Netrack/ WQ/ Panduit /Rittal/ Derwiser Emersion/ Schneider (APC)/ Valrack
VRV/VRF, Air Conditioner & Water Purifier		
1	Split/Window type Air Conditioner	Mitshubshi/ Toshiba /O General/ Daikin/ Hitachi/ Voltas/ Carrier/ Bluestar / LG/ Panasonic
2	VRV/VRF	Mitshubshi Electric/ Mitshubshi Heavy Industries/ Toshiba/ Bluestar / O General/ Daikin / Hitachi/ Voltas/ Carrier/ LG
3	Voltage stabilizer	Vguard/ Bluebird/ Voltas/ Servokon/ Logicstate
4	RO/water purifier	Kent/ IonExchange/ Aquaguard/ VENZA
5	Drinking water cooler	Voltas/ Blue Star/ Usha
6	Refrigerant Copper Tube/pipes	Met-Tube/ Hindustan/ Rajco/ Totalline/ Mandav tubes /Jindal Refrigeration
7	UPVC Drain pipe	Polypack/ Supreme/ AKG/ BEC/ Ashirwad/ Astral/ Finolex
Insulation		
1	Nitrile Rubber	Armaflex/ Vidoflex/ Superflex/ K-flex/ ALP Aeroflex

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2	Crossed linked polyethylene	Torcellene/ Thermo Break/ Armaflex / ALP Aeroflex
Ducting & Grills		
1	Factory Fabricated Duct	Zeco/ Techno Fabri Duct/ Rolastar/ Ductofab/ ETA
2	G.I. Sheet Metal Duct	SAIL/ Tata/ Jindal
3	Grilles/Diffusers	Air Master/ Airflow/ Dynamic/ Ruskintitus/ Carryaire / Revistar
Uninterrupted Power Supply (UPS)		
1	Online/Offline UPS	Numeric/ Eaton/ APC/ Vertiv/ Mitsubshi/ Toshiba/ Alliance Autometer/ Microtek/ Delta
Audio Video System		
1	Projector	Panasonic / Christie / Barco / Sony/NEC /EPSON
2	LED Display	Panasonic / LG / Samsung / Sony
3	SITC of Floor Cart for one 55" Display	Custom Designed
4	Digital Podium	AHA/ILS/ TECOM /EAPL/ ELKO/ Liberty/ UNI
5	Motorised Projection Screen	Draper /Dalite/ Milan Lliberty/ Logic /Chief /Visico/ Teck/ Focus
6	Wall Plate	Atlona / Extron / Lightware/ Aurora/ Creston
7	Matrix Switcher	Atlona / Extron / Lightware / Aurora/ Creston
8	Matrix switcher with USB interface	Atlona / Extron / Lightware/ Aurora/ Creston
9	HD Base T receiver for HDMI with USB	Atlona / Extron / Lightware/ Aurora/ Creston
10	Transmitter and Receivers	Atlona / Extron / Lightware/ Aurora/ Creston
11	Wireless Presentation system	Atlona / Extron / Barco/ Creston/ Cramer/AMX
12	Goose neck microphone etc. complete as reqd. (on podium)	Audio Technica / Shure / Bayerdynamic /AKG/ Electrovoice /Senheiser/ JBL
13	wireless Lapel microphone etc. complete as reqd.	Audio Technica / Shure / Bayerdynamic /AKG/ Electrovoice /Senheiser/ JBL
14	Handheld wireless microphone with table stand etc. complete as reqd.	Audio Technica / Shure / Bayerdynamic /AKG /Electro voice / Senheiser/JBL
15	Antenna distribution system etc complete as per tender specification	Audio Technica / Shure / Bayerdynamic/ AKG/ Electro voice / Senheiser/JBL
16	Pair of UHF wide-band directional antennas etc complete as per tender specification	Audio Technica / Shure / Bayerdynamic/ AKG/ Electro voice /Senheiser /JBL
17	Speakers	L Acoustics / Community Audio/ Bose/ Martin Audio/ JBL/ Electrovoice/ Renkus Heinz / Sony /D&B Audiotechnik
18	Amplifier	Labgruppen / Powersoft / Martin Audio/Bose/ Lab Gruppen/ Ashly Audio /Bose/Sony/JBL
19	Digital Signal Processor	Klark Teknik / Biamp / Clearone/ Ashly Audio /Bose
20	Control System	Atlona / Extron / AMX/ Aurora/ Creston
21	Touch Control Panel	APPLE/ SAMSUNG/ AMX
22	Docking station for wireless touch panel	Launch Port / AMX / Vidda Box/ SAMSUNG

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23	Wi fi access point	Linksys / Netgear / D-Link / CISCO/ Allied Tellies /HP / Aruba/ Juniper
24	POE Switch	Linksys / Netgear / D-Link / CISCO/ Allied Tellies/ HP/ Aruba/ Juniper
25	Cables	Sommer/ Gotham/ Belden/ Panduit/ Commscope /Simon /Atlona/ Sommer /Klotz/ Systimax/ Schneider/ Molex /Legrand/ Extreme/ Derwiser/ Systimax (Commscope)
26	Connectors	Amphenol, Neutrik, Switchcraft
27	Rack	Valrack/MIDDLE ATLANTIC /WQ/ Netrack/ Panduit/ Rittal/ Emerson/ Schneider (APC)/ Derwiser
28	Multi Input Recorder	Lumens/ Mediapointe /Media site/ Vbrick
29	PTZ Camera	Honey Well/ Bosch/Sony/ Pelco/ Tyco/ Samsung
30	Camera Control Joystick	Lumens/ Sony/ Vaddio/ Honeywell
31	Document Camera	Lumens / Elmo / Wolf Vision
32	Video conference Codec	Panasonic /Cisco /Polycom
SIGNAGE		
1	Signage	Autoglo / Prolite / Ceasefire
HVAC System		
1	Chilled Water Machine (Screw/ centrifugal water cooled)	Johnson Control/ Daikin/ Carrier/ Bluestar/ Trane/ Voltas/ Dunhum- Bush 1
2	Brine Chilled Water Machine (Scroll water cooled)	Brine Chilled Water Machine (Scroll water cooled)
3	Pump	Grundfos / Kirloskar / Xylem / Armstrong/ Wilo
4	Variable Frequency Drive (VFD)	Danfoss/ Siemens / ABB / Carrier
5	Cooling Tower	Bell / Paharpur / Mihir / Advance / Belden
6	Air Handling Unit (AHU)	Zeco Aircon/ System Air/ Edgetech /Bluestar / Voltas / Carrier / VTS/ Waves
7	Cooling Coil	Zeco Aircon/ System. Air/ Edgetech/ Bluestar/ Voltas/ Carrier/ Waves
8	Plug Fan	Kruger/ Nicotra / Greenheck/ Camtree
9	Centrifugal Fan	Kruger / System Air / Nicotra / Greenheck/ Camtree
10	Wet Scrubber	Zeco Aircon/ System Air / Edgetch/ Waves
11	Servo Voltage Stabilizer	Servocon/ Servomax / Recons / NEEL / APLAB
12	Air Filter	Mechmaark / Pyramid / Thermodyne
13	Propeller fan	Marathon/ Sphere / Kruger
14	GSS Sheet	Sail/Tata/ Jindal / National
15	Factory Fabricated Duct(MS/GSS)	Dustech/ Ductofeb/ Zeco / Rolasta / Atco
16	EPS Thermal Insulation	Beardcell/ Styrene/SHI/ Lloyd/ Armaflex/ U.P. Twiga/ ALP Aeroflex
17	Fibre glass Wool	Owens Canning /Lloyd/ Armaflex/ U.P. Twiga /ALP Aeroflex
18	Flexible pipe connection	Resitoflex / Dunlop / Easyflex / Cori
19	Butterfly Valve	Advance / Audco / Honeywell / Belimo
20	Y-Strainer	Rapid cool/ Emerald / Honeywell / SM
21	POT Strainer	Rapid cool/ Emerald / Honeywell / SM

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22	Non Return Valve	Audco / Advance / Honeywell
23	Balancing Valve	Audco / Advance / Honeywell
24	Two way Control Valve with Actuator, Motor and Thermostat	Honeywell / Siemens / Belimo / Danfoss
25	Ball Valve	Sant/ Rapid cool / Danfoss / Belimo
26	Auto Air / Purge Valve	Anergy/ Rapidcool / AIP / Flamco
27	Thermometer / Pressure Gauge	Fiebig/ H-Guru / Emerald / Libra
28	Water Flow Switch	Siemens/ Anergy / Omiron / Danfoss/ Honeywell
29	Temp & RH Sensor	Honeywell / Siemens/ Omiron / Schneider
30	Air Differential Pressure Switch	Honeywell / Siemens/ Omiron / Schneider
31	Air Differential Sensor	Honeywell / Siemens/ Omiron
32	Fire Damper with Actuator	Trox/ Greenheck / Conaire / Sgsjemair
33	Grilles & Dampers	Pineair/ Conaire/ Caryaire/ Greenair/ System Air/ Sevea/ Tristar
34	Under deck Insulation	Beardell/ Styrene/ Lloyd/ Modifoam/ Armaflex/ ALP Aeroflex
35	Motor for Centrifugal Fan	Crompton Greaves / Siemens / L&T (LAURITZ KNUDSEN)
36	VFD Enclosure (Flameproof)	Siemens/ Schneider / L&T (LAURITZ KNUDSEN) / Crompton Greaves / Sudhir/ Balliga/ Flexpro/ FCGI
37	Single Phase Preventor	Minilec / L&T (LAURITZ KNUDSEN)/ Ellsco
38	Current Transformer (Cast Resin)	AE/ Kappa
39	Switch / Fuse Unit / HRC Fuse	L&T (LAURITZ KNUDSEN) / Siemens / ABB / C&S
40	Ammeter / Voltmeter (Digital Type)	AE /L&T (LAURITZ KNUDSEN) / Crompton Greaves / Siemens / Conserve
41	LED indicating Lamp / Push Button	Siemens/ GE Power / ABB / L&T (LAURITZ KNUDSEN)/ Schneider Electric
42	Selector Switch	AE/ L&T (LAURITZ KNUDSEN)/ Kaycee
43	Relay Timer / Contactor / Starte/ Push Button	Siemens / L&T (LAURITZ KNUDSEN) / Schneider Electric / ABB / BIL
44	Paint	Nerolac / Asian / Berger
45	Power / Control Cable	Worldcab / Skytone / Polycab
46	Fire Survival Power / Control Cable	Belden / Fusion Polymers / Tyco / RR Kabel /Finolex/ Gloster/ Plaza/ Grandlay/ Rallison
47	Termination Kit	Raychem / Densons / Xicon / ABB
48	Perforated Cable Tray	B.E.C./Apex/ Aditya Steel
49	Fastener	Hilti / AFT / Wurth/ Fisher
50	ACB, Change Over Switch	L&T (LAURITZ KNUDSEN)/ Legrand / Schneider / Siemens
51	Copper Tube/pipes	Met-Tube/ Hindustan/ Rajco /Total line/ Mandav tubes/ Jindal Refrigeration
CCTV System		
1	Bullet Camera	Honey Well/ Bosch/ Sony/ Pelco/ Tyco/ Samsung /PRAMA
2	Dome Camera	Honey Well/ Bosch /Sony/ Pelco/ Tyco/ Samsung /PRAMA
3	NETWORK SWITCH	Cisco/ Avaya/ Juniper/ Extreme/ Hp /PRAMA
4	WIRELESS CONTROLER	Cisco/ Avaya/ Juniper/ Extreme/ Hp /PRAMA
5	ACCESS POINT POE	Cisco/ Avaya/ Juniper/ Extreme/ Hp /PRAMA

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6	NVR / KEYBOARD	Honey Well/ Bosch/ Sony/ Pelco/ Samsung /PRAMA
7	LED TV	Sony/ LG/ Panasonic/ Samsung /PRAMA
8	CAT 6A CABLE (23 AWG)	Panduit - Pannet/ Siemon/ Belden/ Systimax/ Kei /PRAMA
9	PATCH PANEL / PATCH CORD/RJ45 WITH FACE PLATE	Panduit Pannet/ Siemon/ Belden/ Systimax / PRAMA
10	Communication Cables/ Signal Cable/ Control/ Power Cable	Finolex, Havells, Polycab, Techno flex, Lapp Cable, Beldon, Legrand, Molex, Comm Scope, Schneider /PRAMA
11	Optic Fiber Cable	Systemax, Panduit, Siemon, Belkin, Beldon, Comm Scope, Legrand, Molex, Schneider /PRAMA
12	FACE PLATE / ADAPTOR PLATE	Panduit - Pannet/ Siemon/ Belden /PRAMA
13	WALL MOUNTING CABINETS / CABLE MANAGE	Emerson/ Panduit /Rittal /Valrack /PRAMA
14	SFP MODULE	Cisco/ Avaya/ Huawei/ Juniper/ Extreme/HP /PRAMA
15	IPPBX	Panasonic/ Cisco/ Mitel/ Alcatel/ Progility/ Avaya /NEC / Coral /PRAMA
16	CCTV STORAGE HDD	Samsung /WD / Seagate /PRAMA
17	TELEPHONE (ANALOG)	Panasonic/ Cisco/ Mitel/ Alcatel /Progility/ Avaya /NEC
18	TELEPHONE (DIGITAL)	Panasonic/ Cisco/ Mitel/ Alcatel /Progility/ Avaya /NEC
19	DIGITAL KEY TELEPHONE WITH LCD DISPLAY	Panasonic/ Cisco/ Mitel/ Alcatel /Progility/ Avaya /NEC
20	MDF	Panasonic/ Cisco /Mitel/ Alcatel/ Progility/ Avaya/ NEC / PRAMA
21	PVC Conduits	Recision/ BEC/ AKG Polycab/ Pressfit
22	Net work able LaserJet Color printer	Cannon/ Epson/ Hewlett Packard
23	DIGITAL WATER LEAK DETECTION SYSTEM	TTK/ Tyco (Tracetek)/ Elsa/ C- Systems
24	Digital Rodent Repellent System	Maser Electronics/ C-System/ RSCAT
Boom Barriers		
1	Boom Barriers	Motwane, Godrej, Faac, Gunnebo
LAN and Data Networking		
1	STP Cat6a Cable and Its Components Such as Patch Cords, Patch Panels, Face Plates and All Their Accessories	Comm Scope- SYSTIMAX/ Siemon/ Panduit-Pannet/ Belden/ Legrand/ Molex
2	Single Mode Fiber& Multi Mode Optic Cables of Various Core Capacities and Their Accessories — Wall Mounted or Rack Mounted Lius, Patch Cords and Pigtaills and Other Accessories	COMMSCOPE- SYSTIMAX/ SIEMON/ PANDUIT-PANNET/ BELDEN/ MOLEX
3	NETWORKING ENCLOSURES, RACKS OF VARIOUS SIZES — 15U UP TO 42U	APW-VERO PRESIDENT/ RITTAL/ PANDUIT—PANNET/ VALRACK/ NETRECK

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4	0.5 MM DIA FRLS PVC INSULATED ANNEALED Cable	Finolex/ RR Kable/ Havells/ Molex/ Bonton/ Delton/ Legrand/ Beldon/ Avaya/ Gloster/ Plaza/ AKG
5	COPPER CONDUCTOR CABLE — 4 PAIRS Cat-6 cable, fiber optic	Finolex/ RR Kable/ Havells/ Molex/ Bonton/ Delton/ Legrand/ Beldon/Avaya/ Gloster /Plaza/ AKG
6	Networking Switches — Access Switches, Distribution Switches, Core Switches, Server Farm Switches and their components such as 1Gbps SFP, 10Gbps SFP+, 40Gbps QSFP+ & 100Gbps QSFP28 transceivers and modules and other accessories such as power supplies, fans, stacking cables.	Cisco/ Extreme Networks/ HPE (Aruba)/ Juniper Networks/ Allied Telesis
7	Wireless Controllers, Wireless Access Points and their accessories	Cisco/ Extreme Networks/ HPE (Aruba)/ Juniper Networks/ Allied Telesis
8	Internet Router, Intranet Router and their accessories and Optic	Cisco/ Juniper Networks/ Extreme Networks/ HPE (Aruba)
9	Network Management System	Cisco/ Extreme Networks/ HPE (Aruba)/ Juniper Networks/ Allied Telesis
10	AAA Solution for Campus LAN	Cisco/ HPE (Aruba)/ Juniper/ Extreme Networks
11	Next Generation Firewall and its accessories	Check Point/ Cisco/ PaloAlto/ Annexegate/ Fortinet; F5/ HPE(Aruba)
12	IP based PBX Communication Solution, IP Phones, Soft phones, Voice Gateway, Communications Software and Mobility Client, Desktop Client Software	Avaya/ Cisco/ NEC/ Alcatel/ Matrix
13	Industry Standard Intel Platform Server Hardware	Dell/ HP/ Lenovo or as per IP-PBX communication system platform OEM
14	Chrono box	Topaz/ Coral /Crown
15	HARD DISK DRIVE	Seagate/ Hitachi/ WD
16	NETWORK RACK	Valrack/ Dynamic /Rittal/ Comrack /Netrack
17	Rack	Valrack/ Middle Atlantic /WQ/ Netrack/ Panduit/ Rittal/ Emerson/ Schneider (APC)/ Derwiser
ACCESS CONTROL SYSTEM		
1	Access control system & allied accessories	HID/ Lenen/ Genetec /Idcube
DG Set		
1	Diesel Operated Generating Engine	Cummins India/ Caterpillar / Ashok Leyland/ KOEL / Greaves / Perkins
2	Alternator	Stamford/ Lerroy Sommer / Kirloskar Electric / Caterpillar / Crompton Greaves / KOEL
3	DG Set Canopy / Enclosure	As Per OEM / OEA Of Respective DG Set Manufacturer.
4	MCB, MCBDB, RCBO'S/ RCCB'S	Schneider Electric /Hager/ L&T (LAURITZ KNUDSEN)/ Siemens/ ABB
5	MCCB 3 & 4 Pole	Schneider Electric/ Siemens/ Larsen & Toubro/ ABB

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6	Ammeter/Voltmeter/ Selector Switch, Indicating Lamp/Relays	AE/IMP/ MECO/ L&T (LAURITZ KNUDSEN) (Only Digital Type To Be Used)
7	Contractors, Timer	L&T (LAURITZ KNUDSEN)/ Siemens/ Schneider Electric
8	HT Cable	KEI/ Havells /Polycab/ Gloster/ Nicco/ Grandlay/ Finolex /RR KABEL/ Rallison
9	LT Cable	Finolex/ RR Kabel/ KEI/ Havells/ Polycab/ Grandlay/ Plaza Cables/ Panasonic/ Anchor/ Bonton/ Paramount cables/ V-marc/ JMW Kable /AKG/ Gloster/ Rallison
10	Bus Trunking Make	GE/ C&S/ Schneider /L&T (LAURITZ KNUDSEN)/ ABB/ Legrand
11	HT Cable End Termination	M Seal/Denson/Raychem/Cab Seal
12	Battery	Panasonic/ Exide/ Amaron/ luminous/ SF
13	G.I. Pipe	Jindal (Hissar)/Tata. (ISI Marked)
14	ACB	L&T (LAURITZKNUDSEN) /ABB/ Siemens/ Schneider /Legrand
15	Vibration Isolators	Resistoflex/ Flenonics (USA)/ Gerv
16	Noise Control Silencer / Muffler	Intertec/ Sound Control India, As Per OEM
17	Fiberglass	UP Twiga, Kimmco/ Owing Corning
18	Alarm Annunciator	Advani Oralikon/ Larsen & Toubro Minilec
19	Motors	Kirloskar/ Bharat Bijlee/ Siemens
20	MS Pipes Upto 200 Mm Dia	Tata Steel/ Jindal (Hissar)
21	G.I. Pipe Fitting	Unik/ Zoloto M
22	Flexible Pipe Connections	Resisto flex/ Flexionics (USA)
23	Welding Rod	Advani/ ESAB
24	Indicating Lamps, Selector Switch	Siemens/ L&T (LAURITZ KNUDSEN)/ Kaycee/ BCH
25	AMF/Synchronized Panel(DG Set)	As Per OEM of DG Set
26	Cable Glands Double Compression With Earthing Links	Baliga Lighting / Comet / Cosmos / Dowell's
Solar System Solar Power Generation System		
1	Solar Power Generation System	REIL/ BEL/ CEL/ REC/ SOLON/ TATA POWER /ADANI /INA/ WAAREE / VIKRAM/ ABB/ MOSER BEAR/ WIPRO
2	Junction Box	VNT/ SUN GARNER/ OEM of SPV Modules
3	SPV Inverter	Sungrow/ Delta/ SMA/ ABB
4	Module Mounting Structure	As per MNRE/ Manufacturer's standard
5	XLPE Alumunium / Copper cable	Finolex/ RR Kabel/ KEI/ Havells/ Polycab/ Paragon (Electron)/ Universal/Nicco/RPG Cables/ Grandlay/ Bonton/ Plaza cables/ Panasonic/ Anchor/ Paramount Cables/ V-marc/ JMW Kable /AKG/ Gloster/ Rallison
6	Solar cable XLPO Insulated (DC)	RR Kable / Polycab/ Havells/ Finolex/ Lapp/ Paragon (Electron)/ Bonton/ Svarn/ NEC/ KVVS/ HPL Finolex/ KEI/ Grandlay/ Plaza Cables/ Panasonic/ Anchor/ Paramount cables/ V-marc/ JMW Kable

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		/AKG/ Gloster/ Rallison
EARTHING		
1	Earthing	Avon Earthing, Ashlok Safe Earthing, VRH Lightning Protection
FACADE LIGHTING		
1	Facade light	Trilux, Philips, LT, Ligman, Griven, Traxon, Unilamp

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Schedule of Quantity					
Name of Work: Construction of Grain Godown, Family Welfare Centre and Primary School including E & M at GC CRPF Trishundi, Amethi (U.P.).					
S. No	Description of Items	Qty	Unit	Rate	Amount
	PART C-1				
	(WIRING)				
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.	505.00	Pts.	2101.00	1061005.00
2	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.	350.00	Mtr	370.00	129500.00
b)	2 X 4 sq. mm + 1 X 4 sq. mm earth wire.	1000.00	Mtr	476.00	476000.00
c)	2 X 6 sq. mm + 1 X 6 sq. mm earth wire.	500.00	Mtr	652.00	326000.00
d)	4 X 4 sq. mm + 2 X 4 sq. mm earth wire.	700.00	Mtr	744.00	520800.00
e)	4 X 6 sq. mm + 2 X 6 sq. mm earth wire.	500.00	Mtr	1001.00	500500.00
f)	4 X 10 sq. mm + 2 X 6 sq. mm earth wire.	200.00	Mtr	1253.00	250600.00
3	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	550.00	Mtr	254.00	139700.00
b)	25 mm	600.00	Mtr	289.00	173400.00
4	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 (75 mm X 75 mm)	26.00	Each	354.00	9204.00
5	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.				
a)	Data socket. (RJ 45)	21.00	Each	1039.00	21819.00
b)	Telephone socket outlet	8.00	Each	168.00	1344.00

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6	Supplying and drawing following pair 0.5 mm dia FRLS/HFFR PVC insulated annealed copper conductor, unarmored telephone cable in the existing surface/ recessed steel/ PVC conduit as required.				
a)	2 Pair	250.00	mtr	39.00	9750.00
7	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	300.00	mtr	60.00	18000.00
b)	2 Run of cable	300.00	mtr	96.00	28800.00
8	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 A modular socket outlet and 15/16 A modular switch, connections etc. as required.	79.00	Each	659.00	52061.00
9	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).	41.00	Each	757.00	31037.00
10	Supplying & fixing suitable size GI box with modular plate and cover in front on surface or in recess including providing and fixing 25 A modular socket outlet and 25 A modular SP MCB, “C” curve including connections, painting etc. as required.	60.00	Each	807.00	48420.00
11	SITC of laser etched LED light Single/Double Sided Exit Signage on ceiling /wall mounted (with logo & arrow) of standard size of 300 x 150 mm having aluminium housing 8 mm acrylic sheet power consumption < 2 W in top mounted enclosure suitable size 20 SWG M.S. Box duly powder coated with necessary circuit to step down from 230 volt AC 50 Hz to 6 volt /12 volt DC with Li-ion batteries and battery charger as per entire satisfaction of engineer-in	25.00	nos.	3943.00	98575.00

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	charge.				
	FAN & FITTINGS				
12	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.≥0.95, IP20, CRI≥80 , UGR (Unified Glare Rating) ≤19, Flicker free (flicker should be below 5%), life time (LED,Driver & electrical circuitary), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends , CCT 3000°K / 4000°K / 5700°K / 6000°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be confirming to relevant BIS standards. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c 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 ≥105 and <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 aluminum housing such that LED junction temperature shall not rise above 90°C) Powder coated die cast /Extruded aluminum Body including trim				
a)	8 - 10 watt	195.00	nos.	624.00	121680.00
13	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				

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	KV with Short & Open circuit protection, THD < 10% , P. F. ≥ 0.95, IP20, CRI ≥ 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 / 6000°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Color Matching) < 3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c 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 ≥ 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 aluminum housing such that LED junction temperature shall not rise above 90°C).				
	Powder coated die cast / Extruded aluminium Body (Thickness ≥ 1.20 mm)				
a)	36 Watt.	104.00	nos.	2508.00	260832.00
14	Supplying, installation, Testing & 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 > 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. ≥ 0.95, IP20, CRI ≥ 80, 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 / 6000°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Color Matching) < 3, Maximum power consumption should not				

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	more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c 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 aluminum housing such that LED junction temperature shall not rise above 90°C).				
	Powder coated die cast / Extruded aluminium Body (Thickness ≥ 1.20 mm)				
a)	18- 22 watt	30.00	nos.	681.00	20430.00
15	Supply, Installation, Testing and Commissioning of LED Bulkhead luminare with a system lumen output not less than 1100 lumens and a minimum system efficiency of 95 lumen/watt. The luminaire shall have a ≥ 5700 K, CRI > 70, Pressure die cast housing, IP65- Protection against dust and water i/c connection etc as required.	20.00	Each	2014.00	40280.00
16	Supplying Installation, testing and commissioning of Surface mounting wattage < 10W, ≥ 5700 K, CRI > 70, decorative LED Mirror Light fitting aluminium with bronze finish complete with all accessories etc. directly on ceiling/ wall, i/c connection etc as required.	15.00	each	912.00	13680.00
17	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.),				

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	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.				
	1200mm, service value ≥ 6.0 CM/Min/Watt, air delivery 210 CM/Min (Minimum)	103.00	Each	2695.00	277585.00
18	SITC of 600 mm Sweep minimum 1380 RPM Wall Air circulator fan with Double shielded ball bearings for longer life Indexable to different positions up to 15° Oscillation up to 90° for total flexibility Sturdy brazed wire guards with powder coating ensures corrosion resistance Generally conforming to IS: 2997-1964 standards with all accessories suitable for use on 220/240 volts, 50 Hz single phase Air Del. minimum 280 CMM, 3/4 nos. blade , Noise Level maximum DB 72 with 1.5 sqmm FRLS PVC insulated copper conductor single core cable etc as required.	8.00	Nos.	12635.00	101080.00
19	Supplying of Heavy duty exhaust fan of 300 mm sweep 1400 rpm with energy efficient motor suitable for operation on single phase 230V, 50Hz AC with suitable size louver shutter and accessories etc. as required. complete etc. as required.	8.00	Each	3535.00	28280.00
20	Supplying of 300 mm sweep double ball bearing, plastic body fresh air ventilation fan with all accessories suitable for operation on single phase 230V, 50Hz AC etc as required.	22.00	Nos.	2426.00	53372.00
21	Installation, Testing and Commissioning of exhaust fan of size upto 450 mm sweep in the existing opening, including making good the damage, connection, testing, commissioning etc. as required.	30.00	Each	556.00	16680.00
22	Extra for fixing the louvers/ shutters complete with frame for a exhaust fan of all sizes.	8.00	Each	260.00	2080.00
	MCCB, MCB & DB'S				
23	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 MCCB/RCCB/Isolator)				
a)	4 way (4 + 12), Double door	4.00	No.	4377.00	17508.00
b)	6 way (4 + 18), Double door	2.00	No.	5299.00	10598.00

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c)	8 way (4 + 24), Double door	6.00	No.	6337.00	38022.00
24	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	4.00	No.	7951.00	31804.00
b)	8 way (4 + 24), Double door	2.00	No.	10724.00	21448.00
25	Supplying and fixing of following rating, 240/415 V, 10 kA, "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.(6 to 32 A)	228.00	Each	285.00	64980.00
b)	40/63A TPN MCB.	12.00	Each	2684.00	32208.00
c)	40/63 A TP MCB	32.00	Each	2198.00	70336.00
26	Providing and fixing following rating and breaking capacity and pole MCCB with thermomagnetic release and terminal spreaders in existing cubicle panel board including drilling holes in cubicle panel, making connections, etc. as required.				
a)	100A, 16KA, FP MCCB	3.00	Each	4003.00	12009.00
b)	125 Amp, 16 KA, TP MCCB	3.00	Each	5103.00	15309.00
	(EARTHING)				
27	Earthing with G.I. earth pipe 4.5 Meter long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required.	6.00	Set	7658.00	45948.00
a)	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.	30.00	Mtr	755.00	22650.00
b)	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	10.00	Mtr	287.00	2870.00
	CABLES & PANELS				

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28	Supply of following sizes of Aluminium LT cables, XLPE insulated, cores laid up, PVC outer sheathed, armoured with galvanized round steel wire or steel strip cables with stranded Aluminium conductor suitable for rated voltage of 1.1 KV grade, ISI marked conforming to IS:7098(Part-I)/1988 with latest amendements etc. as required.				
a)	3.5 x 120 sq.mm	300.00	mtr	1517.00	455100.00
b)	3.5 x 95 sq.mm	300.00	mtr	1201.00	360300.00
c)	3.5 x 70 sq.mm	150.00	mtr	918.00	137700.00
d)	3.5 x 35 sq.mm	150.00	mtr	503.00	75450.00
e)	4 x 16 sqmm	200.00	mtr	316.00	63200.00
29	Supply of following size Flexible PVC Insulated Multicore FRLS PVC Sheathed multistranded cables with bright copper conductor upto 1100 V Confirming to IS - 694: 2010 with latest amendements etc. as required.				
a)	3 x 2.5 sq.mm	500.00	mtr	172.00	86000.00
30	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size direct in ground including excavation, sand cushioning, protective covering and refilling the trench etc as required.				
a)	3.5 x 120 sq.mm	250.00	Mtr	497.00	124250.00
b)	3.5 x 95 sq.mm	250.00	Mtr	475.00	118750.00
c)	3.5 x 70 sq.mm	20.00	Mtr	475.00	9500.00
d)	3.5 x 35 sq.mm	20.00	Mtr	453.00	9060.00
e)	4 x 16 sqmm	100.00	Mtr	453.00	45300.00
31	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 pipe as required.				
a)	3.5 x 70 sq.mm	100.00	Mtr	72.00	7200.00
b)	3.5 x 35 sq.mm	100.00	Mtr	47.00	4700.00
c)	3 x 2.5 sq.mm	400.00	mtr	47.00	18800.00
32	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)	3.5 x 120 sq.mm	50.00	Mtr	80.00	4000.00
b)	3.5 x 95 sq.mm	50.00	Mtr	58.00	2900.00
c)	3.5 x 70 sq.mm	10.00	Mtr	58.00	580.00
d)	3.5 x 35 sq.mm	10.00	Mtr	36.00	360.00

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e)	4 x 16 sqmm	50.00	mtr	36.00	1800.00
f)	3 x 2.5 sq.mm	100.00	mtr	36.00	3600.00
33	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)	3.5 x 70 sq.mm	20.00	mtr	151.00	3020.00
b)	3.5 x 35 sq.mm	20.00	mtr	64.00	1280.00
c)	4 x 16 sqmm	50.00	mtr	64.00	3200.00
34	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)	3½ X 120 sq. mm (45 mm)	2.00	Each	710.00	1420.00
b)	3.5 x 95 sq.mm (45 mm)	2.00	Each	684.00	1368.00
c)	3.5 x 70 sq.mm (38 mm)	4.00	Each	542.00	2168.00
d)	3.5 x 35 sq.mm (32 mm)	6.00	Each	437.00	2622.00
e)	4 x 16 sqmm (28 mm)	16.00	Each	366.00	5856.00
35	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)	400.00	Mtr	289.00	115600.00
36	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)	100 mm dia.	120.00	Mtr.	1918.00	230160.00
37	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	600.00	Mtr.	50.00	30000.00
38	Supplying and fixing cable route marker with 10 cm X 10 cm X 5 mm thick G.I. plate with inscription there on, bolted /welded to 35 mm X 35 mm X 6 mm angle iron, 60 cm long and fixing the same in ground as required.	100.00	each	598.00	59800.00

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39	Supplying and erection of out door type totally enclosed weather proof feeder pillar with rain shade suitable for 415 V, 3 Phase, 4 wire 50 Hz AC supply system fabricated in compartmentalized (Preferably) design from CRCA sheet steel of 2 mm thick for frame work & covers , 3 mm thick for gland, plates i/c cleaning & finishing complete with 7 tank process for powder coating in approved shade, having suitable amp. capacity extensible type TPN tinned copper bus bars of high conductivity, DMC/SMC bus bar supports, with suitable short circuit with stand capacity bottom base frame fabricated from 75 mm x 75 mm x 6 mm thick MS angle iron, fabrication shall be done in transportable sections, entire panel shall have a common copper earth bar of 2x 20 x 5 sq.mm size all around ,solid connections from main bus bar to switch for breaker capacity of 100 A and above and for below 100 A breaker capacity connection shall be with 16 sqmm FRLS PVC Insulated copper conductor wire, i/c control wiring with 2.5 Sq.mm PVC insulated copper conductor wire and flexible copper conductor FRLS wire for MCB connection, cable alleys, space heaters, cable gland plates in two half, i/c providing following switch gears, CC foundation etc as required including supplying and fixing the following mountings & accessories (Size not less than 4.0 sq.mtr face area & Minimum Depth 1000 mm) i/c dismantling of old worn out feeder pillar by removing existing 08 nos. LT cables with gland of size 95 sq.mm to 300 sqmm and again relaying & reconnecting the cables with new panel by providing required size of glands and lugs etc. as required				
	Extention panel for sub-station				
	Incomer				
	800 amp. Microprocessor based 4-Pole ACB EDO Type-1 no.				
	Digital Amp/ Volt meter-1 set.				
	Digital type Ammeter-1 set.				
	Indication lamp with 6 amp MCB- 3 set				
	Bus bars				
	1200 A four pole tinned copper Bus bar dully sleeved				

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	Outgoing				
	630 amp. 3 pole 36 KA MCCB -2 No. with spreader link.				
	400 amp. 3 pole 36 KA MCCB -4 No. with spreader link.				
	250 amp. 3 pole 36 KA MCCB -4 No. with spreader link.				
	125 amp. 3 pole 25 KA MCCB -2 No. with spreader link.	1.00	job	663161.00	663161.00
40	Supplying and erection of out door type totally enclosed weather proof IP 54 minimum Protection feeder pillar of suitable size fabricated having minimum face area 1.25 sqmtr and 400 mm deep from 2 mm thick CRCA MS sheet with base frame fabricated from 50 mm x 50 mm x 5 mm thick MS angle iron, suitable for 415 volts, 50 Hz AC supply with MS sheet on bottom for taking load of cable gland hinged front openable double leaf door with locking arrangement complete with bus chamber, suitable size of bus bar and MS cover, covering the MCCB's/ MCB's interconnections with PVC insulated aluminium solid connection of appropriate size for outgoing and incoming powder coated painting, CC foundation etc as required including supplying and fixing the following mountings. (Non essential feeder pillar)				
A)	Incomer				
	1 No.- 250 amp. 4 pole 25 KA MCCB (Thermo-magnetic release) (lcs=100% lcu) with spreader & Rotary handle with earth leakage module				
	Digital type Voltmeter (0-500 V), with selector switch.				
	Digital type Ammeter (0-200 Amp), with selector switch and one set of 3 nos CT's of ratio 100 / 5A Class I accuracy and 15 VA burden- 1 set				
	3 Nos Phase indication LED lamps.				
	Bus bars				
	400 A four pole Al. Bus bar dully sleeved				
B)	Outgoing				
	4 nos- 100 amp. TP 25 KA MCCB				
	2 nos.- 63 amp. TP MCB 10 KA	1.00	Set	134094.00	134094.00

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41	Supplying and erection of out door type totally enclosed weather proof IP 54 minimum Protection feeder pillar of suitable size fabricated having minimum face area 1.00 sqmtr and 400 mm deep from 2 mm thick CRCA MS sheet with base frame fabricated from 50 mm x 50 mm x 5 mm thick MS angle iron, suitable for 415 volts, 50 Hz AC supply with MS sheet on bottom for taking load of cable gland hinged front openable double leaf door with locking arrangement complete with bus chamber, suitable size of bus bar and MS cover, covering the MCCB's/ MCB's interconnections with PVC insulated aluminium solid connection of appropriate size for outgoing and incoming powder coated painting, CC foundation etc as required including supplying and fixing the following mountings. (Essential Feeder pillar)				
A)	Incomer				
	1 No.- 160 amp. 4 pole 25 KA MCCB (Thermo-magnetic release) (lcs=100% lcu) with spreader & Rotary handle with earth leakage module				
	Digital type Voltmeter (0-500 V), with selector switch.				
	Digital type Ammeter (0-200 Amp), with selector switch and one set of 3 nos CT's of ratio 100 / 5A Class I accuracy and 15 VA burden- 1 set				
	3 Nos Phase indication LED lamps.				
	Bus bars				
	200 A four pole Al. Bus bar dully sleeved				
B)	Outgoing				
	1 no 100 A 16 KA TP MCCB				
	6 nos- 63 amp. TP 10 KA MCB				
	2 nos.- 32 amp. DP MCB 10 KA	1.00	Set	96159.00	96159.00
	(STREET LIGHT)				
42	SITC of 06 mtr long GI octagonal pole having bottom dia. 130 mm and top dia 70 mm made out of 3 mm thick GI Sheet having base plate of size 220 mm x 200 mm x 12 mm, with single arm bracket of size 1 mtr. long having top dia 70 mm for mounting on the pole top, foundation bolts of suitable length, connection with 1.5 sq mm FRLS copper conductor single core cable from MCB in junction box to fitting, sleek junction box with 4 nos. 16 sq	20.00	nos.	13491.00	269820.00

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	mm stud type connector, one No. 6 Amp SP MCB and having hinged cover with locking arrangement etc. including position Reinforced cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) pole foundation of size 400 mm x 400 mm x 1100 mm depth etc., i/c excavation, surface finishing (plastering & painting) etc. complete as required.				
43	Supplying, Installations, Testing & Commissioning of all in one Hybrid Type Integral LED Solar Street Light having following minimum specification System lumen output ≥ 8500 lumens, system luminous efficacy ≥ 175 Lm/W, inbuilt Mono Crystalline Solar Panel-75 Wp, Lithium Ferro Phosphate battery-25.6 V 12 AH, MPPT charge controller, inbuilt PIR Sensor based dimming profile with motion detection, auto dusk and dawn sensing, made out of extruded aluminum housing IP 65 & IK 08 (For lens) Protection, AC input: 150-270 V AC, Inbuilt surge protection: 10 KV, 50 K burnings hrs. Automatic Power Management. Should have flexible angle of mounting LED's Load for optimum of autonomy uses up to 24 hrs. System should have Smart self-diagnostic feature for indicating battery charging, cut off & fault if any i/c all accessories connection, complete etc. as required.	20.00	nos.	62193.00	1243860.00
44	SITC of 16 mtr High mast shaft of approved make with rising system hot dip galvanized inside & out side dip, heaving pole sheet thickness 3 & 4 mm. Top dia minimum 150 mm, Bottom dia 360 mm base plate 25 mm thick suitable for wind velocity as per IS 875 part 3 & having no circumferential weld, with accessories for high mast such as head frame suitable for 6 to 12 luminaries & its control gear boxes 1.5 HP power tool motor, 3 point suspension system with steel wire rope 6 mm dia, double drum winch, including making suitable foundation as per manufacture drawing/ site regiment along with foundation bolts nuts, washers, anchor plates etc complete in all respect.				
	Supply & fixing of Twin Aviation Light LED Type on top of pole.	1.00	nos.	338673.00	338673.00

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45	Supplying, Installation, Testing & Commissioning of Flood Light, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement with Driver efficiency >85%, Input voltage: Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 deg C to 50 deg C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000-3-2, P. F.≥0.95, IP-66,IK-10, CRI>70, under voltage and over voltage protection, EMI-EMC as per CISPR-15, lenses for beam angle 30 deg-120deg as per the application and the project requirement., suitable tilt able fitting, 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) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard 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 >135lm/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).				
b)	200 Watt.	12.00	nos.	5504.00	66048.00
46	Fabrication, supply, installation testing & commissioning of compartment based cubical outdoor type Highmast cum street light panel made out of 2.0 mm CRCA steel Sheet having 4 strip tinned copper busbar of suitable length, copper earth bar, cable alley with 3mm thick gland plate at the bottom and suitable size to accomodate the following switch Gears, MCCBs Connections/ interconnections, earthing, numbering, painting, control wiring etc. as required making C.C foundation for				

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	erection i/c MS base frame and 500 mm long 40 x 40 x 05 angle iron legs complete as reqd.				
	Incoming :-				
	1 No.- 100 amp. 4 pole 16 KA MCCB (Thermo-magnetic release) (lcs=100% lcu) with spreader & Rotary handle with earth leakage module				
	Time Switch with Bypass (single Dial) - 1 no.				
	Fuse/MCB Terminal - 1no.				
	0.5 A Glass Fuse/MCB - 1no.				
	Neutral Link, 16/32A - 1no.				
	OUTGOING :				
	63 Amp TP MCB C-curve -1 no.				
	Power Contactor 40 A 3P 220V AC - 1 no.				
	Power Contactor 9A 3P 220V AC - 2 no.				
	Auxiliary Contact 2 NC - 3 no.				
	Time Switch - 1 no.				
	Red Push Button, Ø22.5mm - 2 no.				
	NO Push Button Elements - 2 no.				
	Toggle switch Auto-Off-Manual - 1 no.				
	Control MCB 6A 10kA C-curve - 1 no.				
	Neutral Link, 16/32A - 1no.				
	10 nos. SP MCB-16 A	1.00	set	41750.00	41750.00
47	Supplying and making straight through joint with heat shrinkable kit including ferrules and other jointing materials for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
a)	3½ X 120 sq. mm	1.00	each	4866.00	4866.00
	LIGHTNING CONDUCTOR				
48	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.	4.00	set	8351.00	33404.00
49	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.	10.00	Each	609.00	6090.00
50	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)	200.00	mtr	148.00	29600.00

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51	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)	50.00	mtr	238.00	11900.00
	Split type Airconditioner				
52	Supply, Installation, Testing and Commissioning of Air Cooled HI Wall split type Air conditioners complete with Indoor unit (IDU), Out door unit (ODU), surface / concealed copper Refrigerant piping with insulation (closed cell elastomeric nitrile rubber tubular pipe section) upto 3 Mtr (IDU to ODU), copper power cable upto 3.5 Mtr (IDU to ODU) i/c drain pipe R-32/R-410/ R-407 Green Refrigerant, wireless Remote control, suitable for working between 180-260V with low & high voltage cut off and 50 hz ,1 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll /rotary compressor. The system shall be able to deliver 100% of the rated capacity upto 42 Degree Celsius. Min 5 year Original Equipment Manufacturer (OEM) warranty both compressor and Printed Circuit Board (PCB). Must comply : Electrical cable IS694 or IS 9968 temperature sensing control IS/ International Electro technical Commission (IEC) 60730, hermetic compressor IS 10617, heat exchanger IS 11329, capacitor IS 2993 and motor IS 12615. Complete as per CPWD specification and IS :1391 Part II 2023. The system shall be able to operate up to 50 Degree C (out door ambient temperature).				
A)	1.5 TR with 5 Star BEE Rating	1.00	nos.	43539.00	43539.00
B)	2.0 TR with 5 Star BEE Rating	4.00	nos.	57396.00	229584.00
53	SITC of self contained complete Drinking water cooler with inbuilt RO system having following minimum specification body made out of SS 204 outerbody material & storage tank made out of SS 304 material with Energy Efficient Compressor with prefilled of R-134a refrigerant gas i/c copper condenser tube and interconnections with 50 LPH R.O purifier with required filters, RO pump and membrane etc. suitable for operation on single phase, 50 Hz, 230 V AC Supply. Nominal Cooling Capacity Minimum: 60 Ltr/ Hr., Storage Capacity: 80 Ltrs. i/c water &	2.00	set	132795.00	265590.00

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	Electrical connection with required accessories etc complete with one year on site warranty. The product should be ISI mark.				
	Part C-2 (Fire Alarm System)				
	INTELLIGENT FIRE ALARM SYSTEM				
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 ± 5% V, 50 hz), 48 hrs back-up with 24 volt sealed maintenance free batteries with automatic charger. The panel shall have facility to connect printer to printout log and facility to have seamless integration with analog/digital voice evacuation system (which is part of the schedule of work under SH: PA System) and shall be complete with all accessories. The panel shall be compatible for IBMS system with open protocol BACnet/ Modbus over IP complete as per specifications.				
a)	Two Loop Panel.	1.00	Each	250420	250420.00
2-	Supplying, installation, testing & commissioning of intelligent analog addressable photothermal detector complete with mounting base complete as required.	30.00	Each	3004	90120.00
3-	Supplying, installation, testing & commissioning of intelligent addressable thermal detector with rate of rise cum fixed temperature thermistor complete with base as required.	30.00	Each	2866	85980.00
4-	Supplying, installation, testing & commissioning of addressable manual call point complete as required.	6.00	Each	4063	24378.00
5-	Supplying, installation, testing & commissioning of addressable horn cum strobe complete as required.	6.00	Each	3682	22092.00
6	Supplying, installation, testing & commissioning of response indicator on surface/recessed MS Box having two LED, metallic cover complete with all connections	30.00	Each	306	9180.00

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	etc as required.				
7	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.	300.00	mtr	386	115800.00
	C-3 (Fire Fighting System.)				
1	Supplying, installation, testing and commissioning of electric driven terrace pump suitable for automatic operation and consisting of following, complete in all respects, as required: (Terrace Pump).				
a)	Horizontal type, multistage, centrifugal, split casing pump of cast iron body& bronze impeller with stainless steel shaft, mechanical confirming to IS : 1520				
b)	Suitable HP squirell cage induction motor TEFC type suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply with IP55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-325. The efficiency class of motor shall be minimum IE4.				
c)	M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required.				
d)	Suitable cement concrete foundation duly plastered and with anti vibration pads.				
(i)	450 lpm at 35 m Head	2.00	Set	91384	182768.00
2	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.				
a)	20 mm nominal internal dia water hose thermoplastic (Textile reinforced) type -2 as per IS: 12585				
b)	20 mm nominal internal dia gun metal globe valve & nozzle.				
c)	Drum and brackets for fixing the equipments on wall.				
d)	Connections from riser with 25 mm dia stop gun metal valve & M.S. Pipe and socket.				
e)	40 m	3.00	Set	11086.00	33258.00

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3	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)	80 mm dia.	20.00	Mtr	2277.00	45540.00
b)	100 mm dia.	50.00	Mtr.	3077.00	153850.00
4	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.	4.00	Set	5406.00	21624.00
5	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.	2.00	Set	8255.00	16510.00
6	Providing and fixing in position industrial type pressure gauges with gun metal / brass valves complete etc. as required.	2.00	Each	1491.00	2982.00
7	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	2.00	Each	1670.00	3340.00
8	Supplying and fixing single headed internal hydrant valve with instantaneous Stainless Steel coupling of 63 mm dia with cast iron wheel ISI marked conforming to IS 5290 (Type -A) with blank Stainless Steel cap and chain as required				
(a)	Single headed Stainless steel	2.00	set	6632.00	13264.00
9	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)	80 mm dia	2.00	set	5117.00	10234.00
10	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 :				

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a)	2 Way-100 mm dia M.S. pipe.	1.00	Set	7262.00	7262.00
11	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.	1.00	Set	19402.00	19402.00
12	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).	4.00	Set	4667.00	18668.00
13	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).	2.00	Each	3402.00	6804.00
14	Fabrication, Supply, Installation, Testing and commissioning of floor/wall mounted suitable for outdoor installation with IP 54 protection compartmentalized with hinged lockable doors cubical electrical control panel having minimum front surface area 0.60 sqmtr of suitable size fabricated from CRCA sheet of 2 mm thick, dust and vermin proof, power coated of approved shade after chemically treated with seven tank process, cable alley, suitable for operation on 3 phase 415 volt 50 Hz AC supply i/c providing and fixing following switch gear to be mounted on complete with gaskets, interconnections and earthing etc. as required.				
	SYSTEM CONTROLLER Designing, Supply, Installation, Testing and commissioning of system controller to control operation of Terrace pump as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification				
a)	63 Amp TP MCB 10 KA-, 1 no.				
b)	100 A rating 4 strip tinned copper sleeved bus bar - 1 set				

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c)	1 set - multifunction digital meter to read V, Amp, KW, KWH with 3 nos. Suitably rated CT's class 1.0 accuracy and 15 VA burden.				
d)	3 Nos. Phase indication LED lamps with 2Amp back up MCB.				
e)	Suitable star-delta starter for 15 HP pump with suitable capacity contactors, over load protection relay, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation of above terrace pump.				
f)	Selector switch for local/remote, auto/manual/off operation, push buttons for ON/OFF, LED type ON/OFF indication lamps- 1 Sets				
g)	Digital ammeter with selector switch and suitable CT's - 1 Sets	2.00	set	47517.00	95034.00
15	Supplying and fixing of ABC Powder type 6 Kg Fire Extinguisher (Red) duly ISI marked conforming to IS:15683:2018, with IS 4308, ISI marked ABC powder complete with squeeze grip release valve, discharge pipe, locking arrangement, pressure gauge, operation manual i/c fixing with bracket on the wall etc. as reqd.	20.00	nos.	1944.00	38880.00
16	Supplying and fixing of ISI marked CO2 type Fire Extinguisher of 4.5 Kg capacity made from brand new seamless drawn steel cylinder confirming to IS 15683, fitted with wheel valve, 1 Meter long discharge hose, horn complete with initial gas charged with carrying with carrying handle and wall mounted bracket etc. complete as required.	20.00	nos.	4823.00	96460.00
Total Rs.					12045216.00

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