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MMTCL
LIMITED

भारत सरकार का उपक्रम
A GOVT. OF INDIA ENTERPRISE

touching lives, adding value

Regional Office
NIC Building , 4th Floor
8, India Exchange Place
Kolkata – 700 001

**E-TENDER FOR REFURBISHING, ELECTRICAL, FIRE
FIGHTING AND AIR-CONDITION WORK
OF
REGIONAL OFFICE
AT
NIC BUILDING, 4TH FLOOR, 8, INDIA EXCHANGE PLACE
KOLKATA**

Issued to.....

Date of Sale of Tender from2nd December,2013 to 23rd December,2013

Submission of Tender..... 31st December,2013 at 15:00 hrs.

Pre-bid Meeting26th December,2013 at 15:00 hrs.

Date Of Opening of Technical Bid...31st December, 2013 at 15.30 hrs.

ARCHITECTS

DHAR & ASSOCIATES PVT. LTD.
7, Red Cross Place, 4th Floor, Kolkata 700 001
Dial: 2230 1266 / 2213 1496

MMTC LIMITED
REGIONAL OFFICE
NIC Building, 4th floor,
8, India Exchange Place, Kolkata- 700 001

Notice Inviting e-Tender for Proposed Refurbishing, Electrical, Fire Fighting and Air-condition Work at Regional Office of MMTC Limited, NIC Building, 4th floor, 8, India Exchange Place, Kolkata – 700 001 from reputed and bonafide Contractors.

NIT No. :-

Memo No. :-

Dated:-02.12.13

Sub. :- Proposed Refurbishing, Electrical, Fire Fighting and Air-condition Work at Regional Office of MMTC Limited, NIC Building, 4th floor, 8, India Exchange Place, Kolkata – 700 001.

Sir,

You are hereby invited to submit Technical Proposal including Firm credential and Financial Proposals for the above work. The bid document is available online on MMTC Limited portal <http://www.mmtclimited.gov.in> from 2nd December,2013 to 23rd December,2013 (up to 15:00 hrs). Bid must be submitted online only at <http://www.mmtclimited.gov.in> on or before **31st December,2013** (up to 15:00 hrs IST)..**Pre-bid Meeting ...26th December,2013 at 15:00 hrs.**
Instruction to applicants regarding E-Tendering process:

- a) The interested applicants can download the Tender documents from e-tendering Portal of the MMTC Limited.
- b) The applicants have to submit their Bids including scanned copy Bid Security online in electronic format with Digital Signature.
- c) No proposal will be accepted in physical form except Bid Security. The applicants have to submit their Bid Security in hard copy (Original) also on or before 15:00 hrs. on 24th December,2013 at the Office of The Chief General Manager, MMTC Limited, Regional Office, NIC Building, 4th floor, 8, India Exchange Place, Kolkata 700 001. If the office happens to closed on the last date of submission of Bid Security in hard copy as specified, the Bid Security will be received on the next Working day at the Office mentioned above. In case the Bid Security is not received within specified time, the Bid shall be considered non responsive and shall not be downloaded/evaluated. Bids shall be strictly treated as non-responsive if Bid is not accompanied by an acceptable Bid Security.
- d) Before submission of online bids, applicants must ensure that scanned copy of all the necessary documents have been attached with Bid.
- e) MMTC Limited shall not be responsible for delay in online submission due to any reason whatsoever.
- f) All documents/papers uploaded/submitted by the bidders must be legible.

The following are the important dates for award of the above Consultancy work:

Sl.No.	Event Description	Date
1	Last Date for receiving queries / Clarifications	24th December,2013 (15:00 Hrs.)
2	Pre-Proposal Conference (Pre-Bid meet)	26th December,2013 (15:00 hrs.)
3	Authority response to queries	26 th December, 2013
4	Proposal Due Date (PDD)	31 st December,2013(15:00 hrs.)
5	Opening of Proposal	31 st December, 2013 (15:30 hrs.)

E- TENDERING INSTRUCTION TO APPLICANTS

- i) It is mandatory for all the applicants to have Class Digital Signature Certificate (in name of the person who will sign the Tender) from any of the licensed Certifying Agency (Applicants can see the list of the licensed CA's from the link <http://www.mmtclimited.gov.in> to participate in e-tendering of MMTC Limited.
- ii) To participate in the e-tendering submission, it is mandatory for the applicants to get registered their firm with e-tendering portal of MMTC <http://www.mmtclimited.gov.in> have user ID & Password which has to be obtained by submitting an annual registration charges of INR/- (Inclusive of all taxes) to M/s through e-payments gateway of Bank using Credit Card / Debit Card (Master Card and Visa Card only) or Net Banking. Validity of Online Registration is 1 year.
- iii) The complete Tender documents can be viewed / downloaded free of cost from MMTC Limited portal <http://www.mmtclimited.gov.in> from 2nd December,2013 to 23rd December,2013 (upto 15:00 Hrs. IST).
- iv) To participate in e-tender, applicants have to pay INR Rs. 5,000/- (Rs. Five Thousand only) towards application processing fee (non-refundable) to M/s against tender processing fee through e-payment gateway of using Credit Card/Debit Card and Visa Card only.
- v) E-Tender can be requested from e-tender portal of MMTC Limited <http://www.mmtclimited.gov.in> from 2nd December,2013 to 23rd December,2013 (upto 15:00 Hrs IST).

Following may be noted:

- a) Registration should be valid at least upto one month after the date of submission of Tender.
- b) E-Tender can be submitted only during the validity of their registration.
- c) The amendments / clarifications to the E-Tender documents, if any, will be hosted on the MMTC Limited portal <http://www.mmtclimited.gov.in>.
- d) If the contractor's firm is already registered with e-tendering portal of MMTC Limited and validity of registration is not expired the firm is not required to get fresh registration.

The Chief General Manager
MMTC Ltd.
Regional Office
NIC Building, (4th floor)
8, India Exchange Place
Kolkata -700 001
E-mail - <http://www.mmtclimited.gov.in>

Memo No:

Dated: 02.12.2013

Copy forwarded for information & circulation to :

- 1.
- 2.
- 3.

The Chief General Manager
MMTC Ltd.
Regional Office
NIC Building, (4th floor),8, India Exchange Place
Kolkata -700 001
E-mail - <http://www.mmtclimited.gov.in>

MMTC LTD.

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M M T C LTD.
TENDER NOTICE

E-tenders are invited from reputed and bonafide contractors for Furnishing,Electrical and Air-condition Works of MMTC Limited Regional Office at NIC Building, 4th floor, 8, India Exchange Place, Kolkata- 700 001, in two bids viz. Technical Bid & Financial Bid.

- a) **Name of Work** : **Furnishing, Electrical, Fire Fighting and Air-condition Work of Regional Office, MMTC Limited.**
- b) **Address** : **NIC Building, 4th floor, 8, India Exchange Place, Kolkata 700 001.**
- c) **Estimated Cost** : **Rs. 1.26 Crores**
- d) **Earnest Money Deposit** : **Rs. 1,26,000/- (One lakh twenty six Thousand Only)** by way of Demand Draft / PO in favour of MMTC Limited payable at Kolkata.
- e) **Time of Completion** : **3 months**

Pre- qualification documents as per item no. 2 of index and other contract documents consisting of items 3 to 11 of index will be the part of Technical Bid and Schedule of work / BOQ as per items no. 12 of index will be part of Financial Bid.

1. E-Tenders are being called in two bid system. The eligible Criteria for participation in the tender process for this project will be as under –
 - a) Average Financial Turnover during the last 3 years, ending 31st March 2013 should at least 50% of Estimated cost.
 - b) Experience of having successfully completed Interior, Furnishing, Electrical Testing and Commissioning, Fire Fighting and Air-condition Works of Office Building during last 7 years ending 31st December 2013 shall be as per the following :

(Rs. In lakhs)

Works	Furnishing
3 Similar Completed Works	40%
2 Similar Completed Works	50%
1 Similar Completed Works	80%

2. The Contractors / Firms are required to submit Job Completion Certificate from Govt. / Public Sector Undertakings; Those who have executed work in Private Sector, they should submit certificate of the employer having executed similar works along with TDS Certificate.
3. Technical Bid & Bill in Quantities / Financial Bid duly filled in, signed and stamped by the tenderer to be submitted giving the details of Company Profile, Audited Balance Sheet for last 3 years, proof of submission of Income Tax Returns, Banker's Solvency Certificate, PAN No., VAT No., P.Tax No., Trade Licence, Service Tax No., PF, ESI, work experience having Interior Decoration and Electrical Work of Nationalised Bank/PSU/ Corporate Sector/ IT during last 15 years may be submitted at <http://www.mmtclimited.gov.in> on or before **31st December,2013** (up to 15:00 hrs IST).
4. It Should definitely be understood that MMTC Limited does not accept any responsibility for the correctness or completeness of this schedule and this schedule is liable to alteration by the authorised representative of MMTC Limited.

5. The interested candidate can be download from MMTC Limited portal <http://www.mmtclimited.gov.in> from 2nd December,2013 to 23rd December,2013 (up to 15:00 hrs).
6. Furnishing, Electrical, Fire Fighting And Air-Condition Work will be in accordance with the drawing & explanation in BOQ. The rates quoted in the tender shall be for finished work at site and shall include all charges for VAT & other taxes applicable, **only Service Tax will be paid separately against proof of submission of S/Tax.**
7. The tenderer is advised to visit and inspect the site of work before tendering and get himself acquainted regarding availability of materials and labour and other local condition. The work shall be completed within **3 months** time from the date of handing over of the site. No extension of the time shall be granted without any valid reason.
8. The tenderer shall keep the tender open for acceptance for at least 3 months (90 days) from the date of opening of Technical Bid. MMTC Limited reserves the right either to accept or reject any or all tenders received without assigning any reason whatsoever for the same. The tenderer will be duly informed of the result by post within 3 months from the date of receipt of the tenders.
9. Earnest money amounting to **Rs. 1,26,000/- (Rupees One Lakh twenty six Thousand only)** in the form of Demand Draft in favour of MMTC Limited payable at Kolkata or in the form of CDR must accompany each Technical Bid of tender and each tender is to be in a sealed cover, superscribed "Bid Security / Earnest Money" for Furnishing, Electrical, Fire Fighting and Air-condition Work of MMTC Limited, Regional Office, at NIC Building, 4th floor, 8, India Exchange Place, Kolkata 700 001 before 15:00.hrs. **on 31st December, 2013. The scan copy of the Earnest Money should be submit with e-tender documents.**
10. Interested Applicants / Firms may also attend **Pre-bid meeting** which is schedule to be held at the office of The Chief General Manager, MMTC Limited, Regional Office, NIC Building, 4th floor, 8, India Exchange Place, Kolkata 700 001 **on 26th December, 2013 at 15:00 hrs.**
11. The "**E-Technical Bid**" shall be opened at Regional Office, NIC Building, 4th floor, 8, India Exchange Place, Kolkata 700 001 **at 15:30 hours on 31st December,2013** in presence of the tenderers or their authorized representative.
12. The "**E-Financial Bid**" only of the eligible contractors who satisfy pre-qualification criteria will be opened on a separate date and time to be intimated to the successful tenderers. Financial Bid of other Tenderers who failed to quality to be returned unopened.
13. The tenderer whose tender is accepted will be required to sign an agreement for due fulfillment of contract within 7 days of acceptance of tender.
14. Successful tenderer is required to deposit 2% of the accepted value of his tender less earnest money deposit within 7 days. Alternately, a Bank guarantee of like amount valid for 6 (Six) months from a schedule Bank may be furnished which will form initial security deposit for the work.

Date: 02.12.13

CHIEF GENERAL MANAGER
MMTC Ltd.

MMTC LIMITED

REGIONAL OFFICE

NIC BUILDING, 4TH FLOOR, 8, INDIA EXCHANGE PLACE: KOLKATA- 700 001

S. No.....

TECHNICAL BID FORMAT FOR E- TENDER

N.B.-(SOFT COPY SHOULD BE DOWNLOADED FROM E- TENDER PORTAL OF MMTC LIMITED)

Name of the Bidder _____

Last date for submission:

Application in duplicate
To be addressed to _____

Type of Contract:

I/We have read and understood the instructions contained in advertisement appeared in.....dated....., in the web site and in the application form. I/We do hereby declare that the information furnished in the application and in the supplementary sheets from pagesto.....are correct to the best of my/our knowledge and belief.

Signature (digital)_____

Name_____

Designation_____

Address_____

Place:

Date:

Seal of Applicant:

1. Name of the Organisation :
2. Address :
3. Year of Establishment :
4. Status of the firm :
(whether Company/Firm/Proprietary)
5. Name of Directors/Partners/Proprietor:
i)
ii)
iii)
(Enclose relevant document/deed)
6. Whether registered with the Registrar :
of Companies/Registrar of Firms. If
so, mention number and date along with

relevant documents.

7. a) Name and address of Bankers :
 - i) ii)
 - iii) iv)b) Whether able to furnish performance guarantee for full cost of work if entrusted :
8. Whether registered for sale tax/VAT purposes. :
If so, mention No. and date. Also Furnish Copies of sales tax/VAT Clearance Certificate.
9. Whether an assessee of Income Tax. If :
so, mention permanent account number.
Furnish copies of Income Tax Clearance Certificate.
10. Furnish copies of audited Balance Sheet :
and Profit & Loss Account (audited)
for the last three years.
11. If you are registered in the panel of :
other organizations/statutory bodies,
such as CPWD, PWD, MES, Banks etc.
furnish their names, category and date
of registration.
 - i) iv)
 - ii) v)
 - iii) vii)
12. What are your fields of activities? Mention
The fields on preference basis.
 - i) ii)
 - iii) iv)
 - v) vi)
13. Submission of valid Bank Solvency Certificate by the Tenderer.
14. i) Detailed description and value of :
works done for others in the past.(Supported with copies
of relevant documents)
ii) Detailed description and value of :
works done for the Bank.
(Supported with copies of relevant documents)
15. Specify the maximum value of work :
executed in a year.
(Supported with copies of relevant documents)
16. Furnish the names of three responsible
persons in Bank's, CPWD, PWD, MES etc
who will be in a position to certify about the
quality as well as past performance of your organization.
 - i)
 - ii)
 - iii)

NOTE: Where copies are required to be furnished, these are to be certified copies preferably by the concerned agencies or a Govt. Officer.

**PARTICULARS IN RESPECT OF INTERIOR FURNISHING, ELECTRICAL, FIRE FIGHTING
AND AIR-CONDITION WORKS FOR OFFICE EXECUTED
(Separate sheet detailing the works to be enclosed)**

Sl. No.	Name of work/ Project with address	Short description of work executed	Name & address of owner	Value of work executed	Stipulated time of completion	Actual time Of completion	Name & address of Architect/ Consulting Engineer
1	2	3	4	5	6	7	8

KEY PERSONNEL PERMANENTLY EMPLOYED

Sl. No.	Name	Designation	Qualification	Experience	Years with the Firm	Any Other
1	2	3	4	5	6	7

OTHER RELEVANT INFORMATION

WORK FORCE

Permanently Employed -----	No. ----	Any Other -----	Years with the Firm -----
a) Masons			
b) Carpenters			
c) Mechanics			
d) Electricians			
e) Mate/Helpers			
f) Others			

Workshop Facilities

Location -----	Land Area -----	Type of Structure -----	Type of Facilities -----
a)			
b)			

List of major Interior equipment in possession of the firm

Note: Please attach copy of proof for all the items mentioned in the application

Signature of the applicant with seal

FORM OF E-TENDER
N.B.-(SOFT COPY SHOULD BE UPLOADED FROM E-TENDER PORTAL OF MPMC LIMITED)

The Chief General Manager
MPMC Ltd.
Regional Office
NIC Building, (4th floor)
8, India Exchange Place
Kolkata -700 001

Dear Sir,

I/We, the undersigned having carefully gone through and clearly understood the specifications, with conditions of contract for the above mentioned work, do hereby tender to execute and complete the whole of the works strictly in accordance with the said specifications, etc. at the rates set out in the priced bill of quantities.

I/We am/are sending you herewith 1% of Quoted amount as Earnest Money by demand draft which amount is not to bear any interest and I/We do hereby agree that the same may be forfeited by you in the event of your accepting my/our tender and if I/We fail to execute the contract when called upon to do so.

It is understood that the lowest or any tender will not necessarily be accepted and Company reserves the right to accept or reject any or all the tenders and that Company is not bound to assign any reason for the same.

I/We agree to keep our offer open for a period of 90 days from the date of opening of tenders.

Thanking you,

Yours faithfully,

Date:

Place:

(Signature of the Contractor with seal)

FORM OF AGREEMENT

(Not to be filled up at the time of submission of e-Tender)

Stamped Paper of Appropriate Value

N.B.-(SOFT COPY SHOULD BE DOWNLOADED FROM E- TENDER PORTAL OF MMTc LIMITED)

This Agreement entered into on this the _____ day of _____ Two Thousand and Thirteen
(_____/_____/2013) at _____

Between MMTc Limited., a body constituted under the Companies Act, 1963, having its Corporate Office at Core-1, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi – 110 003.

(hereafter referred to as **“the Company”** which expression shall mean and include, wherever the context so requires or admits, its assigns, nominees, successors-in-interest and administrators)

And a contractor having office at (Address) (hereafter referred to as **“the Contractor”** which expression shall mean and include, wherever the context so requires or admits, its successors-in-interest, administrators and executors).

WITNESSES AS FOLLOWS:

- I. WHEREAS the company is a Government of India undertaking engaged in the trading business having offices all over the country
- II. WHEREAS the company is desirous of engaging the services of (name of contractor) in respect of (name of work) for consideration to be mutually agreed upon by the parties. Whereas the bank is desirous of appointing (name of contractor) as its Contractor to carry out works specified in Annexure 1 and the Contractor is desirous of being appointed thus

NOW THIS AGREEMENT WITNESSES THAT in consideration of the above and of the covenants of the parties contained herein, the company hereby engages (name of contractor) as its Contractor for performing work, the scope of which is specified in Annexure I, which appointment is hereby accepted by the Contractor, on the mutual terms and conditions contained below:.

ENGAGEMENT

The Company hereby engage the Contractor above named for performing the works specified in annexure I and employing labour to perform the said works in respect of (name of work).

2. DURATION/TENURE OF CONTRACT AGREEMENT

The engagement of the Contractor by the Company under this Agreement shall be for a period of months, certain, commencing from This Agreement shall automatically stand terminated upon expiry thereof unless extended by mutual agreement.

3. FUNCTIONS, DUTIES AND RESPONSIBILITIES OF THE CONTRACTOR

- 3.1 The contractor shall perform all the works specified in Annexure-I to this agreement and may engage contract labour for the said purpose, the minimum number to be specified by the Company.
- 3.2 The contractor shall and hereby agrees and confirms to comply with all the provisions of Labour laws and industrial laws in respect of the labour employed thereof.
- 3.3 The Contractor shall apply for and obtain license as provided for under Section 12 of the Contract Labour (Regulation and Abolition) Act, 1970 whenever it employs 20 or more workmen on any day in a year and also obtain renewal from time to time.
- 3.4 The contractor shall apply for and obtain license as provided under section 12 of contract Labour (Regulation and Abolition) Act, 1970 for each branch or office as a separate unit.
- 3.5 The Contractor shall strictly comply with all the terms and conditions that the licensing authority may impose at the time grant of license and the Company shall not be responsible for the same.
- 3.6 The Contractor shall be solely responsible for the payment of wages, including overtime wages to the workmen and ensure its timely payment thereof.
- 3.7 The Contract shall duly maintain a register giving particulars of the contract labour employed, nature of work, rate of wages, etc.
- 3.8 The Contractor shall also ensure the compliance of the following labour legislations:
 - (i) Minimum Wages Act, 1984;
 - (ii) Employees Provident Fund;
 - (iii) Employees State Insurance Act, 1948
 - (iv) Workmen’s compensation Act, if the ESI Act does not apply.

3.9 The contractor shall obtain an independent code number under the Employees State Insurance Act, 1948 and the Employees Provident Fund.

- 3.10 The Contractor shall ensure that the compliance with the provisions of the Contract Labour (Regulation and Abolition) Act 1970 and other labour legislations is current and up to date at all times during the performance of the works specified in Annexure I.
- 3.11 The Contractor shall be solely responsible to adhere to all the rules and regulations relating to labour practices and service conditions of its workmen and at no time it shall be the responsibility of the Company.
- 3.12 The Contractor or its workmen shall not at any point of time have any claim whatsoever against the Company.
- 3.13 The Contractor shall indemnify the Company in so far as liability incurred by the Company on account of any default by the contractor.
- 3.14 Neither the Contractor nor his workmen can be treated as employees of the Company for any purposes. They are not entitled for any claim, right, preference etc over any job/regular employment of the Company.
- 3.15 If the contractor fails to discharge his duties or neglects to perform the work agreed to be done under the agreement, the Company is entitled to terminate this agreement as per Clause 6 and get the work done by/through others and claim reimbursement of actual expenses incurred and also damages for the loss incurred on account of failure on the part of the contractor to discharge the duties or to perform the work under the agreement.

4. REMUNERATION

- 4.1 The Company shall pay the Contractor, remuneration for services rendered under the provisions of this Agreement. Provided however, that such remuneration shall be payable only if the Contractor has duly performed all its obligations and covenants under this Agreement and has discharged all its functions and responsibilities to the satisfaction of the Company.
- 4.2 The rate of remuneration payable by the Company shall be mutually agreed between the Company and the Contractor from time to time, in writing, which shall be read as part and parcel of this Agreement;
- 4.3 The remuneration payable shall be subject to deduction of tax at source.

5. MISCELLANEOUS

- 5.1 The Contractor shall not assign, delegate, transfer etc., any of their right/s and/or obligation/s under this Agreement to any third person/s, concern/s, firm/s, company/ies or entity/ies;
- 5.2 The Contractor shall at all times during this Agreement and thereafter, indemnify and keep indemnified MMTC Limited, its officers, employees and representatives, from all or any claims, losses, demands, damages, etc, which the Company, its officers, employees and representatives may or are likely to suffer by reason of acts, defaults, deeds, things, omissions and commissions committed by the Contractor, while performing the conditions of this Agreement;
- 5.3 Any amendment and/or modifications to this Agreement shall be valid and binding on either party, only if such amendment/modification is mutually agreed to in writing and executed by both parties;
- 5.4 If any provision contained herein is held unlawful, becomes incapable of performance by either Party, is rendered void or unenforceable for any reason, that provision shall be severed from this Agreement and the other provisions shall continue to be valid and performed, as if the severed provision was never a part of this Agreement.

6. TERMINATION

If the Contractor, in the opinion of the Company, fails or neglects to fulfill any or all terms and conditions of the Agreement, the Company shall be entitled to terminate this Agreement, without assigning any reason, by a written notice of thirty (30) days to the Contractor and the Contractor shall not have any right to claim any damage/compensation from the Company for the same.

7. NOTICES

All notices required to be given under this Agreement shall be deemed to be sufficiently given if they are forwarded by registered post A.D./hand delivery with acknowledgement to:

MMTC Ltd., Regional Office,
NIC Building, 4th floor
8, India Exchange Place
Kolkata – 700 001.

The contractor at:

.....

.....

.....

8. GOVERNING LAW AND JURISDICTION

This Agreement shall be construed and interpreted in accordance with the laws of India. The Courts in Kolkata City alone, to the exclusion of all other courts elsewhere in India, shall have jurisdiction to try any dispute arising out of this Agreement.

9. DISPUTE RESOLUTION

In case any dispute/s or difference/s arises between the Parties in connection with any matter relating to this Agreement including termination thereof then at the option of the Company the same shall be referred to Arbitration by a sole Arbitrator appointed by the Company. The decision of the sole arbitrator shall be final and binding on the Parties. The provisions of the Arbitration and Conciliation Act, 1996 and amendments, if any, thereto shall be applicable to such arbitration. The place of Arbitration shall be Kolkata and the language of arbitration shall be in English.

10. The original of this agreement shall be with the Company and the signed duplicate or Photocopy of The agreement shall be handed over to the Contractor.

IN WITNESS WHEREOF THE PARTIES ABOVENAMED HAVE EXECUTED THESE PRESENTS ON THE DAY, DATE, MONTH AND YEAR WRITTEN HEREINABOVE IN THE PRESENCE OF THE WITNESSES ATTESTING HEREUNDER:

<u>WITNESSES:</u> 1.	For MMTC Limited
2.	For Contractors

(Signature of the Contractor with seal)

INSTRUCTIONS FOR TENDERING

1. The intending tenders are requested to see the site of works and get themselves thoroughly acquainted with local conditions and all factors, which may affect their rates.
2. Any clarification required on the tender documents / drawings may be obtained from the office of the Architects. It may be noted that no drawings shall be issued to the tenderer / s along with tender documents.
3. The tenderer shall complete the annexed form of tender, schedule of quantities with the whole of the price and information called for therein and shall sign and date each of the documents in the space provided for the purpose who signs the tender and also sign bear the stamp of the tenderer. A tenderer is to quote in English figures as well as words his rates against each item as entered in the 'Schedule of Quantities'.
4. The Architect M/S. DHAR & ASSOCIATES PVT,LTD. 7, Red Cross Place (4th floor) Kolkata—700 001 reserves the right to adjust arithmetical or other errors in any tender in the way which he considers suitable. Any adjustment to make by the Architect shall be stated to the tenderer if the employer shall make an offer to accept the tender does not bind himself to accept the lowest or any tender.
5. The Employer does not bind himself to accept the lowest or any tender.
6. No tender will be considered which is not accompanied by earnest money and tender cost which is lodged on the understanding that in the event of the tenderer withdrawing his tender before the expiry of 90 days from the date fixed for receiving the tenders, the tender will be canceled and the earnest money forfeited to the Company and on the understanding also that if the tender is accepted the Security Deposit of balance 1% of the tendered amount would be furnished by the tenders within 7 days. The Earnest Money Deposit of unsuccessful tenderers will be returned without interest after decision is taken in respect of awarding the work. The Earnest Money deposited by the successful tenderer will be adjusted towards Initial Security Deposit. The Earnest Money will not bear any interest.
7. No tender will be considered unless the tender documents are fully and completely filled in all information that may be ask from a tenderer must be an equivalently finished. Any tender which is incomplete or does not comply with the prescribed conditions on stipulation counter to these laid down therein or in other tender documents will be liable to rejection at the time of opening or during subsequent scrutiny.
8. Any tender which is incomplete or does not comply with the prescribed conditions on stipulation counter to these laid down therein or in other tender documents will be liable to rejection at the time of opening or during subsequent scrutiny
9. Canvassing in connection with the tender is strictly prohibited and a tender who resorts to same render the tender deposited by such party liable to rejection.
10. Value of work tendered for may be increased or decreased at the discretion of the Company (+/- 25%) in which case all the other terms and conditions of contract shall remain unaffected by such alteration.
11. The tender will be opened publicly by the Company receiving tender or by his authorized representative just after the closing time of the tender in presence of such tenderers or their authorized representative who may chose to remain present. If any tenderer or their representative fail to attend during opening of tender as mentioned above the tenders will be opened in their absence and no subsequent objection will be entertained on this ground of the absence of any tenderer under any circumstances.
12. Mode of Submission of E-Tender : (Ref. Annexure-X of the Page no. 3 of the Tender Documents).
13. Opening of E-Tender : (Ref. Annexure-X of the Page no. 3 of the Tender Documents).

(Signature of the Contractor with seal)

TENDER CONDITIONS

1.0 Notice of Invitation to Tender and Salient Conditions of Tender :

1.1 Location and description of work

1.1.1 Item rate e- tender are invited for Proposed Furnishing,Electrical,Fire Fighting And Air-condition Works of Regional Office of MMTC Limited.

1.1.2 The site is located at NIC Building, 4th floor, 8, India Exchange Place, Kolkata.

1.1.3 E-Tenders shall be submitted with their bid to the Portal of MMTC Limited.

1.2 Time Limit

1.2.1 Time is the essence of this contract and the works covered in this contract are required to be completed in all respects within the period stipulated of **Three (3) months**. The period shall be from the date indicated in order to commence work as mentioned in the Appendix to the Tender condition.

1.3 Opening of Tender

The tenders will be opened by The Chief General Manager or his authorised representative at the MMTC Limited Regional Office, Kolkata, NIC Building, 4th Floor, 8, India Exchange Place, Kolkata 700 001.

1.4 Form on which the tender is to be drawn

The tender shall be drawn only on the form furnished with these tender documents and duly signed. Tenders shall be required to be complete in all respects as indicated.

1.5 Procedure for submitting tenders

The Tender shall be in 2(Two) bid (Technical Bid & Financial Bid)

1.5.1 The **Technical Bid** in soft copy consist of list of documents as per the following N.I.T Clause and hard copy be submitted in physical form alongwith all specified documents on or before due date and time:

a. The Firm should have at least 15 years experience in the field of similar works. It should have experience of executing project in Govt. sector/PSU /Banks

b., Experience of having successfully completed following works during last 7 years.

- 3 similar completed works costing not less than 40% of the estimated cost OR
- 2 similar completed works costing not less than 50% of the estimated cost OR
- 1 similar completed work costing not less than 80% of the estimated cost.

c.. Contractors having average annual turnover for the last 3 years equal to 30% of the estimated cost certified by the Auditor,

A covering letter from the Tenderer stating the various considerations in his e-tender.

- i) A list of all scan copy of documents accompanying the e-tender.
- ii) E-Tender Document, E-Tender Conditions of Contract, General Conditions of Contract, Special Condition of Contract, Technical Specification ,etc.
- iii) Earnest money deposit as mentioned
- iv) Copy of the PAN no., Professional Tax No,Trade License, Service Tax No.,VAT no.
- v) Copy of Provident Fund Registration particulars, if any.
- vi) Copy of Employees State Insurance Registration. If any
- vii) Power of attorney of authorised signatory of the firm.
- viii) Banker's Solvency Certificate.

1.5.2 The **Financial Bid** should be submitted only in e-mode quoting the rates and amounts against schedule of quantities.

- 1.5.3 The contractor is advised to visit and examine the site of works and its surroundings at his/their own cost and obtain for himself on his own responsibility, all information that may be necessary for preparing the tender and entering into the Contract.
- 1.5.4 The tenderer shall be deemed to have inspected the site and its surroundings beforehand and taken into account all relevant factors pertaining to the site including adequacy of approach roads, stacking grounds, etc. In the preparation of submission of the Tender. No claim will be entertained in respect of any of these matters nor will lack of knowledge or ignorance of conditions be accepted as substantiating any claim.
- 1.5.5 Taxes & Duties
- 1.5.5.1 All rates quoted in the tender shall be deemed to be inclusive of all taxes and duties payable by the tenderer to the Government of Public Body or Local authorities and no additional amount will be paid. The Company will not entertain any claim on this account.
- 1.5.5.2 Income Tax : Income tax will be deducted at source from each bill of the Contractor in accordance with relevant provisions of the Income Tax Act.
- 1.5.5.3 Sales Tax/VAT on works Contracts : Company will not reimburse any sales tax on works contracts, which is distinct from other sales tax elements. The rates quoted shall be deemed to be inclusive of Sales Tax on Works contract and VAT. Works Contract Tax will be deducted from each bill as per rule time to time.
- 1.5.6 All quoted rates shall remain firm until the job is completed to the Architects satisfaction and no escalation will be allowed for any reason whatsoever. Should there be any discrepancy in, or any doubt or obscurity as to the meaning of the tender documents, or as to any responsibility / functions of the supplier, as to the instruction to be observed by him, he must set forth in writing such discrepancy, doubt or obscurity and submit the same to the Architect for clarification, not later than 7 days before the date fixed for receipt of tenders.
- 1.5.7 All pages of the tender documents and documents accompanying the tender shall be initialed at the lower right corner by the Tenderer or his authorised representative whose power of attorney is enclosed with the bid.
- 1.5.8 All corrections or interpolations in the tender shall be attested in ink by the Tenderer or his authorised representative with the date signature. The tender shall not contain any erasures or overwriting. In the event the Tenderer is a partnership firm, each partner must sign the tender separately. Alternatively the General Power of Attorney holder may do so and enclose the same with the bid.
- 1.5.9 **Validity of the tender:** It shall be obligatory for Tenderers to keep their offer / tender valid for a period of 90 (Ninety) days from the due date fixed for the submission of this tender.
- 1.5.10 Rates shall be quoted both in figures and words. In the event of any discrepancy in words and figures, the rates quoted in words shall prevail.
- 1.5.11 **Liability of Rejection of Tender :**
- 1.5.11.1 It shall not be obligatory for the Employer to accept the lowest or any tender.
- 1.5.11.2 Notwithstanding anything to the contrary herein the Employer reserves the right to accept or reject any tender in its original or modified form either in full or in part, and or to annul the tendering process and or to reject all tenders, at any time prior to award of contract without thereby incurring any liability to the affected tenderer or tenders or any obligations to inform the affected tenderer or tenderers of the grounds for the 'Employer's action.
- 1.5.11.3 Any tender that does not fulfill any of the conditions or is incomplete in any way is liable for rejection.
- 1.5.11.4 A tender not accompanied by the PAN no. and annual turnover renders itself liable for rejection.
- 1.5.11.5 If a Tenderer proposes any alteration to the conditions of the Tender or reserves the right to decline to carry out any work included in tender, his tender is liable for rejection.

GENERAL CONDITION OF CONTRACT

1. INTERPRETATION :

In construing these conditions, the specifications, the schedule of quantities, tender and agreement, the following words shall have the meaning herein assigned to them except where the subject or context otherwise requires :

- a) Company: The term “company” shall denote MPMC Limited with their Regional Office at NIC Building, 4th floor, 8, India Exchange Place, Kolkata - 700 001, and any of its Company’s representative authorized on their behalf,
- b) Contractor : The term contractor shall mean (Name and address of the contractor) and his / their heirs, legal representatives, assigns and successors,
- c) Site :The site shall mean the site where the works are to be executed as detailed in the scope of work/ services.
- d) ‘The works’ shall mean the work or works to be executed as detailed in the scope of works/ services.
- e) ‘Act of insolvency’ shall mean any act as such as defined by the Presidency Towns Insolvency Act or in Provincial Insolvency Act or any amending statutes.
- f) ‘The Schedule of quantities’ shall mean the schedule of quantities as specified and forming part of this contract.
- g) ‘Priced schedule of quantities’ shall mean the schedule of quantities duly priced with the accepted quoted rates of the contractor.

2. SCOPE:

The work consists of Proposed Furnishing, Electrical, Fire Fighting and Air-condition Work of Regional Office at NIC Building, 4th floor, 8, India Exchange Place, Kolkata in accordance with the scope/specifications of work and schedule of quantities and as directed by Company’s Architects.

3. TENDERER SHALL VISIT THE SITE :

Intending tenderer shall visit the site and make himself thoroughly acquainted with the local site condition, nature and requirements of the works, facilities of transport condition, effective labour and materials, access and storage for materials and removal of rubbish. The tenderer shall provide in their tender for cost of carriage, freight and other charges as also for any special difficulties including police restriction for transport etc., for proper execution of work. The successful tenderer will not be entitled to any claim of compensation for difficulties faced or losses incurred on account of any site condition which existed before the commencement of the work or which in the opinion of the Company might be deemed to have reasonably been inferred to be so existing before commencement of work.

4. TENDERS :

The entire set of e-tender issued to the tenderer should be submitted fully priced and also Digital signed on the last page together with initials & seal on every page. Initials/ signature will indicate the acceptance of the e-tender by the tenderer.

Signature of the

The schedule of quantities shall be filled in as follows :

- a) The 'Rate' column to be legibly filled in ink in both English figures and English words.
- b) Amount column to be filled in English figures in both, each items and the amount for each sub head as detailed in the 'Schedule of quantities'.
- c) All corrections are to be initialed.
- d) The 'Rate Column' for alternative items shall be filled up.
- e) The 'amount' column for alternative items of which the quantities are not mentioned shall not be filled up.

No modifications, writings or corrections can be made in the tender papers by the tenderer, but may offer his comments or modifications duly authenticated, in a separate sheet of paper, attached to the original tender papers.

The Company reserves the right to reject the lowest or any tender and also to discharge any or all the tenders for each section of to split up and distribute any item of work to any specialist firm or firms, without assigning any reason.

The tenderers should note that the tender is strictly on the item rate basis and their attention is drawn to the fact that the rates for each and every item should be correct, workable and self-supporting. If called upon by the employer detailed analysis of any or all the rates shall be submitted. The Company shall not be bound to recognise the contractor's analysis.

The tenderer shall note that his tender shall remain open for consideration for a period of 90 days from the date of opening of the tender.

The quantities shown in the schedule of quantities are approximate and any variation therein should not vitiate the contract. Similarly, if any additional or substituted items of work are required to execute, the contractor should provide the same. The rates of such items are to be certified by Company as reasonable would be binding on the contractor. Company also reserves the right to delete any item or part thereof. Company reserve the right to execute only a part or the whole or any excess thereof without assigning any reason therefore. Period of completion of work is 6 months after 7 days of issue of work order or the date of handing over site, whichever is earlier.

5. EARNEST MONEY AND SECURITY DEPOSIT :

The tenderer will have to deposit 1% of Quoted amount in the form of Bank Draft drawn in favour of MMTC Limited payable at Kolkata at the time of submission of tender as an Earnest Money. The Company is not liable to pay any interest on the Earnest Money. The Earnest Money of the unsuccessful tenderers will be refunded without any interest soon after the decision to award the work is taken or after the expiry of the validity period of the tender.

The successful tenderer to whom the contract is awarded will have to deposit further 1% as Security Deposit (SD) make up 2% of Initial security deposit the value of the accepted tender including the Earnest Money Deposit. The Initial Security Deposit will have to be made within 7days from the date of acceptance of tender, failing which the Company at his discretion may revoke the letter of acceptance and forfeit the Earnest Money Deposit furnished along with the tender.

8% Retention Amount out of the running account Bill shall form a part of Security Deposit and the Total Security Deposit of 10% shall be released after defect liability periodis over.

No variations from specifications would be allowed without prior consent of the Company.

Contractor should take all precautionary measures, steps as per standard practice so that no accident and damage occurs to their workmen. Company will not be responsible for any such accident, damage to their workmen. Contractor should follow all statutory rules such as Minimum wages Act, EPF Rules Act prevailing at the time of execution of work and obtain necessary permission/ license as required time to time.

Signature of the
Contractor with seal

Any damage caused by contractor's workmen to walls, ceiling, floor or existing fixtures etc. in the premises would be made good by the contractors at their cost.
The contractors should make arrangements for storage of material, tools and equipment, etc. at their own and Company would not bear any expenses on this account.

All rubbish and superfluous materials should be disposed of at the place earmarked by the Local Municipal authorities and other materials/ tools / equipment used for the work should be removed from the site and area should be cleaned at contractor's cost after completion of work and prior to submission of final bills.

Any material found defective by the Company during or after execution of work would be removed from site by the firm and such material would not be reused in this work.

In case of extremely unsatisfactory execution, incompetence, bad workmanship, use of material officially rejected by the Company or similar circumstances, the Company will reserve the right to terminate this contract with the firm and engage separate agencies for completing the work, prior to which, one week's notice would be served for submission of final bills on actual measurements of work executed at that stage.

6. PAYMENTS :

No advance payment will be paid to the contractors during commencement of work, but running bills may be submitted on the basis of joint measurements after partial execution. Minimum value of work to be completed for submission of running bills is 25% of the contract value. TDS and other taxes if any will be deducted as per prevailing norms of Government.

Period of honouring bills subject to deductions of TDS & Retention amount :

- i) Running Bills – 15 working days.
- ii) Final Bill - 60 working days.

Water/ Electricity as available at site will be provided by Company.

7. ESCALATION :

The rates quoted by the contractor & accepted by the Company shall be firm throughout the tenure of the contract (including extension of time, if any, granted) and will not be subjected to any fluctuation due to increase in cost of materials, labour, Vat, Service Tax, Sales Tax, Octroi, etc. unless specifically provided in these documents. Employer is not concerned with any rise or fall in the prices of any materials / labour. The rates quoted shall take all facts into account.

The decision of the Chief General Manager, MMTC Limited, Regional Office, shall be final and binding, if any, disputes or differences pertaining to the contract arises.

Signature of the
Contractor with seal.

APPENDIX

Earnest Money Deposit (EMD)	1% of Quoted amount in the form of Demand Draft.
Defects Liability period	Twelve(12) calendar months from the date of virtual completion of work.
Date of commencement	7 days from the date of issue of work order or handing over site whichever is earlier.
Time of completion	3 months
Minimum value of work for interim payment.	25% value of contract amount.
Retention money	8% of bill amount from RA Bill.
Period of honoring certificate.	15 working days.
Liquidated damages	1% of Contract Value per week subject to maximum 10% of Executed Value.
Period of final measurement and payment.	one month after issue of virtual completion certificate by Architects.

GENERAL TERMS & CONDITIONS

A. COMPLETION SCHEDULE

- a. The contractor will ensure completion of work in all respects within 3 months from the date of handing over the site or the 7 day from the date of issue of Commencement Order, whichever is earlier.
- b. Without prejudice to the rights of the Company, the Company shall be entitled to recover from the contractor, liquidated damages at 1% of total work order value, per week or part thereof subjected to maximum of 10% for the delay if any on account of reasons attributable to the contractor.
- c. Completion schedule is the essence of the work and the contractor will make all out efforts to ensure completion within the time schedule.
- d. In case the progress of work is unduly and unnecessarily delayed by the contractor without sufficient cause, Company without prejudice to any of the rights under the contract reserves the right to:
 - a. Terminate the contract wholly or partially and complete it by itself or reassign it to others after writing to the contractor to remedy the cause complained of.
 - b. Make any modifications, deletions, additions to the contract as Company may consider necessary in consultation with the contractor to ensure its satisfactory execution.

B. TIME EXTENSIONS

If the contractor does not complete the work within the prescribed time limit given in the work order, the Company may give from time to time such extension of time without prejudice to the Company's right to recover liquidated damages as per the terms and conditions applicable.

C. ACCEPTANCE OF WORK ORDER BY CONTRACTOR

After communication of the Company's acceptance of the tender, if the contractor fails to return the duplicate copy of the work order and the Agreement duly signed in token of their acceptance within 7 days, the Earnest Money deposited may be forfeited by the Company, without further reference to the Contractor.

D. PROGRESS REPORT OF WORK

Contractor shall submit progress report of the work fortnightly to the concerned office, who has awarded the contract.

E. VALIDITY OF RATE

The quoted rates shall be valid for a period of three months from the due date of the tender. No upward revision of rates will be accepted after opening of the tender. If the contractor fails to accept the work order, if placed at his originally quoted rates, or subsequently negotiated rates, as the case may be the earnest money shall be forfeited. Once the quotation is accepted and the work order placed on the successful tenderer, the rates shall be valid till the entire work is 100% complete.

F. EXECUTION OF AGREEMENT

On acceptance of quotation, the Contractor will have to execute an agreement with the Company covering all aspects of the Contract in the standard form, immediately before commencement of work. The intending tenderers should acquaint themselves with the provisions of standard agreement before quoting.

G. POWER OF ATTORNEY

When the party signing the agreement is not the sole proprietor, the necessary power of attorney authorising the person who is acting on behalf of the proprietor should be produced before execution of the Agreement.

H. EMPLOYER'S RIGHT

The Company reserves the right to increase/decrease tendered quantity of any or every item and delete any item at any stage of work at the accepted rates. The Contractor's claim for compensation or damages on account of these shall not be entertained.

I. SUBMISSION OF BILLS

The bills will be submitted in our measurement / bill proforma only.

J. CANCELLATION OF ORDER

If the performance of the successful Contractor is found to be unsatisfactory, the Company reserves the right to cancel in part or whole of the contract and get the work executed through alternate means at the entire risk and cost of the Contractor on whom the order was first placed. In such cases, the Contractor should make good all losses that the Company may suffer due to this.

K. OMISSIONS / DEVIATIONS

Any omissions / deviations noticed in the items without the prior approval of the Company, shall result in rejection of the Contractor's claim for payment for these items.

L. EXECUTION OF WORKS

The contractor shall submit on receipt of the work order a detailed programme / bar chart adhering to the completion time quoted in the work order. The programme thus submitted shall be the part of the contract. However the Company reserves the right to alter the programme if necessary. No. Claim on this account shall be entertained.

M. MATERIALS / EQUIPMENTS

All materials shall be got approved by site in charge before start of the work. All facilities for inspection of materials and subsequent inspection of work shall be made available to the site in charge. Any material brought without the prior written approval shall be entirely at the risk and cost of the contractor.

It shall be Contractors responsibility to procure all materials./equipments. No. delay due to non availability of any materials/ equipments will be entertained.

N. SAFETY / SECURITY OF MATERIALS

The responsibility of safety and security of all materials and equipments brought to site will remain with the contractor and any claim whatsoever nature will not be accepted. The contractor will have to hand over completed job in its entirety as per work order.

Signature of the

O. METHOD OF WORK

As stated in general conditions of work Contract Agreement the contractor shall carry out works as per directions in work order. The contractor shall not under take on his own any change in the specifications mentioned in the tender documents and work order. In case of doubt the matter shall be referred and the work shall be carried out as per clarifications given. In case of getting such clarifications the contractor will not be entitled for any claim on account of idling of their labor. Machinery etc. In case contractor carries the works as per his own specifications not acceptable to Company. In such case the same will be required to be redone as per specifications given by Company at the contractors risk and cost. In case of failure to redo the work the Company reserves the right to get the work done entirely at the risk and cost of the contractor.

P. REVISIONS

The Company reserves the right to revise the specifications. Drawings and designs at any stage of work. Such deviation shall be adjusted at the rate already contained in the work order or at the prevailing market rates if the rates are not available in the work order with the approval of Competent Authority.

Q. MEASUREMENTS

All works shall be measured as per the standard procedure laid down in relevant ISI Standards (latest edition) and final payment will be as per measured quantities and not as per work order quantities.

R. MAINTENANCE OF INSTRUCTION BOOK

The contractor at site will maintain the instruction book serially numbered having one original and two copies of each page so that our visiting officers/site in charge can issue instructions regarding progress and quality of work to the contractor.

S. ABANDONMENT OF WORK

In case contractor abandons the work in spite of our notice, the Company shall issue the final notice to the contractor to remain present at site for taking final measurements and in case the contractor does not report at the site on due date and time as per the notice, the Company's representative will take unilateral measurements of abandoned work which will be binding on the contractor and the balance work will be carried out by any agency appointed by the Company at the entire risk and cost of the contractor.

T. DISPOSAL OF SURPLUS MATERIAL

Contractor shall dispose off all surplus excavated materials /earth available or any other item involving excavation in the following manner and as per instructions of Site Engineer:

- a. Uniformly spreading the excavated materials/earth within the premises, wherever required and rolling with light hand roller.
- b. Dispose off the surplus excavated earth from the premises to outside the limits or as permitted by the local authorities irrespective of load and mode of transportation involved.
- c. Written instructions should be obtained from site Engineer about disposal of excavated material/earth before commencement of excavation. If the contractor fails to do so and dumps the earth adjacent to the excavation site, no extra cost shall be payable for re-handling of the same. If the earth is disposed off outside out site, the contractor shall be responsible to obtain permission from the concerned authority, if any.
- d. Clear the site by removing the debris, plant, roots, etc. as per the instructions of the Site Engineer.

U. CERTIFICATE FOR WORKS

It will be the responsibility of the contractor to get the works approved and obtain certificate for all plumbing and electrical works from the local municipal/other government/required authorities.

V. WORKS BY OTHER CONTRACTORS

Along with the works covered under this documents, water piping fabrication/erection work, electrical works, chain conveyor works civil works, etc. may be carried out simultaneously by other contractors. The successful tenderer should extend full co-operation to the contractors and the works should be carried out in such a way so as not to affect the progress of works. Any damage caused should be rectified by the respective contractor at his own risk and cost.

W. DAMAGE TO EXISTING FACILITIES

Any damage caused to the existing facilities while carrying out the work shall be made good by the contractor to our entire satisfaction at his own risk and cost. During execution of the work, if it is found necessary to dismantle a portion of existing brick wall /enclosure wall to facilitate movement of materials and equipment, the same shall be made good at the contractor's own cost after completion of work.

X. STATUTORY RULES AND REGULATIONS

The contractor will abide by the Rules, Regulations, Bye-law and statutes etc. imposed by the Government/Semi- Government and other local authorities for execution of this job.

AB. EMPLOYMENT APPRENTICES

The contractor shall during the period of the contract when called upon by the Engineer-in-charge, engage and also ensure engagement by sub-contractors and others employed by the contractor in connection with the works, such number of apprentices in the categories mentioned in the act and for such periods as may be required by the Engineer-in – charge.

The contractor shall train them as required under the Apprentices Act, 1961 and the rules made there under and shall be responsible for all obligations of the employees under the said act including the liability to make payment to apprentices, as required under the said act.

AC. COMPLETION OF CONTRACT

Acceptance of a facility/facilities by the Company does not constitute final completion of the contract. The contract shall be deemed to be executed in full and final measurement certified only when the contractor has fully discharged all his obligations in terms of all the contract documents.

AD. SAFETY OF SUPPLIED MATERIALS

Supplied items (in case any) are handed over to the contractor, the safety of the same is the contractor's responsibility.

AE. SECURITY OF CONTRACTOR'S MATERIALS

Company shall not be responsible for the security of contractor's materials/ equipments.

AF. OBSERVATION OF RULES

In case the contract work is to be done within the Security zone, the contractors shall have to observe all local rules for safety/security, gate passes etc. as advised by the Location-in – charge/site Engineer.

AG. STORAGE SPACE

No covered space shall be released for storage/ stocking of contractor's material. The contractor shall make his own arrangement for the same.

AH. SALES TAX WORKS CONTRACT.

The rates quoted by the contractor shall be inclusive of sales tax on contract and turn over tax / works contract tax, if any.

AI. CANCELLATION OF ORDER

The MMTC Limited reserve the right to cancel the order for any item or group of work, or split the work between two or more agencies, if necessary. Such a step shall not constitute a breach of the contract, not shall it from the basis for alteration of quoted rates.

GENERAL TECHNICAL SPECIFICATIONS

1. INTRODUCTION

The general specifications are being prepared and suggested for relevant work to be done including supplying, fixing, fitting and erecting at site works as shown and defined as the drawings and documents, to the entire satisfaction of and under the supervision of the Consultants.

The tenderer must visit the site take cognizance of local conditions like access and exit to site, disposal of debris etc prior to tendering.

The rates quoted must include the best available standards of workmanship and the engagement of specialised personnel in all trades of the work as needed and guided by the consultants.

Any material to be used in the project by the contractor shall have to be in conformity with the tender specifications for which the contractor shall submit samples to the requirements of the consultants. Also for the materials as per the approved list provided by the consultants, the samples shall have to be similarly approved by the Consultants through submission by the Contractor. The contractor shall procure materials from the approved manufacturers only and if the consultants so demand, the contractor shall furnish the challans, invoices, receipts or vouchers of such procurements.

Before placing of order by the contractor for any item to be delivered at site, samples be submitted to the consultants by the contractor which shall be retained by the consultant for comparing the same with material delivered at site, samples with proper packing shall be submitted by the contractor free of cost and any supply material, if rejected shall be removed and replaced to the satisfaction of the consultants. The specimen finishes of colour fabrics and other surface finishes and furnishing and finishing items shall also be submitted by the contractor for approval of the consultants prior to commencement of work.

All temporary protection of all finished and unfinished work shall be provided by the contractor during the progress of work. The contractor shall also clean all out ends, debris, shelving's and other types of waste from the site in general before the construction of in – filling or coverings.

All insertions, moulds, boxes templates and fixtures shall be so accurately laid and rigidly incorporated as to remain accurate during use.

All unexposed timber surfaces and the other timber surfaces adjoining masonry walls and surfaces made of materials other than timber shall be treated with at least two coats of approved timber preservative before fixing or covering.

Uniform quality in accordance with the specified standards and first class workmanship to the satisfaction of the Consultants/Company shall be accepted only. The progress of work shall be in accordance with the schedule submitted by the contractor and approved by the Consultants.

2.0 PROCEDURES

2.1 GENERAL

All materials used in the work shall be of respective kind and quality as specified in the schedule of quantities, obtained from approved source/manufacturer as noted in the specification and shall be subject to prior approval of the Architect/Consultant. Samples of materials need be approved before placement of order and approved samples shall be deposited with the Architect/ Consultant.

If directed by the Architect/Consultant, materials shall be tested in any approved laboratory and the test certificate in original shall be submitted to him and the entire charges for testing, including repeated tests if required, shall be borne by the contractor.

2.2 Workmanship

All works shall be of best workmanship and shall be carried out in proper workman like manner and in accordance with sound engineering practice to the satisfaction of the Architect/ Consultant.

No work shall be considered complete until the Architect / Consultant certificates in writing the same is accepted.

2.3 Dismantling

The work of dismantling and removal of dismantled materials shall be done in such a way as to cause no damage to any structure/ properties/and services or disturbance to the occupants and for public. The contractor must take all precautions necessary for the safety of the public, properties around the area and the occupants and against injury to his workmen. Any such damage or loss shall be of contractors liability.

In case of any accident, the contractor shall immediately report to the police and the Owner and appropriate authority shall take all action necessary under the law.

Dismantling shall be done with appropriate tools, and equipments gradually and carefully without damaging adjacent part of the structure, or the portion of the structure retained.

Any services running through the area and /or serving other areas if required shall be diverted by the contractor at his cost, to the satisfaction of the Owner/Architect/Consultant. The contractor shall remain responsible for the safety of the electrical wiring, water lines and other services, fixtures and installations within his area of work and in case of any damage, disruption of services etc he shall make good the same, forthwith at his cost.

All demolished material, rubbish and debris shall be removed from the premises after the day's work. After the work of dismantling is complete the site shall be kept neat and clean to the satisfaction of the Owner/Architect/Consultant.

- a) Wood work : All surface to be painted shall be thoroughly cleaned sand papered and removed of all foreign materials. In case of surfaces having knot and nail holes, this shall be filled with knotting and stopping materials. The knotting materials shall consist of pure shellacs dissolved in methylated spirit stopping materials shall consist of putty. The surface thus treated shall be allowed to dry and then sand papered smooth.
- b) Application ; After preparing the surface, a primer coat shall be applied. The primer coat shall be ready mixed of approved make and manufacture. After the primer coat is applied and perfectly dried, all holes, cracks, etc. is still remained, shall be filled in with putty and the surface sand papered smooth. Then a second coat of paint of approved shade and manufacturers shall be evenly applied and allowed to dry. The third coat shall be carefully applied to achieve smooth and even surface after the previous coat has dried up. Minimum 3 coats of paint shall be applied inclusive of a primer coat. If a proper and even surface is not obtained to the satisfaction of the Employer/Architects in 3 coats, contractor shall carry out additional coats of a painting to approval, at contractors expenses. Care shall be taken that dust or other foreign materials do not settle or otherwise disfigure the various coats.

- c) Rates to include : Apart from other factors mentioned elsewhere in this contract, the rate for the item of painting shall include for the following :-
- i) All labour , materials and equipment necessary to carry out the work.
 - ii) Supplying the approved paint for priming and finishing coats.
 - iii) Preparing the surface including knotting and stopping for receiving the priming and finishing coats.
 - iv) Scaffolding including the erection and dismantling.
 - v) Application of one primer coat and two coats of finishing minimum. . If a proper and even surface is not applied /obtained to the satisfaction of the Employer/Architects in 3 coats, contractor shall carry out additional coats of painting to approval at contractor's expenses.
 - vi) Protection to painted surfaces till dried and handed over.

Mode of measurement : Normally painting to wood work and steel shall be included in the concerned items of work and shall be measured separately, as per I.S. 1200 (Part XV) 1968.

3.0 POLISHING

French polishing : French polish to be used shall comply with I.S. 348 – 1962 in the requirements of quality and method of test.

Before french polish is applied, the surface of wood works shall be prepared in the same manner as for painting. The wood to be polished should be first painted with a filler composed of 1 part of within mixed with 0.53 part of methylated spirit. After laying, it should be finely sand papered.

On the wood work thus treated a thin coat of french polish shall be applied and allowed to dry. After drying, the surface shall be lightly rubbed with a fine sand paper prior to the second and third coats. The surface shall show an even polished surface and be approved by the employer/Architects.

1. Rates to include : Similar to that of painting .
2. Mode of measurement : similar to that of painting.

4 MATERIALS

4.1 Hardware and Metals

The hardware throughout should be of approved manufacturer or supplier well made and equivalent in very respect, the samples to be deposited with consultants. If required , the contractor should produce and provide samples from different sources before the decision is taken by the consultants and he also should allow his rates to the consultants for doing so, which may be subject for negotiation on presentation of documentary evidence.

Signature of the
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Unless otherwise specified, fittings should be generally brass oxidised and should be suitable for their intended purpose. It should be produced by the Consultants and he also should allow his rates to the Consultants in any case.

Screws must match the finish of the article which should be fixed and should be round or flat headed or counter sink as required.

For the purpose of protecting brass and bronze, the contractor should cover up the said surface with thick layer of grease or other suitable protective material, renew as required and subsequently clean off and clear away on connection.

Aluminium and stainless steel should be used of approved manufacturer and suitable for its particular application. Generally, anodised finish should be there on the aluminium surface and both shall comply with the samples approved by the Consultants. All stainless steel sheet should comply with 304 SS Japan or equivalent with gauge according to the specification but must not be thinner than 16 G.

It is required by the consultants, all steel, brass bronze, aluminium and stainless steel articles should be subjected to a reasonable test for strength at the contractor expenses.

Particularly where exposed, all bronzing and welds are to be executed in a clean and smooth manner rubbed down and left in flats and tidiest way.

Important

Contractor must note that quoted items should be based on current market price of above materials in respective Trade Name/Mark.

In the event, any material with particular Trade name is not available at the time of actual execution or otherwise, if consultants desires so tenderer must provide the same materials in different trade name with the same specification and around same price range, subject to acceptance and approval of the Consultant/Client.

PPROCESS OF WORK FOR PAINTING

1. For every step of painting the approval of Company is to be taken. Approval for following is to be taken before proceeding for next step of the work for each and every area.
 - a) After scrapping is complete.
 - b) After putty is applied and after sand paper is applied.
 - c) After primer is applied.
 - d) After 1st coat.
 - e) After 2nd coat.
 - f) After 3rd coat.
2. Area of re-plastering, if any, in the flat should be jointly recorded before commencement of painting work, otherwise area will not be considered for payment.

5.0 WOOD WORK , JOINERY & ALUMINIUM WORK

5.1 TIMBER :

- a) Unless otherwise specified all timber for frames and shutters for doors, cupboards etc. shall be first class, sound well seasoned, C.P. or other equivalent and approved teak and shall be free from knots, shakes, fissures, flaws, sub –cracks and other defects. The planned surface shall be smooth and free from blemishes and discolorations.

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- b) All timber for carpentry and joinery in touch with masonry or concrete shall be crested before fixing.
- c) All fully fabricated timber shall be air seasoned on site of work for a period of not less than two months to allow for any shrinkage that may take place. The preparation of timber for joinery is to commence simultaneously with the beginning of the project work generally and should proceed continuously until all the wood work is prepared and fixed/ stacked on or near the site as the case may be.

5.2 Holdfasts:

Three holdfasts shall be fixed to each post of the door frame. The M.S. holdfasts shall be of the size 37.5 cm. XZ 40 mm. X 6 mm. or as required at site and shall be fixed to the frames by means of screws and not nails. The other end of the holdfasts shall be fixed into jambs with 1 : 2 : 4 P.C.C. of dimensions as directed. Ends of holdfast will be fish – tailed.

Whenever asked for metal fastener or bolts as directed shall be used for rough ground, framing, hangers etc.

The rates quoted for wood work and joinery shall exclude the cost for all types of holdfasts or Rawl plugs other approved fasteners directed (Horns for frames shall be cut and shall not be used as holdfasts).

The items of holdfasts, metal fasteners etc. shall be paid as a separate item as described in schedule of Quantities. The rate for holdfast shall include for cement grouting and fixing to frame work with screws etc. The rate for metal fasteners shall include for nuts etc. as required.

- a) The workmanship shall be first class and to the approval of the Employer/Architects. Scantling and boardings shall be accurately sawn and shall be of required width and thickness. All carpenter's work shall be wrought except where otherwise specified/ described. The workmanship and joinery shall be accurately set out in strict conformity according with the drawings and shall be framed together and securely fixed in approved manner and with properly made joints. All work is to be properly toned shouldered, wedged, pinned, braided etc. and properly glued with approved quality glue to the satisfaction of Employer/Architects.
- b) Screws : All screws to be used in wood work and joinery shall be of G.I.
- c) Tolerance : 1.5 mm. (1/16") will be allowed for each wrought face of the sizes specified except where described as "Finished" in which case they shall hold to the full dimensions.
- d) Protection : All edges of timber frames etc. shall be protected from being damaged during construction by providing rough timber casing securely fixed and other adequate protective measure.
- e) If it is decided by the Employer/Architects to provide antitermite treatment the buildings contractor shall co –ordinate his work suitable as directed by the employer /Architects.
- f) Door/ Windows frames shall have cut rebate. Planted rebates shall not be permitted.
- g) Where door frames are fixed flush with plaster to wall teak wood cover mould 40 x 12 mm. as per drawings shall be provided all round where the plaster is flush with the frame, pointed or finished as in doors. (this will be paid as a separate item as described in schedule of quantities).

- 5.3 Wooden flush shutters : (Solid core type) :
Solid core flush shutters shall be of commercial or teak veneered type as specified in the item manufactured by Indian plywood Manufacturer's Ltd. or M/s. National Plywood company Ltd. or other equivalent and approved quality. An approved sample shall be deposited in the office of the Employer/Architects at site for reference. The shutters will be provided with limppings. Finished thickness of the shutter shall be as mentioned in the item.
- 5.4 Teak wood panelled shutters :
Solid wood panels for shutters shall be of pattern and size as specified. Wherever possible each panel shall be in a single width piece. But where two pieces are used, width of each piece, should not be less than 12.5 cm. When made from marathone one piece, the pieces shall be jointed with a continuous tongued and grooved joint and glued together and reinforced with metal dowels. Such joints are to be got approved by the Architects before actual manufacture is taken up. The grains of solid panel shall be framed into grooves to the full depth of the grooves leaving an air space of 1.6 mm. and the faces shall be closely fitted to the sides of the grooves. Mouldings to the edge of panel openings shall be scribed at the joints. An approved sample shall be kept in the office of the employer/Architects at site for reference.
- 5.5 Wooden handrail :
Wooden handrail will be of specially selected first class C.P. teak wood fixed to concerted or metal balustrades with concealed screws and dowels. All bends miters covers, moulds etc. will be strictly to proper shape and finally smoothed with same papers. The handrail shall be finished with wax polishing or paintings as per direction of the Employer/Architects. The rate should include cost of polishing and painting and also the wastage of materials for the complete work .
- 5.6 Hardware fittings :
All hardware fittings for doors shall be oxydised iron brass/anodised aluminium otherwise specified in Schedule or Quantities. These hardware fittings shall be obtained from De's Lock Industries, S. Lahiri & Co. Or similar other approved manufacturers. The samples for the fittings shall be submitted to the Employer/Architects for their approval. Hardware fittings for door shutters shall be paid as separate item as given in Schedule of Quantities. The rate for hardware fittings for door shutters shall be paid as separate item as given in schedule of Quantities. The rate for hardware fittings with necessary screws, washers, bolts, nuts, etc. as required. All locks shall be provided with keys in duplicate and rate shall include for the same. All screws shall be of the same metal as specified. Approved samples of hardware fittings shall be deposited with the employer/Architects for reference.
- 5.7 Rates to include :
Apart from other factors mentioned elsewhere in this contract the rate for item of wood work and joinery shall include for the following :=
- a) Items of Scantling :
 - l) All labour, materials and equipment's for fixing frame work as per drawing excluding the cost of holdfasts, Rawl plug or other fasteners etc.
 - b) Items of shutters :
 - i) All labour , materials and equipment for carrying out the work as per drawings.
 - ii) Labour for fixing the shutters in position 9 excluding the cost of fittings as per drawings.

General

All works to be performed under this contract shall comply with the latest edition of the relevant Indian Codes and Standards or where stipulated the latest edition of the relevant International Standard.

SPECIAL CONDITIONS OF CONTRACT

1. Contractor or their authorized representative/supervisor are required to present at site during all working hours who will be responsible for the conduct of the work and who has authority to receive and act on such instructions Company may give.
2. The painting work involves shifting of furniture, household items, etc. in the office. Company /Occupants will not bear any cost in this regard all such incidental jobs to the work should be undertaken by contractors at their cost.
3. Contractors are required to organize the work in such a way that the employees are put to no hardships and the office works are not affected. Contractors are required to take adequate care during progress of work to protect the assets, furniture, etc. In case of any damage, the same shall be made good by contractors at their own cost.
4. Contractors to submit schedule of work. After completion of work, cleaning of floors, furniture, etc. to be done to the satisfaction of occupants / Company.
5. Mode of measurements of the work shall be as per relevant IS codes. Joint measurements of the work shall be recorded as per requirement of the work.

Signature of the
Contractor with seal.

**LIST OF APPROVED PRODUCTS CONSIDERED IN SPECIFICATION OF
MATERIALS OF THESE SCHEDULE OF ITEMS**

	<u>FURNISHING, FURNITURE AND FIXTURE WORK</u>	
1	Block Board / Ply Board and Flush Door Shutter	CENTURY PLY / GREEN PLY
2	DECORATIVE LAMINATES (1mm)	FORMICA /CENTURY MICA / GREEN LAM
3	GLAZING	MODI FLOAT/ St GOBIN/ ASAHI INDIA
4	FALSE CEILING	INDIA GYPSUM LTD. / ARMSTRONG
5	Cabinet / Drawer locks, drawer slides, auto hinges, Keyboard trays	EFFICIENT gadgets/ HETTICH / EBCO / INNOFIT SYSTEM / GODREJ/PAG/SOLO
6	DOOR LOCKS / HANDLE	DORSET ACME / HETTICH / GODREJ/PAG/SOLO
7	DOOR CLOSER / FLOOR SPRING	DORMA / HETTICH/OZONE/HAFELE
8	TEXTURED WALL FINISH	HERITAGE / ACRO / ALTEK
9	PATCH FITTINGS	OZONE / DORMA
10	WOODEN FLOOR (Eng.Wood/Solid Wood)	SKEMATIK/SQUARE FOOT/VISTA
11	VINEER	CENTURY VINEER/GREEN DECOWOOD STANDARD/ MAYUR
12	VERTICAL BLINDS	VISTA -LEVOLOR/MARVEL/HUNTER DAUGLAS
13	PAINT	ICI PAINTS/ASIAN PAINTS/BERGER PAINTS
14	SANITARY FITTINGS AND FIXTURE	JAQUARE/ KOHLER/GROHE/ HINDWARE

Signature of Contractor: Name of
Contractor Address of the Contractor
Date and Seal:

TECHNICAL SPECIFICATION FOR ELECTRICAL WORKS.

1. SCOPE

This specification covers the supply of materials, fabrication and erection testing and commissioning of transformer, H.T switch , L. T. panel , H.T. and L. T. cable, computer cable Trunking system, computer plug point UPS line etc. and Electrical switch boards, wiring system, light fittings and other associated items required for successful completion of the work. Any equipment, device, component or work not specifically mentioned in this specification but considered essential for proper design and operation shall be included by the tenderer in his offer. Applicable provisions and conditions of contract shall govern the work under the section.

2. GUARANTEE PERFORMANCE AND MAINTENANCE.

All equipment shall be guaranteed for workmanship and materials and satisfactory performance for a specified period of time. The equipment should be guaranteed against all defects and bad workmanship for a period of 6 months from the date of commissioning and any defect occurring during this period will have to be rectified by the contractor with free of cost. The guarantee for performance shall cover individual items and the system as a whole. The contractor shall have to be provided six (6) calendar months free maintenance with their own cost from the date of complete erection, testing and commissioning.

3. PRICES FOR EQUIPMENTS AND L.T. INSTALLATION.

Item wise prices for supply of equipment's and materials including Tools & Tackles shall be quoted against each item given in the schedule of works. The price should be quoted on F,O,R, destination basis for delivering to work site. The price shall be firm and inclusive of all taxes and other charges.

4. GENERAL :

- a) The power supply system in the building shall be made available at 11000 Volts, 50 Hz A.C. 3 phase, 4 wire, earthed neutral from local Electric supply Authority.
 - b) The contractor for electrical works must possess valid Electrical contractor's License both H.T. and L. T. endorsed by the Licensing Board, Directorate of Electricity of concerned State Government for the type of work he shall execute.
 - c) The work to be provide for by the contractor, unless otherwise specified, shall include but not limited to the following :-
5. Furnish all labour, supervision, services, materials, supports scaffolds, construction equipment, tools plants and transportation equipment etc. required for the proper execution of the job as per drawing specification and schedule of items and get all necessary tests on materials and work conducted at their cost.
 6. Notwithstanding the electrical layout shown in the drawing, the contractor shall obtain further approval of the layout at site from the Engineer- in – Charge before commencement of the work.
 7. Furnish samples for approval including arranging necessary tests on samples, as directed by the Engineer – in – charge in an approved Laboratory.

8. To extend facilities to the Engineer- in – Charge to inspect work and assist them to obtain samples, if they so desire.
9. Furnish general arrangement drawings of the switchboard and other fabrication items, which the Engineer – in – charge may direct for their approval.
10. To employ a full time experienced supervisor having electrical supervisor's certificate of competency endorsed by the Licensing Board, Directorate of Electricity of concerned State for supervise the work. The Engineer- in – Charge have the right to stop the work if the contractor's supervisor is not present when the work is being carried out.
11. To keep the appropriate Electrical Inspector, supply authority informed as to programme of the work and shall be responsible for ensuring that all work passes their approval .
12. To provide all incidental items not shown or specified in particular but necessary for proper execution of works in accordance with the drawing, specification and schedule of items.
13. To maintain the work add keep them maintained till handed over to the owner in proper working condition. Co-ordinate with all agencies including those engaged by the owner for proper execution of the job.

14. MATERIALS :

- a) Materials shall be of the approved quality. A list of materials of approved brand and manufacture is indicated in the annexure. If the list of materials mentioned above stipulates two or more or alternative brands/ makes of any product, the decision as to which brand/ make shall be used in the work shall be taken by the owner consultant engineer and the contractor shall provide the brand/ make so selected without any extra cost.
In case, materials are required to be obtained from any manufacturer other than those listed on account of non- availability then prior approval form E.I.C. will be necessary supported by relevant tests certificates qualifying the required standard. Further tests as directed by the architects shall also be carried out by the contractor at their own cost, if required.
- b) Contractors shall obtain approval of the Engineer-in –Charge owner consultant engineer of samples of all materials before placing order and the approved sample shall be carefully preserved in n appropriate manner at the site office for verification by the owner . Engineer-in – Charge may be published by them after construction work starts, shall govern in respect of design, workmanship, quality and properties of material and method of testing.

15. SAFETY

- a) All equipments shall be complete with approved safely devices wherever a potential hazard to personnel exists and with provision for safe access of personnel to and around equipment for operation and maintenance functions.
- b) Special care shall be taken to make enclosed equipment proof against entry of rats, Lizards and other creeping reptiles, which may create electrical, short circuit inside, live equipment.

16. DRAWINGS:

On completion of all works the contractor shall furnish three copies of Ammonia print along with the original tracing of the following as done drawings to the consultant without any extra cost.

- a) Wiring diagram for final power/lighting distribution showing the rating /size of Transformer H.T. & L. T. switchgear, SPN and TPN. MCB D.B. computer line etc. cables, conduits, lighting fixtures and all accessories for individual installation.
- b) Detailed arrangement drawings of the L. T. switchboard, Complete with dimension in metric units.

- c) Drawings showing the route of conduits and cables with sizes, lengths, sources and destination of all cables with the circuit designation number etc.

17. TEST CERTIFICATES AND INSTRUCTION :

Unless specifically mentioned otherwise , the contractor shall furnish in duplicate Manufacturer's Test Certificate with the delivery of the equipment to the Consultant and instruction in English for operations and maintenance of equipment where required.

18. TESTING AND COMMISSIONING

- a) Before each field test, the contractor shall obtain the permission from the site engineer and all test shall be conducted in the presence of duly authorize representative. Records of each test shall be prepared immediately after the test and this record shall be signed by contractor's representative conducting the test and the site Engineer attending the test. Copies of their record in quadruplicate shall be handed over to the Engineer- In – Charge.
- b) A certificate in quadruplicate shall be furnished by the contractor countersigned by the furnished by the contractor countersigned by the certified Supervisor under whose direct supervision the installation was carried out and the owner's site engineer. This certificate shall be in the prescribed forms in addition to the test certificate required by the Local Electric supply Authorities.

19. COMPLETION OF WORK :

Each item of the electrical work shall be considered as complete in all respects only after obtaining permanent service connection from local supply authority energizing, testing and final commissioning of the complete installation as directed by the Consultant / Engineer- In – Charge. Payment on each item of electrical work shall be made as per measurement and proportionate to the quantum of works complete. In the event of any dispute with regard to the proportion of work complete. The decision of the Consultant / Engineer- In- Charge shall be final and binding to the contractor.

20. PREAMBLE TO THE SCHEDULE OF WORK

The successful tenderer shall carefully go through the clauses of Invitation to Tender, specification, Schedule of work and drawings and shall include in his rates any sum he may consider necessary to cover the fulfillment of the various clauses contained therein. Unit prices stated in the schedule of work against the item of work shall be inclusive of all installation accessories and consumables necessary to complete the said work within the contemplation of the contract.

Beyond the unit prices no extra amount will be paid for incidental contingent work and materials.

The quantities mentioned in the schedule of work probable quantities and it must be clearly understood that the contract is not a lump sum contract, but the I probable quantities. The value of the entire tender, are only indicative and owner does not in any/ assure wave the tendered or guarantee that the actual quantity of work would correspond to the probable quantities in the tender.

No change in unit rate will be admissible on any variation of quantity .

21. MATERIALS

All materials used in the work shall be of ISI approved / quality of standard reputed make and in its absence conforming to the I.S. specification.

For fabricated equipments special care shall be taken to make the enclosed equipment proof against entry of creeping reptile which may create electrical short circuits inside the live equipments.

22. L.T. MAIN DISTRIBUTION SWITCH BOARD

The 415 Volt main distribution switch board shall have incoming unit fed from L.V. side of transformer or main L.T. source.

23. The equipments shall be designed to confirm to the requirements of IS 4237, 1.5. 2147 and 1.5, 375 .

CONSTRUCTION :-

The main L.T. board shall be of totally enclosed I tropicalised, vermin proof, free standing cubical type of minimum 2.0 mm thick sheet steel construction with angle iron frame work housing incoming switch gear ACB, MCCB, requisite number of outgoing ACB/MCCB, fuse switch switch fuse units, busbars, switch board shall be readily extensible on both sides, The L. T. Terminal of the transformer shall be connected to the incoming terminal of the AIR Circuit breaker through adequate number and size of aluminium conductor 11KV Grade PVC and A/ cable.

The incoming and outgoing functional units shall be arranged in multitier formation, to provide a compact switch board having a pleasant appearance. Each unit shall be accommodated in a separate compartment having gasketed hinged door which shall be Interlocked with the operating mechanism so as to prevent opening of the door when the switch is in the 'ON' position and also to prevent closing of the switch with the door not properly secured.

The 'ON' and 'OFF' positions of the switch handle shall be distinctly indicated by proper marking .Modular construction shall be adopted to cater for different units with each cubical having a busbar chamber at top and a rear cable compartment . The maximum height of the devices on title panel shall not exceed 2000 mm.

Suitably engraved identification levels shall be provided on each unit.

24. When switch board of floor or wall mounting type is specified instead of cubical type with incoming and outgoing fuse switch units, the board shall comprise a suitable length of Busbar Chamber. The board shall have provision for future extension. The floor stands or wall bracket shall have sufficient mechanical strength to carry the weight the entire switch board.

The height shall be such that maximum operating height of the top unit shall not exceed 1800mm.

25. BUSBAR :

The main horizontal vertical busbar shall be air insulated and made of high conductivity, high strength aluminium alloy or electrolyte copper complying with the requirements of grade of IS 3082. The current density in each busbar shall not exceed 160 Amp. Per sq. c. for copper and 125sq.Amp. per sq.cm for aluminium.

The main phase busbar shall have continuous current rating throughout the length of power control centre and the neutral busbar shall have a continuous rating of at least 50% of the phase busbar.

Large clearance and creepage distance shall be provided on the busbar system to minimize the possibility of a fault.

The busbar and vertical risers shall be fully insulated with PVC sleeve or tape to prevent accidental touch.

The busbar including neutral and earth bar shall be short circuit tested for fault withstand of 60 KAEMS for one second as per IS : 8623 for factory Building Assemblies.

In no case the rating of busbars shall be less than the incoming circuit breaker or switch

Busbar should be supplied with insulating materials such as permali Hylam and support shall be sufficient close and robust and support should permit – sufficient movement for compensation of comparative stress in the event of short circuit.

26. AIR CIRCUIT BREAKER

The circuit breaker would be constructed in modular construction or would be enclosed in cassettes, designed for easy switch Board construction.

The formed and welded steel construction should be given corrosive resistance treatment following fabrication work .

The breaker would have three distinct position, service/test/isolated within the cubicle, achieved by a racking cam and slide rails, simplifying inspection and from this position breaker should be able to withdrawn from housing, with door closed, the breaker should be withdrawn to test and isolated position.

The contact system should be designed to ruggedly and to effectively utilize the magnetic force generating in the current path ensuing high short time withstand current and interrupting capacity and reducing the let through energy. The ACB should be provided with separate set of arcing contacts and main contacts ensuing high mechanical and electrical life . Arc chutes on arcing contacts with deionisation plat should be provided . The contacts tips should be made of Silver Nickel Alloy and arcing contact trips are of silver tungsten Alloy.

ACB Should be suitable for manual or Motor wound stored charged spring closing mechanism. ACB should be provided with static trip release, inherent safety inter locks, such as safety shutters and door inter lock, 'OFF' & 'ON' indicator auxiliary switches and contacts. ACB should be complete with overload protection, short circuit protection, under voltage trip, auxiliary contracts and instruments as specified in the schedule.

The ACB should comply with Indian Standard specification I.S. 2516 – 1977 and IEC 157 and should be certified by CPRI.

27. MOULDED CASE CIRCUIT BREAKER :

These MCCB's should comprise of a switching mechanism, contact system, are extinguishing device and the tripping unit, contained in a compact moulded case and cover.

The insulating case and cover shall be made of high strength, heat resistant, flame retardant thermo setting materials, providing interphase insulation of a very high dielectric strength and an insulated enclosure with high withstand capability against thermal and mechanical stress with protection against secondary fire hazards.

In trip free toggle mechanism should ensure that the trip command overrides all other commands.

MCCB should employ a maintenance fire contact system designed to minimize the let through engorges while handling abnormal currents. The special sintered contact tip should provide a wiping motion, high resistance to erosion during interruption and a stable contact for normal service current.

A series of grid plates should be mounted in paralleled between supports of insulating materials. The profile of the de-install plates extends directly over the contacts and draws the arc from the moving contact up into the divider chamber, thus confining, dividing and extinguishing the Arc.

The handle position should give positive indication of whether the MCCB is 'ON' (top) 'OFF' (bottom) or TRIPPED (MIDWAY)

The tripping element provided on each pole of the MCCB should operate on a common trip bar because of which it does not create single phasing in the event of a fault on any of the phases.

The base design ambient of these MCCB's should 40 degree C.

When specified the MCCB should be fitted with under voltage protection, earth fault protection, alarm and auxiliary switch etc.

28. FUSE SWITCH UNIT

The fuse switch units shall be of double break type suitable for load break duty with quick make and break mechanism and front drive mechanism, generally conforming to IS : 4064 – 1978 having fully shrouded contacts. All switch contacts shall be shelf aligning, spring loaded, silver plated. The isolators shall be connected on the busbar side or incoming side and fuses on the load side. However fully withdrawal carriage to facilitate quick fuse link replacement is preferred.

The individual fuse switch units shall be either triple pole and neutral or single pole and neutral as specified with a front operating handle. The fuse links shall be non – deteriorating HRC type complying with IS : 2208 1962 and – having rupturing capacity of 80 KA at 415 Volts.

Units which are to be installed separately should be totally enclosed fully shrouded sheet steel clad/ cast steel casing.

29. INSTRUMENTS

The measuring instruments shall comply with IS 1248 in all respects.

Moving iron, square, flush mounting type instruments shall be used for measuring A.C. voltage and currents.

The instruments shall normally be mounted on the hinged door of an all welded fabricated sheet steel housing of rigid construction to allow easy access to small wiring. Protective circuits shall be protected by HRC type fuse links complying with IS: 9224 (Part –11) 1979. The fuses shall be mounted near the tap – off point from the main connections so that a fault in the instrument wiring does not affect the main supply. Small wiring shall be 660 volts grade single core fire resistant PVC cable with copper conductor having minimum size 2.5 sq. mm. These shall be coloured coded for identification of circuits. The instruments shall be of IMP/ Automatic Electric/ GEC of equivalent make acceptable to the Engineer- in –Charge.

30. CABLE TERMINATION

Separate cable compartment with doors bolted cover plates shall be provided at rear of each vertical section to facilitate cable termination to individual units. The design, shall ensure generous availability of space for ease, of installation and maintenance of cabling and adequate safety for working in one vertical section without coming into accidental contact with live parts in an adjacent section. The compartments shall have detachable cover plate with gaskets at the bottom of the cable compartment unless specified otherwise. Cable glands and slugs of suitable sizes shall be provided for cable termination. Suitable arrangements shall be provided in the compartment for clamping of the cables.

31. EARTHING

G.I./ Copper flats shall run the entire length of the switch board. Two –bolted type earthing terminals shall be provided in the board for connecting to the earth grid .

32. METAL TREATMENT :

All steel materials used in the construction of the switch board shall undergo a rigorous rust proofing process comprising alkaline degreasing, desiccating in dilute sulfuric acid. Cold rinsing, recognized phosphating process Persisting and drying with compressed air in dust free atmosphere. It shall then receive two coats of highly corrosion resistant enamel paint of approved shade.

33. MINIATURE CIRCUIT BREAKER :

Distribution boards shall be of approval manufacturing. The TP & N/SPN DB's shall be 4/8/12 for incorporating isolator, MCB or RCCB as incomer. The busbar shall be tinned copper busbar and coupling links. The MCB's shall be arranged in two vertical banks with switch lever operating in horizontal plane for on –off switching Specially designed mounting channel for quick shop fitted and easy removal shall be fitted.

The sheet steel enclosure fitted with double metallic door shall be provided with protection against ingress IP –42 or IS : 2147. The incomer shall accept upto 35 sq.mm cable while the neutral shall accept 16 sq.mm. wires.

Two conduit entry plates at top and bottom shall be provided to facilitate drilling conduit holes at site to suit site requirements.

34. LIGHTING EQUIPMENT :

- I) The luminaries for fluorescent lamps shall be shop assembled fully wired and suitable for 1no. 4 tube as the case may be. The salient features of these luminaries are basic channel/rails, 240 volt ballasts with copper winding wire. Spring loaded bipin type lamp holders. Glow type starters and condensers, Reflectors and/or decorative covers shall be supplied as specified in the schedule of quantities .
- II) The luminaries for decorative light shall be as specified in the schedule of quantities and approved by the Consultant/Engineer – in – Charge before the same is used.
- III) The incandescent bulkhead type fittings shall be of cast aluminium alloy body, finished by application of synthetic enamelled silver grey paint outside, white insides, with front glass, wire guard, tropicalised gasket, B. C. lamp holder and suitable for use with 100 watt G. L. S. lamp. The fittings shall have tapped 19mm. E.I. for conduit entry.
- IV) The post- top lantern type luminaries shall have a die- cast aluminium electrical unit/housing with provision for pipe – entry from below. A canopy made of spun aluminium and an opal, white acrylic diffuser resistant to ultraviolet radiation and heat. The luminaries shall be rain proof, insect tight and fully wired upto the terminal block and suitable for use with 80/125 Watt HPSV/HPMV or 100 Watt G.L.S. lamp as specified in the schedule of quantities.
- V) The flood lighting luminaries shall a rugged construction housing made of cast aluminium alloy of low. Copper content for corrosion resistant, highly polished and anodised aluminium reflector for beam control heat resistant front glass with gasket fixing, bracket shall be provided on the housing. The luminary shall be rain proof, and suitable for use with 1000Watt tungsten halogen lamp or 250/400 HPSV lamp as specified in the schedule of quantities.
- VI) The ballast's for fluorescent tube shall conform to IS : 1534 & IS : 1534 (Part-I) 1977 and the same for high intensity discharge lamps shall conform to IS : 6616 – 1982 and these shall have high grade synthetic enamelled copper winding wires, quality grade insulation materials, good quality low hysteresis losses electrical stamping, and complete unit shall have polyester filling. The ballast's shall be suitable for use on single phase 240 volts 50 Hz. A. C. system and of Philips make.
- VII) The capacitors shall comply with IS : 1569 – 1976 and be of heretically sealed type.

35. CEILING FANS AND REGULATORS :

The ceiling fans and electronics regulators shall conform to IS : 374 – 1979, The fans shall have totally enclosed capacitor start and run motors suitable for operation on 230/400 volts, single phase, 50 Hz, A.C. system The regulator shall have an 'ON' – 'OFF' position next to the lowest speed contract and shall be provided with at least five running positions.

36. EXHAUST FAN

The exhaust fans shall conform to IS : 2312 – 196/ and suitable for operation on 230/400 volts, single phase, 50Hz. A. C. System. The fans shall be ring mounted type designed to give maximum air volume changes under free air flow conditions.

37. SWITCHES MODULAR PLATE TYPE SWITCHES :

Light computer and fan switches shall be rated for 6 amp 250 volts and of Modular type and suitable for flush mounting board. The switches shall comply with relevant I.S.

38. SOCKET OUTLET AND PLUG MODULAR PLATE TYPE :

These shall be of 3 – pin type and of rating 6 amps. (for light) and 16 Amps, (for power) Each socket outlet shall be complete with controlling switch shall be provided with 6/5 Amps, power socket outlet. The socket outlets shall have modular type acceptable to the Consultant /engineer-in-Charge. The socket outlet and plug shall comply with the relevant I. S. Specification.

39. LOOP – IN JUNCTION BOX :

These junction boxes shall be dust and vermin proof construction fabricated from 2mm. Thick sheet steel having internal dimensions of 200 x150 x100 mm depth for single phase distribution system and 250 x200 x150 mm depth for three phase distribution system. These shall have moulded bakelite base connection block with anti – vibration nickel plated brass terminals of suitable size and porcelain fuse fittings.

40. The successful tender shall submit for approval General arrangement and dimensioned drawings for power and lighting distribution switch board, Motor Control Centre, Bus – duct arrangement, Miniature Circuit Breaker, Distribution Board . Fuse Distribution Board, interlocked switch socket outlets, Clock switch control panel, Power Cable Junction Box and Cable rack etc. as required, in three sets before commencing manufacturer.

41. WORKMANSHIP AND INSTALLATION WORK :

The workmanship shall be of good commercial quality and all supply materials and installation work shall be complete to the full satisfaction of the Consultant Engineer- in – Charge.

42. CONTRACTORS RATE TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the rates for the above shall include for the following,

- i) All labour, materials, tools and construction equipment required for fabricating and fixing of above stated items.
- ii) Scaffolding including erection and removal.
- iii) Making good of all damaged civil work if any.
- iv) Necessary modification of pre-laid conduit including supply & fixing of Metal/PVC conduits and accessories, chase cutting etc. as required to complete the work.

43. WIRING SYSTEM :

- i) Generally the final loading of any sub-circuit for lights and fans shall not exceed 800 Watts and shall not be connected to more than total ten (fans, lights, socket outlets etc.) . Bell push if operated at low voltage shall be fed from a separate circuit of distribution fuse board.

- ii) The final 16 Amps. Sub- circuit for power shall be connected to a maximum one 16Amps socket outlet or two 6 amp socket outlets.
- iii) A power circuit shall always be originating from a distribution fuse board or MCB DB and the same shall run in a separate conduit.
- iv) The point wiring shall mean wiring from one way of distribution board to point of utilisation of electricity i.e. where the load is applied and this shall include complete wiring from distribution board, supply and fixing of switch board, controlling switches, ceiling rose, batten holder and socket outlet etc. as per schedule of quantities.
- v) Insulated or covered earthing conductors where used, shall have green insulation braiding or covering as appropriate. Under no circumstances shall the colour green be used for other than earthing conductor. In addition where it is required, cables of different colours be used for identification purposes the following system shall be employed . Red or any colour (other than : For outer phases or Black or Green) switch wire

Black : For middle wire or neutral.

Green : For Earthing.

- vi) Unless otherwise mentioned in the schedule of quantities, single way porcelain/bakelite terminal, connectors with nickel plated brass inserts and screws to suit the conductor size shall be used for intermediate wiring /joints in junction boxes and in switch boards or by any other method approved by the Engineer- in – Charge.
- vii) Distribution wiring in conduit to light, fan, plug points etc. shall be done in looping in system . In the system, no joints or connections shall be made anywhere or the system except at terminating points such as at terminals of switches, ceiling roses, etc. and in case of socket outlets at the socket etc. and in case of socket outlets at the socket terminals. Intermediate wiring joints of neutral wire in junction boxes will not be permitted.

44. CONDUIT WIRING :

- i) All conduit shall be conforming to I. S. 9337 (Part II) – 1981 and finished with galvanized or stove enameled surface. All conduit accessories shall be conforming to IS : 266/- 1988 and be threaded type. Conduit less than 20mm in diameter shall not be used. All conduits shall be of 1.4 to 1.8mm thickness below 32 mm Dia and 1.6 to 2.2 mm thickness for 32 mm and above.
- ii) The conduit for each circuit shall be erected complete with necessary bushes before drawing in of any wire. Galvanized M. S. spacer of 3mm thick minimum shall be used between the conduit saddle and fixing surface. The saddle shall be fixed at an interval of not more than 7560 mm apart for vertical run and 600mm apart for horizontal run.
- iii) The joint in conduits shall be made by means of threaded couplers and threaded accessories only to ensure electrical continuity throughout. All pipes after cutting, the threading shall be carefully reamed out with special reamer to remove any burr and then painted immediately with an anti – corrosive preservative after removing all traces of oil or grease. Junction boxes shall be provided with gasketed covers to render them dust and damp proof. The conduit accessories having pull outlet for conductors shall only be used in all conduit installation.
- iv) Where specified, P.V.C. conduit conforming to IS: 2509 – 1973 or IS : 9537 (Part –III) shall be used, the thickness of PVC conduit shall be adequate to withstand mechanical

injuries. Where necessary PVC conduit, accessories conforming to IS: 3419 – 1976 shall be used along with PVC conduit.

- v) The entire conduit system shall be effectively earthed by means of suitable earthing conductors and the resistance from any point to earth shall not be more than one OHM.
- vi) After installation of conduit pipes and fittings are completed in all respects, the exposed outer surfaces of the conduit and accessories shall be painted with two coats of approved enamel paints or aluminium paint over a coat of red oxide as required to match the surrounding wall finishing. The protect against rust the bare thread portion shall be painted with anti-corrosive preservative.

45. CONCEALED WIRING :

- i) Recessed conduit wiring system : This system of wiring shall comply with all the requirements of surface conduit wiring system specified.
- ii) Making of chase : The chase in the wall shall be filled up neatly made and be of ample dimensions to permit the conduit to be fixed in the manner desired. In case of buildings under construction, chases shall be provided in the wall, ceiling etc. at the time of their construction and shall be filled up neatly after erection of conduit and brought to the original finish of the wall. Specially for ceiling, conduit shall be laid before casting.
- iii) Fixing of conduit in chase : The conduit in chase in the wall shall be fixed by means of staples or by means of saddles not more than 60cm. Apart. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with a long radius which joints of conduits shall be treated with some approved preservative compound to secure protection against rust.
- iv) Inspection boxes : Suitable inspection boxes shall be provided to permit periodical inspection and to facilitate removal of wires, if necessary. These shall be provided with bakelite covers.
- v) Types of accessories to be used : All outlets such as switches, wall sockets etc. may be either flush mounting type or of surface mounting type. The outlet box shall be the same as in Clause 15 of section and shall be mounted flush with the wall. The metal box shall be efficiently earthed with conduit by an approved means of earth attachment.
- vi) Fish wire : 1 x 18 SWG G.I. wire inside the conduit and accessories to be provided with an extension of 250mm at both the conduit ends.
- vii) Conduits laying in floor/ roof, slabs before casting: M. S. /G.I. rigid PVC/ polythene conduit shall be laid straight as far as practicable and properly placed including binding with the steel reinforcement rods with 22 SWG G.I. binding wire so that proper positions of conduits are maintained.

While laying the conduits for concealed wiring in the ceiling / beams/ Columns / walls before casting the contractor shall ensure that both ends of the conduit are plugged by means of dead – end sockets or otherwise to prevent the entry of any foreign materials against conduit choking.

All precaution must be taken while laying the conduits in the slabs R.C. walls, columns, etc. and the contractor shall rectify at his own cost, if any defects are found during process of drawing cables through the concealed pre-laid conduits.

Each M.S/ G.I. conduit shall be provided with protruding length of 150mm on free end of the conduits with sockets under the bottom level of slab/ beam.

Each rigid PVC/ Polythene conduit shall be provided with protruding length of 150mm free end of the conduits under the bottom level of slab/beam.

There shall be no intermediate joints in one straight run of conduit.

All ceiling outlets shall be terminated in a round M.S/G.I. circular box 80mm. Depth minimum /deep box to suit standard size ceiling rose or / and rectangular M. S. junction box or Fan Hook Box as the case may be it may be mandatory for the contractor to get the layout approved by the Engineer-In- Charge/ Consultant, measurements are checked when the conduits are laid and bound to steel reinforcement rods, before he can release the work for casting of slabs/floor /beams etc.

46. CONNECTOR BOXES, DRAW – IN – BOX, JUNCTION BOXES :

These shall be constructed from 16 SWG MS sheet and have MS cover. Minimum size for connector box is 150mm x 100 mm and for Draw – in – Box is 100 x 100 mm with required depth upto 80mm.

47. FAN HOOK BOX :

These shall be 100 mm dia x 80mm depth, constructed from 14 SWG M.S. Sheet and provided with one 16mm dia M.S. rod of 300 mm long having 'U' bend inside the box.

48. PAINTING :

Out side of wall switch boards, connection box, draw – in – box and other M.S. accessories shall be painted with two coats of anti corrosive paint in addition to other painting instructions given elsewhere.

49. WIRES :

Unless otherwise mentioned in the schedule of quantities, only core PVC insulated /PVC insulated and sheathed cable consisting of single / Multistrand/FRLS flexible copper conductor and or approved manufacturers conforming to relevant I.S. shall be used for wiring in conduit system.

50. INSTALLATION AND WIRING OF DISTRIBUTION FUSE BOARDS/MCB DISTRIBUTION BOARD :

- I) Where fixing of distribution fuse board /MCB D B on double teak wood board is specified only hinged type wooden board with brass hinge shall be provided and the size of the board shall be such as to match the size of the distribution fuse board /MCB D B. A minimum margin of 25mm shall be provided on all sides of the distribution fuse board/ MCB D B. The outgoing circuit shall be taken out through a horizontal slot at the rear side of the distribution fuse board/ MCB DB enclosure.
- II) Where fixing of distribution fuse board/MCB DB on M.S. frame is specified, the frame shall have sufficient mechanical strength to carry the weight of the D.F.B./ MCB D B .
- III) Where fixing of distribution fuse board / MCB D B will be of concealed type the chase in the wall shall be neatly made and be of ample dimensions to permit the D B to be recessed in wall and flushed with finished wall surface.
- IV) The cable/wire shall be connected to the terminal only by soldered or crimped lugs, unless the terminal is of such of form that it is possible to securely clamp them without cutting away of cable strands.
- V) All bare conductors shall be rigidly fixed in such a manner that a clearance of the least 25mm is maintained between conductors and materials other than insulating material.

51. CABLES :

I) TYPE AND QUALITY OF CABLES

Unless otherwise specified in the schedule of quantities all wiring cables shall be PVC insulated and PVC sheathed conforming to relevant IS standard. The conductor of cable shall be of standard wires of aluminium or copper as specified. All power cables shall be 1100 volts grade, PVC insulated, PVC sheathed and armoured with standard aluminium conductor, Materials should be obtained from the approved list of manufacturers/ brands as indicated in the document.

ii) HANDLING OF CABLES :

It shall be ensured that both ends of the cables are properly sealed to prevent ingress/ absorption of moisture by the insulation.

When the cable drums have to be moved over short distances, they should be rolled in the direction of the arrow marked on the drum. While removing cables, the drum shall be properly mounted on jacks or on a cable wheel or any other suitable device, making sure that the spindle, jack, etc. are strong enough to take the weight of the drum.

iii) DEFECTIVE CABLES

Cables with kinks and straightend kinks or with similar apparent defects like defective armouring etc. shall not be installed.

IV) BENDING RADIOUS :

Cable runs shall be uniformly spaced, properly supported and protected in an approved manner. All bends in runs shall be well defined and made with due consideration to avoid sharp bending and kinking of the cable. The minimum safe bending radius for all types of PVC cables shall be taken as 12 times the overall diameter of the cable. Wherever practicable larger radius shall be adopted.

v) LENGTH OF CABLES :

All cables shall be laid in one length. No joint shall normally be made at any intermediate point in through runs of cables unless the length of the run is more than the length of the standard drum supplied by the cable manufacturer. In such cases where jointing is unavoidable, the same shall be made by means of standard cable joint boxes/ kits. Before cutting the cables, the requisite length between terminals (Including extra length required at loops) shall be carefully measured.

vi) STRIPPING OF OUTER COVERING :

While cutting and stripping the outer covering (i.e. sheathing of the cable, care shall be taken that the sharp edge of the cutting instrument does not cut or damage the inner insulation of the conductor. The protective outer covering of the cable shall be stripped off near the connecting terminal, the protective covering being maintained upto a point as close as possible to the connecting terminal.

52. CABLE LAID IN TRENCHES :

- I) Cables shall be laid generally in accordance with Indian standard code of Practice IS : 1255

SIZE OF TRENCH

- II) Unless other wise mentioned in the schedule of quantities, the minimum width and average depth of trench of laying a single cables in ground shall be 460mm and 760mm for L.T. and 1000 mm for H. T. cable respectively. For laying horizontal axial spacing shall be 250 mm. For 110 volts 150mm. However, communication cable shall not be

taken in a common trench. Where more than one cable are to be laid in the same trench in horizontal formation, the width of trench shall be increased according to the above stated inter – axial spacing between the cable except where otherwise specified). There shall be a clearance of at least 150 mm between the trench edge and axis of the end cable.

53. EXCAVATION OF TRENCH AND PREPARATION OF BED :

The trench shall be excavated in reasonably straight line. Where there is a change in direction, suitable curvature shall be provided , Where gradients and changes in depth are unavoidable, these shall be gradual.

Adequate precautions shall be taken during excavation not to damage any existing cables, pipes or similar installations in the produced route. Where bricks, tiles or protective covers or bare cables are encountered, further excavation shall not be carried out without the approval of the Consultant/Engineer-in – Charge.

The bottom of the trench shall be level across the width and free from stone, brick bats etc. The trench shall be then provided with a cushion of fine sand, the thickness of the cushion being not less than 75mm.

54. LAYING OF CABLES.

i) All cables shall be tested for proper insulation prior to laying. The cable drums shall be transported on wheels to the place of work . The cables shall be laid out in proper direction as indicated on the drum using cable drum lifting jacks. In case of higher size cables the laid out cables shall run over rollers placed at close intervals and finally transferred carefully on to the trenches and racks, care shall be taken so that kinks and twists or any mechanical damage does not occur in cables. Only approved cable pulling grips on other devices shall be used. The entire length of cable shall as far as possible. Be said in one operation. However, if this is not possible, the remainder of the cable may be shifted from position by falking i.e. by making one long loop in the reverse direction. For crossing water, gas or sewerage pipes, etc. cables shall be taken available. The cable shall cross these pipes through RC/GI pipes at a minimum depth of 750 mm from finished ground level keeping the distance between the utility pipes and pipe carrying cable 300 mm minimum.

While laying cables parallel to building, railway track, utility pipe lines, drainage, sewerage, etc the minimum clearance shall not be less than 1000mm.

Adequate length of cables shall be pulled inside the switch boards, control panel terminal boxes, feeder pillar etc. so as to permit neat termination of each core.

ii) SURPLUS CABLE

At the time of original inspection, approximately 1 meter of surplus cable (in the form of a loop or otherwise) shall be left at each entry or exist of the cable at a pole on at the pillar box, or near any terminal as may be directed by the Consultant / Engineer-in – Charge.

iii) PROTECTIVE COVER FOR CABLES DIRECTLY BURIED GROUND .

Except where otherwise directed by the Engineer-in-Charge, cable (for the entire length in trench) shall be protected by a layer of bricks laid flat on top and shall be provided at least by 75mm sand cushioning both at top and bottom. This brick protection shall cover all the cables in the trench (single or multiple cables, in horizontal formation). In case of single cable, the brick protection shall consist of one brick flat (with the length along the width of the trench) and supported on two lines of brick – on – edge, one on each side of the cable (with the length of the bricks along the length of the trench) For multiple cables in horizontal formation, in addition to the two outer lines of brick –on – edge there shall be

additional lines in between adjacent cables,. The top cover of brick flat shall extend to cover all the cable each brick being supported on the lines of brick – on –edge.

iv) BACK FILLING OF TRENCH

After laying of cables the remaining portion of the trench shall be back filled with good excavated soil and well rammed in successive layers not exceeding 300mm depth each and duly compacted to the satisfaction of the Consultant/Engineer-in-Charge.

All material like sand , brick and clamp, etc. shall be supplied by the contractor. The cable laying rate shall be inclusive of all these items.

v) CABLES LAID THROUGH PIPE SLEEVES :

Entry of cable from underground trenches to the building or tunnel shall be through pipe sleeves. Necessary precaution shall be taken to make entry point fully water tight by properly sealing the pipe sleeves in a manner approved by the consultant/ Engineer-in – Charge.

Where cables are required to cross roads, railway tracks and surface drains, they shall be taken through pipe sleeves at a minimum depth of 1000mm.

55. LAYING OF CABLES ON RACK/TRAY /BRACKET/HOOKS/MASONRY TRENCH :

- i) Where cables are required to be laid directly along structure walkway, walls ceiling, they shall generally be taken exposed on brackets, cable racks, trays, hooks laid along building structure. Spacing of saddles/ hooks shall be such that the cables are straight and shall not exceed 750mm.
- ii) The cables rack/trays shall be ladder type/pre-fabricated perforated type and bends / curvature shall be smooth and suitable for bending the largest cable running in the rack/ tray. The cable rack/tray shall be suitably installed on the building structure with proper support at regular intervals.
- iii) Cable rack/tray shall be so arranged that they do not obstruct or impair clearance of passage way.
- iv) Where there is possibility of mechanical damage cable racks/ trays shall be adequately protected by sheet steel cover.
- v) Unless otherwise specified in the schedule of quantities the rack/trays shall be painted with corrosion resistant paint and finished with enamel paint of shade battleship Grey or any other colour shade acceptable to consultant/ Engineer-in- Charge.

56. CABLE TERMINATION :

- i) Power cable termination shall be carried out in such a manner as to avoid strain on the terminals by providing suitable clamp near the terminals. All power cables shall be terminated to the switch fuse terminals, busbars, etc. by means of suitable sizes crimping type or soldering type cable socket/sugs/ferules and empire tape upto plam of the cable lug. PVC tape shall not be used directly, because of its poor thermal stability. It may however be used over the empire tape. Control cables shall be terminated by crimping of directly clamped in the terminal blocks of screws.
- ii) When pinching the smaller size conductor directly in the terminal bore of the switches, the individual strands shall be fanned out and cleaned by wire pool or emery paper and the cleaned surface shall be coated with a thin layer of oxide inhibiting grease. The conductor shall be tightened fully to the terminal bore but over tightening shall be avoided.

- iii) For connection to busbars and other terminals brass or cadmium plated nuts/bolts and washers shall be used. Copper cables shall never be terminated directly on aluminium busbar. Suitable measure shall be taken to avoid heating due to bimetallic contacts.

57. A selection chart of crimping type cable plugs for various combination of cables/busbar/fuse switch terminals is shown below :

Material of Busbar/ Switch terminals -----	Material of Cables -----	Material of Crimping lug -----
a) Aluminium	Aluminium	Aluminium over tin plated copper
b) Copper	Aluminium	Aluminium lug with copper plated palm.
c) Silver /tin plated	Aluminium	Aluminium or tin plated copper.
d) Aluminium	Copper	Tin plated copper
e) Copper	Copper	Copper or tin plated copper.

58. EARTHING :

All non current carrying metallic part of various electrical equipments as well as cable armouring, metallic conduct, cable rack/trays, brackets, supporting structures, etc. shall be effectively earthed by not less than two separate and distinct earth connection in accordance with Indian Electricity Rules, and the relevant Indian Code of Practice for earthing 3043 -1987.

59. EARTH ELECTRODE :

i) Pipe Electrode :

The earth electrode for earthing station shall comprise of G.I. pipe 'B' class of 50mm, internal diameter and 3mtr. Long in one single piece with holes 12mm dia on all sides at 150mm centre, upto a minimum height of 2.5 metre from bottom. Removable caps/wire mesh funnel shall be provided at the top of pipe to facilitate purring of water. Suitable clamps made of 40mm x 6mm galvanized M. S. flats complete with bolt and nut shall be provided with the electrodes at 100 mm from the top and for connecting earth conductor. No joints will be allowed in the earth electrode. The electrode shall be driven at least 2 metre clear from masonry structure and the distance between two electrode shall be not less than 2 metre when installed in parallel and preferably placed twice the length of the electrode i.e. metre. A masonry inspection pit of size 600mm x 600mm x 450 mm deep (unless otherwise stated) shall be built with 125mm thick cement mortar (6:1) brick work both inside and outside plastered 20mm thick and neatly cemented 1.5mm thick, inside top and outside, around the top of the earth pit, so that the top of the G.I. pipe is 250mm below the finished ground level and the opening on top shall be provided with C.I. manhole ring having lockable C. I cover fixed and flush with the outside finished ground level.

60. EARTH BUSBAR

i) GALVANISED M.S. FLAT

Specified in the schedule of quantities the earth busbars shall be of heavily galvanized M. S. flat of 75mm x 8mm having adequate number of drilled holes with 10mm galvanized steel bolts, nuts, plain and spring washers for securely connected the earth lead and the

continuity conductor. The busbar shall be fixed on wall , having clearance of 6mm from wall with spacing at least the number 13 mm G.I. rag bolts spaced about 500mm apart.

61. EARTH LEAD CONDUCTORS :

- i) The earth lead for each electrode shall be 65mm x 6 mm standard G. I. Flat connected securely to the earth electrode and earth busbar. The pipe shall be filled with bituminous compound.
- ii) Galvanized M. S. flat earth conductor directly buried in ground shall generally be taken at a depth of 600mm and shall be provided with one coat of bituminous paint, one layer of half lapped bituminized tape and a final coat of bituminized paint to prevent corrosion.
- iii) The earth conductor when laid inside building / shall be taken either exposed on cable racks/ trays, walls, ceiling, etc. o remedied in concrete depending on installation. Galvanized M. S. saddles, clamped to M. S. flat spacers with tapped holes shall be used for clamping earth conductor. Flats shall be supported at intervals not exceeding 1000mm and stranded wires at intervals of 300mm.
- iv) Connection of earthing lead to earth electrodes and termination of flat earth continuity conductor to equipment shall be made by means of bolting. Connection of stranded earth wire to earth bus as well as to equipment shall be made through crimping type lugs and bolting. Jointing and taping of flat earth conductor shall be done by means of welding.
- v) The earth resistance from any point of the earthing system shall not be more than one ohm .

62. WORKMANSHIP AND INSTALLATION WORK:

The workmanship shall be of good commercial

The workmanship shall be of good commercial quality and all supply materials and installation work shall be completed to the full satisfaction of the owner Engineer –in – Charge.

TECHNICAL SPECIFICATION

H. T. SWITCHGARE

The H.T. circuit – breaker shall be completed with the following

<u>PANELS</u>	<u>IN – COMING</u>
Number of panels	1 (one)
Labelling	Incoming
Breaking capacity and rated capacity	250 MVA 400 A
System capacity and rated current	11000 V. 3 – ph, 3 Wire, 50
Breaking current	Hz.
a) Symmetrical current	24 KA
b) Closing	Manual/ spring charging
c) Type	Indoor Vacuum circuit breaker draw – out

d) Tripping & relays	IDMT series tripping relay 2 – 0/c 50-200% 1 – EL 20-80% Manual Remote tripping provisions
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Sundry Fittings

a) ON - OFF Indicator	ON - OFF
b) Phase – indicator	R.Y.B
c) Terminations	Cable boxes with loop – in & loop out arrangements for 3/2 core 185 sq. mm X 2 PE cable
d) Padlock with key	One
e) Standard	IS : 2516

VOLTAGE TRANSFORMER

Number	1(one) Cast resin insulated
Rating	3 P. H 50 VA
Standard	$\frac{11000}{-3}$ / $\frac{100}{-3}$

CURRENT TRANSFORMER

Measuring	3 Nos. 200/1 15 VA Class –1 3 Nos.200/1 15 VA Class 15 P10 or 5 P10 cast resin insulated.
Standard	IS : 2705

METERS

Voltmeter	1No. –96 x 96 Sq. mm 0-15 K V and selector switch with HRC fuse
Ammeter	1No. – 96 x 96 Sq. mm 0-150A With selector switch
Power – factor – meter	3 – Phase unbalanced.
Energy meter	KWH 3 PH unbalanced load
Standard	IS : 1248

CABLE TERMINAL

3 – core, 185 sq. mm 11KV grade
X LPE looping – in and looping –
out arrangement.

POWER TRANSFORMER

The transformer shall be generally designed, manufactured and tested as per I.S. : 2026 – 1962 & shall have following Technical characteristics:

Capacity	:	500 KVA
Type	:	Three phase, double wound, step – down VPI resin impregnated Dry Type naturally air cooled, Indoor type, copper wound and shall be suitable for use on 3 – Phase, 50 Hz supply.
Primary voltage	:	1100 volts, base – voltage.
Secondary Voltage	:	415 Volts, base – voltage
Winding connections	:	Delta / Star ISS Vector group, Dyn –11
Percentage Impedance	:	5%
Neutral	:	Full capacity neutral brought out to a fully insulated terminal on L.V. side for earthing and for 3 – phase, 4 – wire connection
Neutral earthing	:	Neutral solidly earthed on L.V. side
Tap changer	:	Tappings on H.V. windings for +2 ½% and + 5% Voltage off – circuit tap changer, operated by hand wheel with locking arrangement.
Temperature rise at rated capacity	:	Maximum 115 C winding temperature rise.
H.T. side terminal arrangement	:	Cable terminal box, complete with brass cable glands, with disconnecting chamber so as to remove the transformer without disturbing the cable joint, suitable for terminating of one 3 – core, 185 sq. mm. 11 K V grade. XLPE
L.T. side terminal arrangement	:	Cable terminal box with disconnecting chamber and cable glands suitable for terminating . 2 Nos. – 3 ½ core 400 sq. mm. PVCA.

The Transformer shall operate successfully under the following conditions without exceeding the specified temperature rise :-

- a) At rated load & frequency with voltage 10% above or below specified.
- b) At rated load & voltage with frequency 5% above or below specified.
- c) Any combination of (a) and (b) above.

Painting : The Transformer shall be painted with two coats of primer and two coats of finish paints. The colour of painting shall conform to shade No. 631 of I.S.:5 .Accessories & Fittings : The Transformer shall be complete with all standard fittings and accessories as listed below :

- a) Ratings plate, diagram and terminal marking plate.
- b) Two earthing terminals.

- c) Winding Temperature Indicator Box with alarm and trip contacts.
- d) Buchholz relay with alarm and trip contacts.
- e) Marshalling box with terminal block where all the contacts of buchholz relay and winding temperature indicator relay will be connected. Interconnection control cabling between Transformer & HT Breaker.
- f) Suitable under carriage with unidirectional rollers.
- g) Lifting lugs.
- h) Jacking lugs.
- i) Hauling lugs.

<u>APPROVED LIST OF MATERIALS</u>				
SL. NO.	ITEMS			MAKERS/BRANDS
1	H.T. XLPE INSULATED PVC SHEETED a) CABLES 11 KV (E) ALUMINIUM b) L.T. INSULATED PVC SHEETED ALUMINIUM PVC/A.CABLE 1.1KV.			FINOLEX/POLYCAB/R R CABLE FINOLEX/POLYCAB/ R R CABLE
2	M C C B			L & T / SIMENS/ SCHNEIDER / LEGRAND
3	FUSE SWITCH UNIT WITH H.R.C. FUSES			L & T / SIMENS / SCHNEIDER / LEGRAND
4	ON -- LOAD MANUAL CHANGE OVER SWITCH			HAVELL'S/ L & T / LEGRAND
5	MCB DISTRIBUTION BOARD WITH MCB ISOLATOR /MCB. ELCCB/RCCB			LEXIC MDS/ SIMENS/SCHNEIDER / LEGRAND
6	PVC ISULATED SINGLE CORE MULTISTRAND FLEXIBLE COPPER CONDUCTOR 1100 V. GRADE WITH FIRE PROOF			RR KABEL/ FINOLEX / NATIONAL
7	CONDUIT (A) MILD STEEL CONDUCT (16 S.W.G.) (B) PVC (RIGID) CONDUIT			BEC/SUPREME/KK SUPREME/ HARSH/PRECISSIONS
8	G.I.PIPES			TATA/ KALINGO
9	PVC TERMINALS (A) CLIP - ON TYPE (B) STUD TYPE			ELMEX/WAGO ELMEX/ACDC
10	6/16A SWITCH SOCKET, BELL PUSH MODULAR) TYPE			(NORISYS (CUBE SERIES) / CRABTREE (MURANO)
11	SINGLE PHASE MOTOR STARTER UNIT			NORTHWEST / ELECTRON DEVICE

SL. NO.	ITEMS	MAKERS/BRANDS		
12	LAMPS (CF & FL.TUBE)	PHILIPS / OSRAM		
13	LIGHTING FIXTURES	PHILIPS / WIPRO		
14	CEILING FAN / WALL BRACKET FAN	CROMPOTON / ORIENT/ POLLAR		
15	EXHAUST FAN	EPC/ CROMPOTON /KHAITAN		
16	ALUMINIUM FLATS FOR BUSBAR.	INDAL		
17	INDICATING METERS (AMMETER/ VOLTMETER/PREQUENCY METER, ETC. (ANALOG TYPE)	AE		
18	L.E.D. INDICATING LAMP	L&T/ VAISHNU		
19	SELECTOR SWITCH VOLTMETER/ AMMETER/ON - OF	L&T/ KAYCEE		
20	M.S. SHEET BOARD(16 S.W.G.)	BEST QUALITY		
21	H.T. CABLE TERMINATION (HEAT SHRINKABLE TYPE)	RAYCHEM /	MASTER ELECTRIC	
NOTE				
1	THE ARCHITECT RESERVES THE RIGHT TO CHOOSE ANY ONE OF THE MAKES OF MATERIALS IN THE APPROVED LIST.			
2	THE CONTRACTOR SHALL FURNISH AS AND WHEN DEMANDED BY THE EMPLOYER/ ARCHITECT. THE INVOICE/ BILLS OF PURCHASE FOR VERIFICATION OF QUALITY, QUANTITY AND MAKE OF THE MATERIALS.			
3	THE EMPLOYER RESERVES THE RIGHT TO SUPPLY MAJOR EQUIPMENTS AND SUCH THAT THE CONTRACTOR RATE QUOTED FOR ERECTION DEEMED TO THE COST OF INSTALLATION, TESTING & COMMISSIONING.			

TECHNICAL SPECIFICATIONS FOR FIRE

FOR PORTABLE EXTINGUISHERS

1.0 SCOPE OF WORK

- 1.1 Supply testing and commissioning of the all mechanical and electrical equipment's, instrumentation, pipes, valves, fittings, supports, cables etc complete in all respects.

Preparation & submission of drawings/ calculations/other documents to concerned authorities & obtaining interim & final Approval/ Sanction/N O.C. (No Objection Certificates) from local Fire Brigade before, during and after execution of work as required. The official fees to this account will be borne by the employer.

2.0 PORTABLE EXTINGUISHERS

- 2.1 Portable fire extinguishers shall be of ISI marked or as approved by the Architect..
- 2.2 These shall be located in prominent positions easily accessible for ready use.
- 2.3 Contractors rate shall also include free demonstration by operating at least one extinguisher of each type to the Employer/ Architects before handing over. Such extinguishers shall be re- filled at contractor cost.

3.0 TEST CERTIFICATES ETC.

For any materials, equipment's, and accessories etc, manufacturers test certificates, performance charts, ISI/TAC approval certificates etc. as applicable shall be submitted by the contractor to owner / Architects whenever asked for.

TECHNICAL SPECIFICATION FOR FIRE ALARM AND DETECTION SYSTEM

- 1.0 The system covered under this specification shall be designed, manufactured and tested for proven, reliable and trouble – free performance. It shall be capable to identify the fire within the Building and cause audio- visual indication in Master control panel (MCP) to be located in the Fire control in the ground floor. The fire detection and alarm system should be so designed as to clearly identify the hazardous zone for taking quick, safe and faster remedial measure by the Security/ Fire Fighting personnel.

It shall include two numbers hooters on each floor to provide clear audible warning to the persons on the floor. Each floor of the Building shall be provided with two numbers manual call points to be fixed near each staircase in every floor and one no. each in the basement entry and exist points. In case the fire is detected by any person visually he will be able to actuate the alarm system by operating the manual call point provided in the particular area for drawings attention of the working/ Security personnel and taking faster remedial measures for extinction of fire.

The Master control panel shall be located in control Room at ground floor. A separate public Address (P.A.) system shall be provided for enabling the security personnel to advice for taking remedial measures for fighting the fire as well as to guide the people for safe escaping during fire.

The scope of this specification shall include all the items/ components, which are essential and necessary for proper performance of the individual items, irrespective of whether the item is

specifically mentioned herein or not, and for completion of the installation in all respects. Cost of individual items shall include all the accessories/ items essential for satisfactory performance of the particular items.

The equipment's used and the system design should be TAC approved or acceptable to TAC.

Surface/ Concealed conduit wiring shall have to be provided in floors/ walls / ceiling as detailed in the schedule of items. To make the installation complete, necessary chipping, making openings etc are to be done by the successful tenderer without any extra cost. Also final finishing are to be made matching with the existing finishing of the floor/ ceiling / walls etc. after completion of the work without any extra cost.

2.0 DETECTORS

All the Detectors shall be connected to the control and indication equipment provided in the local control panels, which are to be installed in respective floors. The detectors shall be so designed as to have high accuracy, sensitivity, reliability and long life. At the same time the Detectors shall be so designed and constructed that it should restrict in giving all possible false alarms. The Detectors shall also be so designed as to give protection from vibrations, pollution's, heat, corrosion etc. A visual IED alarm indication shall be provided on the corner of the detector and it indication shall be provided on the corner of the detector and it will glow in case the particular detector detects the fire. The will glow in case the particular detector detects the fire. The detectors shall be of surface mounting type of flush mounting type according to the application taking into consideration the aesthetic sense and the approved colour finish.

2.2 SMOKE DETECTOR.

These are to be dual chamber ionization type approved by TAC/ Under writer Laboratory, USA or any other recognized international standard and shall be low voltage type working on 24 V or less.

2.2 HEAT DETECTOR

It uses principle of expansion resulting from heat. The detector senses excess of a preset temperature (fixed temperature) as well as any abnormal rate of increase of temperature above a preset value. Operating fixed temperature shall be 69 degree for transformer rooms, other areas and 79 degree in kitchen areas for the rate of rise of 2 degree C/ minute and air velocity 1 metre/ second. Operating time for rate of rise action shall be 70- 100 second for a rate of rise 22 degree C/ minute and air velocity 1 metre/ second and within safe time at different air velocities. These shall be TAC approved type.

2.3 The operations of one or more detectors shall result in simultaneous alarm as following.

- i) Hooter will sound at respective floor.
- ii) Audio- Visual indications on Local control panel.
- iii) Audio- Visual indications in the Master control panel.
- iv) Damper will be closed and electric supply to AHU motor will cut of at respective floor.
- v) Control rooms should have overriding facility to sound all the hooters of all floors simultaneously in case of fire/ drill / test operation.

2.4 Where the detectors are installed in the path of air current (as in the case of A/C Return Air Duct) appropriate arrangement to reduce the velocity of air current to prevent false alarm shall be provided.

2.5 FLAME DETECTOR

Flame Detector shall work on ultra violet principle approved by statutory Authority for application causing no radiation hazard for personnel. These shall be TAC approved type

- 2.6 The operation of one or more detectors shall result in simultaneous alarm given by –
- i) Hooter will sound at respective floor.
 - ii) Audio/ Visual indication on local Panel.
 - iii) Audio/ Visual indication on Master Panel indicating the floor where detector has operated.

3.0 MANUAL CALL POINTS

On each floor manual call points as indicated in the drawing should be installed. The call points should form integral part of the fire detection system.

Manual calls points should be wall mounting type. The housing should be mild steel and should be dust proof. The housing should be minimum 100 x 100 mm and glass thickness should not exceed 1 mm. Once the glass is broken the alarm should sound on the floor as well as on the main control panel and visible indication should glow to indicate the operation and the related floor. The alarm should be maintained by the control equipment, even if some one presses button subsequently.

3.3 REMOTE INDICATOR

These are connected to the detectors which are concealed or located in enclosed unattended areas. On actuation of the detector, its location will be indicated and pin pointed by this indicator. These Remote Indicators are generally to be mounted in easily visible points near the from housing the detector unit. The Remote Indicators are to be provided with single luminous diode display with clusters of fire IFD indications. These shall be approved by the architect.

4.0 EXTERNAL HOOTER

This is connected mainly to the LCP/ Master control Panel and operated by LCP of relevant floor. This shall be suitable for giving double tone audible indications and shall produce high pitch sound to indicate fire. Minimum audible range shall be to 20 metres. It shall be of reliable and proved electronic design.

- 4.1 Two or three numbers external Hooters shall be provided in general on each floor.
- 4.2 The circuit feeding power from control panel shall have the design provision to give fault signal on control panel in the event of short circuit, disconnection of power circuit to manual call points and hooter provided in floors.
- 4.3 The hooter should be available to give clear, audible and intangible sound. The sound level should be 75 db (A) above and loud noise likely to persist for more than 30 seconds.
- 4.4 The hooters can be silenced only on acceptance from either LCP or MCP

5.0 LOCAL CONTROL PANEL

- 5.1 The panel shall be constructed with cold rolled sheet metal of minimum thickness 2 mm and shall be IP 54 degree of protection and TAC approved.
- 5.2 It shall be spray painted with approved paints. Colour shall be Grey Shade No. 631 as per IS 5. Two coats of primer shall be used after proper cleaning, and removal of Harris, followed by two coats of final painting. If required painting shall be redone after installation.
- 5.3 It shall be wall mounted type with provision of cable entry at the top, bottom & back sides as required for site condition.

- 5.4 The power supply shall be from a centralized emergency power panel (common for all panels) which is fed from normal and emergency system with auto- change over as detailed afterwards.
- 5.5 Each floor is divided into zones. There shall be one indicator for 'Fire" and one for " Fault" on the LCP for each zone. All the detectors in one zone shall be associated with one indicator on the panel. The 'Fire" & " Fault" indicators shall consist of two separate LED/ bulbs in parallel. Red & yellow indication shall be used for 'Fire Signal" & " Fault Signal" respectively. These will flash at abnormal condition along with audio alarm.
- 5.6 The panel wiring shall conform to IS 2189 – 1976 and its latest revision.
- 5.7 Separate annunciates for fire and faults shall be provided on the panels. Continuous audible alarm shall indicate " Fault" whereas pulsating alarm shall indicate " Fire" The Fire tone shall always override the fault tone.
- 5.8 The panel shall consist of all solid state electronic circuitry or plug in printed circuit boards. The tenderer shall submit the following documents for the panels in requisite numbers (six sets) .
- a) Annunciation PCB card details.
 - b) Pin details of each card.
 - c) INPUT/OUTPUT details of annunciation.
 - d) Basic trouble shooting chart.
 - e) Ordering instructions of PCB's
 - f) Pin connection details between card to card.
 - g) Block diagram of annunciation scheme.
- 5.9 Fault detector circuit shall indicate –
- a) Open circuit fault.
 - b) Short circuit fault.
- 5.10 Repeat alarm actuation for connection to Master control panel shall be provided such that these are not affected during operation from local panel.
- 5.11 The panel shall have provision for operating all the hooters in the floor simultaneously in case of fire- sensing by detector's Provision of silencing the hooters and thus accepting fire- intimation shall also be kept in the panel. All necessary equipment's for flawless operation of the above shall he provided.
- 5.12 A facility shall be provided for deliberate isolation of each inside the panel and is not easily accessible for unauthorized persons. This facility is needed to keep the system operating in other parts of the floor while any repair / testing work is being done in any zone with visual indication on panel.
- 5.13 One set of potential free contacts for fire damper (to be used with central A/C system) shall be provided in Local control Panel (LCP)
- 6.0 MAIN CONTROL PANEL (MCP)
- 6.1 The Master Control Panel shall be mounted in the in the Hall and shall be TAC approved.
- 6.2 The panel shall be constructed with cold rolled sheet metal of minimum thickness 2 mm and shall be IP 54 degree of protection.
- 6.3 It shall be spray painted with approved paints. Colour shall be Grey shade no. 631 as per IS 5. Two coats of primer shall be used after properly cleaned, and removing barrs, followed by two coats of final painting. If required painting shall be re- done after installation.
- 6.4 It shall be wall / floor mounted console type design with provision of cable entry at the top, bottom and back sides as required for site condition.

The console shall have an inclined flat desk surface with all controls and the microphones easily accessible to the operating personnel sitting in front of the same

- 6.5 The power supply unit backed by Dry Maintenance Free rechargeable battery and battery charger shall be provided in the Main control Panel.
- 6.6 There shall be separate audio-visual indication for 'normal power supply failure' and 'battery voltage low/standby supply failure.'
- 6.7 There shall be indication of the 'System ON', 'Standby ON' etc.
- 6.8 There shall be one indicator for 'Fire' and for 'Fault' on the M. P. for each floor. The 'Fire' and 'Fault' indicators shall consist of two separate LED/ Bulbs in parallel. Red & yellow indication shall be used for "Fire Signal" and "Fault Signal" respectively. These will flash at abnormal condition along with audio alarm.

The panel wiring shall conform to IS 2189 – 1976 and its latest revision.

- 6.9 Separate annunciation for "Fire" and "Fault" shall be provided on the panel. Continuous audible alarm shall indicate "Fault" whereas pulsating alarm shall indicate "Fire". The "Fire" tone shall always override the "Fault" tones.
- 6.10 A fault warning shall be given in the event of failure/ disconnection of any of the followings :
 - i) Normal supply
 - ii) Standby supply
 - iii) Battery charging equipment
 - iv) L.C.P. – (open Circuit/ short Circuit Fault)
 - v) Fuse/ Protective Device
 - vi) Any other item

6.11. 'Fault' detector circuit shall indicate :

- a) open circuit fault
- b) Short circuit fault.

6.12. The panel shall consist of all solid state electronic circuitry or plug in printed circuit boards. The tenderer shall submit the following documents for the panels. :

- a) Annunciation PCB card details and circuitry with component details.
- b) Pin details of each card.
- c) INPUT /OUTPUT details of annunciation.
- d) Basic trouble shooting chart.
- e) Ordering instructions of PCB's
- f) Pin connection details between card to card
- g) Block diagram of annunciation schemes.

6.13. A facility, which is not easily accessible for unauthorized persons, shall be provided for deliberate isolation of each zone inside the panel. This facility is needed to keep the system operating in other parts of the floor while any repair/ testing work is being done in any zone with visual indication to panel.

6.14. Besides 'System on' 'Standby on' 'system on test' indicators should be provided.

- 6.15. Toggle switch to actuate alarm from the MCP to one floor or all the floors as necessary.
- 6.16. The operation of any fire alarm sounder or the transmission of signal to main control panel in the control room does not depend upon the operation of the indicator and is not stopped by any defect/ failure in the indicator.
- 6.17. Failure of any indicator circuit should not prevent the fire alarm from sounding for acknowledgement / silencing of alarm from one floor should prevent another alarm coming from other floor.
- 6.18. The provision of voltmeter and ammeter in the front panel shall be provided in MCP for both A. C. and D.C supplies.

4.0 GENERAL TO CONTROL PANELS

7.1 Alarm System & Indications

a) The sequence of operation of the alarm system shall be ---

<u>Sequence</u>	<u>Hooter</u>	<u>Indication</u>	<u>Remarks</u>
Normal	OFF	OFF	-----
Abnormal	ON	Flashing	Preliminary Alert Alarm which will be 2 second ON & 1 second OFF
Reset	OFF	OFF	If the system comes back to normal.
Abnormal	ON	Flashing	If Fault / Alarm persists, flashing will be faster after 1 minute from occurrence of fault.
Reset	OFF	Flashing	During abnormal stage.
Reset	OFF	OFF	If systems comes to normal.

The reset push button shall be lockable type, to avoid unauthorized reset of audio – visual indication.

B) INDICATION

The circuit & mechanical design of the apparatus shall be such that operation of one indicator does not prevent proper & separate operation of other indicators. Each fire/ fault indicator shall be clearly labeled with the floor address from which the call originates.

- 7.2 All the components of fire alarm system i.e. manual call point, solid state circuitry, shall have same 'nominal operating voltage'
- 7.3 There shall be a system and lamp test button. The hooter and all indicators will be 'ON' when this button is pressed.

- 7.4 Pulse timer should be provided calibrated to sound the alarm if not acknowledged within 60 seconds and thereafter if not acknowledged from the floor of alarm within 3/4/5/ minutes.
- 7.5 The audible alarm shall continue until silenced by a manually operated switch / button provided on the panel. The alarm shall not be silenced automatically. The silencing of audible alarm for the zone shall not prevent alarm coming from other zones. The visible indicator showing the zone of actuation shall continue to glow till the whole system is reset.
- 7.6 The manual operation of silence switch/button shall automatically result in giving a visual signal on the panel until the system is reset.
- 7.7 Test facilities should be provided to test alarm circuit, sounder, indicator etc.
- 7.8 The following should be provided – acknowledge button, fire alarm cancel button, fire alarm cancel indicator, fire alarm cancel audible buzzer, reset button, pulse timer, related fuses/ protective devices etc.
- 7.9 Local control panel shall be provided with voltage appropriate to the rating of the interconnected manual call point and shall incorporated overload cutout device to protect external circuit against excess current. The voltage drop in the cable risers should be taken into account. The voltage drop in the cable risers should be taken into account. To solve this problem consideration may be given to operate main console at a slightly higher voltage, with solid state voltage adjuster and stabilizer circuits in the main & local control panels.

5.0 POWER SUPPLY

- 8.1 The Master Control Panel shall be provided with a complete unit of charger, rectifier & distribution system. The charger shall be provided with auto change over system from normal to emergency supply in case of failure of normal power supply. The emergency power shall be derived from a maintenance free battery which shall be included in the offer.
- 8.2 Only 230 V, 1 Ph, 50HZ AC power supply shall be made available to the Master Control Panel from the nearest available power source. The cabling from the permanent supply source to the Master Control Panel and the cabling from Master Control Panel to the respective floors and to the individual sensing items external speaker- cum- hooter are to be included in the offer.
- 8.3 The Master Control Panels for any other panels requiring power supply for its operation shall be approved with “Power Supply Healthy ON” “Indication Fuse Blown” “Charge ON”, “ Supply in EM Power “ etc. indications.
- 8.4 The battery bank shall be such that all the equipment will work at its “ Final Voltage”
- 8.5 The battery charging equipment shall incorporate automatic control features which should match the output with the limits, specified by the batter manufacturer taking into consideration the quiescent load of the system.
- 8.6 Low battery voltage condition shall be monitored and indicated on MCP by visible and audible alarm.
- 8.7 Each battery of the secondary cells when charged by its normal charging arrangements for a period of 24 hours from the fully discharged condition shall then have sufficient power to supply quiescent load together with fault signal resulting from disconnection for a period of 24 hours. Thereafter it shall have enough supply to cope with additional load resulting in an alarm originating in all zones for 30 minutes. If utilized to sound emergency evacuation alarm it shall supply additional power for at least 10 minutes.
- 8.8 There shall be provision of protection against earth leakage current. All panels/Equipment's shall be effectively earthed whenever required to satisfy statutory & system requirements.

8.9 A suitable anti – corrosive insulating rack shall be provided for the battery bank.

6.0 GENERAL REQUIREMENTS

9.1 All equipments and panels shall be rugged in design. It shall be reliable in design and should have long service life.

9.2 Equipment shall be designed to operate continuously on a maximum ambient temperature of 45 degree C and the temperature rise shall be within the allowable limit. It shall also be so designed that it should work in local vibration and impacts, if arises at any time in the locality during use.

9.3 The internal circuits shall be so designed that due to failure of any part/ component or malfunction it should not give any false fire alarm signals at any time. It should instead may give rise to fault alarm signals only.

9.4 There shall be no easily accessible normal controls, e.g. switches off – main / standby power supply etc. to the unauthorised person.

9.5 All manual controls, indicators, switches etc. shall be clearly labelled to indicate their proper function/ services. All manual controls shall be robust in construction positive in action and so located that no accidental operation can take place.

9.6 All equipments and components shall be designed, manufactured and selected to work satisfactorily against deterioration due to temperature, humidity, corrosion etc. resulting from the atmospheric condition existing in the vicinity. The equipments and components shall be of first class good quality materials for its reliability. The cubicle type Master control Panels shall be dust and vermin proof and to prevent ingress of moisture. Protective painting shall be provided after installation of the panels and equipments wherever required.

9.7 The selection of the power supply unit and the cables shall be such that on appreciable voltage drop takes place. There shall be provision of protection against over load.

9.8 All the electrical/ electronic components covered under this specification, shall conform to the following. :

- i) Components shall conform to the ISI specification or to B.S. specification where no IS specification exist.
- ii) Alarm indication lamps may have signals or double filaments to suit the requirement and it should be having larger life. The intensity of the indications shall be clearly visible from distance at 10 metres in normal condition. IED may be used wherever it suits to have low power consumption.
- iii) Double lamps should be used to avoid confusion/ inattention in case of one lamp blows off.
- iv) All frictional contact surfaces should be plated/ flashed with double metals or equipments.
- v) List of recommended spares for its normal and trouble free operation for at least 5 years shall be furnished separately with quoted price as on optional item.

9.9 CIRCUIT DESIGN.

Latest design and technology shall be offered as accepted by the ISI or similar institution. All components shall be interchangeable in design. As an optional case separate price may be quoted for provision of “ Self diagnosis feature” of each circuit of the equipment offered, In case the design of any circuit is such that any failure or malfunction in it does not activate automatic fault warning then the tests of its function shall be included in routing procedure.

9.10 CONDUIT WIRING SYSTEM

- i) Surface conduit wiring shall be adopted in wall/ ceilings or similar other coverages. Conduits are to be laid in an approved manner and the surfaces are to be made good after laying of the conduit. Wherever require-ment of the fire protection system and made good in an approved manner. NO extra cost will be paid on this account.
- ii) All conduits shall be of 25 mm dia M.S. conduits of wall thickness conforming to the relevant IS. The conduits shall be free from burrs and integral roughness. No. conduit shall be less than 25 mm dia unless specified otherwise.
- iii) Metal conduits wherever running shall be mechanically and electrically continuous and an earth continuity conductor shall be run along and an earth continuity conductor shall be run along its length according to the I.E. Rules and the relevant IS for its proper and rigid earthing . It shall be bounded electrically at a regular interval to provide effective and rigid earthing of the conduit installation. In long distance straight runs of the conduit, inspection type screwed coupler shall be provided at a suitable interval on running threads with couplers and jam nuts.
- iv) To protect against rust the outer surface of the conduit Y accessories shall be thoroughly cleaned and painted with anti-corrosive preservative paints, similar to the walls/floors/ceiling finish wherever required.
- v) Necessary bends in the system including diversions shall be done by bending the pipes or by inserting suitable inspection type bends/ elbows or similar fittings.
- vi) Generally 100 V grade 1.5mm PVC insulated and sheathed copper cable shall be used conforming to IS 694 (Part II) with adequate number of cores required for wiring. However, the voltage drop in the system should be selected wherever such necessity arises. Total number of cables shall be so taken in a conduit as to facilitate easy drawing of the cables.
- vii) For loop earthing G. I. wires shall be used.
- viii) Panels and bigger items should be having cable glanding facility using double compression dust and moisture proof Electro plated brass cable glands of approved make.

9.11 CABLE TERMINATION.

- i) All heavy duty cables to be used for the purpose of connecting the fire protection system shall be PVC insulated and PVC sheeted copper conductor cables of armored type conforming to IS 1554 (Part I) 1964 of 650/1100 V grade wherever used for indoor purpose. Cables concerned only with fire protection system are generally to be taken along the fire protection system are generally to be taken along the fire protection duct provided in the building. All cables after bringing to site must be got approved by the Engineer- In – Charge before use. All relevant test certificates shall be submitted in support of the sound manufacturing of the cables for approval to the Engineer- In Charge. The cables are to be dispatched to site in wooden drums with the ends sealed. The requirement of the exact length of cables shall be determined by the successful tenderer after measurements at site.
- ii) Cables shall be laid in walls/ ceilings/ structures wherever concealed wiring is to be done but mainly the wiring run along the duct provided for the fire protection system shall be surface wiring. The cables shall be suitably supported @ 0.45 M for vertical run and @ 0.30 M for horizontal run in general , by means of M.S. brackets and clamps or aluminium cleats fixed on M.S. brackets. Bolts of suitable sizes are to be grouted on wall for fixing of the brackets. Cables to be laid underground shall be of armored type conforming to IS 1554 (Part I) 1964.
- iii) Loops should be kept at terminal ends. Appropriate glands should be provided where the cable enters junction box.

- iv) All the cables and wires should be bagged for proper identification. Wires should be identified by ferrules, and cables by colour bands at every 3M distance.
- v) Minimum bending radius permissible is 12 D in case of armoured cables and 8/10 D in case of unarmoured cables.

10.0 TESTS

- 10.1 The contractor shall obtain from the manufacturer of major equipment, components and control panels and produce the necessary test certificates from the National Test House or any other approved Testing laboratory of each item to satisfy the good work—manship of the equipment fitness offered, and submit to clients.
- 10.2 After satisfactory completion of all the procedural tests/ performance test, inspection etc the contractor shall be responsible to obtain the final ‘ No Objection Certificate” from the Local Fire Brigade, TAC and other Statutory Bodies as applicable without any additional/ extra charges.

11.0 INSTRUCTION MANUAL & DRAWING.

- 11.1 The manufacturer shall submit all the relevant drawings and instruction manual furnishing detail information's on the circuit diagrams, component specifications, operational and maintenance instructions. Routine and periodical test methods and frequencies within one month from the date of completion and handing over. During detail engineering stage, a complete wiring diagram/ cable schedule interconnections shall be furnished by the contractor along with G.A drawings of each floor and the Main Control Panel and for the major equipment for comments / approval.
- 11.2 The tenderer shall submit a list of users of their materials and installation along with the satisfactory performance certificates of the users.

12.0 EARTHING

- 12.1 The Master control Panel, battery charger, metallic non- current carrying parts etc of the installation shall be rigidly earthed with adequately rated G.I. wires not less than 14 SWG. The Master control Panel shall be earthed to the nearest earthing grid/ mat with adequately rated earth wires. The earthing of the Fire Alarm system shall be separately done from Master Control Panel to the various floors, manual call points, external hooter etc.

TECHNICAL SPECIFICATION FOR MUSIC /PUBLIC ADDRESS SYSTEM

- 1.0 The system covered under this specification shall be designed, manufactured and tested for proven reliable and trouble free performance. The Public Address system is mainly being provided for Fire Fighting and orderly evacuation of people from affected areas in case of fire. There will also be an automatic Fire Detection and Alarm system installed separately which will be in operation alongside the P.A. system. The system would be such that in case of emergency, a responsible person can take command of the whole situation and issue necessary instructions over P.A. system for taking remedial measures for fire – fighting, evacuation and other necessary safety measures.
- 2.0 The scope of this specification includes all the items and components which are essential and necessary for proper performance of individual items, irrespective of whether the item is specifically mentioned herein or not, and for completion of the installation in all respects. Costs of individual items shall include all the accessories/ items essential for satisfactory performance of the particular items.
- 3.0 The Public Address System shall consist of
 - a) Control console with Microphone (s); Mixer amplifier(s) Amplifier Rack, Monitor Speakers, etc located in Main Control Room.

- b) Speakers at various suitable location if different floor of the building.
 - c) One speaker in each cabin and also minimum 4 nos. speakers at common places at each floor.
 - d) The associated wiring, and
 - e) Power Supply equipment's.
- 4.0 The Public Address system shall also have provision for playing pre-recorded/ taped instructions or otherwise as necessary through the speaker.
- 5.0 The equipments used shall be of Philips make and the system design should be TAC approved or acceptable to TAC.
- 6.0 The design of the system shall be such that
- a) It will not be possible to switch off the P.A. system manually so long the Fire Detection and Alarm system remains switched on. – Separate power source and independent arrangement for PA System interconnection with the alarm system having isolation arrangements so that either hooters Alarm system or speakers for PA system can be made functional .
 - b) It will be possible to communicate as follows :
 - i) Loud speakers of any floor operating in parallel ,
 - ii) All loud speakers of all the floors, operating in parallel.

7.0 SYSTEM

- 7.1 The speech will be fed from microphone, through the preamplifiers and amplifiers to speakers at various locations.
- 7.2 The amplifier shall have solid state circuitry, properly tropicalised and capable of ac/dc operation and capable to drive the speakers used for the installation.
- 7.3 The speakers shall generally have minimum audible range of 20 to 30 mtrs and should give clear, audible and intangible sound having frequency rage of 50 Hz to 20000 Hz.
- 7.4 There will be an auto manual change over selector switch with locking facility. In manual mode of operation it will energies the amplifier which will then act as a public Address Amplifier. There should be zone switches for selection where communication is to be made. Under normal condition, Auto/ manual switch shall be in auto mode. In the event of fire in a particular floor, the speaker connected to that floor will start producing an ' Alert Tone' from the " Fire Alarm System". If it is necessary to warn other floors or all places there shall be zone switches as well as common switches through which it can be done. If it is switch is to be pressed to create Evacuate Tone, For acoustic purposes, a speech switch is to be operated so that quality voice can be generated which will be optically indicated through LED. There shall be provision for adjustment of tone and volume in each case from the panel.
- 7.5 All power supply equipment's and accessories necessary for the system including back – up maintenance free battery and automatic battery charger, as necessary, shall be provided.
- 8.0 P A System enclosure shall be fabricated sheet metal constitution and consisting the following switches and controls :
- a) One goose neck type moving coil/ cardoid/hyper cardoid or equivalent microphone.
 - b) Arrangement for speaking to each floor separately or all floors together.

- c) Provision for playing pre-recorded /taped instructions or otherwise as necessary through the speakers.
- d) Pre- amplifier, 2 Nos. monitor loud – speakers , and other accessories.
- e) Testing arrangements and provisions.

9.0 Amplifier rack have the following :

- a) Amplifier mounting rails.
- b) Lockable steel doors with proper ventilation's slot for heat disputations.
- c) Proper cable entry arrangements and terminal blocks.

10 DESIGN REQUIREMENTS.

Speakers shall be connected in parallel and correctly phased.

System should be designed for high input impedance and impedance matching between microphones and pre- amplifier, amplifier and speakers on floor shall be done. Impedance of long length of cables also shall be considered.

The system shall be properly earthed to avoid unwanted distortion in the system.

System installation diagram giving details of cables routing, speaker installation, junction boxes etc and circuit diagrams for P A System amplifier shall be given by the contractor.

11 GENERAL REQUIREMENTS

- 11.1 All equipment's and panels shall be rugged in design. It shall be reliable in design and should have long service life.
- 11.2 Equipment shall be designed to operate continuously on a maximum ambient temperature of 45 degree C and the temperature rise shall be within the allowable limit. It shall also be so designed that it should work in local vibration and impacts, if arisen at any time in the locality during use.
- 11.3 All manual controls, indicators, switches etc shall be clearly labeled to indicate their proper function /services. All manual controls shall be robust in construction positive in action and so located that on accidental operation can take place.
- 11.4 All equipment's and components shall be designed, manufactured and selected to work satisfactorily against deterioration due to temperature, humidity, corrosion etc. resulting from the atmospheric condition existing in the vicinity. The equipment's and components shall be of first class good quality materials for its reliability. Protective painting shall be provided after installation of the panels and equipment's wherever required.
- 11.5 The selection of the power supply unit and the cables shall be such that on appreciable voltage drop takes place There shall be provision of protection against over load.
- 11.6 All the electrical/ electronic components covered under this specification, shall conform to the ISI specification or to B S specification where no IS specification exist.
- 11.7 List of recommended spares for its normal and trouble free operation for at least 5 years shall be furnished separately with quoted price as on optional item.

12 CONDUIT WIRING SYSTEM

- i) Surface/ concealed conduit wiring shall be adopted in wall/ floors/ ceilings or similar other coverage's as detailed in the Schedule of Items. Conduits are to be laid in an approved manner and the surfaces are to be made good after laying of ht conduit. Wherever required chases are to be cut on wall/ floor to suit and requirement of the fire protection system and made good in an approved manner. No extra cost will be paid on this account.
- ii) All conduits shall be of 25 mm dia M.S. conduits of wall thickness conforming to the relevant IS. The conduits shall be free from burrs and integral roughness. No. conduit shall be less than 25 mm dia unless specified otherwise.
- iii) Metal conduits wherever running shall be mechanically and electrically continuous and an earth continuity conductor shall be run along its length according to the I. E. Rules and the relevant IS for its proper and rigid earthing. It shall be bonded electrically at a regular interval to provide effective and rigid earthing of the conduit installation . In long distance straight runs of the conduit, inspection type screwed coupler shall be provided at a suitable interval on running threads with couplers and jam nuts.
- iv) To protect against rust the outer surface of the conduit & accessories shall be thoroughly cleaned and painted with anti – corrosive preservative paints, similar to the walls/ floors/ ceiling finish wherever required.
- v) Necessary bends in the system including diversions shall be done by bending the pipe or by inserting suitable inspection type bends/ elbows or similar fittings.
- vi) Generally 1100 V grade 1.5 mm. PVC insulated and sheathed copper cable shall be used conforming to IS 694 (Part ii) with adequate number of cores required for wiring. However, the voltage drop in the system should be duly taken into consideration and higher size of cables may be selected wherever such necessity arises. Total number of cables shall be so taken in a conduit as to facilitate easy drawing of the cables.
- vii) For loop earthing G I wires shall be used.
- viii) Panels and bigger items should be having cable glanding facility using double compression dust and moisture proof Electro plated brass cable glands of approved make.

13 CABLE TERMINATION

- i) All heavy duty cables to be used for the purpose of the P.A system `shall be PVC insulated and PVC sheathed copper conductor cables of armoured type conforming to IS 1554 (Part I) 1964 of 650/1100 V grade wherever used for indoor approved by the Engineer- in – Charge before use. All relevant test certificates shall be submitted in support of the sound manufacturing of the cables for approval to the Engineer- In – Charge. The cables are to be dispatched to site in wooden drums with the ends sealed. The requirement of the exact length of cables shall be determined by the successful tenderer after measurements at site.
- ii) cables shall be laid in walls / ceilings/ structures wherever concealed wiring is to be done but mainly the wiring run along the duct provided for the fire protection system shall be surface wiring. The cables shall be suitably supported @ 0-.45 M for vertical run and @ 0.30 M for horizontal run in general, by means of M. S. brackets and clamps or aluminium cleats fixed on M. S. brackets. Bolts of suitable sizes are to be grouted on wall for fixing of the brackets. Cables to be laid underground shall be of armoured type conforming to IS 1554 (Part I) 1964.
- iii) All the cables and wires should be tagged for proper identification. Wires should be identified by ferrules, and cables by colour bands at every 3M distance.
- iv) Minimum bending radius permissible is 12 D in case of armoured cables and 8/10 D in case of undermoured cables.

14 EARTHING

All the equipments shall be earthed to the nearest earthing grid/ mat with adequately rated earth wires.

15 TESTS

15.2 The contractor shall obtain from the manufacturer of major equipment, components and control panels the necessary test certificates and submit to clients.

15.3 After satisfactory completion of all installation contractor shall carry out tests in presence of the Owner and to the satisfaction of the Owner .

16 INSTRUCTION MANUAL & DRAWING

16.1 The manufacturer shall submit all the relevant drawings and instruction manuals furnishing detail information's on the circuit diagrams, component specifications, operational and maintenance instructions, routine and periodical test methods and frequencies within one month from the date of completion and handing over. Before commencement of work wiring diagram along with G A drawings of each floor shall be furnished by the contractor for Owner's approval.

17 LIST OF USERS

The tenderer shall submit a list of users of their materials and installation along with the satisfactory performance certificates of the users.

PORTABLE EXTINGUISHERS, FIRE ALARM AND MUSIC SYSTEM

LIST OF APPROVED MATERIALS & MANUFACTURERS

NOTE : All the materials shall be ISI marked wherever available from the list of Manufacturer given below. Wherever the ISI marked materials are not available the materials shall be from the best quality available in the market subject to submission of satisfactory test report & with prior approval from Architects.

Sl. No.	Item	Specification /Manufacturer
1.	Cushy Foot Mountings with rubber Friction pads	DUNLOP
2.	Pipes & Valves	
	a) M S/E R W Pipes	Medium quality pipes (ISI marked) conforming to IS 1239 for pipes upto 150mm N.B. & 6 mm (minimum) thickness pipes conforming to IS 3589 for pipes above 150 mm N.B.
3.	Power and control cables	UNIVERSAL/CCI/INCAB/ FORTGLOSTER

4.	Starters, contractors, push buttons, single phasing preventors	L & T. / Siemens,
5.	Portable Extinguishers	Approved make, bearing relevant ISI marking on body as well as the 1 st charge of chemicals/ gases et c. inside.
6.	650/1100V grade PV C insulated copper wires and flexible cable	Evershine -- KDK/ National/ Finolex/ Deltron/ Havells
7.	Star- Delta/ DOL Starter	L&T/Siemens/Crompton Greaves
8.	Contractors (Main & Auxiliary)	L&T/Siemens/Telemc hanique.
9.	Bimetal O/L Relay with SPP	L&T/ Siemens/ Telemec hanique
10.	Pneumatic Timers	Curtler & Hammer.
11.	Electronic Timer	L & T
12.	Voltmeter & Ammeter selector switch	Kaycee.
	HRC fuse base and carrier (Control Fuses)	EE/ Siemens / L&T.
	Steel conduits (Conforming to IS in all respects)	
	a) Galvanized	SENCO/ASHIS/MECHO/KKI/ BEC/SUPREME.
	b) Black Enameled	SENCO/ASHIS/MECHO/KKI/ BEC/SUPREME.
15.	Miniature Circuit Breakers (9 KA Breaking capacity)	MDS/STANDARD/INDO-KOPP /S&S/HAVELLS/CROMPTON GREAVES.
16.	Current Transformer	AE/KAPPA/SIEMENS.
17.	PVC Terminal Blocks	ESSEN/ELMEX.
18.	Hotters (F.A System)	PHILIPS/NATIONAL/HOMA/ KHERAJ
19.	Music System & Accessories	PHILIPS / BOSH
20.	Detectors (Ionization/Heat)	Apollo-60Series,Edward, System Sensor
21.	Battery	Chloride, Exide.
22.	Battery Charger	Approved quality..

INTENT OF SPECIFICATION & SYSTEM DESCRIPTION

It is not the intent to specify completely herein, all details of design and construction of the equipment / system. However, the equipment / system shall conform, in all respect, to high standard of engineering and be capable of performing in continuous operation up to the tenderer's guarantee in a manner acceptable to the client who all interpret the meaning of drawing and specification and shall have the right to reject any work or materials, which in his judgement are not in full accordance therewith.

1.0 SCOPE OF WORK

- 1.1 The Fire Protection and Fire Alarm System of the Regional office, Kolkata should be inline with the specifications and bill of materials enclosed herewith. The complete work should also comply with the system description, technical specification / data etc. as furnished hereinafter and the bill of material for instant scope of work can be referred from schedule of prices.
- 1.2 Manufacture or Procure, Supply, Delivery, Installation, Testing, Commissioning and Performance Test at site for all the Materials indicated under schedule of prices.
- 1.3 Supply of all the equipment / material should be completed in all respects i.e. all necessary accessories like special tools, first charge of refill, commissioning spare etc. as may be needed for proper installation and operation, irrespective of whether specifically mentioned in the technical specification or not.
- 1.4 In the interest of standardization, client reserves the right of selecting a particular manufacturer of fire protection equipment / component and the Tenderer / Contractor should supply the same of the particular make, if so required.
- 1.5 Providing anti-corrosive treatment for buried piping and painting for above ground piping including supply of auxiliary steel members as necessary and demonstration for operation of the system.
- 1.6 Assistance to client in getting W.B.F.S.'s approval i.e. final N.O.C.. The assistance shall include arranging, participating in discussion with W.B.F.S. and after completion of all the fire fighting arrangement the Director of W.B.F.S. shall be approached for inspection and testing of the system. More precisely, the complete responsibility of getting final N.O.C. shall be with the contractor.

2.0 SERVICES TO BE PROVIDED BY CLIENT

- 2.1 Civil works associated with construction of pump house, water reservoir, equipment foundation, floor / wall inserts, all puddle pipes, pipe trench, cable trench, providing and lying of hume pipe under the road as may be needed for the instant job.
- 2.2 Power Supply / Cabling & Earthing of all electrical equipment as detailed in specification.

3.0 SUPPLY DESCRIPTION

- 3.1 The complete Fire Protection and Fire Alarm System for the Regional Office at Kolkata will be generally in line with the recommendations of W.B.F.S. .
 - a. Fire Protection by Portable Extinguisher.
 - b. Electrically operated Auto-Manual Fire Alarm System by Break Glass type Manual Call Point and Smoke / Heat Detector.
- 3.2 Portable Extinguisher :

- a. All floors or area of the complete building complex will be equipped with portable extinguisher of different type, complying the norms of IS : 1648.
- b. 9 ltrs. capacity Water CO₂, 5 kgs. capacity Dry Powder, 9 ltr. capacity Foam and 4.5 kgs. capacity Carbon-di-Oxide type extinguisher will be kept and distributed on each floors in such a way that during emergency / fire hazard on any portion of the floor, it should not require to travel long distance for the personals to collect the extinguisher. Moreover, all the extinguishers will be installed in the locations which will have easy access / approach.

3.3 Fire Alarm System:

- a. The Fire Alarm for the complex will be auto-manual nature. The system will operate through a 10-zone Fire Alarm Panel complete.
- b. The system will comprise network of cabling for connecting numbers of Break Glass type Call Point, Smoke / Head Detector, Response Indicator and Hooter. The Smoke / Heat Detectors are considered for the office space at the 1st floor.
- c. In case the fire is detected by any person, the near by call point will be actuated by breaking the glass or by the automatic actuation of detector (Smoke / Heat), the impulse will be transmitted to the Fire Alarm Panel. On receipt of impulse from the respective zone, the complete Fire Alarm System will automatically come into operation and necessary audio-visual annunciation will appear on the panel.
- d. After each operation / testing the complete system is to be resettled manually (if required by replacing the glass cover of call point) and the system should be kept ready for operation.

CODES & STANDARDS

All the systems and equipments within the scope of this tender shall be of reputed proven makes, designed and manufactured in accordance with the stipulations of latest versions of Indian Codes or recommendations of W.B.F.S. / T.A.C. / F.O.C./ N.F.P.A.

When an equipment is offered conforming to standards other than those listed below, it shall be clearly brought in Schedule of Deviations.

01. IS : 1646 : Code of Practice for fire safety of building (general), Electrical Installation.
02. IS : 1648 : Code of Practice for fire safety of buildings (general), Fire Fighting Equipment and its Maintenance.
03. IS : 3034 : Code of Practice for Fire of Industrial Buildings, Electrical Generating and Distributing Stations.
04. IS : 884 : Fire Aid Hose Reel for Fire Fighting (for fixed installations).
05. IS : 2171 : Portable Fire Extinguisher, Dry Powder type.
06. IS : 2175 : Heat Sensitive Fire Detector.
07. IS : 2878 : Portable Fire Extinguisher, CO2 type.
08. IS : 1239 : Part - I : Mild Steel Tubes.
Part - II : Mild Steel tubulars and other wrought steel pipe fittings.
09. IS : 778 : Gunmetal gate, globe and check valves for general purposes.
10. IS : 14946 : Sluice Valves for water works purposes (50 to 300 mm size).
11. IS : 5312 : Swing Check type Reflux (Non-Return) Valves.
12. IS : 940 : Portable Fire Extinguisher, Water CO2 type.
13. IS : 10204 : Portable Fire Extinguisher, Foam type.
14. IS : 2190 : Code of Practice for selection, installation and maintenance of portable Fire Aid Fire Appliances.
15. IS : 1520 : Horizontal Centrifugal Pumps for clear, cold and fresh water.
16. IS : 5290 : Landing Valves (internal hydrant)

17. IS : 8423 : Controlled Percolation Hose for fire fighting.
18. IS : 903 : Fire Hose Delivery Couplings, Branch Pipe, Nozzles & Nozzle spanner.
19. IS : 2062 : Structural Steel (Fution / Welding quality).
20. IS : 325 : Three Phase Induction Motor.
21. NBC : National Building Code, Chapter - IV.
22. IS : 2871 : Branch Pipe, Universal, for Fire Fighting purposes.
23. IS : 732 : Code of Practice for electrical wiring installations.
24. IS : 2217 : Recommendations for providing first aid fire fighting arrangements in public buildings.
25. IS : 3844 : Code of Practice for installation of internal fire hydrant in multistoried buildings.
26. IS : 2189 : Code of Practice for selection, installation and maintenance of Automatic Fire Detections and Alarm System.

VRF AIRCONDITIONING UNITS

SPECIFICATION FOR AIR-CONDITIONING WORK AT MMTC, KOLKATA

1 OBJECTIVE OF THE SPECIFICATION

This specification is intended to cover the design, manufacture, testing and delivery, duly packed for transport to site, for complete Air-conditioning work as specified herein after for the proposed Office Building.

The scope of the specification also includes the complete erection, final check-up, testing and commissioning at the site of the entire equipment to be supplied under this specification.

2 GENERAL INFORMATION

MMTC has proposed to install the VRF air cooled type air-conditioning system for air-conditioning of the Office building.

2.1 BASIS OF DESIGN

OUTSIDE DESIGN CONDITION

Summer : 39°C DBT & 28.3°C WBT

Inside Design Condition: 24±0.5 °C DBT, around 55% RH.

Occupancy : Normal.

Lighting load : 1.5 W/sq.ft

2.2 REFRIGERATION LOAD & SCHEME OF UNITS

The scheme of units is enclosed in Annexure I.

3 SCOPE OF WORK

The scope of this Section comprises the supply, erection testing and commissioning of air-cooled type DC Inverter Based Variable Refrigerant Flow (VRF) type air-conditioning system conforming to these specifications listed below for air -conditioning different areas (as specified in the Annexure – I) inside the proposed Building.

3.1 VARIABLE REFRIGERANT FLOW (VRF) SYSTEM

TYPE

Units should be DC Inverter Technology based Variable Frequency Driven VRF air-conditioners with air-cooled outdoor units, which shall be capable of cooling gas per individual or season requirement suitable for operation on 415V, 3 Phase, 50 Hz AC electric supply.

The outdoor units shall have cooling mode only, consisting of one/multiple modules with single circuit of refrigerant piping and multiple indoor units of various types & capacities. Each indoor unit should have capability to cool independently for the requirement of particular area & also as per seasonal weather changes.

The indoor unit on any circuit can be different type & capacity and also controlled individually. It must have the facility to connect following types of indoor units to the system.

- # Ceiling mounted Cassette type
- # Ceiling mounted Duct Type
- # Ceiling mounted Low Static Duct Type
- # Hi-Wall mounted type
- # Ceiling Suspended Type
- # AHU Units

However all the above mentioned units may not be applicable for this project.

General

Indoor units & outdoor units shall be factory assembled, tested and filled with first charge of R 410A refrigerant only before delivering at site & should be suitable for operation on 380V- 415V, 3 Phase, 50 Hz AC electric supply.

Units should be air cooled type, DC Inverter Technology based variable frequency driven VRF type air conditioner consisting of outdoor units and multiple indoor units, each suitable to cool in summer as per the requirements.

All proposed outdoor unit should have minimum COP of 3.65&4.69 at 100% & 50% load condition respectively for Cooling.

The DCinverter technologybased variable frequency driven VRF equipment should be capable enough, so that the refrigerant piping between indoor and outdoor unit shall be extendable upto 1000m with maximum height difference between outdoor & indoor unit of 110m & level difference between two indoor unit maximum upto 15m. The equipment also should have the capacity to cater total piping length of 1000m.

For testing and evaluation of equipment, KSB ISO 15042 or equivalent standard shall be applicable.

Outdoor Unit

The outdoor unit shall be a factory assembled unit housed in a sturdy weather proof casing constructed from rust-proofed mild steel panels coated with a baked enamel finish. The unit should be completely factory wired tested with all necessary controls. It should be Air Cooled type with Top Air discharge.

The System must have the following features:

- All outdoor units of capacity equal or more than 18 HP shall have minimum three scroll compressors.
- It should also be provided with duty cycling forDC inverter scroll compressors capable of changing the rotating speed of compressor by DC inverter controller to follow variation in cooling loads & switching starting sequence for better stability and prolonging equipment life.
- Each outdoor unit should equipped with at least **One** DC Inverter HSS Scroll Compressor upto20 HP &**Two** DC Inverter HSS Scroll Compressors upto40 HP, **Three** DC Inverter HSS Scroll Compressors upto60 HP &**Four** DC Inverter HSS Scroll Compressors upto80 HP so that

operation is not interrupted with failure of any inverter compressor and if one inverter compressor malfunctions, other continues to provide emergency operation smoothly till repair is effected.

- It should also be provided with duty cycling for multiple inverter compressor switching starting sequence for better stability and prolonging equipment life.
- All out door unit must have pump out and pump down feature so that incase of failure, refrigerant can be accommodated in indoor and outdoor unit respectively.
- The outdoor unit shall be modular in design and should be allowed for side by side installation.
- The unit shall be provided with its own microprocessor control panel.
- The outdoor unit must have the feature of Record running parameters of last 3 minutes before failure, for fault analysis & easy, faster trouble shooting.
- All out door unit must have the feature of auto recharging of refrigerant.
- All out door unit must have Anti Corrosive Fins, preferably Gold Fin Condenser for better life.
- All out door unit should have Oil recovery system.
- All out door unit should have connectable range of Indoor units from 0.59 TR to 8 TR and above.
- The machine must have a Plate type Heat exchanger for sub cooling feature to use coil surface more effectively thru proper circuit/bridge so that it prevents the flushing of refrigerant from long piping due to this effect thereby achieving energy savings.
- Outdoor unit shall be suitable for mix match connection of all type of indoor units.
- The condensing unit shall be designed to operate safely when connected to multiple fan coil units.
- All out door unit should have Auto Backup function.
- The outdoor unit should have low noise level which should not exceed 63 db(A)±3 during normal operation. It should have night quite mode operation as a standard feature.
- The outdoor unit should have liquid injection system to achieve no deration on high ambient temp up to 39 deg C

Compressor

The compressor shall be of highly efficient hermetic HSS scroll type and equipped with DC INVERTER capable of variable frequency drive with capacity modulation.

Heat Exchanger

The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminum fins to form a cross fin coil. The aluminum fins shall be covered by anti-corrosion resin film.

Refrigerant Circuit

The refrigerant circuit shall include an accumulator, liquid and gas shut off valves and a solenoid valves.

All necessary safety devices shall be provided to ensure the safety operation of the system.

Safety Devices

The following safety devices shall be part of the outdoor unit;
High Pressure Switch, Low Pressure Switch, Fan Motor Safety Thermostat, Inverter Overload Protector, Over Current Relay, Fusible Plugs, Fuses.

Oil Recovery System

Each unit shall be equipped, with an oil separator to ensure stable operation with long refrigerant piping.

INDOOR UNIT:

General

The Indoor unit shall be Ceiling mounted Cassette type or Wall Mounted type as specified in BOQ. These units should be suitable for operation on 220V-240V, Single Phase, 50 Hz AC electric supply.

These units shall have electronic control valves to control refrigerant flow rate in response to load variation in the room.

The address of IDU shall be set automatically in case of individual and group control.

The IDU shall be basically a Fan coil unit suitable for Ceiling/Wall hung type. Each unit shall have Cooling coil, Blower, Filter, BLDC Motor, Drain pan and accessories. All the IDUs installed to have individual Cordless/Corded Remote controls.

Indoor unit shall have cleanable type filter to an integrally moulded/ moulded plastic frame. The filter shall be slide away type and neatly inserted.

It shall be possible to clean the filters either with compressed air or water.

The Cooling coil shall have Aluminum fins and copper tubes. The Fan section shall be dual suction, aerodynamically designed & balanced turbo, multi blade type blower to ensure low noise and vibration free operation and having multiple speed motor. The fan shall be direct driven type, mounted directly on motor shaft having support from housing. The Cassette units to have Automatic drain pump.

All Cassette units should have Inbuilt Drain pump as a standard feature to avoid any sort of water logging problem.

Ceiling Mounted Cassette Type Unit (Multi Flow Type)

The unit shall be ceiling mounted type. The unit shall include pre-filter, fan section and DX coil section. The housing of the unit shall be powder coated galvanised. The body shall be light in weight & shall be able to suspend from four corners.

The unit shall have an external attractive panel for supply & return air. Unit shall have four-way supply air grills on sides and return air grill in centre, which should be auto elevated. All units below 2 TR Nominal Capacity should have 700mm x 700 mm Front panel & 2 TR onwards the front panel size should be 950mm x 950mm.

Each unit shall have high lift drain pump, individual 4-way control low gas detection system and very low operating sound which should not exceed 48db(A)±3.

Wall Mounted Type

The unit shall be wall mounted type. The units shall include pre-filter, fan section & DX coil section. The housing of the unit shall be powder coated galvanised. The body shall be light in weight & flat finish type. The unit shall have an attractive external casing for supply & return air. The noise level for these unit should not exceed 46db(A)±3.

Y-Joints

Supply & installation of the Y- Joints separation refrigeration pipe joints and headers in the appropriate orientation to enable correct distribution of refrigerant. The distribution joints should be factory insulated with pre-formed section of Expanded polystyrene/Equivalent.

3.2 REFRIGERANT PIPING

- Refrigerant piping for the air-conditioning system shall be upto 15.88mm dia. of soft seamless copper tubes & for above 15.88mm dia the pipe material shall be of hard seamless copper tubes with pipes material being hard drawn copper pipe.
- Before joining any copper pipe or fittings, its internals shall be thoroughly cleaned by passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt etc. while constructing the joints. Subsequently it shall be thoroughly blown out using nitrogen gas.
- After completion of installation of the refrigerant piping, the piping system shall be pressure tested using nitrogen gas at a suitable pressure as specify by OEM (Original Equipment Manufacturer). Pressure shall be maintained in the system for 48 hours. The system shall then be evacuated to a vacuum of not less than 700 mm Hg and held for minimum 24 hours.
- The suction line pipe size and the liquid line pipe sizes shall be selected according to the manufacturer's specified diameter. All refrigerant pipes shall be properly supported and anchored to the building/structure using steel hangers, fastener, brackets and supports which shall be fixed to the building/structure by means of inserts or expansion shields or anchor fasteners of adequate size and number to support the load imposed thereon.
- The refrigerant piping should be laid in core cut in the floors in such a way that it should not distort the interior of the room, wherever the refrigerant pipe has to be laid across the room, it should be laid in a concealed manner by making appropriate boxing arrangement matching with the interior of the room. All associated minor Civil Engineering works (like chasing on wall, ceiling & replastering etc.) related with the above items are included in the scope of work.
- Entire liquid and suction refrigerant pipe lines including all fittings, valves and strainer bodies etc. Shall be insulated with 19mm/ 13 mm thick Nitrile rubber as specified in BOQ.

3.3 DRAIN PIPING

G.I. /PVC condensate drain pipe in the drain point of indoor units shall be provided.

P. 3.4 PAINTING

All the equipments, mounting frames, stands etc. shall be painted with 2 coats of suitable paints of approved colour over the priming paint to prevent corrosion of the equipment. **LIST OF RECOMMENDED MAKES**

Sl. No.	Items	Recommended Makes
1)	Approve makes for Supply of VRF Units	Toshiba / LG/Mitsubishi Electric
2)	Insulation (Nitrile Rubber)	Superlon /Armaflex/A-Flex/K-Flex
3)	Control Cable	Finolex/Asian/Equivalent
4)	Copper Piping	Nippon/Mandev/Rajco
5)	Drain Piping	Supreme/Karan/Oriplast

ANNEXTURE—A
(Part of Financial Bid)

SUMMARY OF TOTAL QUOTED RATE

COST FOR THE REFURBISHMENT, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION
WORK AT KOLKATA REGIONAL OFFICE, MMTC AT NIC BUILDING, 4TH FLOOR,
8, INDIA EXCHANGE PLACE, KOLKATA 700 001

SCHEDULE—I (CIVIL, SANITARY AND FURNISHING WORKS):

SCHEDULED—II(ELECTRICAL WORKS):

SCHEDULED—III(FIRE FIGHTING SYSTEM AND MUSIC WORK):

SCHEDULED—IV(AIR-CONDITION WORK):

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Total Rupees in Words:

Place:

Date:

Signature of Contractor With Seal

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SCHEDULE-- I (CIVIL AND ALLIED WORKS)					
PART-A FURNISHING WORK					
SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
DISMANTLING JOB					
1.1	Dismantling all types of damage plastering in wall, ceiling etc. including staking servicable materials at site and removing rubbish all complete made as per direcion by the Employer / Architect(4th Floor)	Sqm.	780		
1.2	Dismantling all type of wooden partition /wooden clading on wall & columns / False ceiling etc. including staking serviceable materials at site and removing rubbish all complete made as per direction by the Employer/ Architect.	Sqm.	210		
1.3	Dismantling all type of M.S.Window/ Grill etc. including staking servicable materials at site and removing rubbish all complete made as per direction by the Employer/ Architect.	Sqm.	56		
1.4	Dismantling and removing all type of Mossaic Tiles flooring etc. including staking servicable materials at site and removing rubbish all complete made as per direction by the Employer/ Architect.	Sqm.	1021		
1.5	Dismantling and removing ceramic tiles from toilet / kitchen and other area including staking servicable materials at site and removing rubbish all complete made as per direction by the Architect.	Sqm.	165		
1.6	Dismantling and removing all type of masonry wall including staking servicable materials at site and removing rubbish all complete made as per direction by the Architect.	Sqm.	110		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR, 8, INDIA EXCHANGE PLACE, KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
2	<u>BRICK WORK</u>				
	Providing and laying brick work at all heights above plinth level in cement mortar (1:4) in 125 mm thk. Wall with HB wire netting reinforcement at every fourth course including fair cutting bending, plumbing lining, levelling, raking of joints, scaffolding and curing all materials and labour complete.	Sqm.	12		
3	<u>PLASTERING</u>				
	Providing cement plaster to all internal surfaces of walls, ceiling etc. including chipping watering surface, scaffolding, curing, materials and labour complete as per requirement.	Sqm.	24		
4	<u>WALL PUTTY</u>				
	Applying Wall Putty about 1:5mm thk. as per direction to wall, columns incl. preparation of base and supply of materials at all levels over cement plaster as per specification and direction by our Architect.	Sqm	325		
5	<u>PAINTING</u>				
5.1	Providing and applying plastic emulsion of approved colour & shade, cleaning the surface and make it free from dust by scrapping, cleaning etc., including application of two coats acrylic putty of approved make over the walls to make it the same in line and level; application of primer coat over the same; application of minimum two or more coats of plastic emulsion of Asian paints / ICI Paints or equivalent upto the desired finish of the Architects and protecting till the handing over of site including required scaffolding, cleaning, filling up cracks with approved crack filler etc. all complete at all levels and leads to entire satisfaction of the Architects.				
5.1.1	For Wall only	Sqm	560		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR, 8, INDIA EXCHANGE PLACE, KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
5.1.2	For Ceilling	Sqm	130		
5.2	Supply and application of two coats of synthetic enamel paint of approved brand and manufacturer to give an even shade over a coat of primer after thorough sand papering, pully work and cleaning of the surfaces all complete as per direction of our Architect.				
5.2.1	For Electric Rm/Canteen	Sqm	60		
5.2.2	For Window/Grill/rolling Shutter	Sqm	67		
6	<u>MIRROR POLISHED VITRIFIED TILES FLOORING</u>				
6.1	Providing, laying and fixing of 800mm x 800mm VITRO Polished Vitrified Tiles with NANO Technoligy, high gloss, Stain Resistant full body glazed Vitrified Tiles with sharp edges approved make mirror finished, anti skid quality of shade selected by Archietects, 10.5mm thick, use bed mortar of 20mm thk. with 1:3 cement and sieved sand , after chiping the existing floor bed and cleaning the floor bed surface throughly all set in combination of plain or designed tiles or other shade on floor including 150 mm high skirting (200 x 800) mm as per design drawing etc. all complete as per terms, conditions, specifications and direction by our Architect--basic price Rs.146/-	Sqm	910		
6.2	Providing and laying designed glazed ceramic tiles of approved make and brand for dado upto a height of 1200mm of stationery set in cement mortar (1:3) and using grey cement slurry of honey like consistency and joints finished with white cement including soaking of tiles in water for minimum six hours, floor and skirting all complete as per direction by our Architects.				
6.2.1	Canteen/Electric Rm./Store area --450x450mm	Sqm	65		
6.2.2	Toilet area: Floor: 8 sqm. + Dado 15 Sqm.--600x300mm--CGM	Sqm	23		

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SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
6.2.3	Toilet area: Floor:35 sqm. + Dado 85 Sqm--- 300x200mm--Gents / LadiesToilet	Sqm	120		
7	<u>BLACK STONE SLAB (PANTRY)</u>				
	Providing and fixing in position 18 mm thk black stone slab of approved quality to the top of				
	Pantry counter and side wall of about 3000 mmx 900 mm x 600mm and two nos. 800mm x 600mm including machine cut and polished on exposed surfaces and edges all complete.	Sqm.	5		
8	<u>FALSE CEILING</u>				
8.1	GYPBOARD --- Providing and fixing suspended false ceiling which includes providing and fixing G.I peremeter channels of size 0.55 m. of thick having one flange of 20mm and another flange of 30 mm and a web of 27 mm along with peremeter of ceiling screw fixed to brick wall/ partition with metal slaves and screws at 600 mm centers. Then suspending GI intermediate channels of size 45mm 0.9mm thick two flanges of 15mm each from the soffit at 1220mm centres with ceiling angle of width 25mm x 10 mm x 0.55mm thk. fixed to soffit with GI cleat and steel expansion fastners, ceiling section of 55 mm thick having knurled web of 51.5mm and two flanged of 26mm each with lips of 10.5 are then fixed to intermediate channels with the help of connecting clips and in direction perpendicular to the immediate channel at 457mm centres 12.5 mm tapered edge Gyp board conforming to IS 2095 -- 1982 is then screw fixed to ceiling position 25mm sky wall screws at 230 mm centres, finally teh boards are to be jointed and finished, so as to have a flush look which includes filling and finishing the				
	tape shade and square edges of the boards with jointing compound synthetic tape and two coats of primer and two coats of acrylic emulsion paint of approved make and desired colour suitable for Gyp Board(as per manufacturers specification)				
8.1.1	Plain Design	Sqm	810		

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
8.1.2	Drop Design with cove pattern	Sqm	75		
9	<u>FALSE CEILING (Armstrong)</u>				
	Providing & fixing in position false ceiling in Armstrong 600 x 600 mm x 15/16mm Dune Supreme RH 99 Prima tile with Tegular edge framework as specified by Armstrong Co. with suspenders wherever required. Making necessary framework for A.C. Ducting, if any, and necessary cutouts for diffusers and light fittings, taping and finishing to proper line & level, including making grooves and trap doors for A.C. unit in 18mm thick BWR Grade Plywood with Stainless Steel hinges & locks with moulding 25mm x 25mm for edges including finishing with White Plastic Emulsion Paint after application of two coats wooden prima etc. complete in all respects. (Note:- Only the plan area will be measured for payment. No. extra payment will be made for cutouts, grooves, mouldings etc.)				
	Hall Area	Sqm.	165		
10	<u>TEXTURED WALL</u>				
	Providing and applying textured wall finish of approved brand and colour, texture and finish, spray coat, the coats wall coating with drop effect in single shade. The item also includes preparation of surface, painting the surface with a coat of acrylic emulsion paint all complete as per direction of the Architects.	Sqm	65		
11	<u>WOODEN FLOOR</u>				
	Wooden laminated Floor of thickness 8.3 mm as per manufacturers specifications design to be approved by the Architect/ Employer , (Manufacturers Warranty to be submitted)	Sqm	70		
12	<u>FULL HT. PARTITION (OPAQUE)</u>				
	Supplying and erecting full height opaque partitions (2500 mm. high) as per drawing and conforming to the following specifications.				

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	<u>Basic frame work :</u>				
	Well seasoned hardwood like Malayasian Sal Wood / Kapoor or eqv.sectins, treated with two coats of wood preservatives, 75mm x 50 mm wide at minimum 600 mm c/c both ways horizontal or vertical spacings as per site condntions. Vertical members shall be suitably extended upto anchored and cross- tied at ceiling level.				
	<u>Skin membrane :</u>				
	6mm. thk. MR grade Plywood on both side, as per drawing/ instructions.				
	<u>Finishing :</u>				
	1mm thk. design laminate sheet of same or combinatin shades as per instructions.				
	Quoted rates shall include all necessary materials, accessories and labour and also allow provisions for electrical/ telephone / computer wiring conduits and switch boxes, etc.(Materials for wiring conduits and switch boxes shall be separately paid for.)	Sqm	170		
13	<u>FULL HEIGHT PARTITION (PARTLY GLAZED)</u>				
	Supplying and erecting full height partly glazed partitions (upto 2500 mm high) as per drawing and conforming to the following specifications				
	<u>Basic frame work :</u>				
	Well seasoned hardwood like Malayasian Sal Wood / Kapoor or eqv.sectins, treated with two coats of wood preservatives,75mm x 50mm wide at minium 600 mm c/c both ways horizontal or vertical spacings as per site condntions. Vertical members shall be suitably extended upto. anchored and cross- tied at ceiling level.				

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	Exposed frame members in the glazed portions shall have wider spacings(max. 1850mm. Clear) as per instructitons. Exposed members shall be finished with 1 mm thick laminate sheet of same or combination shades, over 6 mm thk MR Grade plywood at locations as per instruction.				
	<u>Skin membrane :</u>				
	opaque portions at top and bottom shall have 1 mm thick laminate sheet of same or combination shades over 6 mm. thick MR Grade plywood on each face, as per drawing/ instructions.				
	<u>Finishing :</u>				
	1 mm thick laminate sheet of same or combination shades as per instructions.				
	<u>Glazing :</u>				
	6mm. thk clear etching design float glass fixed with continuous steam beech wood glazing beads of approved shape (from 75 x 25 mm) all round, polished and coated with melamine lacquer finish.				
	Quoted rates shall include all necessary materials, accessories and labour and also allow provisions for electrical/Telephone/ computer wiring conduits and switch boxes, etc. (Materials for wiring conduits and switch boxes shall be separately paid for.)	Sqm	155		
14	<u>CASH WORK STATION</u>				
	Providing and erecting in position Cash Work Station of size 1900x 800 x 750 mm inclusive of a 1050 mm high, 400 mm wide customer writing top finished with 19mm thk. MR block board, 1mm thk. mica laminate of approved shade finished with 12mm thk.toughened glass on top fitted with glass stud including a drawer unit for cash comprising of a readymade MS powder coated metal drawer (MD3025 INNOFIT SYSTEMS or Eqv) and 2 nos. cash drawer, a readymade articulated keyboard drawer (AR-485 INNOFIT SYSTEMS or Eqv.) and all necessary				

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	accessories, suitably suspended below table top.The workstations shall be supported from the partition system and made of 19mm thk. BWP block board (IS:1659) finished with 1 mm thk. mica laminate sheet including all inner surfaces. Free edges shall have CP teak wood liping of straight profile,all inner surface of drawer powder coated spray paint as per drawing and design.				
	All drawers shall be provided with approved drawer-slides, automatic central locks with keys in duplicate and other necessary hardware and accessories including satin finish S.S.heavy duty knob etc. of approved quality.				
	The front of the cash counter between customer writing top to 1650 mm high from floor level i.e., 600mm shall be provided with 12mm thk. clear toughened float curved glass suitably supported from the side partitions with glass clamp.				
	Partition system shall be separately paid for.	Sqm.	1.43		
15	<u>GLASS (CASH COUNTER)</u>				
	Providing and fixing 12mm thk clear toughned glass finished with machine polished of all free edges between glass working top (1050mm to 1650 mm)using the patch fittings/ glass frame work of full height cash partition, all complete as per design and drawing by our Architects.	Sqm.	1.92		
16	<u>HALF HT. PARTLY GLAZED PARTITION</u>				
	Supplying and erecting Low height partly glazed Partition (upto max. 1350 mm. high) as per drawing and conforming to the following specifications :				
	<u>Basic frame work :</u>				
	Well seasoned Malayasian sal / Kapoor wood sections, treated with two coats of wood preservatives, 62.5mm wide x 50 mm (Minimum) at maximum 400 mm horizontal or vertical spacings as per site conditions.				
	<u>Skin Membrane :</u>				

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SI.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
	6 mm thk. MR grade plywood on each face as per drawing/ instruction.				
	<u>Finishing :</u>				
	1 mm thk. design laminate sheet of same or combination shades as per instructions.				
	<u>Edge moulds :</u>				
	All free top / end surfaces shall have wood moulds finished with natural wood polish of approve shape and size (75 mm x 20 mm) .				
	<u>Tiles(Any one)</u>				
	Prelaminated Tiles : Prelaminated tiles will be made of 12mm thick exterior grade particle board as per IS12823:1990 and will be fitted with the frame with wooden beat.All exposed edge of tiles will be covered with wooden beat and will be fitted with the wooden frame.				
	Glass Tiles : Single skin glass tile will be made of minimum 4mm thick clear/etching glass of reputed brand and will be fitted with the frame with glass beat.				
	Marker Tile : Marker tile will be of 12mm thick made of exterior grade plain MDF board as per IS:12406 duly pasted with 0.8mm thick marker laminated. Back side of the tile will be covered by minimum 0.8mm thick balancing laminate. All exposed edge of tiles will be covered with wooden beat.				
	Pin up Tile : The tile shall be made of minimum 9mm thick soft board inside and covered with fabric pasted on it by PVA glue.				
	Quoted rates shall include all necessary materials, accessories and labour and also allow provisions for electrical/Telephone/computer wiring conduits and swithc boxes, etc.(Materials for wiring conduits and switch boxes shall be separately paid for.)	Sqm.	175		
17	<u>HALF HT. PARTITION (OPAQUE)</u>				
	Supplying and erecting half height opaque partitions (1350 mm. high) as per drawing and conforming to the following specifications.				

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Sl.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
	<u>Basic frame work :</u>				
	Well seasoned hardwood like Malayasian Sal Wood / Kapoor or eqv.sectins, treated with two coats of wood preservatives, 62.5mm x 50 mm wide at minimum 450 mm c/c both ways horizontal or vertical spacings as per site condtions. Vertical members shall be suitably extended upto anchored and cross- tied at ceiling level.				
	<u>Skin membrane :</u>				
	6mm. thk. MR grade Plywood certificate on both side, as per drawing/ instructions.				
	<u>Finishing :</u>				
	1mm thk. design laminate sheet of same or combinatin shades as per instructions.				
	Quoted rates shall include all necessary materials, accessories and labour and also allow provisions for electrical/ telephone / computer wiring conduits and switch boxes, etc.(Materials for wiring conduits and switch boxes shall be separately paid for.)	Sqm	65		
18	<u>OFFICER'S PRIVACY PANEL</u>				
	Supplying and erecting Low height partly glazed Privecy Panel (upto max. 1350 mm. high) as per drawing and conforming to the following specifications :				
	<u>Basic frame work :</u>				
	Well seasoned Malayasian sal / Kapoor wood sections, treated with two coats of wood preservatives, 62.5mm wide x 50 mm (Minimum) at maximum 400 mm horizontal or vertical spacings upto 900mm and balance portion(300mm) will be 8 mm partly float glass with etching design and partly soft board all complete as per design and drawings by our Architects.				
	<u>Skin Membrane :</u>				

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	6 mm thk. MR grade plywood on each face as per drawing/ instruction.				
	<u>Finishing :</u>				
	1 mm thk. design laminate sheet of same or combination shades as per instructions.				
	<u>Edge moulds :</u>				
	All free top / end surfaces shall have wood moulds finished with natural wood polish of approve shape and size (75 mm x 20 mm) .				
	<u>Tiles(Any One)</u>				
	Prelaminated Tiles : Prelaminated tiles will be made of 12mm thick exterior grade particle board as per IS12823:1990 and will be fitted with the frame with wooden beat.All exposed edge of tiles will be covered with wooden beat and will be fitted with the wooden frame.				
	Glass Tiles : Single skin glass tile will be made of minimum 4mm thick clear/etching glass of reputed brand and will be fitted with the frame with glass beat.				
	Marker Tile : Marker tile will be of 12mm thick made of exterior grade plain MDF board as per IS:12406 duly pasted with 0.8mm thick marker laminated. Back side of the tile will be covered by minimum 0.8mm thick balancing laminate. All exposed edge of tiles will be covered with wooden beat.				
	Pin up Tile : The tile shall be made of minimum 9mm thick soft board inside and covered with fabric pasted on it by PVA glue.				
	Quoted rates shall include all necessary materials, accessories and labour and also allow provisions for electrical/Telephone/computer wiring conduits and swithc boxes, etc.(Materials for wiring conduits and switch boxes shall be separately paid for.)	Sqm.	76		
19	<u>DOOR</u>				
19.1	Supplying and fixing in position 38 mm thk. solid core hot pressed phenol formaldehyde bonded flush door shutter of approved make finished				

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	with 1 mm thk. laminate sheet of approved quality on both sides of the door shutter one Vision Panel (125mmx1500mm) is to be provided with 6 mm thk. clear float glass fixed with glass bead finished with natural wood polish, complete as per drawing. Rate to include cost of hardware fittings e.g. mortice lock with S.S Handle, hinges, door closer etc. of approved make and quality. The exposed timber surface to be polished in natural colour and finishing the same with melamine lacquer in mat satin finish all complete.	Sqm.	55		
19.2	Premium range approved make 25mm thk.FRP Door made out of high density polyurethen foam(PUF) dimension 600x2125 mm and 900x2125mm. And shutter frame of PUF of dimension 95x55 mm overall thickness on wall with total fittings and fixing all complete as per direction of our Architects.	Sqm.	23		
19.3	Supply and fixing in position well seasoned steam beech wood scanting to door frame as directed and specified. Exposed surfaces are to be polished in approved colour and finished with melamine lacquer in mat satin finish.	Cum	0.25		
20	<u>GLASS DOOR</u>				
	Providing & fixing double shutter Glass door of size as per drawing fabricated with 12mm thk TOUGHENED glass (Modi Guard / Saint Gobain)with approved patch fittings & floor springs. It shall have approved stainless steel door handles on both sides and suitable locking arrangement etc. all as directed & to the entire satisfaction of our Architects. All the fittings shall be of Ozone or eqv. make, Handle of Neki or eqv. make - H shape (25mm dia - 600mm long)	Sqm	3.15		
21	<u>FIXED GLASS PARTITION</u>				
	Providing and fixing Fixed Glass partition with 12 mm thk clear float TOUGHENED glass with approved patch fittings all as directed & to the entire satisfaction of our Architects.				

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SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	All the fittings shall be of Ozone or eqv. make fixed to the top wooden / R.C.C member and bottom floor grove with necessary screws / holdfast for fixed glass partition with all kinds of patch fittings with proper sylicon sealants in all edges of fixed glass to avoid leakage of A.C . The glass edges shall be machine polished & having 'zero' detail junction etc. complete (crystal polish) in all respect as per drawing and direction by the Architects.				
	CGM'S Sect./GM/DGM/DISPLAY	Sqm.	137.85		
22	<u>COLUMN CLADDING</u>				
	Supply & Fixing column,wall cladding as per design, consisting of 6 mm thk. MR grade Ply fixed on column with 37.5mm x 25mm chemically treated hard wood framing, finished with 1 mm design as per design and specification all complete.	Sqm.	135		
23	<u>WALL PANELLING</u>				
	Supply & Fixing wall paneling in CGM's chamber and conference room as per design, consisting of 4 mm +6mm thk.MR grade solid Ply fixed on exixting partition, finished with 1 mm design mica laminate as per design and specification all complete.	Sqm.	162		
24	<u>WOODEN ROLLING SHUTTER BOX</u>				
	Providing and fixing 19mm thk MR graded ply openable wooden panelling in front of the rolling shutter hood inclusive of providing and fixing 50 x 37.5mm hardwood framing, hinges to open the same for maintenance,finish with 1mm laminate in all exposed surface etc. complete.	Sqm.	8		
25	<u>NOTICE BOARD</u>				
	Providing and fixing Fabric Wrapped Soft Board Panels for notice board of size and profile with free glass door as per detail.The Rate should be include approved fabric, accoustical infill with				

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SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	necessary 150mm wide, 12mm thk.MR grade Ply reinforcement ,note the Fabric shall be stretched uniformly along the direction of weave and shall be wrinkle free etc. all as direction and to the entire satisfaction of our Architects.(1500mm x 1200mm).	Sqm.	1.8		
26	<u>VERTICAL BLIND</u>				
	Providing and fixing vertical drape / blind in windows with 100 mm wide fabric,assembled on top aluminium channel 35 x 28 mm with high quality Clycon fittings with end covers,				
	runners and stainless steel master runners, with nylon chord, fabric hanger and bottom link chain	Sqm	65		
27	<u>WOOD MOULDING</u>				
	Providing and fixing polished steam beech wood moulding (out of 50 x 50 mm sections) at junctions of false ceiling , walls and at other locations.	RM	175		
PART- 'A' TOTAL CARRIED TO GENERAL SUMMARY					
PART-B <u>SANITARY WORKS</u>					
1	<u>SANITARY FITTINGS</u>				
NOTE	The rates include the cost of all necessary cutting and chasing through floors and repairing the same, supplying and fixing all necessary jointing materials, brass c.p. screws, scaffolding charges and effecting all necessary pipe connection complete.				
1.1	Providing and fixing in position floor mounted 'LYRIC' model (LYS-WHT-0204) white coloured Single piece WC with quiet close toilet seat and cover in white 'P' trap cistern of Dual flushing system 6 to 3 liters, C.P. hinges, rubber buffers etc complete with all internal fittings.(Size: 360X650X750MM)--CGM	Set	1		

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
1.2	Providing and fixing in position floor mounted 'OPAL' model (OPS-WHT-0310) Couple closet WC with quiet close seat and cover in white colour 'P' trap cistern of Dual flushing system 6 to 3 liters, C.P. hinges, rubber buffers etc complete with all internal fittings.(Size: 360x650x780MM)-Gents Toilet	Set	4		
1.3	Providing and fixing in position floor mounted 'SOLO' model (SLS-WHT-0311) 'P' trap of Dual flushing system 6 to 3 litrs., C.P. hinges. rubber buffers etc. complete with all internal fittings (Size:370X645X765MM)--Ladies Toilet	Set	3		
1.4	Providing and fixing white Table top basin 'LYRIC' model (LYS-WHT-0555), 15mm C.P. brass single control lavatory faucet with lever handle ,32mm C.P. brass waste grid drain of standard pattern, 32mm dia C.P. brass bottle trap(K-16407IN-CP) and unions complete, incl. cutting and making good the walls wherever required all complete(Size:564x442mm)--CGM	Set	1		
1.5	Providing and fixing white vitreous wash basin with half pedestal 'OPAL' model (OPS-WHT-0610), 15mm C.P. brass pillar lavatory'OPAL' , 32mm C.P. brass waste grid drain of standard pattern, 32mm dia C.P. brass bottle trap and unions complete, incl. cutting and making good the counter top wherever required all complete(Size:600x480X505mm)-Gents Toilet	Set	4		
1.6	Providing and fixing white vitreous undercounter lavatory'SOLO' model (SLS-WHT-0611), 15mm C.P. brass pillar lavatory faucet with lever handle 'SOLO', 32mm C.P. brass waste grid drain of standard pattern, 32mm dia C.P. brass bottle trap and unions complete, incl. cutting and making good the counter top wherever required all complete(Size:530X440X430mm)-Ladies Toilet	Set	2		

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
1.7	Providing and fixing urinal (URS-WHT-0701) with rear inlet in white (Size:280x300x550mm) with C.P. spreader, necessary brass chromium plated P Trap Siphon connection kit for siphon jet with clamps and caps including stop valve, extra heavy body with adjustable wall flange all complete.	Set	4		
1.8	Providing and fixing soap dispenser with C.P bottle (Jaquar/Kohler/Grohe)	Nos.	6		
1.9	Providing and fixing chrome plated Toilet paper holder with flap and necessary fittings as required (Jaquar/kohler/Grohe) --CGM	Nos.	1		
1.10	Providing and fixing chrome plated 24" long Towel rail with necessary fittings as required (Jaquar/kohler/Grohe)	Nos.	3		
1.11	Providing and fixing chrome plated soap dish with necessary fittings as required (Jaquar/kohler/Grohe)	Nos.	8		
1.12	Providing and fixing chrome plated Double Hook with necessary fittings as required (Jaquar/kohler/grohe)	Nos.	8		
1.13	Providing and fixing odonil perforated brass C.P. Container complete with bracket and brass C.P. screws.	Nos.	6		
1.14	Providing and fixing Towel Rack 600mm long with Lower Hangers (JaquarKohler/Grohe) with C.P. screws (Size 22")	Set	1		
1.15	Providing and fixing bathroom shelf (Jaquar/kohler/Grohe) with C.P. screws (Size 56.5 cms x 7.5 cms. X 13 cms.)	Sets.	6		
1.16	Providing and fixing 1200mm x 400mm bevelled edge plate glass mirror 5.5 mm th. with suitable pieces as directed fixed with c.p. dome shaped screws, 19mm solid ply backing and rubber washers.	Nos.	5		
1.17	Providing and fixing handshower (health Faucet) with 8mm dia, 1 mtr long flexible tube and wall hook-(Jaquar/Kohler/Grohe)	Nos.	8		

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
1.18	Supplying , fitting and fixing stainless steel sink (Nirati) complete with 32mm dia waste fittings, 15 mm dia brass C.P. Bib cock heavy quality including 32 mm dia brass C.P. bottle trap of jaguar brand (heavy quality) and two coats of white painted C.I. brackets etc. complete.				
	l) Sink with draining board size 1050mm x 450mm x 180mm	Sets	1		
2	<u>SOIL, WASTE WATER PIPES AND FITTINGS</u>				
Note :	The rates must include the cost of all necessary impervious lead caulked joint, cutting and chasing through floors and walls and repairing the same, necessary scaffolding charges, supplying necessary C.I. nails, bobbing, jointing compound and earthwork where necessary including painting complete.				
2.1	Supplying , fitting fixing and jointing H.C.I. pipes with lead caulked joints complete.				
2.1.1	100 mm dia H.C.I. pipes	Mtrs.	23		
2.2	"Extra over" pipes of H.C.L. fittings, such as bends / plain or with door, single or double junction/ plain or with door, 'P' or 'S' trap/ plain or with vent, B.M. trap, Trap extension pieces, offset, C.I. Cowl etc. (Flat rate to be quoted).				
2.2.1	100 mm dia	Nos.	10		
2.3	Concealed G.I. Waste pipe of the following sizes with all necessary G.I. Fittings such as bend, tees, elbows, nipple, plugs, reducers etc. complete.				
2.3.1	50 mm dia	R.M.	10		
2.3.2	40 mm dia	R.M.	20		
2.3.3	32 mm dia	R.M.	25		
2.4	Providing and fixing 125mm dia C.I. round grating in place of existing one	Nos.	10		

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Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
2.5	Scraping hard Scume of or 'S' trap carefully to render the flushing flow easy after soaking with strong acid through W.c.pan on floor and also cleaning through flanged junction door under neath the certing includifng necessary scaffolding and reseting the flanged door watertight by putty joints by methor mistry.	Each	14		
3	<u>WATER SUPPLY PIPES AND FITTINGS</u>				
Note :	The galvanised iron pipes and fittings for water supply are to be melleable steel of medium water pipes quality. All pipes are to be 'TATA' make. All G.I. Fittings should be of 'R' brand. The rate must include the cost of cutting and chasing through floors, walls and repairing the same, necessary changes and earthwork wherever necessary including painting complete.				
3.1	Supplying, laying fitting, fixing and jointing G.I. pipes of following sizes with all necessary G.I. Fittings such as bends, tees, elbows, reducers, sockets, long screw fittings, caps, clamps, plugs etc. complete.				
3.1.1	25 mm dia	R.M.	8		
3.1.2	20 mm dia	R.M.	12		
3.1.3	15 mm dia	R.M.	45		
3.2	15 mm dia brass/ copper chromium plated connector with c.p. coupling at both ends.	Each	22		
3.3	15 mm dia brass Bibcock with hose union.	No.	7		
3.4	Providing and fixing C.P. over brass bib cock (Jaguar/Kohller/Grohe brand) heavy type. As per requirement	Nos.	18		
3.5	15 mm dia C.P. Brass concealed (Jaguar/Kohler/grohe brand) heavy type stop cock. (as per requirement)	Nos.	14		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
3.6	Supplying fitting and fixing 15 mm dia white pvc connector with both end coupting with heavy brass nut and washer (heavy type) of approved brand in place of existing one upto 450 mm long (as per requirement)	Nos.	5		
3.7	Inserting G.I. pipe including mending good all damages in cement concrete (1:2:4) with stone chips and cement plaster (1:6) to match with existing surface including curing and necessary shuttering all complete	Mtrs.	140		
3.8	Providing and fixing C.P. over brass bib cock (Jaguar/Kohller/Grohe brand) heavy type. As per requirement	Nos.	18		
3.9	15 mm dia C.P. Brass concealed (Jaguar/Kohler/grohe brand) heavy type stop cock. (as per requirement)	Nos.	14		
3.10	Supplying fitting and fixing 15 mm dia white pvc connector with both end coupting with heavy brass nut and washer (heavy type) of approved brand in place of existing one upto 450 mm long (as per requirement)	Nos.	5		
3.11	Inserting G.I. pipe including mending good all damages in cement concrete (1:2:4) with stone chips and cement plaster (1:6) to match with existing surface including curing and necessary shuttering all complete	Mtrs.	120		
PART-`B' TOTAL CARRIED TO GENERAL SUMMARY					
PART-C FURNITURE & FIXTURE WORK					
1	CGM's TABLE				
	Supply & fixing in position free-standing office table (2400mm X 1200mm X 750mm) with 150mm stationery drawer for CGM's cabin, in 25mm thk.BWP grade blockboard (IS:1659) with 4mm thk.vineer on top,side, both side of modesty panel (25mm) and all exposed surfaces. Inside of drawer will be finished with natural colour hi gloss water proof melamine polish, all edges shall have CP teak wood lipping.				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	Table will have one credenza unit (550mm) consist of one tea tray, one readymade stationery drawer of engineering plastic (SD 3036 INNOFITT SYSTEMS or similar make) & three nos heavy duty tele-scopic drawer slides, godrej central lock, decorative s.s handle, 10mm clear beveled edge glass on top all complete as per design and drawing by our Architects.	Each	1		
2	<u>GM's TABLE</u>				
	Supply & fixing in position free-standing office table (2200mm X 1210mm X 750mm) with 150mm stationery drawer for GM's cabin, in 25mm thk.BWP grade blockboard (IS:1659) with 4mm thk.vineer on top, side, both side of modesty panel (25mm) and all exposed surfaces. Inside of drawer will be finished with natural colour hi gloss waterproof melamine				
	polish, all edges shall have CP teak wood lipping. Table will have one credenza unit (550mm) consist of one tea tray, one readymade stationery drawer of engineering plastic (SD 3036 INNOFITT SYSTEMS or similar make) & three nos heavy duty tele-scopic drawer slides, godrej central lock, decorative s.s handle, 10mm clear beveled edge glass on top all complete as per design and drawing by our Architects.	Each	3		
3	<u>DGM's TABLE</u>				
	Supply & fixing in position free-standing office table (2000mm X 1000mm X 750mm) with 150mm stationery drawer for DGM's cabin, in 25mm thk.BWP grade blockboard (IS:1659) with 1mm thk.design mica laminate of approved				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	shade on top,side, both side of modesty panel (25mm) and all exposed surfaces. Inside of drawer will be finished with natural colour hi gloss waterproof melamine polish, all edges shall have CP teak wood lipping. Table will have one credenza unit (550mm)consist of one tea tray, one readymade stationery drawer of engineering plastic (SD 3036 INNOFITT SYSTEMS or similar make) & three nos heavy duty tele-scopic drawer slides, godrej central lock,decorative s.s handle, 10mm clear beveled edge glass on top all complete as per design and drawing by our Architects.	Each	6		
4	<u>SR.MANAGER's TABLE</u>				
	Supply & fixing in position free-standing office table 1500mm X 750mm X 750mm high with 150mm stationery drawer forSr.Mgr's cabin, in 25mm thk.BWP grade blockboard(IS:1659) with 1mm thk.mica laminate on top,side, both side of modesty panel (25mm) and all exposed surfaces,inside of drawer will be finished with natural colour hi gloss polish,all edges shall have CP teak wood lipping. Table will have one credenza unit (500mm)consist of one tea tray, one readymade stationery drawer of engineering plastic (SD 3036 INNOFITT SYSTEMS or similar make) & three nos heavy duty tele-scopic drawer slides, godrej central lock,decorative s.s				
	handle, 10mm clear glass on top all complete as per design and drawing by the Architects.	Each	8		
5	<u>CGM's SECRETARIAT TABLE</u>				
	Supply & fixing in position free-standing office table 1500mm X 750 mm X 750mm high for GM's secretariat Cubicle, in 19mm thk.BWP blockboard(IS:1659) with 1mm thk.mica laminate on top,side, both side of modesty panel (19mm) and all exposed surfaces. Inside of drawer will be finished with natural colour hi gloss polish as per design, all edges shall have CP teak wood lipping. Table will have one credenza unit (450mm)consist of one tea tray, one stationery drawer of engineering plastic				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR, 8, INDIA EXCHANGE PLACE, KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	(SD 3036 INNOFITT SYSTEMS or similar make) & three nos tele-scopic drawer slides, godrej central lock, decorative s.s handle, 10mm clear glass on top all complete as per design and drawing by the Architects.	Each	2		
6	<u>MANAGER/Dy. MANAGER's TABLE</u>				
	Supply & fixing in position free-standing cockpit type office table 1500mm X 750mm X 750mm high for Manager/Dy Manager's table, in 19mm thk. BWP grade blockboard(IS:1659) with 1mm thk.mica laminate on top, side, both side of modesty panel (19mm) and all exposed surfaces, inside of drawer will be finished with natural colour hi gloss polish, all edges shall have CP teak wood lipping. Table will have one credenza unit (450mm) consist of one tea tray, one readymade stationery drawer of engineering plastic (SD 3036 INNOFITT SYSTEMS or similar make) & three nos heavy duty tele-scopic drawer slides, godrej central lock, decorative s.s handle all complete as per design and drawing by the Architects.	Each	12		
7	<u>OFFICER's TABLE</u>				
	Supply & fixing in position Officer's table 1500mm X 750mm X 750mm high with 510mm wide keyboard drawer in 19mm thk. BWP grade block board(IS:1659) with 1mm thk.mica laminate on top, side, both side of modesty panel and all exposed surfaces, inside of drawer will be finished with natural colour hi gloss polish, all edges shall have CP teak wood lipping. Table will have one credenza unit consist of one tea tray, one readymade stationery drawer of engineering plastic (SD 3036 INNOFITT SYSTEMS or similar make) & three nos heavy duty tele-scopic drawer slides, godrej central lock, decorative s.s handle all complete as per design and drawing by the Architects.	Each	44		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
8	<u>CLERK'S TABLE</u>				
	Supply & fixing in position Clerk's Work Station 1350mm X 750mm X 750mm high with 510mm wide keyboard drawer in 19mm thk. BWP grade blockboard(IS:1659) with 1mm thk.mica laminate on top,side, both side of modesti panel and all exposed surfaces, inside of drawer will be finished with hi gloss natural polish, all edges shall have CP teak wood lipping. Table will have one Credenja unit(450mm), one tea tray, three nos heavy duty tele-scopic drawer slides, godrej central lock,decorative s.s handle all complete as per design and drawing by the Architects.	Each	10		
9	<u>LOW HT. WORK STATION</u>				
	Supply & fixing in position Computer table for Server Room, 1350mm X 600mm X 750mm high with 510mm wide keyboard drawer in 19mm thk.BWP grade blockboard (IS:1659) with 1mm thk.mica laminate on top,side, both side of modesti panel and all exposed surfaces, inside of drawer will be finished with hi gloss natural polish, all edges shall have CP teak wood lipping. Table will have one Credenja unit(450mm), one tea tray, three nos heavy duty tele-scopic drawer slides, godrej central lock,decorative s.s handle all complete as per design and drawing by the Architects.	Each	2		
10	<u>SERVER TABLE</u>				
	Supply & fixing in position server Room table 3000mm X 500mm X 750mm high in 19mm thk. BWP grade blockboard(IS:1659) with 1mm thk.mica laminate on top,side, both side of modesti panel and all exposed surfaces. All edges shall have CP teak wood lipping all complete as per design and drawing by the Architects.	Each	1		
11	<u>RECEPTION TABLE</u>				
	Supply & fixing in position free standing half circle type front office reception table 3000mm X 600mm X 750mm high with 510 mm wide key				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	board drawer in 19mm thk.BWP grade blockboard with 1mm thk. METALIC laminate on top,side and modesty panel with 8mm thk. float glass (300 mm x1500mm) with etching design fixing with 25mm S.S solid studd for privecy in front of the table as per design. All edges shall have CP teak wood lipping. Table will have one storage unit, one tea tray,one engineering pencil tray & 2 nos tele-scopic drawer slides, godrej lock,S.S handle all complete as per design by the Architects.	Each	1		
12	<u>BACK STORAGE FOR CGM/GM(700 mm)</u>				
	Supply, fixing and keeping in position back storage unit consisting of 19mm thk. BWP grade (IS:1659) blockboard with intermediate shelves, door and 6mm thk.BWR grade Plywood(IS:303) with godrej lock. mat s.s decorative handle, magnetic lock,concealed type auto-closing shutter hinges etc. The side table top, both side of shutter shall be finished with 4mm thk. Vineer of approved shade. All inner surfaces shall have natural colour smooth finish polished with liping all complete as per design and drawing by the Architects.				
12.1	DO BUT SIZE D-500 X L-2400 X H-700 -CGM	Each	1		
12.2	DO BUT SIZE D-500 X L-2200 X H-700 -GM	Each	3		
13	<u>BACK STORAGE FOR DGM(700 mm)</u>				
	Supply, fixing and keeping in position back storage unit consisting of 19mm thk. BWP grade (IS:1659) blockboard with intermediate shelves, door and 6mm thk.BWR grade Plywood(IS:303) with godrej lock. mat s.s decorative handle, magnetic lock,concealed type auto-closing shutter hinges etc. The side table top, both side of shutter shall be finished with 1mm thk. design mica laminate of approved shade. All inner surfaces shall have natural colour smooth finish polished with liping all complete as per design and drawing by the Architects.				
13.1	DO BUT SIZE D-500 X L-2100 X H-700 -DGM	Each	5		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
14	<u>COMPUTER TABLE FOR CGM/GM/DGM(700 mm)</u>				
	Supply, fixing and keeping in position Computer table consisting of 19mm thk. BWP drade blockboard(IS:1659) on top and both the side, 6mm thk.BWR Plywood(IS:303) in back with intermediate self in both the side etc. All the side of the table shall be finished with 4mm thk. Vineer of approved shade with liping all complete as per design and drawing by the Architects.				
14.1	DO BUT SIZE D-600 X L-1200 X H-700 -GM	Each	1		
14.2	DO BUT SIZE D-600 X L-1200 X H-700 -GM	Each	3		
14.3	DO BUT SIZE D-600 X L-1200 X H-700 -DGM	Each	5		
15	<u>SIDE UNIT FOR SR.MGR. (700 mm)</u>				
	Supply, fixing and keeping in position Side Unit consisting of 19mm thk. BWP grade blockboard(IS:1659) with door and 6mm thk.BWR grade Plywood(IS:303) in back with godrej lock. mat s.s decorative handle, magnetic lock,concealed type auto-closing shutter hinges etc. The both side,top, both side of shutter shall be finished with 1mm thk. design mica laminate of approved shade. All inner surfaces shall have natural colour hi gloss polish with liping all complete as per design and drawing by the Architects.				
	DO BUT SIZE D-450 X L-750 X H-700	Each	14		
16	<u>LOW HT. DISPLAY UNIT FOR CGM'CHAMBER</u>				
	Supply & fixing in position partly 900mm and partly 1200mm Low ht. Display unit with intermediate shelves in 19mm thk.BWP grade				

B.O.Q FOR REFURBISHING, ELECTRICAL,FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	blockboard(IS:1659) finished with 4mm thk. Vineer on top side,both side of shutter and inside of the storage and back will be 6mm BWR Plywood(IS:303)as per design. All edges shall have CP teak wood liping,conceal type auto-closing shutter hinges,godrej lock,decorative S.S handle all complete as per design and drawing by our Architects.				
	DO BUT SIZE D-450 X L-2000 X H-700	Each	1		
17	<u>DISPLAY CABINET</u>				
	Supply & fixing in position Display Cabinet in Display area with intermediate glass shelves,glass shutter in 19mm thk.BWP blockboard(IS:1659) finished with 1mm thk. metallic laminate on all exposed side as per design. All edges shall have CP teak wood liping,glass shutter hinges, lock,decorative glass knob all complete as per design and drawing by our Architects.				
	DO BUT SIZE D-350 X L-450 X H-1650	Each	12		
18	<u>WALL SHOWCASE</u>				
	Supply & fixing in position Wall Showcase unit in Lift Lobby,19mm thk. BWP blockboard(IS:1659) finished with 1 mm thk. design mica laminate on all exposed surface as per design. All edges shall have CP teak wood liping all complete as per design and drawing by our Architects.				
	DO BUT SIZE D-200 X L-300 X H-600	Each	7		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR, 8, INDIA EXCHANGE PLACE, KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
19	OVERHEAD STORAGE				
	Supply & fixing in position overhead storage unit (1500x450x300) in 19mm thk.BWP grade blockboard(IS:1659) finished with 1mm thk. mica laminate on top side, both side of shutter and inside of the storage and back will be 6mm BWR Plywood(IS:303) as per design. All edges shall have CP teak wood liping, conceal type auto-closing shutter hinges, godrej lock, decorative S.S handle all complete as per design and drawing by our Architects.	Nos.	17		
	PART- 'C' TOTAL CARRIED TO GENERAL SUMMARY				-
	SCHEDULE-- I (CIVIL AND ALLIED WORKS)				
	TOTAL SUMMARY OF CIVIL, SANITARY AND FURNISHING WORK				
	PART- 'A' : FURNISHING WORK				
	PART- 'B' : SANITARY WORK				
	PART- 'C' : FURNITURE AND FIXTURE WORK				
	GROSS VALUE				
	Add Service Tax				
	(Service Tax Registration No.)				
	NET VALUE				
	Total Rupees In Words:				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
	<u>SCHEDULE-- II (ELECTRICAL WORKS)</u>				
	<u>PART -A --POWER DISTRIBUTION</u>				
1.0	<u>PANELS, DBS, CABLING & WIRING WORK</u>				
1.1	<u>MAIN SWITCH</u>				
	Supply and fixing of following Switch Fuse Unt (SFU) with HRC fuse in sheet steel enclosure on M. S. Angle frame / M.S. Legs on wall complete with interconnection, mending good damages to orginal finish, painting, etc. as required.				
1.1.1	125 A TPN SFU with HRC fuse	Each	1		
1.1.2	63 A TPN Changeover Switch for generator.	Each	1		
1.2	<u>MAIN INCOMING PANEL (MIP)</u>				
	Supply, installation, testing and commissioning of wall mounted indoor type, air insulated, totally enclosed vermin-proof, dead front, cubicle type, 2 mm thick sheet steel enclosure main incoming panel (MIP) suitable for use on 415 V. 3 Ph. 4 wire, 50 Hz A.C. system, incoming and outgoing cable compartment. Each unit shall be accommodated in a totally separate compartment having gasketed hinged door with locking arrangement . The Panel shall be complete with MCCBs/ MCB of following ratings, interconnection, G.I. earth busbar of adequate size covering the total length of panel board with drilled holes, G. I. bolts, nuts, washers etc.				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
	The cubicle should be painted with 2 (two) coats of cream colour synthetic enamel paint over two coats of zinc chromate primer. The complete fabrication, construction shall be done as per the detailed specification and conforming to the relevant IS. Name plate of Panels Danger Board, incoming and outgoing feders with Ampere rating of MCCB / MCB are to be fixed up on front door above or below the respective switches. Short circuit I.C. of all MCBs should be of 10 KA (min.). Approval of Manufacturer's drawings from Architects is required before commencing manufacture.				
	The MIP consists of the following				
	<u>INCOMING :</u>				
	1 No : 415 V 250 A 4 pole MCCB having short circuit breaking capacity of 35KA(min) with O/L,E/F & S/C protection device				
	1 No. : 415 V 63 A 4 Pole MCB				
	1 No. : 96 MM square 0-500 V Voltmeter with Selector switch, protective fuse, base & carrier				
	1 No. : 96 mm square 0- 100 A Ammeter with selector Switch				
	3 Nos. : 100/5A CTS				
	3 Nos. : Phase indicating lamp				
	(PVC sleeved TPN tinned Copper Busbar (25 mm x 5 mm for phases & neutral				
	G.I. EARTH BUSBAR				
	25 mm x 6 mm covering the total length of panel				
	<u>OUTGOING</u>				
	2 Nos. 415 V 63A TPN MCB for AC units				
	2 No 63A TPN MCB for LDB				
	2 No.63A TPN MCB for UPS				
	2 No 63A TPN MCB for Raw Power DB				
	1 No.32A TPN MCB for Spare	Each	1		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTc LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
1.3	<u>DISTRIBUTION CABLE</u>				
1.3.1	<u>SUPPLYING & FIXING OF CABLE</u>				
	Supplying & Fixing of 1.1 KV grade PVC insulated and PVC sheathed armoured aluminium conductor cables of following sizes conforming of IS : 1554 (Part -1) :				
1.3.1.1	3.5 core 95 sq. mm cable for LDB / PDB	Mtr.	25		
1.3.1.2	4 core 10 sq. mm copper unarmour cable for UPS Power	Mtr.	35		
1.3.1.3	4 core 6 sq. mm copper unarmour cable for AC Unit	Mtr.	140		
1.3.1.4	4 x 10 sqm.copper wire from L.T Panel to UPS incomer MCB	Mtr.	35		
1.3.2	<u>LAYING OF CABLE</u>				
	Laying of above cable on wall / column / above false ceiling including supply and fixing of M.S. clamps/ galvanised bar saddles @ 300 mm apart, making holes and mending good damages.				
1.3.2.1	3.5 core 95 sq. mm cable for LDB / PDB	Mtr.	25		
1.3.2.2	4 core 10 sq. mm cable for UPS power	Mtr.	35		
1.3.2.3	4 core 6 sq. mm copper unarmour cable for AC Unit	Mtr.	140		
1.3.2.4	4 x 10 sqm.copper wire from L.T Panel to UPS incomer MCB	Mtr.	35		
1.3.3	<u>CABLE GLAND AND FINISHING THE END</u>				
	Supplying and fixing of compression type brass cable gland alongwith rubber rings for dust and moisture proof entry of following 1.1 KV grade PVC insulated and PVC sheathed armoured aluminium conductor cable and finishing the end by crimping method including supply and fixing				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	of " Dowel" make soloderless socket, tapes and jointing materials as required to be completed in all respect.				
1.3.3.1	3.5 core 95 sq. mm. Aluminium cable	Set	6		
1.3.3.2	4 core 10 sq. mm cable for UPS power	Set	4		
1.3.3.3	4 core 6 sq. mm copper unarmer cable for AC Unit	Set	6		
1.3.3.4	4 x 10 sqm.copper wire from L.T Panel to UPS incomer MCB	Set	4		
1.4	<u>SUBMAIN WIRING</u>				
	Submain wiring with following sizes 1100 V grade, single core, PVC insulated flexible FRLS copper conductor cable (IS:694) through suitable size PVC.				
	conduit (ISI marked embossed on conduit surface) complete with junction box, circular box, elbows, bends and other accessories on surface below true ceiling or concealed by chase cutting on wall, as per site condition, mending good all damages to original finish, interconnection, etc. as required to be completed in all respect. All connections of wires to be done by means of "Wago" type connectors:				
1.4.1	With 4 Nos. 6 Sq.mm. + 2 No 4 Sq.mm. (green colour for earth) PVC insulated FRLS copper wire.	Mtr.	310		
1.4.2	With 2 Nos. 6 Sq.mm. + 1 No. 4 Sq.mm. (green colour for earth) PVC insulated FRLS copper wire.	Mtr.	265		
1.5	<u>MCB DISTRIBUTION BOARD</u>				
	Supply, installation, testing and commissioning of following approved make MCB Distribution Board in sheet steel enclosure with double door and suitable for mounting on wall by chase cutting and flushed with finished level to the position shown in the Electrical Layout complete in all respect, mending good all damages to the original finish, interconnection etc. as required.				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTc LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
	Short circuit I.C. of all MCBs should be 16 KA (minimum) and RCCB of 300 MA sensitivity should have earth leakage, overload and short circuit protection. Name plate of DB's to be fixed / written on front door alongwith switch board numbers / DB's at the outgoing.				
1.5.1	<u>MCB DISTRIBUTION BOARD (LDB)</u>				
	TPN 8 way Vertical type MCB DB complete with busbar and the following MCBs/RCCB :				
	<u>Incoming</u>				
	1 no. : 415V 32A 4P RCCB (300 mA sensitivity)				
	<u>Outgoing :</u>				
	3Nos : 240V 16A SP MCB				
	15 nos. : 240V 10A SP MCB				
	6 Nos. Blank plate	Each	4		
1.5.2	<u>MCB DISTRIBUTION BOARD PDB (Raw Power)</u>				
	TPN 8 way Ezee-Box double door type MCB DB complete with busbar and the following MCBs/RCCB :				
	<u>Incoming</u>				
	1 no. : 415V 32A 4P RCCB (300 mA sensitivity)				
	1 no. : 415V 32A 4P Gnext MCB (300 mA sensitivity)				
	<u>Outgoing :</u>				
	3Nos : 240V 16A SP MCB				
	15 nos. : 240V 10A SP MCB				
	6 Nos. Blank plate	Each	4		
1.5.3	<u>TPN DISTRIBUTION BOARD FOR A.C</u>				
	Supply and installation of metallic single door Distribution Board with MCB having breaking capacity of 16 KA (minimum) or RCCB of 300 MA sensitivity complete with busbar, interconnection, painting, mounted on flat iron frame on wall / flushed with finished wall by chase cutting , mending good to original finish painting etc. as required. Name plate & number				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR, 8, INDIA EXCHANGE PLACE, KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
	of Dbs are to be fixed up on front door of DBs for their identification. RCBOs should have over load short circuit & Earth leakage protection.				
	TPN 6 way MCB DB complete with busbar and the following RCCB / MCBs				
	<u>INCOMING :</u>				
	2 No. 240 V 63A TPN MCB (300 MA sensitivity)				
	<u>OUTGOING :</u>				
	18 Nos. 240 V 32A SP MCB	Set	2		
1.6	<u>6/16A SOCKET OUTLET POINT WIRING</u>				
	Wiring for 6 pin 6/16 A shuttered socket outlet with controlling switch from DB with 1100 volt grade 2 Nos. single core 2.5 sq. mm. + 1 No. 1.5 sq. mm (Green colour for earthing)				
	PVC insulated flexible FRLS COPPER CONDUCTOR CABLE (IS ; 694) through suitable size M. S. conduit (ISI marked embossed on conduit surface) complete with junction box, circular box, elbows, bends, couplers and other accessories on surface above false ceiling or concealed by chase cutting on wall. The work includes supply & fixing of 6/16A 6 pin shuttered socket outlet with controlling switch, indicator, suitable size mounting box and front plate for socket outlet flushed with finished wall, mending good all damages to original finish, interconnection, painting etc. as required to be completed in all respect all connections of wires to be done by means of 'Wago' type connectors.	Each	75		
1.7	<u>POINT WIRING</u>				
	Point wiring with 1100 V grade 3 nos. single core 1.5 sq. mm. (1 for phase, 1 (black colour) for common neutral by looping method and 1 (green colour) for common earth by looping method) PVC insulated flexible FRLS copper conductor cable (IS : 694) through suitable size M. S. conduit (ISI marked embossed on conduit surface) complete with junction box, circular box, elbows, bends, couplers and other				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTc LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
	accessories on surface above false ceiling or concealed by chase cutting on wall from light & fan switch board to light, fan & ^A socket outlet on the same switch board or separately mounted switch board. The work includes supply and fixing of all materials as specified in tender, se 6A switch for each light and fan point. 6A 2/3 pin shuttered socket outlet with switch. 3 plate ceiling rose/ angle or batten holder etc. as required. The point wiring also includes circuit wiring with 1100 V grade 2 nos. single core 2.5 sq. mm. (1 for phase and 1 (Black colour) for netural) + 1 no. single core 1.5 Sq. mm (Green colour for earth) PVC insulated flexible (FRLS) copper conductor cable (IS:694) through suitable size M. S. conduit as described above from Db to switch board, interconnection, mending good all damages to original finish painting etc. as required to be completed in all respect.				
	All connections of wires to be done by means of "Wago" type connectors. (All wiring in stornj room, locker room, records & stores will be of surface conduit type.)				
1.7.1	Light Points (all types)				
	I) 1 light for switch control	Each	153		
	ii) 2 light for switch control	Each	43		
1.7.2	Exhaust Fan Point (cutting,framing and fixing all complete)	Each	10		
1.7.3	Ceiling Fan/Wall bracket fan point with supply and fixing of 6Amp socket near the fan and controlling switch at light switch board.	Each	82		
1.7.4	Call bell point with buzzer	Each	9		
1.7.5	Red light point	Each	1		
1.7.6	1 x 6A 2/3 pin shuttered socket with switch on separate switch board other than light / fan switch board / or work stations / skirting of wall etc.	Each	10		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
1.7.7	Supply,laying of 2x6 mm+1x2.5 mm Copper wiring from UPS board to Computer D.B through PVC conduit.	Mtr.	125		
1.7.8	Supply, laying of 2x4mm+ 1x2.5mm spare copper wiring from L.T Panel to lighting D.B through PVC conduit.	Mtr.	150		
1.8	<u>HI-WALL A.C POINT WIRING</u>				
	Point Wiring from AC DB to socket outlet using 3x4sqmm 1100v,standard copper conductor PVC insulated wires in MS conduit above false ceiling complete with accessories, junction boxes etc.				
	The cost of point wiring should include length of circuit wiring also.No addition rates will be given for circuit wiring.				
	6M Power Unit Flush Type modular MCB , socket outlet and starter for hi wall Split type air-conditioner.	Nos	17		
1.9	<u>EARTHING (GENERAL)</u>				
	Earthing the installation as per I.E rules conforming to IS : 3043 or its latest ammendment by making earth station with 600 mm x 600 mm (minimum) thick G.I. plate electrode to be installed such that its top edge shall be at a minimum depth of 3.0 metre below ground level after preparation of ground with charcoal and salt and connecting the MIP with 25 mm x 6 mm G. I. earth lead-in-strip directly in ground by bolting and then brazing to the G. I. plate complete with G.I. bolts of suitable length double nuts and washers including supply and fixing of 50mm dia. partly perforated G.I. pipe with funnel for watering arrangement .				
	The earthing installation should be provided with 300 mm x 300 m and 300 mm depth inside dimension masonry inspection pit with C.I. hinged cover having locking arrangement, test link of size 150 mm length x 25 mm x 6 mm G.I. flat connected to G.I. Earth lead-in-strip and restoring the surfaces duly rammed.	Each	2		
	PART- `A' TOTAL CARRIED TO ELECTRICAL SUMMARY				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
PART- B	SUPPLY & INSTALLATION OF LIGHT FITTINGS & FAN				
1.0	Lighting Fixtures & Fans:				
	Supply and Installation of the following lighting fixtures complete with lamps, tubes, fixing arrangements, ball and sockets, suspension conduits/ chains, cutting of false ceiling etc. as per specifications and site conditions all complete.				
1.1	4x14W FTL(T5) recess mounted high efficiency luminaire low LPDs-ideal for Green Buildings--direct T5(WVF-14414SGW--Hall Area	Nos	128		
1.2	1x28W FTL(T5) SG surface mounted luminaire suitable for T5 lamps --CORAL-(WRF 80128 SG)	Nos	25		
1.3	2 x 18W CFL (TC-DE) Recess mounted low depth downlighter with frosted diffuser--VENUS (WCP 27218 SGW)	Nos	61		
1.4	1x11W CFL (TC-S) 11W PEARL (WRP21111)-Toilet Mirror	No.	7		
1.5	1x 18W CFL (TC-D) recess mounted low depth square downlighter with satin finish reflector and frosted diffuser (GCP 15118)-Toilet Area	Nos	9		
1.6	1x18W CFL recess mounted square downlighter with satin finish reflector --Entrance Lobby.(GCP10218 SGW P-15228)	Nos.	10		
1.7	1x28W surface mounted luminaire suitable for T5 lamps suspended through conduit in ceiling.as cove light--Conference/Display.(P-15228)	Nos.	20		
1.8	1x12V 50W (MAX) Halogen Dichoric Lamp	Nos	12		
1.9	Supply & Installation of 450 mm dia wall bracket fan	Nos	75		
1.10	Supply & Installation of 1200 mm dia Ceiling fan	Nos	7		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
1.11	Supply and installation of 200 mm suitable for 220/240 volts single phase, A.C. 500hz, exhaust fan fitted with a safty guard.(louvre)	Nos	8		
1.12	Supply and installation of 300 mm dia suitable for 220/240 volts single phase, A.C. 500hz, exhaust fan with metal blade only.	No.	1		
	PART 'B' TOTAL CARRIED TO ELECTRICAL SUMMARY				
PART-C	<u>COMPUTER POWER WIRING</u>				
1.0	<u>INDUSTRIAL TYPE SOCKET DB FROM U.P.S</u>				
	Supply,installation,testing and commissioning of following wall mounted,DB with socket & matching plug with controlling MCB in sheet steel enclosure (Company manufactured)				
1.1	63A 5pin industrial socket with matching plug & 63A TPN controlling MCB including connection	Set	2		
1.2	Each DB comprising of 2 nos. 63A 3 pin socket with matching plug & 63A SP controlling MCB.	Set	2		
1.3	Supply and laying 4 x 16 sqm Copper wire	Mtr.	25		
1.4	25 x 6mm copper bus bar chamber with sheet steel enclosure(size 600mm)	Set	1		
1.5	<u>COMPUTER DISTRIBUTION BOARD (CDB)</u>				
	Supply and installation of metallic double door MCB Distribution Board with MCB having breaking capacity of 16 KA (minimum) or RCCB of 300 MA sensitivity complete with busbar, interconnection, painting, mounted on flat iron frame on wall / flushed with finished wall by chase cutting , mending good to original finish painting etc. as required, name plate & number of Dbs are to be fixed up on front door of DBs for their identification. RCBO's should have over load short circuit & earth leakage protection.				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
1.5.1	TPN 4 way consumer Unit MCB DB complete with busbar and the following RCCB/MCB's incoming.				
	<u>INCOMING</u>				
	2 No. 440 volt. 63 A TPN RCCB (300 MA Sensitivity)				
	<u>OUTGOING</u>				
	4 Nos. 32A D.P.MCB	Each	6		
1.5.2	SPN 8 way consumer unit MCB DB complete with busbar and the following RCCB/MCBs				
	<u>INCOMING :</u>				
	1 No. 240 V 32 A DP RCCB (300 MA sensitivity)				
	<u>OUTGOING :</u>				
	8 Nos. 240 V 10 A SP MCB	Each	6		
1.5.3	Supply and laying of 2 x 10.0 sqm. + 1.4 sqmm. S/c copper wire from L.T panel to UPS incomer MCB through MS conduit	Mtr.	35		
1.6	<u>COMPUTER SOCKET OUTLET CLUSTER POINT WIRING</u>				
	Computer socket outlet cluster point wiring with 1100 V grade 3 nos. single core (1 for earth, green colour) 2.5 sq.mm. PVC insulated flexible FRLS copper conductor cable conforming to IS : 694 through suitable size M. S. conduit (ISI mark embossed on conduit surface) and conduit accessories partly through concealed in eall, embedded in floor, partly on surface above false ceiling and partly through partition or through flexible conduit from DB to computer socket outlet cluster as detailed below and upto connection of 2 nos. socket clusters in 1 (one) circuit connecting by looping method. The work includes supply and fixing of socket outlet clusters components as detailed below.				
1.6.1	Each PC Power Unit comprising of the following items :				
	3 Nos. 6A/13A International Power socket				
	1No. 16A cotrolling switch				
	1 No. Front cover of suitable size				
	1 No. Metal mounting box of suitable size.	Set	100		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
1.6.2	Each computer socket outlet cluster comprising the following				
	1 No. 16A pin shuttered socket.				
	1 No 16A type controlling switch				
	1 No. Front cover of suitable size				
	1 No. metal mounting box of suitable size.	Set	10		
1.7	<u>EARTHING (COMPUTER)</u>				
1.7.1	Earthing the installation as per I. E. rules conforming to IS : 3043 - 1987 or its latest amendment by making earth station with 600 mm x 600 mm x 6mm (minimum) thick copper plate electrode to be installed such that its top edge shall be at a minimum depth of 3.0 metre below ground level after preparation of ground with charoal and salt and connecting the 25 mm x 6 mm copper earth lead- in -strip (upto 10 metre length) by bolting and then brazing to the copper plate complete with copper bolts of suitable length double nuts and washers including supply and fixing of 50 mm dia. partly perforated G.I. pipe with funnel for watering arrangement.				
	The copper earth lead-in-strip shall be PVC sleeved/ insulated throughout the total length and the underground portion to be laid through suitable size heavy duty rigid PVC conduit (ISI mark embossed on conduit surface) at an average depth of 500 mm below ground level. The earthing installation should be provided with 300mm x 300 mm and 300 m depth inside dimension masonry inspection pit with C. I. hinged cover having locking arrangement, test link of size 150 mm length x 25 mm x 6 mm copper flat connected to copper earth lead- in - strip and reastoring the surfaces duly rammed.	Each	2		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
1.7.2	Extra for earth lead -in - strip exceeding 10 metre length as mentioned in item no. 3.5.1. With supply and fixing of 25m x 6mm copper strip having PVC sleeved/ insulated to be fixed on wall surface with tinned copper bar saddles/ clamps at an interval of 300 mm etc. as required to be completed in all respect. Minimum clearance between wall surface and copper earth lead- in - strip should be 6 mm.	Mtr	45		
	PART- 'C' TOTAL CARRIED TO ELECTRICAL SUMMARY				
	PART-D COMPUTER DATA AND TELEPHONE SYSTEM				
1	<u>SUPPLYING AND LAYING OF PVC CONDUIT</u>				
	Supplying and laying of 20/25 mm dia PVC Conduit(ISI marked) complete with junction box, circular box, elbows, bends, couplers and other accessories as required by chase cutting on wall through partition or over false ceiling, The work includes making good all damages to original finish, painting etc. as required.	Mtrs.	650		
2	<u>TELEPHONE SOCKET</u>				
	Supply and fixing on furniture / partition recessed type telephone socket outlet (twin RJ 11) with mounting box & front plate as shown in the drawing complete with chase cutting, mending good damage etc. as required .	Each	100		
3	<u>TELEPHONE JUNCTION BOX</u>				
	Supply and fixing of 50 pair telephone junction box " Krone" make on wall with hinged cover and screwed type tag strips complete with chase cutting, mending good all damages etc.all complete as required.	Each	2		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
4	<u>TELEPHONE WIRING</u>				
4.1	Supplying and laying of 2 - pair 0.61 mm dia. PVC insulated telephone cables through pre- laid rigid PVC conduit as shown in the drawing or otherwise as directed by the consultant from Telephone Junction Box to telephone socket outlet including interconnection mending good all damages etc. as required to be completed in all respect.	Mtrs.	325		
4.2	Supplying & laying of 25 pair 0.61 mm dia Armoured Telephone cable in underground or on wall surface as per site requirement.	Mtrs.	35		
5	<u>COMPUTER DATA WIRING</u>				
	Supplying and laying of CAT -- 6 e cables through pre-laid rigid PVC conduit as shown in the drawing or otherwise as directed by the consultant from server to HUB, HUB to Computer Data Socket including interconnection mending good etc. as required to be completed in all respect.	Mtrs.	325		
6	<u>COMPUTER DATA SOCKET</u>				
	Supply and fixing on wall/furniture/partition recessed type make Computer data socket (RJ 45) with suitable mounting box & front plate as shown in the drawing complete with chase cutting, mending good etc. as required.	Each	100		
7	<u>T.V. WIRING</u>				
7.1	Supply and erection of T.V. socket in MS Box	Nos.	3		
7.2	Supply and installation of T.V cable in 25mm dia PVC Conduit	Mtr.	68		
7.3	Supply and installation of T.V. Splitter	Nos.	3		
8	Making arrangement for temporary connection with supply of wires accessories etc.	L.S			
	PART-'D' TOTAL CARRIED TO ELECTRICAL SUMMARY				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate Rs.	Amount Rs. P.
	SCHEDULE-- II (ELECTRICAL WORKS)				
	TOTAL SUMMARY OF ELECTRICAL WORKS				
	PART - A : POWER DISTRIBUTION			-	
	PART - B : INSTALLATION OF LIGHT FITTINGS AND FAN			-	
	PART - C : COMPUTER POWER WIRING			-	
	PART- D : COMPUTER DATA AND TELEPHONE SYSTEM			-	
	GROSS VALUE			-	-
	Add Service Tax (if any) (Service Tax Registration No.)				
	Total in Words : Rupees				
	LESS SALVAGE VALUE				
	Dismantling the existing electrical installation including wiring, switch board, distribution board, light and fan fittings including all accessories as instructed by the Architects/Owner.(minimum offer should be Rs. 15,000/-)	L.S			
	NET VALUE				
	Total Rupees in Words :				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
SCHEDULE-- III (CHANNEL MUSIC, FIRE FIGHTING WORKS)					
PART-'A' CHANNEL MUSIC cum PA SYSTEM:					
1	SUPPLY				
1.1	6W RMS Flash Mounted False Ceiling Speaker-- Bosch/Onkyo	Nos.	30		
1.2	120 W RMS Mixing Amplifier with the modification for compatibility with PC-- Bosch/Onkyo	No.	1		
1.3	Dynamic Paging Microphone with suitable stand (for emergency announcement)--Bosch/Onkyo	No.	1		
1.4	Local Volume Control for chambers--customised	No.	1		
1.5	VCD/ DVD Player--PHILIPS / VIDEOCON/ SAMSUNG	No.	1		
2	ACCESSORIES				
2.1	2 core 24/0.2mm twin twisted cable with required PVC conduit pipe / cable--Finolex / Netco / Asian	Mtrs.	200		
2.2	2 Core Shielded Microphone Cable fitted with Male / female connectors(10 Mtrs.)--Finolex / Netco / Asian	No.	1		
3	SERVICES				
3.1	Laying of cables, Testing, Installation & Commissioning	Job	1		
	TOTAL				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
PART-'B'	<u>ANALOG ADDRESSABLE FIRE ALARM SYSTEM</u>				
	For Supply, installation, testing and commissioning of Automatic Addressable Fire Detection and Intrusion Alarm System				
1	<u>SUPPLY</u>				
1.1	2Loop Analog Addressable Fire Alarm Panel – Model: NFS 640(E) -- Notifire/ Honeywell/ Siemens /Morley	No.	1		
1.2	Analog Addressable Acclimate Smoke Sensor with Base – Model: FAPT 851 -- Notifire/ Honeywell/ Siemens /Morley	Nos.	60		
	Plug in type multi-sensor type detector i.e. combo of photoelectric & heat type with output level from optical chamber placed on the ceiling with red LED lamp type for indication				
1.3	Analog addressable Hostile area smoke sensor –Model:F5H751 -- Notifire/ Honeywell/ Siemens /Morley	No.	1		
	with air aspirating fan & 25 micron filter				
1.4	Intelligent Addressable Laser detector(VIEW)-- Notifire/ Honeywell/ Siemens /Morley	Nos.	1		
	Model :FSL 751				
1.5	Intelligent Addressable rate of rise thermal detector-FST851R-CH -- Notifire/ Honeywell/ Siemens /Morley	Nos.	25		
	Plug in type Detector placed on the ceiling with red LED lamp type for indication.				
1.6	Addressable Manual Call Point – Model: NBG 12 X Make:Notifire/Honeywell/ Siemens /Morley	Nos.	12		
	Dust tight Push Button manual Call Point to initiate audio alarm with a breakable glass cover in the front with small steel hammer attached with a steel chain.				
1.7	Electronic Sounder / Speaker – Model: PA400 -- Notifier/ Honeywell/ Siemens /Morley	Nos.	5		
	Wall mounted Electronic sounder / Hooter with output along with the control module (FCM-1)				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
1.8	Analog Addressable Photoelectric Smoke Sensor with Base – Model: FSP 851--Notifier/ Honeywell/ Siemens /Morley	Nos.	30		
	Plug in type optical type detector with output level from optical chamber placed on the ceiling with red LED lamp type for indication				
1.9	Fault Isolation Module – Model: ISO-X Make:Notifire -- Honeywell/ Siemens /Morley	Nos.	10		
	Note:				
	All rates should be included with wiring cost (2 C x 1.5 sq mm Twisted FRLS Cable+ installation all Complete)				
1.10	Power supply for MCP, Hooter & inactive devices.	No.	1		
2	<u>FIRE EXTINGUISHERS</u>				
2.1	CO ₂ Fire extinguisher as per IS :2878 of 4.5 kg. Capacity. --Dflame or eqv.	Nos.	3		
2.2	Water CO ₂ Fire extinguisher 9 Ltr. Capacity--Dflame or eqv.	Nos.	3		
2.3	DCP fire extinguisher of 5kg. Capacity as per IS : 2878 --Dflame or eqv.	Nos.	3		
	TOTAL				
	<u>SCHEDULE-- III (CHANNEL MUSIC, FIRE FIGHTING WORKS)</u>				
	<u>TOTAL SUMMARY OF CHANNEL MUSIC AND FIRE FIGHTING WORKS</u>				
	PART--CHANNEL MUSIC cum PA SYSTEM:				
	PART--ANALOG ADDRESSABLE FIRE ALARM SYSTEM				
	Total Rupees in Words :				

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

SI.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
	<u>SCHEDULE-- IV (AIR-CONDITION WORK)</u>				
PART-A	<u>SUPPLY OF VRF SYSTEM</u>				
A	Supply of factory assembled outdoor units (Cooling Only) as per technical specifications and capacities. The unit shall be housed in a sturdy weather proof casing constructed from rust-proofed mild steel panels coated with a baked enamel finish. The unit should be completely factory wired tested with all necessary controls. Units should be DC Inverter Technology based Variable Frequency Driven VRF air-conditioners with air-cooled outdoor units, which shall be capable of cooling as per individual or season requirement suitable for operation on 415V, 3 Phase, 50 Hz AC electric supply.				
1	48 HP	No.	1		
B	<u>IDU Units</u>				
1	The unit shall be wall mounted type. The units shall include pre-filter, fan section & DX coil section. The housing of the unit shall be powder coated galvanised. The body shall be light in weight & flat finish type. The unit shall have an attractive external casing for supply & return air. The noise level for these unit should not exceed 46db(A)±3.				
	1.00 TR	No.	1		
	1.59 TR	No.	1		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

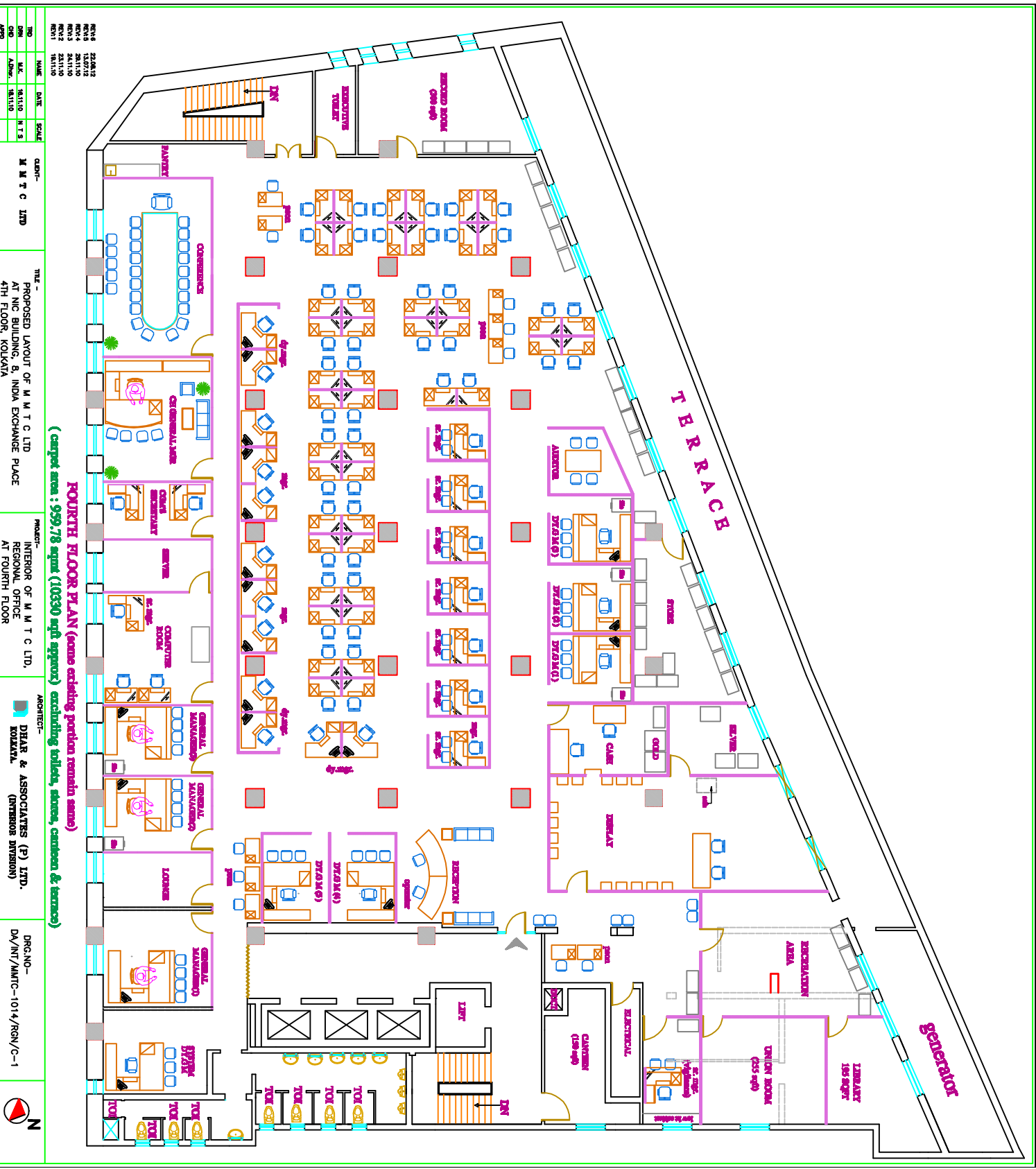
Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
2	The unit shall be ceiling mounted type. The unit shall include pre-filter, fan section and DX coil section. The housing of the unit shall be powder coated galvanised. The body shall be light in weight & shall be able to suspend from four corners. The unit shall have an external attractive panel for supply & return air. Unit shall have four-way supply air grills on sides and return air grill in centre, which should be auto elevated. All units below 2 TR Nominal Capacity should have 700mm x 700 mm Front panel & 2 TR onwards the front panel size should be 950mm x 950mm. Each unit shall have high lift drain pump, individual 4-way control low gas detection system and very low operating sound which should not exceed 48 db(A)±3.				
	2 TR	No.	1		
	4 TR	Nos.	11		
C	Supply & installation of the Y- Joints separation refrigeration pipe joints and headers in the appropriate orientation to enable correct distribution of refrigerant. The distribution joints should be factory insulated with pre-formed section of Expanded polystyrene /Equivalent.	Lot	1		
D	Wireless Remote	Nos.	14		
PART 'A' TOTAL CARRIED TO GENERAL SUMMARY					
<u>PART-B INSTALLATION WORK</u>					
A	Installation, testing and commissioning of following equipment and materials along with accessories as per specification and requirement at site.				
1	Supply of Variable Refrigerant Flow modular type airconditioning system complete with indoor and out door units with individual controller as per detail given in specifications and having following items				
	Capacity: ODU OF 48 HP	No.	1	NA	

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
2	Installation, testing and commissioning of VRF Indoor Units complete with electronic expansion valves with sensor, control panel and cordless controller etc. as per specification.				
2.1	4 Way Discharge Regular Cassette Unit of 4.0 TR	Nos.	11		
2.2	4 Way Discharge Regular Cassette Unit of 2.0 TR	Nos.	1		
2.3	Hi-Wall Unit of 1.59 TR	Nos.	1		
2.4	Hi-Wall Unit of 1.0 TR	Nos.	1		
3	Supply, installation, testing and commissioning of shielded Control wiring between indoor & outdoor unit & system controller with 2Cx1.25 sq.mm copper control cable.	Rmt	532.5		
4	First charge of Refrigerant (R - 410) for VRF system	Lot	1		
5	Refrigerant Piping with 19 mm closed cell Nitrile Rubber elastomeric pipe insulation of following quantities and sizes.				
5.1	41.3 mm with Insulation	Rmt	40		
5.2	38.1 mm with Insulation	Rmt	15		
5.3	31.8 mm with Insulation	Rmt	15		
5.4	25.4 mm with Insulation	Rmt	20		
5.5	22.2 mm with Insulation	Rmt	15		
5.6	19.05 mm with Insulation	Rmt	60		
5.7	15.88 mm with Insulation	Rmt	70		
5.8	12.7 mm with Insulation	Rmt	30		
5.9	9.52 mm with Insulation	Rmt	80		

B.O.Q FOR REFURBISHING, ELECTRICAL, FIRE FIGHTING AND AIR-CONDITION WORK FOR REGIONAL OFFICE OF MMTC LIMITED AT NIC BUILDING(4TH) FLOOR,8, INDIA EXCHANGE PLACE,KOLKATA.

Sl.No.	Description Of Works	Unit	Qty	Rate	Amount
				Rs.	Rs. P.
5.10	6.35 mm with Insulation	Rmt	10		
6	<u>PVC DRAIN WITH INSULATION</u>				
	Supply and installation of Hard PVC Drain Piping complete with all necessary fittings and to be insulated with 9mm thick Nitrile Rubber Elastomeric insulation.				
	32mm dia	Rmt	350		
7	<u>INSTALLATION TESTING & COMMISSIONING</u>				
	Indoor unit		14	NA	
	Outdoor unit		1		
	PART 'B' TOTAL CARRIED TO GENERAL SUMMARY				
	<u>SCHEDULE-- IV (AIR-CONDITION WORK)</u>				
	<u>TOTAL SUMMARY OF AIR-CONDITION WORK</u>				
	PART-A: SUPPLY OF MECHINERY:				
	PART-B: INSTALLATION WORK:				
	Total Rupees in Words :				
Place:				Signature of Contractor With Seal	
Date:					



REV	NO	DATE	SCALE
REV4	22/08/12		
REV3	15/07/12		
REV2	24/11/10		
REV1	18/11/10		

NO	NAME	DATE	SCALE
DRN	M.K.	18/11/10	N.T.S
CHD	ASHOK	18/11/10	
APP			

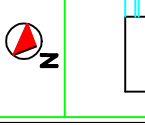
CLIENT -
M M T C LTD

TITLE -
PROPOSED LAYOUT OF M M T C LTD
AT NIC BUILDING, 8, INDA EXCHANGE PLACE
4TH FLOOR, KOLKATA

PROJECT -
INTERIOR OF M M T C LTD,
REGIONAL OFFICE
AT FOURTH FLOOR

ARCHITECT -
DIAR & ASSOCIATES (P) LTD,
KOLKATA,
(INTERIOR DIVISION)

DRG.NO -
DA/INT/AMTC-1014/RGN/C-1



FOURTH FLOOR PLAN (some existing portion remain same)
(carpet area : 939.78 sqm (10330 sqft approx) excluding toilets, stairs, common & terrace)

NO.	NAME	DATE	SCALE
001	M.K. SARKAR	11.12.13	1:100
002	A. SARKAR		
003			

CLIENT -
M M T C LTD

TITLE -
ELECTRICAL LAYOUT OF M M T C LTD
AT NIC BUILDING, B, INDA EXCHANGE PLACE
4TH FLOOR, KOLKATA

PROJECT -
INTERIOR OF M M T C LTD,
REGIONAL OFFICE
AT FOURTH FLOOR

ARCHITECT -
DIAR & ASSOCIATES (P) LTD.
KOLKATA
(INTERIOR DIVISION)

DRG. NO -
DA/INT/AMTC-1014/RGN/C-1



FOURTH FLOOR PLAN (some existing portion remain same)
(carpet area : 939.78 sqm (10330 sqft approx) excluding toilets, stairs, common & terrace)

