Tender Document for "Electrical works for 3rd floor (Phase – 1) of Indian Bank, Head Office Main Building, No: 66, Rajaji Salai, Chennai - 600 001".

Through electronic mode only

TECHNICAL BID

HO:EST:SVM:02:2023-24

Date: 15.04.2023

CONSULTANT:

CREATIVE ARCHITECTS AND INTERIORS

1090, POONAMALLEE HIGH ROAD,

1ST FLOOR, A.R. COMPLEX

EGMORE. CHENNAI – 600084

PH: 044 –42042303

Email: creative1090@gmail.com

This Tender has 106 pages

INDEX

FORM OF E-TENDER

To,
Assistant General Manager (Estate),
Indian Bank Corporate Office,
Premises, Estate & Expenditure Dept,
No. 254-260, Avvai Shanmugam Salai,
Royapettah, Chennai – 600 014.

Dear Sir/s,

Sub: "Electrical works for 3rd floor (Phase – 1) of Indian Bank, Head Office Main Building, No: 66, Rajaji Salai, Chennai - 600 001"

Having duly examined the tender documents including the drawings, specifications, designs bill of quantities relating to the works specified in the under written memorandum and having visited / inspected the site of the said works and having acquired all the requisite information relating there to as affecting this tender, I/We hereby offer to execute the works specified therein at the rates specified in the Bill of quantities **(while submitting Price Bid)** and in accordance, in all respects, with the specifications, designs, drawings and instructions in writing referred to in the conditions of tender, the Articles of Agreement, Special Conditions, if any, the Bill of quantities and Conditions of Contract and with such materials are as specified, by and in all other respects in accordance with such conditions in the Bill of quantities and conditions of contract so far as applicable.

Thanking You,

Tenderers Name & Signature

Date and Company Seal:

NOTICE INVITING TENDER (e-tender)

Indian Bank, Corporate Office, Estate Department, Chennai invites e-tender under 2 bid system from reputed and resourceful bidders for executing "**Electrical works for 3rd floor (Phase – 1) of Indian Bank, Head Office Main Building, No: 66, Rajaji Salai, Chennai - 600 001".**

1.	Name of Work	**"Electrical works for 3rd floor (Phase – 1) of Indian Bank, Head Office Main Building, No: 66, Rajaji Salai, Chennai - 600 001".**
2.	Estimated cost of work	Rs. 25 Lakhs
3.	Period of completion	90 days reckoned from the 7th day of issue of the work order or handing over of site whichever is later.
4.	Validity of e-Tender	90 days from the date of opening of Technical Bid
5.	Earnest Money Deposit (EMD)	Rs. 50,000/- (Rupees Fifty Thousand only) in NEFT. Bank/Branch: Indian Bank, Harbour Branch IFSC : IDIB000H003 A/c Name : HO Expenditure Dept A/c Number : 432438421 . UTR details to be submitted along with Technical Bid.
6.	Initial Security Deposit (ISD)	2% of the Bid Amount (Including EMD amount)
7.	Retention Money (RM)	5% against each RA bill
8.	Total Security Deposit EMD+ISD+RM	7% of the cost. (50% will be released after 15days of payment of the final bill and the balance 50% will be released after the Defect liability Period of One year).
9.	Value of work for Interim Payment	Rs 12,50,000/- (Rupees Twenty Lakhs and Fifty Thousand Only)
10	Tender Documents	The Tender Documents can be downloaded from the Bank's website www.indianbank.in & e-procurement portal: https://www.tenderwizard.com/indianbank

11.	Cost of Tender documents	**Free of cost.**
12.	Liquidated Damages	1% for delay per week of the contract value subject to maximum of 10% of contract value.
13.	Last date of submission of Tenders (Through Online Mode only)	**09.05.2023- 15.30hrs.**
14.	Date of Opening of Technical bid	**09.05.2023- 15.30hrs**, at Indian Bank Head Office Main Building, HO: OM Dept, Ground Floor, No:66, Rajaji Salai, Chennai – 600 001.
15.	Date of Opening of Financial bid	Will be intimated later to the qualified Tenderers only.
16.	Defect Liability Period	12 Months from the date of Virtual Completion of work.
17.	Bank Account Details (for EMD)	Bank/Branch: Indian Bank, Harbour Branch IFSC : IDIB000H003 A/c Name : HO Expenditure Dept A/c Number : 432438421

Note:

1. The Final Financial price bid will be decided through the e-Auction portal: https://www.tenderwizard.com/indianbank
2. The bank reserves the right to reject any or all tenders/bids without assigning any reason.
3. The rates quoted by the Tenderer shall be based only on the specifications and conditions of the tender documents.
4. Bank is not liable to make any payment to tenderers either for inspection of site or for preparation to submit the tender/bid, regardless of the condut or outcom of the bidding process.
5. Bank reserves the right to cancel the tender of the bidder who fails to submit their tender in the prescribed format of bank.
6. The Companies who are registered with Micro, Small & Medium Enterprises and also

those having valid NSIC certificate under Government Store Purchase Programme are exempted from the submission of Tender document fee/EMD on submission of requisite proof in the form of valid certification from MSME and NSIC.

ASSISTANT GENERAL MANAGER (Estate)
Indian Bank, Corporate Office
Premises, Estate & Expenditure Dept,
First Floor,
No. 254-260, Avvai Shanmugam Salai,
Royapettah, Chennai – 600014
Phn : 044 - 2527 8800
044 – 2813 4401
044 – 2813 4498
Email: hoestate@indianbank.co.in
ho.om@indianbank.co.in

Pre-Qualification

Document

"Electrical works for 3rd floor (Phase – 1) of Indian Bank, Head Office Main Building, No: 66, Rajaji Salai, Chennai - 600 001".

Sub: "Electrical works for 3rd floor (Phase – 1) of Indian Bank, Head Office Main Building, No: 66, Rajaji Salai, Chennai - 600 001".

The intending bidders shall fulfill the following minimum **Criteria for pre-qualification** bidding for the above jobs: -

1.0 The bidder should hold valid EA/ESA grade license issued by the Electrical Licensing board of Tamil Nadu for carrying out HT & LT works. The copy of the license with expiry date shall be submitted along with tender.

2.0 EXPERIENCE

S.no	Eligible Work	Value – Rs. In Lakhs
1	**Three** similar completed works each costing not less than	10
2	**Two** similar completed works each costing not less than	12
3	**One** similar completed work each costing not less than	20

In the Last five years ending 31.03.2023. Similar nature means but not limited to the following:

1) Electrical panel fabrication / modification/servicing etc.,
2) Electrical Wiring Services.
3)Electrical Repairs & Maintenance including Operation & Maintenance (per annum).
4) Electrical Laying / Cable Jointing.
5) Electrical Substation Installation Services.
6) Electrical Breakdown related Works.
7) Interior Electrical related Services.

3.0 **TURNOVER:** Average annual turnover from the works for the last three years ending 31st March 2022 should not be less than **Rs. 25 Lakhs** as per the audited balance sheet.

4.0 **Profit / Loss: -** Tenderer should be a Net Profit making firm and should not have made losses in the last three financial years out of past 5 years. Certificate(s)

from Chartered Accountant / Statutory auditors specifying the net worth of the Applicants, as at the close of the preceding financial year.

5.0 **Solvency Certificate: -** The contractor should have a solvency of the amount of Rs **10 Lakhs** duly certified by any Scheduled Bank **obtained on or after 01.10.2022.**

Other conditions

1.0 Interested parties meeting the above Tender criteria can download the tender document from banks website www.indianbank.co.in/tenders/etender or https://www.tenderwizard.com/indianbank and submit experience profile, proof of meeting the above criteria, attested copies of completion / work in progress certificates from the clients, audited certified balanced sheet for the last 3 (three) years, EPF /GST, Registration as Contractor with various PSUs, State PWDs, CPWD, MES, Railways and Autonomous Bodies (if any), details of Technical and Administrative employees, etc., through online mode https:/www.tenderwizard.com/indianbank . Application not accompanied by any of the above documents and EMD will be rejected at the discretion of Indian Bank.

2.0 No Joint Venture or consortium of firms shall be allowed.

3.0 Indian Bank reserves the right to verify the authenticity of the documents submitted by the contractors. Indian Bank also reserves the right to reject any or all applications, split the works or cancel the process without assigning any reason whatsoever may be.

5.0 The Panel of pre-qualified contractors shall be initially valid for three year. However Indian Bank reserves the right to curtail or extend at its sole discretion.

6.0 The bidder should possess the necessary testing instruments like Megger, clip on meter, earth resistance tester etc for carrying out the tests at any time.

7.0 The contractors fulfilling the above eligibility criteria & Prequalified during this Tender process shall be empaneled for a period of 3 years from the date of Pre-Qualification. These empaneled contractors shall be deemed as Technically Qualified for the Phase 2 of the 3rd floor project and price bid will be called for, from them directly. However Indian Bank reserves the right to curtail or extend at its sole discretion.

SECTION I

INSTRUCTIONS TO TENDERERS
General

1.0 SCOPE OF TENDER BID

1.1 The Employer, as defined in the Tender document, hereinafter called "the Owner," wishes to receive tender documents.

1.2 Throughout these bidding documents, the terms "bid" and "tender" and their derivatives ("bidder"/"tenderer"), "bidered /tendered", "bidding"/"tendering", etc. are Synonymous. Day means calendar day. Singular also means plural.

1.3 The approximate Estimated Value of the works is as indicated in the tender document

2.0 ELIGIBLE TENDERERS

2.1 This Invitation to Tender bid is open to all experienced and reputed contractors involved in "**Electrical works for 3rd floor (Phase – 1) of Indian Bank, Head Office Main Building, No: 66, Rajaji Salai, Chennai - 600 001"** whether Individual or Sole Proprietor, Partnership firm, Private limited, or Public limited Company who satisfy the qualifying criteria. Joint ventures are not accepted.

2.2 The tenderers are required to forward the documents as indicated in the tender documents.

3.0 QUALIFYING CRITERIA

As given in Page No. 8 of this tender document.

Additional Requirement: Even though the tenderers meet the above qualifying criteria, they are liable to be disqualified if they have

(a) Made misleading or false representation in the forms, statements and attachment in proof of the qualification requirements;

(b) Records of poor performance such as abandoning the work, not properly completing the contract, inordinate delays in completion, litigation history or financial failures etc.

(c) Their business banned by any Central Govt. Department/ Public Sector Undertakings or Enterprises of Central Govt.

(d) Not submitted all the supporting documents or not furnished the relevant details as per the prescribed format.

(e) Any one of the partners (in case of partnership firm) or any Directors in case of pvt ltd., or public ltd firm being convicted by a Court of law.

3.1 Tenderer shall submit the general information about them as per ProformaNo-I

3.2 Tenderer shall submit the list of major plant & machinery available with the firm as per Proforma No.- II

4.0 SITE VISIT

4.1 The tenderer is advised to visit **(upon prior approval),** and examine the Site of Works and its surroundings and obtain for itself on its own responsibility and cost all information that may be necessary for preparing the bid and entering into a contract for construction of the Works.

4.2 The tenderer and any of its personnel or agents will be granted permission by the Employer /Owner to enter upon its premises and lands for the purpose of such visit **(upon prior approval),** but only upon the express condition that the tenderer, its personnel, and agents, will release and indemnify the Employer/Owner and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

4.3 Before submitting a Bid, the Tenderer shall be deemed to have satisfied himself by actual inspection of the site and locality of the works, Traffic conditions/restrictions, Availability of parking space, Transportation of materials that all conditions liable to be encountered during the execution of the works are taken into account and that the rates entered in the Price Bid document are adequate and all inclusive for the completion of work to the entire satisfaction of the Employer/Owner.

5.0 BID OPENING

5.1 Part-I of the Bid (Technical Bid) will be opened through Online mode and (the date and time intimated in the Notice Inviting tender (NIT)) mentioned in "Tender document" in presence of Tenderers or authorized representatives of Tenderers who wish to attend the opening of Bids.**Bank will decide the Final Financial price through Online. Advance intimation will be given to all qualifying bidders of Technical Bid about the date, time.The bidders have to register their company in the e-Procurementportal** https://www.tenderwizard.com/indianbank **obtain Digital Signature for participating in the online tender. Only online mode of submission of Tender is accepted. No Hardcopy of Tender is accepted for evaluation.**

6.0 PROCESS TO BE CONFIDENTIAL

6.1 Information relating to the examination, clarification, evaluation and comparison of bids, and recommendations for Tender shall not be disclosed to tenderers or any of their persons not officially concerned with such process until the Tender process is finalized.

7.0 EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS

7.1 The Employer shall examine the bids to determine whether they are complete, whether the documents have been properly signed and whether the bids are generally in order, and all documents as per tender document have been submitted.

7.2 Prior to the detailed evaluation, Employer shall determine whether each bid is of acceptable quality, is generally complete and is substantially responsive to the tender documents. For purposes of this determination, a substantially responsive bid is one that confirms to all the documents as specified in the Tender document without material deviations, objections, Conditionality or reservation, material deviation, objection, conditionality or reservation is one;

a) That affects in any substantial way the scope, quality or performance of the contract.

b) That limits in any substantial way, inconsistent with the bidding documents, the Employers' rights or the successful Tenderer's obligations under the tender document or

c) Whose rectification would unfairly affect the competitive position of other Tenderers who are presenting substantially responsive bids.

7.3 If a bid is determined to be not substantially responsive, it shall be rejected by the Employer.

8.0 EVALUATION OF TENDER BIDS

8.1 The bids, which are determined as substantially responsive, shall be evaluated based upon the criteria as given in qualifying criteria.

8.2 No Tenderer is permitted to canvass to Employer on any matter relating to this Bid. Any Tenderer found doing so is liable to be disqualified and his/their bid is liable to be rejected.

8.3 The Employer may visit few of the works completed by the tenderers, whom they claim satisfying the eligibility criteria (As a part of tender process).

9.0 The application should be type-written. The applicant should sign and stamp each page of the application.

10.0 Overwriting should be avoided. Correction, if any should be made by neatly crossing out, initialing, dating and rewriting. Pages of the Tender documents are numbered. Additional sheets, if any, added by the contractor, should also be numbered by him.

11.0 Any information furnished by the applicant found to be incorrect either immediately or at a later date, would render him liable to be debarred from Tender / tendering / taking up of work in Indian bank. If such applicant happens to be pre-qualified/ enlisted contractor, his name shall be removed from the pre-qualified list of contractors.

12.0 All information called for in the enclosed forms should be furnished against the relevant columns. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even if no information is to be provided in a column, a 'NIL' or 'NO SUCH CASE' entry should be made in that column. If any particulars! Query is not applicable in case of the applicant, it should be stated as "not applicable". The applicants are· cautioned that not giving complete information called for in the application forms or not giving it in clear terms or making any change in the prescribed forms or deliberately suppressing the information may result in the applicant being rejected. Applications/Tender document submitted through Email. The Application/Tender document received after the due date and time of submission shall not be considered.

eProcurementSupport Desk Contact Details
M/s. Antares Systems Limited
#24, Sudha Complex, 3rd Stage, 4th Block
Basaveshwaranagar, Bangalore – 560 079.
Support Contact No. 9943277499/080-40482100
Support Email: gunaseelan.m@antaressystems.com

2.3. SUBMISSION OF BIDS THROUGH E-TENDERING PORTAL

The Bid documents, to be uploaded as part of online bid submission, are as follows:

a. Eligibility Criteria, along with all supporting documents required.

b. All Annexure as per this tender on Bidder's letter head with authorizing person's signature and Bidder seal on all pages.

c. All supporting documents and product literature in support of Technical specifications.

d. Relevant brochures

e. Compliance to Technical Specifications as per Technical Bid.

f. Any other information sought by the Bank with relevant to this tender. Bidder should upload all the copies of relevant documents without fail in support of their bid and as per the instructions given in tender documents. If the files to be uploaded are in PDF format, ensure to upload it in "Searchable" PDF Format. After filling data in predefined forms bidders need to click on final submission link to submit their encrypted bid.

Please take care to scan documents so that total size of documents to be uploaded remains minimum. **All documentation evidence provided to the Bank shall be in PDF Format. The Scanned Documents shall be OCR enabled for facilitating "search" on the scanned document.** Utmost care may be taken to name the files/documents to be uploaded on e-tendering portal.

2.4. BID RELATED INFORMATION

Bidders must ensure that all documents uploaded on e-tendering portal as files or zipped folders, contain valid files and are not corrupt or damaged due to any processing at bidder PC system like zipping etc. It shall be the responsibility of bidder themselves for proper extractability of uploaded zipped files.

Any error/virus creeping into files/folder from client end PC system cannot be monitored by e-tender software/server and will be bidder's responsibility only.
In addition to uploading the documents in our e-Tendering portal, Bidders should also submit the following in a sealed envelope, super scribing with the tender Reference number, due date, Name of the Bidder, etc.

a) Earnest Money Deposit/Bid Security
b) DD towards Cost of bid document (Bidders may also remit the amount in the account number mentioned in Schedule 9)

Note: Companies registered as Micro/Small Units under MSE/NSIC should submit documentary proof for claiming exemption for Cost of Bid document and EMD.

OTHER INSTRUCTIONS

For further instructions like system requirements and manuals, the bidder should visit the e-tendering portal (https://www.tenderwizard.com/indianbank), click on System Requirement Manual/ User Manual.

The following 'Four Key Instructions' for bidders must be assiduously adhered to

a. Obtain individual Digital Signing Certificate (DSC or DC) well in advance before tender submission deadline on e-tendering portal.

b. Register your organization on e-tendering portal well in advance before tender submission deadline on e-tendering portal

c. Get your organization's concerned executives trained on e-tendering portal well in advance before tender submission deadline on e-tendering portal

d. Submit your bids well in advance of tender submission deadline on e-tendering portal (Bank will not be responsible any problem arising out of internet connectivity issues).

Note: While the first three instructions mentioned above are especially relevant to first-time users of the e-tendering portal, the fourth instruction is relevant at all times.

Proforma – I

General Information

All Individual /Sole Proprietor/Partnership firm/Private limited/Public limited Company applying for pre-qualification are requested to complete the information in this form.

1	Name of Tenderer	
2	Head Office Address	
3	Address on which Correspondence should be done.	
	Tel. No.	
	Mobile no.	
	Fax No.	
	E-mail address	
4	Place of incorporation / registration	
5	Constitution of tenderer	
i)	Specify, if the tenderer is	
	a) An individual	
	b) A proprietary firm	
	c) A firm in partnership	
	d) A Limited Company or Corporation	
ii)	Attach a copy of Proprietorship or Partnership Deed or Article of Association or Incorporation of Company as the case may be .	
6	Bank solvency	
7	Turn Over for the years given below	
	2019 - 2020	
	2020 - 2021	
	2021 - 2022	
	2022 - 2023	
8	Give particulars of registration with Govt. / Semi Govt. / Public Sector Undertakings / Local Bodies.	
9.	Other details: a) EPF No. b) Labour license no c) PAN No. d) GST Registration No. (Copies to be enclosed)	

10.	Any other information considered necessary but not included above	
11.	Names and Titles of Directors and officers with designation to be concerned with this work with Designation of individuals authorized to act for the organization	
12.	Was the applicant ever required to suspend works for a period of more than six months continuously after commencement of works. If so, give the name of the project and give reasons thereof.	
13.	Has the applicant or any constituent partner in case of partnership firm, ever abandoned the awarded work before its completion? If so, give the name of the project and give reasons thereof.	
14.	Has the applicant or any constituent partner in case of partnership firm, ever been debarred / black listed for tendering in any organization at any time? If so, give details	
15	Has the applicant or any constituent partner in case of partnership firm, ever been convicted by a court of law? If So, give details	
16.	Detailed description and value of works successfully completed during the last five years as mentioned in Page no. 8	
17	Furnish names and address of previous organization for which you have executed similar work in the recent past (At least three)	

Note: Only self attested copies to be furnished.

Date & Place **Signature & seal of the applicant**

PROFORMA – II

List of major Plant and Machinery in possession of the firm

S. No.	**Name of Plant & Machinery / equipment**	**Nos. Available Owned**	***Other than col. No. C**
A	**B**	**C**	**D**
1			
2			
3			
4			
5			
6			

Signature & seal of the applicant

Date & Place

Note:

* In case of any arrangement for getting the equipment on lease, etc., authenticated proof of the same is to be submitted.

Use separate sheets for providing more information.

PROFORMA II(a)

DETAILS OF KEY TECHNICAL AND ADMINISTRATIVE PERSONNEL EMPLOYED BY THE FIRM / COMPANY

S.no	Designation	No of staffs	Names	Qualification	Professional Experience	Years of Experience in this firm

Seal and Signature of the applicant

Date and Place

PROFORMA III

FINANCIAL INFORMATION

I Financial Analysis – Details to be furnished duly supported by figures in Balance Sheet/Profit and Loss Account for the last three years ended 31.03.2022 duly certified by the Chartered Accountant, as submitted by the applicant to the Income-Tax Department (Copies to be attached).

FINANCIAL YEARS	17-18	18-19	19-20	20-21	21-22
(i) Gross Annual turn-over in Works: mentioned in the NIT					
(ii) Profit or Loss					
(iii) Financial position:					
(a) Cash					
(b) Current Assets					
I Current Liabilities					
IV) Net Working capital (b-c)					
(b)Current Ratio: Current Assets/Current Liabilities (b/c)					
I Acid Test Ratio: Quick Assets/Current Liabilities (a/c)					
V. Income Tax clearance Certificate					
VI. Solvency certificate from Bankers (Scheduled Bank) of Applicant.					
VII. Financial arrangements for carrying out the proposed work					

Date and Place

SIGNATURE OF APPLICANT(S)

Signature of Charted Accountant with seal of the Applicant

PROFORMA IIIA

LIST OF SIMILAR WORKS SATISFYING QUALIFICATION CRITERIA COMPLETED DURING THE LAST 5 YEARS

S.No	Clients Name & Address	Name of the work & Location	Scope of work carried out by the bidder	Agreement/ Letter of Award No. & Date	Contract Value	Date of start	Date of completion	Reasons for delay in Completion, if any	Ref. Or Document (with page no.) in support of meeting Qualification Criterion

PROFORMA IIIB

LIST OF WORKS ON HAND

S.No	Clients Name & Address	Name of the work & Location	Scope of work	Agreement/ Letter of Award No. & Date	Contract Value	Date of start

PROFORMA – IV

Certificate of Credit Facility
(Solvency) (On Bank's letter Head)

This is to certify that M/s _____ , is a reputed firm / company with a good financial standing.

The firm / company is enjoying a fund based credit facility of Rs. _____ to meet its working capiral requirements.

Signature

Name, Designation &

Address of Bank

BANK'S SEAL

NOTE: The above certificate shall be from Scheduled Bank.

PROFORMA V

PERFORMANCE REPORT FOR WORKS REFERRED TO IN PROFORMAIII (A)

1. Name of the work / Project & Location.
2. Scope of work.
3. Agreement No.
4. Estimated Cost
5. Tendered Cost
6. Value of work done
7. Date of Start
8. Date of completion

a. Stipulated date of completion.

b. Actual date of completion.

9. Amount of compensation levied for delayed Completion if any.

10. Performance report based on quality of work, Time Management, and Resources :
Very Good/Good/Fair/Poor

Date and Place

SUPERINTENDING ENGINEER /
CHIEF PROJECT MANAGER
OR EQUIVALENT.

SPECIAL INSTRUCTIONS TO E-TENDERERS

Time of Completion, Extension of Time & Progress Chart

Time of Completion:

The entire work is to be completed in all respects within the stipulated period of **90** days. The work shall deem to be commenced within seven days from the date of issue of Work order or date of handing over of site, whichever is later. Time is the essence of the contract and shall be strictly observed by the Tenderer.

The work shall not be considered as complete until the Architects have certified in writing that this has been completed and the Defects Liability Period shall commence from the date of such certificate.

The contractor may plan and execute all the works around the clock.

Extension of Time:

If in the opinion of the Indian Bank/Architects / Project Management Consultants the works be delayed (a) by reason of any exceptionally inclement weather, or (b) by reason of instructions from the Indian Bank in consequence of proceedings taken or threatened by or disputes, with adjoining or neighboring owners or (c) by the works, or delay, of other Tenderers or tradesmen engaged or nominated by the Indian Bank and not referred to in the specification or (d) by reason of authorized extra and additions or I by reason of any combination of strikes or lock-out affecting any of the building trades of (1) from other causes which the Indian Bank may consider being beyond the control of the Tenderer, the Indian Bank at the completion of the time allowed for the contract shall make fair and reasonable extension of time for completion in respect there for. In the event of the Indian Bank failing to give possession of the site upon the day specified above the time of completion shall be extended suitably.

In case of such strikes or lockouts, as are referred to above, the Tenderer shall, immediately give the Indian Bank, written notice thereof. Nevertheless the Tenderer shall use his best endeavors all that to prevent delay, and shall do all that may be reasonably required to the satisfaction of the Indian Bank to proceed with the works and on his doing so, it will be ground of consideration by the Indian Bank for a extension of time as above provided. The decision of the Indian Bank as to the period to be allowed for an extension of time for completion hereunder (which decision shall be final and binding on the Tenderer) shall be promulgated at the conclusion of such strike or lock-out and the Indian Bank shall then, in the event of an extension being granted, determine and declare the final completion date. The provision in clause 5 with respect to payment of liquidated damages shall in such case, be read and construed as if the extended dated fixed by the Indian Bank were substituted for and the

damage shall be deducted accordingly.

Progress of Work:

During the period of construction, the Tenderer shall maintain proportionate progress on the basis of a Programme Chart submitted by the Tenderer immediately before commencement of work and agreed to by the Indian Bank / Architects. Tenderer should also include planning for procurement of scarce material well in advance and reflect the same in the Programme Chart so that there is no delay in completion of the project.

2. Defects Liability Period (DLP)

a) It must be realized that this period is for exposure of "latent defects" such as settlements, shrinkages or expansion cracks, undue weathering and wear due to faulty material and workmanship.

b) The DLP commences from the certified date of Virtual Completion issued by the Architects. DLP – 1 year from the Date of issue of Virtual Completion Certificate for the work by Architects.

c) Whenever the Indian Bank is of the view that the defects in the workmanship and/or materials used are likely to be apparent only over a long period, the Defect Liability Period may be extended as deemed fit.

3. Date of Commencement

Normally, Date of commencement shall be either 7 Days from the Work order issued to the Tenderer or the day on which Tenderer is instructed to take possession of the site, Whichever is earlier.

4. Date of Completion

Date of completion shall be arrived at after adding the time allowed for the execution of the work to the date of commencement of work.

5. Period of Final Measurement

The period of final measurement after completion shall be made taken into account the complexity of the work and staff available for carrying out measurements.

All hidden works shall have already been measured as the work progressed in presence of Tenderers, Indian Bank, Architect and respective specialized consultants to check up the quality and method of installation. It should be noted that unless a longer period is stipulated, the condition of contract generally lays down three months (maximum) from the date of completion of the contract as the period of final measurement. Even though the maximum period of

three months is mentioned, it shall be endeavored to complete the measurements as expeditiously as possible.

6. **Period of Honoring Interim Certificate**

The period shall be ten days from the date of receipt of the certificate from the Architect along with M Book only signed by the Tenderer consultants & Architect.

7. **Period of Honoring Final Certificate**

The period shall be one month from the date of receipt of the final bill certificate from the Architect along with M book duly signed by Tenderer, Consultant and Architects and statutory Certificates wherever necessary along with as built drawings of the works executed. No due certificate from self as well as from the sub agencies involved by the main contractor should be produced to the bank at the time of submitting final bill by the main contractor.

8. **Retention Money**

The retention percentage (I.e. deduction from interim bill) shall be 5% of the Gross value of each interim bill. The maximum amount of retention money shall be the balance amount of the Total Security Deposit. 50% of the retention amount will be refunded to the Tenderer on completion subject to the following:

- Issue of Virtual Completion Certificate by the Architect.
- Tenderer's removal of his materials, equipment, labour force, temporary sheds/stores etc. from the site. (excepting for a small presence required if any for the Defect Liability Period and approved by the Indian Bank) The remaining 50% of the amount may be refunded 14 (Fourteen) days after the end of defects liability period provided he has satisfactorily carried out all the works and attended to all defects in accordance with the conditions of the Contract, including site clearance.

9. **Receiving, Opening and Recording of Tenders**

Part-A tender will be opened at **15.30** hours on the same day as the last day of the receipt (through online mode only).

After technical evaluation, intimation will be given to all qualifying bidders about the date, time of opening of e – price bid with the opening of the lowest value among the quotes shall be treated as Successful Bidder.

GENERAL CONDITIONS OF CONTRACT

Except where provided for in the description of the individual items in the schedule of quantities and in the specifications and conditions laid down hereinafter and in the Drawings, the work shall be carried out as per standard specifications and under the direction of Architects.

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 him except where the subject or context otherwise requires:

i. Indian Bank: The term Indian Bank shall denote Indian Bank with their Corporate Office at No. 254-260, Avvai Shanmugam Salai, Royapettah, Chennai – 600 014 and any of its employees representative authorized on their behalf.

ii. Tenderer: The term Tenderer shall mean (to the firm the contract is awarded) and his / their heirs, legal representatives, assigns and successors.

iii. Site: The site shall mean the site where the works are to be executed as shown within boundary in red border on the site plan including any building and erections thereon allotted by the Indian Bank for the Tenderer's use.

iv. Drawings: The work is to be carried out in accordance with drawings, specifications, the schedule of quantities and any further drawings which may be supplied or any other instruction, which may be given by the Indian Bank during the execution of the work.

All drawings relating to work given to the Tenderer together with a copy of schedule of quantities are to be kept at site and the Architects shall be given to such drawings or schedule of access whenever necessary.

In case any detailed Drawings are necessary, Tenderer shall prepare such detailed drawings and or dimensional sketches there for and have it confirmed by the Indian Bank/ Architects/PMC as case may be prior totalling up such work.

The Tenderer shall ask in writing for any clarifications.

v. "The Works" Shall mean the work or works to be executed or done under this contract.

vi. "Act of Insolvency" shall mean any act as such as defined by the Presidency Towns Insolvency act or in Provincial Insovency Act or any amending Statutes.

vii. "The Schedule of Quantites" shall mean the schedule of quantities as specified and forming part of this contract.

viii. "Priced Schedule of Quantities" shall mean the schedule of quantities duly priced with the accepted quoted rates of the Tenderer.

2. Tenders

a) Technical Bid

The entire set of e-tender issued to the tenderer should be submitted fully signed on every page . Signature will indicate the acceptance of the tender papers by the tenderer. Signed copy of Technical Bid to be uploaded in the website.

b) Price Bid - the price should be quoted in the Price Bid format attached to this bid through on-line mode only.

The Indian Bank reserves the right to reject the lowest or any tender and also to discharge any or all of the tenders for each section or 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 Indian Bank/ Architects detailed analysis of any or all the rates shall be submitted. The Indian Bank/ Architects shall not be bound to recognize the Tenderer's' analysis.

The works will be paid for as "measured work" in the basis of actual work done and not as "lump sum" contract, unless otherwise specified. All items of work described in the schedule of quantities are to be deemed and paid as complete works in all respects and details including preparatory and finishing works involved, directly, related to and reasonably detectable from the drawings, specifications and schedule of quantities and no further extra charges will be allowed in this connection. In the case of lump-sum charges in the tender in respect of any item of works, the payment of such items of work will be made for the actual work done on the basis of lump-sum charges as will be assessed to be payable by the Indian Bank.

The Indian Bank has power to add to, omit from any work as shown in drawings or described in specifications or included in schedule of quantities and intimate the same in

writing but no addition, omission or variation shall be made by the Tenderer without authorization from the Indian Bank. No variation shall vitiate the contract. Please also refer to para 9 hereinafter.

The tenderer shall note that his tender shall remain open for consideration for a period as specified in General rules and Instructions under Item no 10. from the date of opening of the price of the tender.

3. Agreement

The successful Tenderer is required to sign agreement as may be drawn up to suit local conditions and shall pay for all stamps and legal expenses, incidental thereto.

4. Permits and Licenses

Permits and licenses for release of materials which are under Government control will be arranged by the Tenderer. The Indian Bank will render necessary assistance, sign any forms or applications that may be necessary.

The Indian Bank/ Architect / PMC shall be indemnified against all Government or legal actions for theft or misuse of cement M.S. rods and any controlled materials in the custody of the Tenderer.

It may be clearly understood that no compensation or additional charges can be claimed by the tenderer for non-availability of such materials in due time on this account or according to his own requirements.

5. Government and Local Rules

The Tenderer shall conform to the provisions of all local Bye-laws and Acts relating to the work and to the Regulations etc., of the Government and Local Authorities and of any company with whose system the structure is proposed to be connected. The Tenderer shall give all notices required by said Act, Rules, and Regulations and Bye-laws etc., and pay all fees / fines payable to such authority / authorities for execution of the work involved. The cost, if any, shall be deemed to have been included in his quoted rates, taking into account all liabilities for licenses, fees for footpath encroachment and restorations etc., and shall indemnify the Indian Bank against such liabilities and shall defend all actions arising from such claims or liabilities.

6. Taxes and Duties

The tenderers must include in their tender prices quoted for all duties royalties, cess and Sales tax or any other taxes or local charges if applicable. GST will be payable extra as applicable. No extra claim on this account will in any case be entertained.
The tenderer shall keep necessary books of A/C & other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by duly authorized

representative of the Indian Bank and or the Engineer-in-charge and further shall finish such other information / document as the Indian Bank may required from time to time.

7. Quantity of Work to be executed

The quantities shown in the schedule of quantities are intended to cover the entire new structure indicated in the drawings but the Indian Bank reserves the right to execute only apart or the whole or any excess thereof without assigning any reason therefore. Variation in the value is however not expected to be more than 25%.

8. Persons Engaged by the Indian Bank

The Indian Bank reserves the right to execute any part of the work included in this contract or any work which is not included in this contract by other Agency or persons and Tenderer shall allow all reasonable facilities and use of his scaffolding for the execution of such work. The main Tenderer shall extend all cooperation in this regard.

9.Earnest Money and Security Deposit

The tenderer will have to deposit an amount of Rs. 50,000/- (Rupees Fifty Thousand Only) through NEFT / RTGS at the time of submission of tender as an Earnest Money. The Indian Bank 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 acceptance of the selected tenderder after award of work or after the expiry of the validity period of the tender.

Apart from the EMD, retention money shall be deducted from progressive running bills @ 5% of the gross value of each running bill until the Total Security Deposit, i.e., EMD and the retention money equals 7% of the project cost. 50% of the total security deposit shall be released on successful completion of the works and after obtaining Virtual completion certificate from the Architect and No Claim certificate by the tenderder to the Indian Bank.

The balance retention amount 50% will be refunded after the end of defects liability period as mentioned in point no.2 of this special condition of contract provided he has satisfactorily carried out all the work and attended to all defects in accordance with the conditions of the contract. No interest is allowed on retention money. A part of the Security Deposit if and as decided by a constituent Indian bank can also be furnished in the form of a Indian bank guarantee on a Indian bank other than that of the constituent Indian bank

10. Tenderer to provide everything necessary

The Tenderer shall provide everything necessary for the proper execution of the work according to the intent and meaning of the drawings, schedule of quantities and

specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from and if the Tenderer finds any discrepancies therein he shall immediately and in writing, refer the same of the Indian Bank/ Consultant whose decision shall be final and binding.
The Tenderer shall provide himself for ground and fresh water for carrying out of works at his own cost. The Indian Bank shall on no account be responsible for the expenses incurred by the Tenderer for hired ground or fresh water obtained from elsewhere.

The rates quoted against individual items will be inclusive of everything necessary to complete the said items of work within the contemplation of the contract, and beyond the unit price no extra payment will be allowed for incidental or contingent work, labour and/or materials inclusive of all taxes and duties whatsoever except for specific items, if any, stipulated in the tender documents.

The Tenderer shall supply, fix and maintain at his own cost, for the execution of any work, all tools, tackles, machineries and equipments and all the necessary centering, scaffolding, staging, planking, timbering, strutting, shoring, pumping, fencing, boarding, watching and lighting by night as well as by day required not only for the proper execution and protection of the said work but also for the protection for the public and safety of any adjacent roads, streets, walls, houses, buildings, all other erections, matters and things and the Tenderer shall take down any remove any or all such centering, scaffolding, planking, timbering, strutting, shoring, etc., as occasion shall be required or when ordered so to do, and shall fully reinstate and make good all matters and things disturbed during the execution of the works to the satisfaction of the Indian Bank/ Architects.

The Tenderer shall also provide such temporary road on the site as may be necessary for the proper performance of the contract, and for his own convenience but not otherwise. Upon completion, such roads shall be broken up and leveled where so required by the drawings unless the Indian Bank shall otherwise direct. The Tenderer shall at all times give access to workers employed by the Indian Bank or any men employed on the buildings and to provide such parties with proper sufficient and if required, special scaffolding, hoists and ladders and provide them with water and lighting and leave or make any holes, grooves etc., in any work, where directed by the Indian Bank as may be required to enable such workmen to lay or fix pipes, electrical wiring, special fittings etc. The quoted rates of the tenderers shall accordingly include all these above mentioned contingent works.

11. Tools, Storage of Materials, Protective Works and Site Office Requirements

The Tenderer shall maintain a site engineer/ supervisor to receive instruction notices or communications etc.

All drawings maintained on the site are to be carefully mounted on boards of appropriate

size and covered with a coat of approved varnish. They are to be protected from ravages of termites, ants, and other insects.
The Tenderer shall provide at his own cost all artificial light required for the work and to enable other Tenderers and sub-Tenderers to complete the work within the specified time.

The Tenderer shall use the toilets identified by the Indian bank for use of their workmen and keep the same in a clean and sanitary condition to the satisfaction of the Indian bank / Public Health Authorities and shall cause such latrines and soil to be cleared away whenever necessary and shall make good all the works disturbed by these conveniences.

Every precaution shall be taken by the Tenderer to prevent the breeding of mosquitoes on the works during the construction, and all receptacles; cisterns, water tanks etc., used for the storage of water must be suitably protected against breeding of mosquitoes.

The Tenderer shall indemnify the Indian Bank against any breach of rules in respect of anti-malarial measures.

The Tenderer shall not fix or place any placards or advertisement of any description or permit the same to be fixed or placed in or upon any boarding, gantry, building structure other than those approved by the Indian Bank.

Protective Measures: The Tenderer from the time of being placed in possession of the site must make suitable arrangements for watching, lighting and protecting the work, the site and surrounding property by day, by night, on Sundays and other holidays.

Tenderer shall indemnify the Indian Bank against any possible damage to the building, roads, or members of the public in course of execution of the work.
The Tenderer shall provide necessary temporary enclosures, gates, entrances, etc., for the protection of the work and materials and for altering and adopting the same as may be required and removing on completion of the works and making good all works disturbed.

Storage of materials: The Tenderer shall provide and maintain proper sheds for the proper storage and adequate protection of the materials etc. and other work that may be executed on the site including the tools and materials of sub- Tenderers and remove same on completion. Cement should be stored one feet above the ground level and have raised floor.

Tools: The theodolite levels, steel and metallic tapes and all other surveying instruments found necessary on the works shall be provided by the Tenderer for the due performance of this contract as instructed by the Site Engineer. All measuring tapes shall be of steel and suitable scaffolding and ladders that may be required for safely taking measurement shall be supplied by the Tenderer.

The masteries and the supervisors on the works shall carry with them always a one meter or two meter steel tape, a measuring tape of 3 meters, a spirit level, a plumb bob and a square and shall check the work to see that the work is being done according to the drawing and specifications. The Site Engineer will use any or all measuring instruments or tools belonging to the Tenderers as he chooses for checking the works executed or being executed on the contract. The Tenderer should cover in his rates for making provisions for all reasonable facilities for the use of his scaffolding, tools and plant etc. by sub-Tenderers for their work.

12. Notice and Patents of Appropriate Authority and Owners

The Tenderer shall confirm and adhere to the provisions of any Acts of the Legislature relating to the work, and to the Regulations and Bye- laws of any authorities, and/or any water, lighting and other companies, and/or authorities with whose systems the structures were proposed to have connection and shall before making any variations from the drawings or specification that may be associated to so conform, give the Indian Bank/ Architects written notices specifying the variations proposed to be made and the reasons for making them and apply for instruction thereon. The Indian Bank/ Architects on receipt of such intimation shall give a decision within a reasonable time.

13. Clearing Site and Setting out Works

The site shown on the plan shall be cleared of all obstructions, loose stone, and materials rubbish of all kinds. All holes or hollows whether originally existing or produced by removal or loose stone or materials shall be carefully filled up with earth well rammed and leveled off as directed at his own cost. The Tenderer shall set out the works and shall be responsible for the true and perfect setting out of the work and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time, any error shall appear during the progress of any part of the work, the Tenderer shall at his own expenses rectify such error, if called upon to the satisfaction of the Indian Bank. The Tenderer shall further set out the works to the alternative positions at the site until one is finally approved and the rates quoted in his tender should include for this and no extra on this account will be entertained.

14. Tenderer Immediately to Remove All Offensive Matters

The Tenderer shall keep the foundations and works free from water and shall provide and maintain at his own expenses electrically or other power driven pumps and other plant to the satisfaction of the Indian Bank for the purpose, until the building is handed over to the Indian Bank. The Tenderer shall arrange for the disposal of the water so accumulated to the satisfaction of the Indian Bank and local authority and no claims will be entertained afterwards if he does not include in his rates for the purpose.

15. Access

Any authorized representative of the Indian Bank shall at all reasonable times have free

access to the works and/or to the, workshops, factories or other places where materials are being prepared or constructed for the work and also to any place where the materials are lying or from where they are being obtained, and the Tenderer shall give every facility to the Indian bank or their epresentatives necessary for inspection and examination and test of the materials and workmanship. Except the representatives of the Indian Bank no person shall be allowed at any time without the written permission of the Indian Bank.

16. Materials, Workmanship, Samples, Testing of Materials

All the works specified and provided for in the specifications or which may be required to be done in order to perform and complete any part thereof shall be executed in the best and most workmanlike manner with materials of the best and approved quality of the respective kinds in accordance with the particulars contained in and implied by the specifications and as represented by the drawings or according to such other additional particulars, and instructions as may from time to time be given by the Indian Bank/ Architects during the execution of the work, and to his entire satisfaction.

If required by the Indian Bank/ Architects the Tenderer shall have to carry out tests on materials and workmanship in approved materials testing laboratories or as prescribed by the Indian Bank/ Architects at his own cost to prove that the materials etc. Under test conform to the relevant I.S. Standards or as specified in the specifications. The necessary charges for preparation of mould (in case of concrete cube) transporting, testing etc., shall have to be borne by the Tenderer. No extra payment on this account should in any case be entertained.

All works to be carried out generally as per BIS Specifications.
Branded items, i.e., BIS compliant items specified in the tender shall not be tested separately. However the other items if approved by Indian bank are subjected to testing as per tender specifications.
All the materials (except where otherwise described) stores and equipment required for the full performance of the work under the contract must be provided through normal channels and must include charge for import duties, sales tax, octroi and other charges and must be the best of their kind available and the Tenderers must be entirely responsible for the proper and efficient carrying out of the work. The work must be done in the best workmanlike manner. Samples of all materials to be used must be submitted displayed to the Indian Bank/ Architects when so directed by the Engineer/ Architects and written approval from Indian Bank/ Architects must be obtained prior to placement of order.

During the inclement weather the Tenderer shall suspend concreting and plastering for such time as the Indian Bank/ Architects may direct and shall protect from injury all work when in course of execution. Any damage (during constructions) to any part of the work for any reasons due to rain, storm, or neglect of Tenderer shall be rectified. by the

Tenderer in an approved manner at no extra cost.

Should the work be suspended by reason of rain, strike, lock -o–ts or any other cause, the Tenderer shall take all precautions necessary for the protection of work and at his own expenses shall make good any damage arising from any of these causes.

The Tenderer shall cover up and protect from damage, from any cause, all new work and supply all temporary doors, protection to windows, and any other requisite protection for the execution of the work whether by himself or special tradesmen or sub-Tenderer and any damage caused must be made good by the Tenderer at his own expenses.
The contractor shall prepare for approval of Architect the "Co-ordinated services drawings" for pre-planned openings so that the alterations are reduced to the minimum.

17. Removal of Improper Work

The Indian Bank shall during the progress of the work have power to order in writing from time to time the removal from the work within such reasonable time or times as may be specified in the order of any materials which in the opinion of the Indian Bank / Architects are not in accordance with specification or instructions, the substitution or proper re-execution of any work executed with materials or workmanships not in accordance with the drawings and specifications or instructions. In case the Tenderer refuses to comply with the order the Indian Bank shall have the power to employ and pay other agencies to carry out the work and all expenses consequent thereon or incidental thereto as certified by the Indian Bank/ Architects shall be borne by the Tenderer or may be deducted from any money due to or that may become due to the Tenderer. No certificate which may be given by the Architects shall relieve the Tenderer from his liability in respect of unsound work or bad materials.

18. Bank Engineer/Consultant:

The term "Site Engineer/PMC" shall mean the person/agencies appointed and paid by the Indian Bank to superintend the work. The Tenderer shall afford the BankEngineer/consultant every facility and assistance for examining the works and materials and for checking and measuring work and materials. The Site Engineer/PMC shall have no power to revoke, alter, enlarge or relax any requirements of the Tenderer or to sanction any day work, additions, alterations, deviations or omissions or any extra work whatever, except in so far as such authority may be specially conferred by a written order of the Indian Bank.
The Bank Engineer/Consultant shall have power to give notice to the Tenderer or to his foreman, of non-approval of any work or materials and such work shall be suspended or the use of such materials shall be discontinued until the decision of the Indian Bank is obtained. The work will from time to time be examined by the consultant, Engineer from the Premises Department of the Indian Bank and the Site Engineer if any. But such examination shall not in any way exonerate the Tenderer from the obligation to remedy

any defects which may be found to exist at any stage of the work or after the same is complete. Subject to the limitations of this clause the Tenderer shall take instructions only from the Consultant/Indian Bank or his representative.

19. Tenderer's Employees

The Tenderer shall employ technically qualified and competent supervisors for the work who shall be available (by turn) throughout the working hours to receive and comply with instructions of the Indian Bank/ consultant. The Tenderer shall engage at least one experienced Engineer as site-in-charge for execution of the work. The Tenderer shall employ in connection with the work persons having the appropriate skill or ability to perform their job efficiently. The Tenderer shall employ local labourers on the work as far as possible. No labourer below the age of eighteen years and who is not an Indian National shall be employed on the work.

Any labourer supplied by the Tenderer to be engaged on the work on day-work basis either wholly or partly under the direct order or control of the Indian Bank or his representative shall be deemed to be a person employed by the Tenderer.

The Tenderer shall comply with the provisions of all labour legislation including the requirements of

a) The Payment of Wages Act 1936
b) Indian Bank's' Liability Act 1938
c) Workmen's' Compensation Act Contract Labour (Regulation & Abolition) Act, 1970 and Central Rules 1971 and subsequent amendments.
d) Apprentices Act 1961
e) Minimum Wages Act 1948
f) Any other Act or enactment relating thereto and rules framed there Under from time to time.

The Tenderer shall keep the Indian Bank saved harmless and indemnified against claims if any of the workmen and all costs and expenses as may be incurred by the Indian Bank in connection with any claim that may be made by any workmen.

The Tenderer shall comply at his own cost with the order of requirement of any Health Officer of the State or any local authority or of the Indian Bank regarding the maintenance of proper environmental sanitation of the area where the Tenderer's' laborers are housed or accommodated, for the prevention of small pox, cholera, plague, typhoid, malaria and other contagious diseases. The Tenderer shall provide, maintain and keep in good sanitary condition adequate sanitary accommodation and provide facilities for pure drinking water at all times for the use of men engaged on the works and shall remove and clear away the same on completion of the works. Adequate precautions shall be taken by the Tenderer to prevent nuisance of any kind on the works or the lands adjoining the same.

The Tenderer shall arrange to provide first-aid treatment to the laborers engaged on the works. He shall within 24 hours of the occurrence of any accident at or about the site or in connection with execution of the works, report such accident to the Indian Bank and also

to the Competent Authority where such report is required by law. Compliance of labour regulations:

20. Dismissal of Workmen

The Tenderer shall on the request of the Indian Bank immediately Withdrawal / remove from works any person employed thereon by him, who may in the opinion of the Indian Bank be unsuitable or incompetent or who may misconduct himself. Such Withdrawal / Remove shall not be the basis of any

claim for compensation or damages against the Indian Bank or any of their officer or employee.

21. Assignment

The whole of the works included in the contract shall be executed by the Tenderer and the Tenderer shall not directly or indirectly transfer, assign or underlet the contract or any part, share or interest therein nor, shall take a new partner, without written consent of the Indian Bank and no subletting shall relieve the Tenderer from the full and entire responsibility of the contract or from active superintendence of the work during their progress.

22. Damage to Persons and Property Insurance Etc.

The Tenderer shall be responsible for all injury to the work or workmen to persons, animals or things and for all damages to the structural and/or decorative part of property which may arise from the operations or neglect of himself or of any sub-Tenderer or of any of his or a sub-Tenderer's' employees, whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this contract. The clause shall be held to include inter-alia, any damage to buildings whether immediately adjacent or otherwise, and any damage to roads, streets, foot paths or ways as well as damages caused to the buildings and the works forming the subject of this contract by rain, wind or other inclemency of the weather. The tenderer is also responsible for the damages/injury/accidents caused to any public in general / vehicles in general and pay necessary compensation or settlement or whatsoever in this regard.

The Tenderer shall indemnify the Indian Bank and hold harmless in respect of all and any expenses arising from any such injury or damages to persons or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of compensation or damage consequent upon such claim.

The Tenderer shall reinstate all damage of every sort mentioned in this clause, so as to deliver the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damages to the property or third parties.

The Indian Bank shall be at liberty and is hereby empowered to deduct the amount of any damages, compensations, costs, charges and expenses arising or accruing from or in respect of any such claim or damages from any sums due or to become due to the Tenderer.

23. Insurance

The Tenderer shall arrange to take "Tenderers all risk insurance policy including third party liability", covering the entire period of contract till virtual completion of the contract (including extended period if any) for the entire scope of works for a risk cover not less than the contract value. The third party insurance shall be for a sum of Rs. 5 Lakh per accident.

The Tenderer shall effect the insurance necessary and indemnify the Indian Bank entirely from all responsibility in this respect. The insurance must be placed with a company approved by the Indian Bank and must be effected jointly in the name of the Tenderer and the Indian Bank and the policy lodged with the latter. The scope of insurance is to include damage or loss to the work and workman due to carelessness accident, including fire, theft, loss of life of workmen earthquake and floods etc., damage or loss to the contract itself till this is made over in a complete state. Insurance is compulsory and must be effected from the very initial stage.
The Tenderer shall also be responsible for anything which may be excluded from damage to any property arising out of incidents, negligence or defective carrying out of this contract.

Unless otherwise instructed the Tenderer shall insure the works and keep them insured until the virtual completion of the contract against loss or damage by fire and /or earthquake, flood. The insurance must be placed with a company approved by the Indian Bank, in the joint names of the Indian Bank and the Tenderer for such amount and for any further sum if called to do so by the Indian Bank, the premium of such further sum being allowed to the Tenderer as an authorized extra.

The Tenderer shall as soon as the claim under the policy is settled or the work reinstated by the Insurance Company should they elect to do so, proceed with due diligence with the completion of the works in the same manner as though the fire has not occurred and in all respects under the conditions of the contract. The Tenderer in case of rebinding or reinstatement after fire shall be entitled to extension of time for completion as the Indian Bank may deem fit.

24. Accounts, Receipts & Vouchers

The Tenderer shall, upon the request of the Indian Bank furnish them, with all the invoices, accounts, receipts and other vouchers that they may require in connection with

the works under this contract. If the Tenderer shall use materials less than what he is required under the contract, the value of the difference in the quantity of the materials he was required to use and that he actually used shall be deducted from his dues. The decision of the Indian Bank shall be final and binding on the Tenderer as to the amount of materials the Tenderer is required to use for any work under this contract.

25. Measurement

All the Measurements should be taken in the presence of Bank officials/ Architects. And the measurements shall be countersigned by the Bank officials.

26. Payments

All bills shall be prepared by the Tenderer in the form prescribed by the Indian Bank / Architects. **Normally one interim bill shall be prepared each month subject to minimum value for interim certificate as stated in these documents.** The bills in proper forms must be duly accompanied by detailed measurements in support of the quantities of work done and must show deductions for all previous payments, retention money, etc.

The Indian Bank/ Architect shall issue a certificate after due scrutiny of the Tenderers' 'ill stating the amount due to the Tenderer from the Indian Bank and the Tenderer shall be entitled to payment thereof, within the period of honoring certificates named in these documents. In case of delay due to some reasons in the processing of such bills for payment, an advance of 75% of the billed Amount may be paid on the request of the Tenderer for the smooth progress of the work. The amount stated in an interim certificate shall be the total value of work properly executed and 75% of invoiced value of material brought to site for permanent incorporation into the work up to the date of the bill less the amount to be retained by the Indian Bank as retention money vide clause 11 of the general conditions of contract, less TDS, and less installments previously paid under these conditions, provided that such certificate shall only include the value of said material and goods as and from such time as they are reasonably, properly and not prematurely brought to or placed adjacent to the work and then only if adequately protected against weather or other causalities.

The Indian Bank will deduct retention money as per tender conditions.
If the Indian Bank has supplied any materials or goods to the Tenderer, the cost of any such materials or goods will be, progressively deducted from the amount due to the Tenderer in accordance with the quantities consumed in the work.

All the interim payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually, done and completed, and shall

not preclude the Requiring of bad, unsound, and- imperfect or unskilled work to be; removed and taken away and reconstructed, or re-erected or be considered as an admission of the due performance of the contract, or any part thereof in any respect or the accruing of any claim, nor shall, it conclude, determine or affect in anyway the power of the Indian Bank under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be submitted by the Tenderer within one month of the date fixed for completion of the work or of the date of certificate of completion furnished by the Site Engineer and payment shall be made after checking the work completely. Payment will be made 75 % against supply of materials & 25 % against erection and commissioning, less statutory deductions.

27. Final Payment

The final bill shall be accompanied by a certificate of completion from the Consultants & Architects. Payments of final bill shall be made after deduction of Retention Money, which sum shall be refunded after the completion of the Defects Liability Period after receiving the Indian Bank's' consultant's' 'certificate that the Tenderer has rectified all defects to the satisfaction of the Indian Bank/ Architects. The acceptance of payment of the final bill by the Tenderer would indicate that he will have no further claim in respect of the work executed.

The contractor has to submit 2 copies of "As built drawings" of A2 or A1 size and CD duly certified by the Architect to the Bank along with final bill documents. Along with Every bill the contractor has to submit the photographs of the work executed

28. ENHANCEMENT IN RATES AND QUANTITY VARIATION

The tender rates shall be fixed, firm and applicable for any increase or decrease in the tendered quantities. The Employer / consultant can increase or decrease any quantities to any extent or even delete particular item as per the site requirements and the contractor shall not be paid anything extra on thisaccount. Nothing extra will be paid by the Indian Bank on account of omission /deletion of items or decrease in the quantity of items. The Bank shall not entertain any claim whatsoever from the contractor on this account.The price of all additional items / non-tendered items will be worked out onthe basis of rates quoted for similar items in the contract wherever existing. Ifsimilar items are not available, the rates for such items will be derived as per standard method of rate analysis based on prevalent fair price of labour,material and other components as required with 15% towards contractor'sprofit and overheads.

29. UNQUOTED ITEMS

The bidders to offer their competitive rates for each and every item listed in the Schedule of rates, the bidders who have not quoted for all the items as required in the SORs shall be liable for rejection. In case a bidder who has left certain items unquoted and if they happen to be overall lowest on evaluation, then their offers shall be considered subject to the unquoted items being taken as NIL cost. The bidder shall also give a clear undertaking to the effect that they shall execute the said items (unquoted) free of cost. In the event the bidder refuses the above conditions and insists on additional cost for the unquoted items, then such an offers shall be rejected as invalid.

For Extra works at the time of work in progress the contractor should submit the reasonable rate with the rate analysis and after approval given by the Architect/ Bank that amount will be given.

30. ABNORMAL RATES

The Contractor is expected to quote rate for each items after careful analysis of costs involved for the performance of the complete item consisting all specifications and conditions of the contract. If it is noticed that the rates quoted by the tenderer for any items are unusually high (or) unusually low it will be sufficient cause for rejection of the tender unless the owner is convinced about the reasonableness of the rate on scrutiny of the analysis for such rate to be furnished by the tenderer on demand. Not with standing anything there in stand, the rate once accepted by the owner shall be final and shall not be subject to any claim either on account of un-workability of rates or on any other ground whatsoever.

31. Substitution

Should the Tenderer desire to substitute any materials and workmanship, he/they must obtain the approval of the Indian Bank/ Architects in writing for any such substitution well in advance. Materials designated in this specification indefinitely by such term as "Equivalent" or "Other approved" specific approval of the Indian Bank/ Architects has to be obtained in writing.

32. Preparation of Building Works for Occupation and Use on Completion

The whole of the work will be thoroughly inspected by the Tenderer and deficiencies and defects put right. On completion of such inspection the Tenderer shall inform the Indian Bank that he has completed the work and it is ready for inspection.
On completion the Tenderer shall clean all windows and doors including the cleaning and oiling if necessary, of all hardware, inside and outside, all floors, stair-cases, and every part of the building. He will leave the entire building neat and clean and ready for

immediate occupation and to the satisfaction of the Indian bank.

33. Clearing Site on Completion

On completion of the works the Tenderer shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and the works clean and in a workman like condition to the satisfaction of the Indian Bank/ Architects.

The main /Principal contractor is only responsible for the cleanliness of the site/building irrespective of numbers of sub agencies deployed by them to carryout various other works in the tender.

34. Defects after Completion

The Tenderer shall make good at his own cost and to the satisfaction of the Indian Bank all defects, shrinkage, settlements or other faults which may appear within 12 months after completion of the work. In default the Indian Bank may employ and pay other persons to amend and make good such damages, losses and expenses consequent thereon or incidental thereto shall be made good and borne by the Tenderer and such damages, loss and expenses shall be recoverable from him by the Indian Bank or may be deducted by the Indian Bank, in lieu of such amending and making good by the Tenderer, deduct from any money due to the Tenderer a sum equivalent to the cost of amending such work and in the event of the amount retained being insufficient, recover that balance from the Tenderer from the amount retained under General Rules and instruction Special Instruction Clause 5 together with any expenses the Indian Bank may have incurred in connection therewith.

35. Concealed Work

The Tenderer shall give due notice to the Indian Bank/ consultant whenever any work is to be buried in floor / earth, concrete, ceilings or in the bodies of walls or otherwise becoming inaccessible later on, in order that the work may be inspected and correct dimensions taken before such burial, in default whereof the same shall, at the opinion of the Indian Bank/ Architect be either opened up for measurement at the Tenderer's'expense or no payment may be made for such materials. Should any dispute or differences arise after the execution of any work as to measurements etc., or other matters which cannot be conveniently tested or checked, the notes of the Indian Bank/ Architects shall be accepted as correct and binding on the Tenderer.

36. Escalation

The rate quoted shall be firm throughout the tenure of the contract (including extension of time, if any, granted) and will not be subject to any fluctuation due to increase in cost of materials, labour, sales tax, octroi, etc. unless specifically provided in these documents.

37. Idle Labour

Whatever the reasons may be no claim for idle labour, additional establishment cost of hire and labour charges of tools and plants would be entertained under any circumstances.

38. Suspension

If the Tenderer except on account of any legal restraint upon the Indian Bank preventing the continuance of the work or in the opinion of the Indian Bank shall neglect or fail to proceed with due diligence in the performance of his part of the contract or if he shall more than once make default, the Indian Bank shall have the power to give notice in writing to the Tenderer requiring the work to be proceeded within a reasonable manner and with reasonable dispatch, such notice purport to be a notice under this clause.

After such notice shall have been given the Tenderer shall not be at liberty to remove from the site of the works or from any ground contiguous thereto any plant or materials to subsist from the date of such notice being given until the notice shall have been complied with. If the Tenderer fails to start the work within seven days after such notice has been given to proceed with the works as therein prescribed, the Indian Bank may proceed as provided in clause 40 (Termination of Contract by Indian Bank).

39. Termination of Contract by Indian Bank

If the Tenderer being a company go into liquidation whether voluntary or compulsory or being a firm shall be dissolved or being an individual shall be adjudicated insolvent or shall make an assignment or a composition for the benefit of the greater Para, in number of amount of his creditors or shall enter into a Deed or arrangement with his creditors, or if the Official Assignee in insolvency, or the Receiver of the Tenderer in insolvency, shall repudiate the contract, or if a Receiver of the Tenderer's' firm appointed by the court shall be unable, within fourteen days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Indian Bank that he is able to carry out and fulfill the contract, and if so required by the Indian Bank to give reasonable security therefore. or if the Tenderer shall suffer execution to be issued, or shall suffer any payment under this contract to be attached by or on behalf of and of the creditors of the Tenderer, or shall assign, charge or encumber this contract or any payments due or which may become due to the Tenderer, there under, or shall neglect or fail to observe and perform all or any of the acts matters of things by this contract, to be observed and performed by the Tenderer within three clear days after the notice shall have been given to the Tenderer in manner hereinafter mentioned requiring the Tenderer to observe or perform the same or shall use improper materials or workmanship in carrying on the works, or shall in the opinion of the Indian Bank not exercise such due diligence and

make such due progress as would enable the work to be completed within due time agreed upon, and shall fail to proceed to the satisfaction of the Indian Bank after three clear days notice requiring the Tenderer so to do shall have been given to the Tenderer as hereinafter mentioned, or shall abandon the contract, then and in any of the said cases, the Indian bank may notwithstanding previous waiver determine the contract by a notice in writing to the effect as hereinafter mentioned, but without thereby effecting the powers of the Indian Bank of the obligations and liabilities of the Tenderer the whole on which shall continue in force as fully as if the Contract, had not been so determined and as if the works subsequently executed had been executed by or on behalf of the Tenderer (without thereby creating any trust in favour of the Tenderer) further the Indian Bank or his agent, or servants, may enter upon and take possession of the work and all plants, tools, scaffolding, sheds, machinery , steam and other power, utensils and materials lying upon premises or the adjoining lands or roads and sell the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other Tenderers or other persons or person to complete the works, and the Tenderer shall not in any way interrupt or do any act, matter of thing to prevent or hinder such other Tenderers or other persons or person employed from completing and finishing or using the materials and plants for the works when the works shall be completed, or as soon thereafter as conveniently may be, the Indian Bank shall give notice in writing to the Tenderer to remove his surplus materials and plants and should the Tenderer fail to do so within a period of 14 days after receipt by him the Indian Bank may sell the same by Public Auction and shall give credit to the Tenderer for the amount so realized. Any expenses or losses incurred by the Indian Bank in get the works carried out by other Tenderers shall be adjusted against the amount payable to the Tenderer by way of selling his tools and plants or due on account of work carried out by the Tenderer prior to engaging other Tenderers or against the Security Deposit.

40. Arbitration

All disputes or differences of any kind whatsoever which shall at any time arise between the parties hereto touching or concerning the works or the execution or maintenance thereof of this contract or the rights touching or concerning the works or the execution of maintenance thereof of this contract or the construction remaining operation or effect thereof or to the rights or liabilities of the parties or arising out of or in relation thereto whether during or after determination foreclosure or branch of the contract (other than those in respect of which the decision of any person is by the contract expressed to be final and binding) shall after written notice by either party to the contract to the other of them and to the Indian Bank hereinafter mentioned be referred for adjudication to a sole Arbitrator to be appointed as hereinafter provided.

For the purpose of appointing the sole Arbitrator referred to above, the Indian Bank will send within thirty days of receipt of the notice, to the Tenderer a panel of three names of

persons who shall be presently unconnected with the organization for which the work is executed.

The Tenderer shall on receipt of the names as aforesaid, select anyone of the persons name to be appointed as a sole Arbitrator and communicate his name to the Indian Bank within thirty days of receipt of the names. The Indian Bank shall there upon without any delay appoint the said person as the Sole Arbitrator. If the Tenderer fails to communicate such selection as provided above within the period specified, the competent Authority shall make the selection and appoint the selected person as the Sole Arbitrator.

If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another Sole Arbitrator shall be appointed as aforesaid.
The work under the Contract shall, however, continue during the, arbitration proceedings and no payment due or payable to the Tenderer shall be withheld on account of such proceedings.

The Arbitrator shall be deemed to have entered on the reference on the date he issued notice to both the parties fixing the date of the first hearing.

The Arbitrator may from time to time, with the consent of the parties, enlarge the time for making and publishing the award.

The Arbitrator shall give a separate award in respect of each dispute or difference referred to him. The Arbitrator shall decide each dispute, in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be in chennai only as may be fixed by the Arbitrator in his sole discretion.

The fees, if any, of the Arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award including the fees, if any, of the Arbitrator who may direct to and by whom and in what manner, such costs or any part thereof shall be paid and may fix or settle and amount of costs to be so paid. The award of the Arbitrator shall be final and binding on both the parties.
Subject to aforesaid the provisions of the "Arbitration and Reconciliation Act 1996" or any statutory modification or re-enactment thereof and the rules made there under, and for the time being in force, shall apply to the arbitration proceeding under this clause.

The Indian Bank and the Tenderer hereby also agree that arbitration under clause shall be a condition precedent to any right to action under the contract with regard to the matters hereby expressly agreed to be so referred to arbitration.

The arbitration proceedings will not preclude the right of approaching legal forum by the parties.

SAFETY CODE AND MODEL RULES FOR PROTECTION OF HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS

Safety Measures

All people working shall be provided with safety helmets, safety shoes, goggles, gloves, Safety belts etc., which shall be worn by the workmen while performing work and people working at elevation more than 10 feet shall be always provided with safety belts at contractor's cost. The safety belts shall be properly fixed to a lifeline always while at work. The Contractor shall provide safe means of access to any working place including provisions of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen. Contractor shall ensure deployment of appropriate equipment and appliances for adequate safety and health of the workmen and protection of surrounding areas. The Contractor shall ensure that all their staff and workers including their sub-contractor (s) shall wear Safety Helmet and Safety Shoes. Contractor shall also ensure use of safety belt, Protective goggles, gloves etc. by the personnel as per job requirements.

Contractor shall ensure that a proper Safety Net System and shall be used at appropriate locations. The safety net shall be located not more than feet (9.0 meters) below the working surface at site to arrest or to reduce the consequences of a possible fall of persons working at different heights.

Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public.

Personal Safety Equipments:

All necessary personal safety equipment as considered adequate by the Engineer should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the Tenderer should take adequate steps to ensure proper use of equipment by those concerned.

a) workers employed on mixing asphalt materials, cement and lime mortars shall be provided with protective footwear and protective goggles.

b) Those engaged in white washing and mixing or stacking of cement bags or any material that is injurious to the eyes shall be provided with protective goggles.

c) Those engaged in welding works shall be provided with welder's protective eyesight lids.

d) The Tenderer shall not employ men below the age of 18 years and women on the work of painting with products containing lead or any toxic material in any form. Wherevermen above the age of 18 are employed on the work of precautions should be taken:

iii. Overalls shall be supplied by the Tenderer to the workers and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.

iv. When the work is done near any public where there is risk of necessary equipments should be provided and kept ready for use and all necessary steps take for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

First Aid

At every work place, there shall be maintained in readily accessible place, first aid appliance including an adequate supply of sterilized dressings and sterilized cotton wool. The appliance shall be kept in good order and in large work place, they shall be placed under the charge of a responsible person who shall be readily available during working hours.

Electricity & Water

Construction water shall be provided by Bank at one point at the cost of Rs.10000/- per month. The tenderder has to make his own arrangements for electrical power to carry out the work, in view of the Power restrictions imposed by State Electricity Board. If the contractor need power, the same will be provided at one / two points on chargable basis by having separate energy meters at Rs.10/- per Unit.

Before starting the work the contractor has to submit the Scaffolding drawings and it is to be approved by the Architect/Client.The Contractor is directly responsible for any accident, injury disableness and other such things that may happen to his workmen during working hours or outside working hours if they happen to be in the work site and that he will pay adequate compensation to such people. And the contractor has to take the full responsibility for these disabilities. The Contractor will be responsible for any accident or unto ward incident that may happen to any person in the work site or near about due to inadequate safely measures, carelessness, negligence, incorrect procedures, inadequate supervision, improper methods, and that he will attend to all related police enquiry, court attendance and will bear the cost for all such expenses including compensation, if any, to be paid.

ARTICLES OF AGREEMENT

THIS AGREEMENT is made on this …… day of ……month of ……. between Indian Bank and having its Corporate Office at No. 254-260, Avvai Shanmugam Salai, Royapettah, Chennai – 600 014 (hereinafter referred to as the "Employer") which expression shall include its successor, legal heirs and assignees of the one part.

AND M/s. ……. having its office at …… ……... (hereinafter referred to as the "Contractor") which expression shall include its successor, legal heirs and assignees of the second part.

WHEREAS the Employer has caused drawings and tender documents for **AND** whereas the Employer has called for tender vide ref. no. ……..…….…… dated……...…**AND** whereas the contractor has submitted the tender ref. no. ……. dated …… to the Employer on …….

AND whereas the Employer has issued the work order ref ……. dated……. to the contractor to do the work.

AND whereas the Contractor has agreed to execute the work as per drawings, specifications, conditions of contract and Work Order.

AND whereas the Employer has accepted the Contractor's tender as aforesaid and whereas the tender submitted by the contractor has been accepted for such sum as may be ascertained to be payable in terms of the Bill of Quantities and which sum is estimated to be Rs. …….. (Rupees ……..……) hereinafter referred to as the said "Contract Agreement".

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS: -

1) consideration of the said Contract Sum to be paid at the times and in the manner set forth in the said Conditions the Contractor shall carry out and complete the Repair & Painting Works in terms and conditions herein contained and according to the general conditions of the contract, notice inviting tender, special conditions of contract,

general scope of work, technical specifications, schedule of rates and instructions to be given by and the supervision of and to the entire satisfaction of the Employer.

Contract Price, Taxes and Payment Terms:
Total contract price is Rs. ……. which is inclusive of cost of materials, equipment, installation charges and tools and tackles required for execution of the job. Above price is exclusive of all taxes (GST) in respect of this contract.

Interim payment will be made as per the site measurements on Item Rate basis.

2) **Completion Period**:

Time is the essence of the Contract. The work is to be completed in all respects within **90 days reckoned from 7th day from the date of issue of the Work Order or handing over of site whichever is later.** If the Contractor fails to complete the job within the agreed time period, the Contractor will have to bear liquidated damages as per the relevant clause mentioned in the Tender Documents.

3) **Earnest Money**:

The Contractor has deposited an amount of Rs. 50,000/- (Rs. Fifty Thousand only) as earnest money.

4) **Inspection of Site**:

The Contractor has inspected the site before submitting his tender and has satisfied himself as to the nature of the work to be executed on the site. Any difficulties which the Contractor may come across in the course of the work shall in no way relieve the contractor to claim or receive extra payment unless the Employer is of the opinion that such difficulties could not have been foreseen and the Employer consents in writing.

5) **Supply of Material and Labour**:
The Contractor shall arrange all labour, materials, equipments, tools, tackles and everything necessary for the completion of the work. The Contractor will assume all responsibility for the safety, protection and accounting of all material and equipment and the work during construction. All materials used by the Contractor shall be of the best quality conforming to the required specification mentioned in the tender document and will be subject to the approval of the Employer. All such materials not approved by the Employer shall be removed at once by the Contractor at his own expense. The Contractor shall also at his own expense arrange for carrying out any test of materials which the Employer may from time to time require or if so desired by the employer.

6) **Defective Work / Materials**:

If any part of the work done by the Contractor is found defective in workmanship or if bad or inferior materials have been used the Contractor shall at his own risk and cost demolish all such defective work and rebuild the same and / or replace the bad or inferior materials used within a time frame mentioned to the satisfaction of the Employer. The decision of the Employer in this regard shall be final and binding on the Contractor. In case of default of the contractor to remove the defective work and rebuild the same or replace bad or inferior materials as directed by the Employer, the Employer shall be entitled to employ anyone else to carry out the same at risk and cost of the Contractor and recover all expenses incurred in this regard from the contractor.

7) **Inspection of Work**:

During progress of the work the Employer shall be entitled at all times to have access to and inspect the work.

8) **Supervision**:

The Contractor shall provide one or more competent and technical qualified engineers duly and fully authorized to act on his behalf in all matters relating to the works to be carried out under or any other matter concerning this agreement and who shall at all times be present at the works while any work is in progress as per directions, explanations & instructions of Employer.

9) **Compliance with Statutory Regulations & Work Rules**:

The Contractor shall be responsible for complying with the applicable laws / bye laws / Regulations in force from time to time and shall have to bear all statuary liabilities to the workers / personnel engaged for the job. Nothing will be paid extra in this regard. If any amount is paid by the Employer with this regard the same amount shall be deducted from the Contractor's dues. The Contractor shall have to arrange insurance cover for the workers / personnel engaged by him for the job.

10) **Determination of Contract**:

In the event of Contractor failing to keep / adhere to agreed schedule of work, or in the event of the Contractor failing to comply with the provisions of this contract by default and / or negligence and / or suspension of work or in the event of Contractor failing to complete the work within the stipulated period, the Employer may terminate this Agreement forthwith and employ, at the Contractor's risk and cost, another contractor or sufficient number of workmen to complete the work.

11) **Force Majeure**:
This clause will be operative only if the work is delayed by

a) Acts of God
b) Earthquake or floods or similar natural calamities.
c) Serious loss or damage by fire or lightning.

In case any Force Majeure condition herein mentioned occurs and continues for a period exceeding 15 days the parties here to undertake to sit together and devise ways for expeditious and proper performance of the obligations of the parties under this order.

12) **Arbitration**:
" In the event of any dispute or difference relating to interpretation and application of provisions of the contract and all disputes/claims whatsoever which shall either during the continuance of the contract or afterwards either between the parties to the contract or the respective representatives touching the construction/application of any provision/clause mentioned in the contract or any account or liability between the parties to the contract or as to any act or deed or omission of any party to the contract, in any way relating to these presents, shall be first at the discretion of the Bank attempted to be resolved in good faith by mutual discussion within 30 days of the dispute or question being raised failing which the same shall be settled by arbitration in accordance with provisions of Indian arbitration and Conciliation act 1996.

The Parties concerned shall designate an arbitrator on mutual consent/consensus. In the event of no consensus being arrived, an Arbitral Tribunal shall be constituted comprising three Arbitrators, each party appointed one arbitrator and a third arbitrator to be appointed by the two arbitrators so appointed by the parties. The venue of the arbitration shall be exclusively at Chennai and any award passed by arbitrator or the arbitral Tribunal shall be final, conclusive and binding upon the parties and shall be deemed to have been made between parties themselves. The parties to the dispute shall share equally the cost of arbitration as intimated by the arbitrator".

The arbitration proceedings will not preclude the right of approaching legal forum by the parties.

IN WITNESS whereof the said contracting parties have set their hands and seals on the day and year first hereinabove witness.

Witness Address Employer

Witness Address Contractor

GENERAL SPECIFICATIONS

To be read in along with particular specifications and bill of quantities

These specifications are for work to be done, item to be supplied and materials to be used in the works as shown and defined on the drawings and described herein, to the satisfaction of the Employer / Architect.

1). The workmanship is to be the best possible and of a high standard. The contractor shall take all steps immediately to make up deficiency if any noticed by the Employer/ Architect. Use must be made of special tradesman in all aspects of the work and allowance must be made in the rates for the same.

(ii). The materials to be provided by the contractor shall be in accordance with the samples already got approved from the Employer/ Architect by he contractor and in conformity with specification and approved list of manufactures and brand. The contractor shall produce all invoices, vouchers or receipts for any materials if called upon to do so by the Employer/ Architect.

(iii). Samples of materials are to be submitted to the Employer/ Architects for their approval before the contractor orders or delivers the materials to the site. Samples together with their packing are to be provided free of charge by the contractor and should any materials be rejected they will be removed from the site at the contractors expense. All samples will be retained by the Employer/ Architects for comparison with materials which will be delivered at site. Also the contractor will be required to submit specimen finishes of colors, fabrics, etc. for the approval of the Employer/ Architects before proceeding with the works.

(iv). The contractor shall be responsible for providing and maintaining temporary coverage required for the protection of finished work. He is also to clean out all wood shavings, cuts ends and other waste from all parts of the works before covering or in fillings is constructed.

(v). The contractor shall maintain uniform quality and consistency in workmanship throughout the execution of the work.

ELECTRICAL WORK:

The entire installation work shall be carried out in accordance with approved drawings and in general conformity with the requirements of the Indian Electricity Act, 1910 the Indian Electricity Rules , 1956, the relevant I.S. Codes of Practice, as amended to date, wherever applicable and the regulations of the local licensing bodies/ C.E.I.G. etc and where such installations are subject to inspection and approval of Fire Insurance and Explosives Authorities the Installation shall be planned and executed also conforming to their regulations / rules.

1.1 In case of difference between

(a)The specifications here in and the IEE Rules /Regulations of the local licensing authority/ CEIG or/and of the Fire Insurance / Explosives Authorities, the later shall prevail.

Drawings and Schedules:

The tender papers include only the general site plan and the main and sub main circuit diagram to the rising main and the distribution board in the various floors of the building and the layouts of the various points therein. These show the general scheme of things. Should the tenderer feel that design, the specifications or the drawing / layouts require modifications either due to manufacturing practice or special requirements under regulations/rules or for other substantial reasons, he is required to set out in his covering letter the modifications needed, stating reason therefore, with complete information to enable the Employer to properly appreciate the modified proposal. The tenderer shall quote for the tender proposal but state separately the rates/sums necessary for such modification, as alternatives.

The precise positions of all points, controls, switch boxes, mean and distribution board, tap off points etc, shall be subject to approval by the Architects. Wherever required, the contractor shall prepare whatever detailed drawing are necessary, complying with the requirements under para-1, General above, for proper execution of the work and under the approval of the Architects shall submit them to the Electrical Inspectorate or other appropriate State Authority along with necessary forms and papers and obtain the approval. Fees or charges for such purpose shall initially paid, on behalf of the Employer, to the appropriate authority, by the contractor, the payments so made being reimbursed by the Employer to the contractor in due course on production of necessary proof of payment supervision:

From the contractor's side shall be carried out by person/persons holding certificates of competency of appropriate class issued by the respective State Government bodies authorized to issue such certificate under statutory rules and regulations in force. The names of such supervising personnel shall be approved by the architects.

Service Connection:

It is the responsibility of contractor to obtain the necessary service connection from the local electric supply undertaking or system the necessary fees or charges begin paid by the Employer.

Testing and Commissioning:

On completion of the work and /or at the appropriate stages of the work as necessary the contractor shall arrange for all the necessary tests for safety, resistance, continuity etc, of the installation/equipment/Plant, etc. in Provided that the work shall not be deemed to be complete and the installation will not be taken over if the test results are not within satisfactory limits. In case the results are unsatisfactory the contractor is required to carry out all necessary rectifications/modifications at his own cost to bring the installation/plant/equipment to the level of acceptability within a period of 4 (four) weeks from the date of test and the defects liability period of 12 months will stand extended by the period of delay in such rectification/modification. modification, that is in excess of the said period of 4 weeks

On completion of work four prints each of the completion drawings (wiring diagrams and electrical layouts) incorporating all the modifications, carried out from time to time shall be submitted by the contractor to the employer through the Architects, indicating therein the position of all points board, mains, sub mains, circuits, etc. Properly number, the point bearing the same numbers as the circuit to which they belong. The contractor shall also where necessary furnish 4 sets of complete date of the equipment / plant installed, manufacturer' maintenance and operating instruction and the relevant literature to enable proper operation and maintenance to be carried out after he hands over the work / installation.

Workmanship

First class workmanship and neat appearance are essential requisites for compliance with these specifications.

Materials and Makes

All materials, equipment, fittings, fixtures, appliances, accessories, etc. to be used in the installation shall conform to the relevant Indian Standard Specifications and for such items as are not covered by I.S.S. the British Standards shall become applicable. They must be of the best quality obtainable in the makes/manufacture specified below, samples being approved by the Architects.

Note:

The tenderer will specify the makes (one in each category) of goods, accessories, fittings, etc. which he proposes to use, in column 4 of the "List of approved makes of electrical goods and statement of makes proposed to be used by Tenderer etc. "attached to the Form of Tender. If he specifies more than one make in any category, the Architects shall be entitled to assume that the best of the different makes so specified will be used by the contractor on the works or other equivalent make/maker as the Architects shall decide upon.

The word Equivalent used in these papers means "make of Equivalent Chipping, Chasing, Holing, Conduit Work:

The contractor shall be deemed to have inspected the General Builders work (and of others) in progress (or if it has been finished, the building) prior to submission by him of his tender and his rates shall be deemed to include the following:

(a) In the case of all RCC work (slabs, columns etc.) wherein conduits are required to be buried the contractor or his representative/supervisor shall be continuously watching the work so that before concrete is laid in, he may lay and fix the conduits securely in place to proper alignment and in proper position, ensuring that during the process of laying of the concrete the conduits laid remain rigidly in their proper positions.

Note:

(a) All chipping, chasing, holding to be done in walls/ floors and the like (whether bare or plastered or finished or not) shall be done neatly and the surfaces made good (or restored) by the contractor at his cost, after the conduits or other accessories are buried and fixed in place, without any delay begin caused to the General Builder work or work of other contractors on the job the walls, floors, etc. So made good are to match with the adjoining / contiguous wall/floor surfaces. All such work shall be done neatly and efficiently in the best workman like manner.

All materials used shall be approved by the Client prior to use.

P. S: It will be Contractors responsibility to provide Test Certificates from each manufacturer, specifying clearly Batch No, date of Manufacturing etc. Manufacturer Authorization Format (MAF), which is mandatory in case of Authorized dealer(s), is attached at **Annexure – I.** However, if any doubt arises about the quality of a particular material brought to site, Bank may directly take the samples and get them tested in any laboratory and the cost towards testing to be borne by the Contractor. If material found to be of inferior / substandard quality, Contractor at his own cost shall remove such material from the site and procure new material as required.

ANNEXURE 'I'

MANUFACTURER'S AUTHORIZATION FORM (MAF)

(ON MANUFACTURER LETTER HEAD ONLY)

Date:

To:
M/s Indian Bank,
Corporate Office
Chennai

WHEREAS

We, ……. who are official manufacturers of…… having factory at……., do hereby authorize …… to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with the General Conditions of Contract, with respect to the Goods offered by the above firm in reply to this Invitation for Bids.

Name In the capacity of:
Signed
Duly authorized to sign the Authorization for and on behalf of

TECHNICAL SPECIFICATIONS FOR MCB-DB

1.0 SCOPE:

1.1 This chapter covers the Supply, Installation, Testing and Commissioning of MCB Distribution Boards for lighting and power.

2.0 STANDARDS:

1. Indian Electricity Act 1910 and Indian Electricity Rule 1956 amended upto date.

2. Relevant Indian Standards Code of Practice for the type of work as per appendix.

3.0 MATERIALS AND CONSTRUCTION:

3.1 Enclosure:

3.1.1 The Distribution Board shall be fabricated out of 16 SWG Sheet Steel and shall be factory fabricated and shall be duly prewired in the works ready for installation at site.

3.1.2 The board shall be wall mounted and shall be with stove enameled paint finish. The M.S Sheet shall have undergone degreasing, acid nickeling and phosphating before powder coated painting.

3.1.3 The board shall be provided with loose wire box as a separate compartment for the complete width and depth of the board and with maximum height of 125 mm in case of TPN DBs and 100 mm in case of Single Phase Distribution Boards.

3.1.4 The board shall be provided with a hinged cover of 1.6 mm thick sheet steel in the front. Only the knobs of the MCB shall protrude out of the sheet covers, through openings neatly machine made for this purpose.

3.1.5 Knock out holes at the bottom and detachable plates with knock out holes at the top of the board shall be provided.

3.1.6 Three phase boards shall have phase barriers and wire channel on three sides.

3.1.7 The board shall be complete with the following.

a. Solid tinned copper busbars (Rated 200A)

b. Solid tinned neutral bars with tapped holes and chase headed screws. For 3 Phase DBs 3 Nos. independent neutral bus shall be provided.

c. Common Earth Bar.

d. DIN bar for mounting MCBs.

e. Elmex type terminal connector suitable for incoming.

f. Earthing studs.

g. A set of Neon Indication lamps with HRC Cartridge fuse for each phase of incoming supply where specified.

3.1.8 The board shall be fully prewired with single wire PVC Insulated copper conductor of size (as specified below) insulated solid copper links and terminated to extended type terminal connections suitable for connections to the size of respective conductors upto 15 A 2.5 sqmm 25 A 4.0 sqmm 32 A 6 sqmm 63 A 16 Sqmm.

3.1.9 All incoming wirings to the MCB DBs, shall be terminated only on the elmex type extended connectors provided within the DB. The terminal connections shall therefore be so provided so as to facilitate easy cable connections and subsequent maintenance.

3.1.10 A common copper earth bar shall be provided with in the loose wire box. The common neutral bar as well as terminal connections shall however be provided within the main compartment just below the loose wire box.

3.1.11 Circuit diagram indicating the load distribution shall be pasted on the inside of DB as instructed. Each board shall have plastic name plates fixed to it in the front.

3.1.12 The board shall be provided with two brass earthing stud terminals with suitable nuts & washer for connection to earth bus outside the boards.

3.2 Miniature Circuit Breaker:

3.2.1 The MCBs shall have quick make and break non welding self-wiping silver alloy contacts. They shall have short circuit rating of 9 KA. Each pole of MCB shall be provided with universe time thermal overload and instantaneous over current magnetic tripping elements with trip free mechanism. In case of multipole breakers, the tripping must be on all poles and operating handle shall be common. Breaker shall conform to BS 3671 with facility for locking in / Off Position.

3.2.2 Pressure clamp terminals for conductors upto 2.5 sqmm copper is acceptable and for higher sizes the terminals shall be suitably shrouded.

3.2.3 'C' series MCBs shall be used for normal lighting circuits.

'D' series MCBs shall be used for motor loads, Halogen lamp fittings, sodium mercury discharge lamps and all power circuits.

3.2.4 The ELCB's shall have sensitivity as specifed in the BOQ and shall be of 9KA breaking capacity. In case they have only overload capability additional MCB for breaking under short circuit condition shall be provided at no extra cost.

4.0 TERMINALS:

4.1 The distribution board shall be recessed in wall unless specified otherwise with the outer surface of door flush with the wall.

4.2 The frame work shall be suitably grouted in the wall. Minor civil works such as cutting of walls and plastering after erection will be included.

4.3 Shop drawings showing the detailed dimensions and design including the disposition of mountings shall be submitted for approval of consultant before fabrication,

4.4 All wires to the boards shall be bushed at the entries to avoid damage to the insulation.

4.5 When it is required to terminate number of conduits a suitable M.S Adaptor box shall be provided as per direction of the Consultant.

4.6 All distribution shall be touched up for damaged painting before handing over.

5.0 EARTH LEAKAGE MINIATURE CIRCUIT BREAKER:

Earth leakage miniature circuit breakers current operated with a sensitivity of 100 mA. The ELMCB shall have Trip free mechanism and shall operate even on natural failure.

The ELMCB shall be provided with a Test Push Button to stimulate leakage and test the ELMCB. The ELMCB shall operate and switch off the circuit within 300 milli seconds in case of a fault.

The enclosure of the ELMCB shall be moulded from High quality insulating materials, which shall be fire retardant, anti-tracking, non-hygroscopic, impact resistant and shall withstand high temperatures.

6.0 MEASUREMENT:

The distribution board complete with the various components specified, indicating lamps supporting trays, internal wiring etc., shall be treated as one unit for purpose of measurement and payment.

TECHNICAL SPECIFICATIONS OF CONDUITS & WIRES:

1.0 SCOPE:

1.1 This chapter covers the detailed requirement for wiring work in Metallic Conduits, Rigid PVC Conduits, FRLS PVC Conduits in surface and recess.

2.0 STANDARD APPLICABLE:

2.1. Indian Electricity Act 1910 and Indian Electricity Rules 1956 amended up to date.

2.2 Relevant Indian Standard codes of Practice for type of work as per appendix.

3.0 MATERIALS:

3.1 Conduits and Accessories Steel Conduits:

3.1.1 The Conduits shall be of steel, the wall thickness shall not be less than 1.6 mm (16 SWG) for conduits up to 32 mm dia and not less than 2 mm (14 SWG) for conduits above 32 mm dia. They shall be solid drawn or seamed by welding

and finished with galvanized or black stove enameled surface as specified in Schedule of Works.

3.2 Accessories:

(i) All conduits accessories shall be threaded type and under no circumstances pin grip type or clamp grip type accessories shall be used.

(ii) Bends, Couplers etc., shall be solid type in recessed type of works and may be solid or inspection type as required in surface type works.

(iii) Minimum 60 mm depth junction boxes shall be used in roof slabs in recessed conduit system and in other places shall be as per IS 2667 - 1977.

(iv) Saddles for surface conduit work on walls shall not be less than 0.55 mm (24 Gauge) for conduits up to 25 mm dia and not less than 0.9 mm (20 Gauge) for larger diameter. The corresponding width shall be 19 mm & 25 mm.

3.3 RIGID PVC CONDUITS:

(i) The conduit pipes and accessories shall be of suitable material complying with IS:2509 - 1973 and IS:3419 - 1976 for rigid conduits. The interior of the conduits shall be free from obstruction. The make shall be as specified.

(ii) The conduits shall be circular in cross section. The conduits size is designated by their nominal outside diameter. The dimensional details shall be as follows:

S.No.	Nominal Outside Diameter	Maximum Outside Diameter	Minimum Inside Diameter	Maximum Permissible Eccentricity	Maximum Permissible
1	20	20 + 0.3	17.2	0.2	0.5
2	25	25 + 0.3	21.6	0.2	0.5
3	32	32 + 0.3	28.2	0.2	0.5
4	40	40 + 0.3	35.8	0.2	0.5
5	50	50 + 0.3	75	0.5	0.8

Note: All Dimensions are in MM.

3.4 CONDUIT ACCESSORIES:

(i) Rigid Conduit accessories shall be normally grip type.

(ii) Bends, Couplers etc., shall be solid type in recessed type of work and may be solid or inspection type as required in surface type works.

(iii) Saddles for fixing conduit shall be heavy gauge non-metallic type with base.

(iv) The minimum width and thickness of ordinary clips or guarder clips shall be as follows:

ORDINARY CLIPS OR GUARDER CLIPS:

SIZE OF CONDUIT	WIDTH	THICKNESS
20 MM & 25 MM	19 MM	20 SWG (0.9144 MM)
32 MM & ABOVE	25 MM	18 SWG (1219 MM)

(v) For all size of conduits the size of clamping rod shall be 4.5 mm (7 SWG) diameter.

3.5 WIRES:

(i) All Wires shall be Multistrand Electric Grade Copper, PVC Insulated as per IS 694 and 660 V Grade.

(ii) The colour coding of wires shall be as follows:

PHASE	COLOUR OF WIRE
R	RED
Y	YELLOW
B	BLUE
N	NEUTRAL - BLACK
EARTH	GREEN (Insulator)
CONTROL	GREY

3.6 OUTLETS:

(i) Switch Box: A rectangular box shall be made of metal on all sides except the front. The boxes shall be made from 16 SWG Galvanized Sheet Steel or MS Cadmium Plated.

(ii) The depth of the boxes shall not be less than 60 mm and this shall be increased suitably to accommodate mounting of fan regulators in flush pattern.

(iii) An earth terminal with stud and 2 metal washers shall be provided in each MS box for termination of protective conductors and for connection to socket outlet / metallic body of fan regulator.

(iv) The size of switch boxes shall be suitable for fixing modular plates of switches of the makes specified.

(v) The cover of the Switch Boxes shall be moulded plates of modular design to fix switches and socket outlets.

3.7 SWITCHES & SOCKETS OUTLETS:

(i) Control Switches shall be of moulded plate type of modular design with silver plated contacts.

(ii) The socket outlets shall be 3 pin with switch and plate type cover. The sockets shall be of shuttered type where specified in the schedule of work.

4.0 INSTALLATION:

4.1 Sizing of Conduits:

(i) Conduit size shall be so selected that the maximum number of PVC Insulated cables including earth conductor that are drawn in one conduit shall not exceed the numbers shown in the table below:

Maximum number of PVC insulated 650 V / 1100 V Grade Aluminum / Copper Conductor Cable as per IS: 694 - 1990.

Cross Sectional Area of Conductor in Sqmm	20 mm		25 mm		32 mm		38 mm		51 mm	
	S	B	S	B	S	B	S	B	S	B
1.50	5	4	10	8	18	12				
2.50	5	3	8	6	12	10				
4.00	3	2	6	5	10	8				
6.00	2		5	4	8	7				
10.00	2		4	3	6	5	8	6		
16.00	2	2	3	3	6	5	10	7		

Note:

(i) Column headed 'S' apply to runs of conduits which have distance not exceeding 4.25 mm between draw in boxes and which do not deflect from straight by an angle of more than 15 degrees. The columns headed 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees.

(ii) The minimum size of conduit shall be 20 mm for lighting and 25 mm for power wiring.

4.2 Conduit Points:

a. Conduit work of each circuit section shall be completed before cables are drawn.

b. Conduit Pipes shall be joined by sleeved coupler and sleeved accessories only and threads on conduit pipes in all cases shall be 15 mm long, sufficient to accommodate full threaded portion of coupler and accessories in case of metallic conduits. In case of rigid PVC Conduit, all points shall be sealed / cemented with an approved cement.

Cut ends of conduit pipes shall have no sharp edges nor any burrs left to avoid damage to the insulation of conductors while pulling than through the pipes.

4.2.1 Bends in Conduit:

All necessary bends in the system including diversion shall be done by either neatly bending the pipes without cracking with a bending pipe of not less than 7.5 cm. In respect of rigid PVC Pipes the bending shall be achieved with approved method of heating. Alternatively, the bends may be formed by using suitable accessories such as bends, elbows and Junction Boxes (cast iron / MS in case of rigid steel conduits and PVC in case of rigid PVC Conduits).

No length of conduit shall have more than equivalent of four quarter bends from outlet to outlet.

4.2.2 Making Chase:

The chase in the wall shall be neatly made and of ample dimension to permit the conduit to be fixed in the wall.

In case of buildings under construction, the conduit shall be buried in the wall before Plastering and shall be refilled and brought to the finish of the wall neatly after erection of the conduit.

In case of exposed brick / marble masonry work, special care shall be taken to fix the conduit and accessories like Switch Boxes and Junction Boxes along with building.

4.2.3 Fixing Conduits in Chase:

The Conduit pipes shall be fixed by means of staples, hooks or means of saddles not more than 60 cm apart or by any other approved mans of fixing.

All threaded points of conduit pipes shall be treated with some approved preservative compound to ensure protection against rust.

4.2.4 Fixing Conduits in RCC Work:

The Conduit pipes shall be laid in position and fixed to the steel reinforcement bars by steel binding wires before the concreting is done. The conduit pipes shall be fixed to the steel reinforcement bars to avoid their dislocation while cement concreting and subsequent curing of the same.

Fixing of standard bends or elbows shall be avoided as far as possible, and all bends shall be maintained by bending the conduit pipe itself with long radius which will facilitate easy drawing of conductors.

Where conduits pass through expansion joints in the building adequate expansion fittings shall be used to take care of relative movement.

4.2.5 Fixing Inspection Boxes:

Suitable inspection boxes to the minimum requirement shall be provided to permit inspection and to facilitate replacement of wires if necessary.

These shall be mounted flush with the wall or ceiling concrete in case of recessed conduit system. They shall be spaced at not more than 12 meters apart or 90-degree solid bends or equal.

All junction boxes shall be covered by 6 mm clear Perspex / 3 mm hylam sheet of approved colour truly cut and fixed with Cadmium Plated Screws & Washers.

4.2.6 Surface Conduits:

a. Conduit Pipes shall be fixed by saddles, with sleeves in an approved manner at an interval of not more than one metre, in respect of rigid steel conduit and 60 cm in respect of rigid PVC Conduit but on either side of coupler or bends or similar fittings. Saddles shall be fixed at a distance of 30 cm from the centre of such fittings.

b. In long distance straight run of conduits, inspection type couplers at reasonable intervals shall be provided.

c. In respect of rigid PVC Conduits, if the pipes are susceptible to mechanical damage, they shall be adequately protected.

4.2.7 Fixing of Outlet Boxes:

Only a portion of the switch box shall be sunk in the wall, the other portion being projected out for suitable entry of conduit pipes into the box.

5.0 LIGHT AND POINT WIRING:

5.1 Wiring System:

(i) Unless and otherwise specified in the tender documents, wiring shall be done only by the looping system and the phase conductor shall be looped at the switch boxes and neutral conductors at the point outlets.

(ii) Where joint box system is specified in the Tender Documents, all joints in the conductors shall be made by means of approved mechanical connectors in suitable and approved junction boxes.

(iii) The wiring throughout the installation shall be such that there is no break in the neutral wire except in the form of linked switch gear.

5.2 Joints in Wiring:

5.2.1 No joints in wiring is permitted. If the length of final circuit to a submain is more than the length of a standard coil, thus necessitating a through joint, such joints shall be made by means of approved mechanical connectors in suitable junction boxes.

5.2.2 The termination of multi strand conductors shall be done using suitable crimping type lugs for size more than 4 sqmm.

5.2.3 All final branch circuits conductors shall be as shown in schedule of quantities and a drawing.

5.2.4 No other wiring shall be bunched in the same conduit except those belonging to the same phase and each conduit shall not have more than three branch circuits. In case
of three phase loads, separate conduit shall be run from distribution boards to the load points or outlets as the case may be.

5.3 Earthing Requirements:

(i) The entire system of metallic conduit work including the outlet boxes and other metallic accessories, shall be mechanically and electrically continuous by properly screwing at points or by double check nuts at termination. The conduit shall be continuous when passing through walls or floors.

(ii) Protective (loop earthing) conductor (s) shall be laid along runs of the conduit between the metallic switch boxes and the distribution boards / switch boards, terminated thereto. The protective earth conductors shall be drawn either inside conduits along with cables, or shall be laid external to the conduits. When laid external to the conduits, this shall be properly clamped with the conduits at regular intervals.

(iii) The protective conductors shall be terminated properly using earth studs, earth terminal block etc., as the case may be.

5.4 FIXING OF WIRING ACCESSORIES:

(i) Control Switches shall be 'ON' when the knobs are down. Control Switches shall be placed only on the live conductors of the circuit. No single pole switch or fuse shall be provided in the protective earth conductor or earthed neutral conductor of the circuit.

(ii) The Switch Box and socket outlets shall be installed based on interior drawing. The Contractor shall prepare Shop Drawing indicating location of outlets as per Interior Drawing before execution. In respect of rooms the location shall follow approved mock-up room layout. As location of outlets are liable for change, only such changes which are done after approval of shop drawing in respect of public area and after approval of mock-up room in respect of rooms will be eligible for payment as actuals.

6.0 MEASUREMENTS:

6.1 Point Wiring:

The wiring for light points, fan points, exhaust fan points, bell points and 5A Socket outlets shall be measured on unit basis by counting.

The following shall be deemed to be included in the point wiring.

- Conduits and its accessories and wiring cables between the switch box and point outlets.
- All fixing accessories such as saddles, screws, rawl plugs etc., as required.
- Metal / PVC Switch Boxes for control switches, regulators sockets etc., and moulded plate cover / plastic laminated sheet cover for the same.
- Outlet boxes, junction boxes, pull through boxes etc., along with their covering sheets including metal boxes provided with switch boards for housing wire / conduit termination.
- Control Switch / MCB as specified.
- 3 Pin or 6 Pin Socket, ceiling rose connector as required.
- Connection to ceiling roses, connector socket outlet, lamp holder / switch etc.,
- Inter connecting wiring between points of the same circuit on the same switch box and from another.

- Protective (loop earthing) conductor from one metallic switch box to another in the distribution circuits and for socket outlets, fittings etc., (The length of protective conductor run along with the circuit / sub main is excluded from scope of points).

6.2 Group Controlled Point Wiring:

In case of point with more than one point controlled by same switch / MCB, such points shall be measured as one point depending on the run of points controlled by one switch / MCB as specified in the BOQ. The wiring from the MCB/switch shall be included in the point wiring rate and shall not be paid separately.

6.3 5 Amps Socket Outlet:

6.3.1 Dependent Socket Outlet:

Each socket outlet fixed in switch box and phase, neutral and earth looped from adjacent / same switch box shall be measured as one dependent socket outlet.

6.3.2 Independent Socket Outlet:

Socket outlet including boxes, socket, switch etc., for which conduit is laid and wires drawn from DB or another switch board shall be measured as Independent Socket outlet.

6.4 15 Amps Socket Outlet:

The wiring for these outlets shall be paid as linear basis and the outlets shall be measured as unit basis.

6.5 Sub main and Circuit Wiring:

These shall be paid on linear basis along the run of the conduit, including junction boxes, bends etc., from the top of the distribution board to the top of the switch board.

6.6 System of Wiring:

The system of wiring is with FRLS PVC insulated copper wire with FRLS PVC insulated copper wire as for earth protection wire.

TECHNICAL SPECIFICATIONS FOR LT CABLES

Scope

Supply, installation, storing, laying, fixing, jointing, terminating, testing and commissioning of Medium Voltage PVC sheathed Armoured Aluminium Conductor Cables PVC insulated, cores laid-up with Polypropylene central filler and tape, extruded PVC inner sheathed, GI wire/strip armored and PVC outer sheathed overall confirming to IS 1554 part I 1988 with latest amendments and specifications given below, laid in built up trenches, directly buried underground, on cable trays, in pipes, clamped directly to wall or Structures.

Type

Medium voltage cables shall be aluminium conductor, PVC insulated, PVC sheathed and steel wire flat armoured or steel tape armoured construction. The cable shall have stranded, sector shaped aluminium conductors for cables of 4 Sq.mm size and above.

The cables shall be rated for a voltage of 650/1100 Volts.

Core Identifications shall be provided with the following colour scheme of PVC insulation

- Single Core: Red/Black/Yellow/Blue
- Two Core: Red and Black
- Three Core: Red, Yellow and Blue
- 3½ or 4 Core: Red, Yellow, Blue and Black

Conductor

Conductors are made from electrolytic grade aluminium/copper conforming to IS: 8130, are compact circular or compact shaped, solid/stranded circular.

No of strands to be provided for circular compacted or shaped conductor to achieve better-compacted conductor.

Sl.no	Size in Sqmm	copper	Aluminium
1	1.5	3	----
2	2.5	3	----
3	4	7	3
4	6	7	3
5	10	7	7
6	16	7	7
7	25	7	7
8	35	7	7
9	50	7	7
10	70 to 150	19	19
11	185 to 300	37	37
12	400 to 500	61	61
13	630 to 1000	91	91

Insulation

PVC cables use specially made from high-grade cross-linked polyethylene for insulation by extrusion process.

Operating characteristic

1. Max. Conductor temp. for continues operation 90 deg C
2. Ambient air temp. 40 deg C
3 Standard ground temp. 30 deg C

4. Thermal resistivity of soil 150 deg C Cm/W
5. Thermal resistivity 350 deg C Cm/W
6. Depth of laying 75 Cm
7. Minimum bending radius 12D
8. Max. Conductor temp. during SC 250 deg C
9. Maximum ambient, air temp 85 deg C

Inspection

All cables shall be inspected upon receipt at site and checked for any damage during transit and shall be supplied with complete manufacturer's test certificates. At any cost the cables shall not be accepted without test certificate.

Storing

All the cables shall be supplied in drums, with manufacturer's seal. On receipt of cables at site, the cables shall be inspected and stored in drums with flanges of the cable drum in vertical position.

Joints in Cables

The Contractor shall take care to see that all the cables received at site are apportioned to various locations in such a manner as to ensure maximum utilization and avoidance of cable jointing. This apportioning shall be got approved by the Consultant before the cables are cut to lengths.

Where joints are unavoidable, the Consultant shall be approved the location of such joints and marking shall be done with suitable tags.

Jointing Boxes for Cables

Cable joint boxes shall be of appropriate size, suitable for PVC insulated armoured cables of particular voltage rating.

Joining Cables

All cable joints shall be made in suitable, approved cable joint boxes, and the filling in of compound shall be done in accordance with manufacturers' instructions and in an approved manner. All straight through joints shall be done in epoxy mould boxes with epoxy resin.

All cables shall be jointed colour to colour (should not be different colours); tested for continuity and insulation resistance before jointing. The seals of cables must not be removed until preparations for jointing are completed. Joints shall be commenced and finished on the same day. During the time of joining the cables, sufficient protection from the weather shall be ensured. Joints shall be made by means of suitable solder for conductors, the conductors

being firmly butted into the connections or thimbles or ferrules and the whole soldered with proper solder and soldering flux. The conductors shall be efficiently insulated with high voltage insulating tape and by using of spreaders of approved size and pattern. The joints shall be completely topped up with epoxy compound so as to ensure that the box is properly filled.

Bonding of Cables

Where a cable enters any piece of apparatus, it shall be connected to the casing by means of an approved type of armoured clamp and gland. The clamps must grip the armouring firmly to the gland or casing, so that no undue stress is passed on to the cable due to vibrations. The glands shall be fixed to the lead sheath by means of either a 'Plumbing joint' or a cone of approved material, capable of being compressed into lead sheath. The gland or cone shall be capable of affecting a good electrical bond between both the armouring of the cable, and the casing.

Laying of Cables

Cables shall be laid as per the specifications given below:

Cables - Outdoor Trenches

Cables shall be laid in outdoor trenches wherever called for. The depth of the trenches shall not be less than 1000 mm, below the final ground level. The width of the trenches shall not be less than 450 mm. However, where more than one cable is laid, a coaxial distance of not less than 150 mm shall be allowed between the cables. The trenches shall be cut square with vertical sidewalls and with uniform depth. Suitable shoring and propping may be done to avoid caving-in of trench walls. The floor of the trench shall be rammed level. The cables shall be laid in trenches over rollers placed inside the trench.

The cable drums shall be laid unrolled in the direction of the arrow marked on the drum for unrolling.

Wherever cables are bent, the minimum-bending radius shall not be less than 12 times the diameter of the cable. After the cable is laid and straightened, it shall be covered with 80 mm thick layer of sand. The cable shall then be lifted and placed over the sand cushion. Over this, 300 mm thick layer of sand shall be covered and a course of cable protection tiles or RCC troughs shall be provided to cover the cables by 50 mm on either side. Remaining trench shall be backfilled with earth and consolidated as original. Cables shall be laid in

hume Pipes / stoneware pipes at all road crossings and in GI pipe at the wall entries. Cable route markers to be provided as per standards.

Excess debris shall be removed from site with free of cost

Cables - Indoor

The cables laid indoors should be laid on slotted angle steel cable trays supported on M.S. angles. The cable trays should be routed above false ceilings wherever provided. Suitable clamping with straps and saddles shall be used for keeping the cables in position. Spacing between the cables shall not be less than the overall diameter of the cable.

The cables on wall surface from panel board up to angle iron shall run in galvanized steel pipes of adequate size.

The Cables run inside concrete trenches shall be supported on cable trays and shall be neatly arranged and clamped.

The Cable entries through pipes from outside to inside the building shall run in GI pipes and shall be sealed water tight with approved type of sealant to avoid water entering the building.

Testing of Cables

TESTS

The cables shall be tested in accordance with the IS: 694/1554/7098. The tests shall include

PVC insulated cables (for voltage up to 1100V:IS 694

PVC insulated cables (heavy duty): IS 1554 – Part I.

Cross-linked polyethylene insulated PVC sheathed cables: IS 7098 – Part I.

Cable Insulation Tests shall be conducted between phases and between phase and earth for each length of cable, before and after jointing. As such all phase cables may be checked before being laid for above tests. On completion of cable laying work, the following tests shall be conducted in the presence of the Consultant/Employer.

Construction tests

- Test for conductor and compaction.
- For copper conductor:
- Persulphate test for tinned copper only
- Annealing test

- Test for aluminium conductor:
- Tensile test
- Wrapping test
- Annealing test
- Resistance test for both copper and aluminium
- Test of eccentricity of insulation.
- Test for thickness of insulation
- Test for laying up along with Polypropylene tape and fillers.
- Virgin material test for PVC insulation.
- Test for thickness of inner sheath
- Test for armouring and armour coverage which should be more than 95%
- Test for thickness of outer sheath
- Insulation Resistance Test (sectional and overall) Continuity resistance test.
- Sheathing continuity test.
- Cable size, sequential and manufacturers identification marking on the outer sheath.
- Earth test.

All tests shall be carried out in accordance with relevant Indian Standard Code of Practice and Local Electricity Rules. The Contractor shall provide necessary instruments, equipment and labour for conducting the above tests and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the Consultant/Employer.

CABLE TRAYS, ACCESSORIES AND TRAY SUPPORTS

Cable racks / trays shall either be run in concrete trenches or on overhead supports, supported from building steel, floor slab etc.

Cables shall be clamped to the cable trays at regular intervals.

CONDUITS, PIPES AND DUCTS

The Contractor shall supply and install conduits, pipes and ducts as per requirement. All accessories / fittings required for making the installation complete, including but not limited to, ordinary and inspection tees elbows, checkouts, male and female reducers and enlarges, wooden plugs, caps, square headed male plugs, nipples, gland sealing fittings, junction boxes, pull boxes, conduits, outlet boxes, splice boxes, terminal boxes, glands, gaskets and box covers, saddles and all steel supporting work shall be supplied by the Contractor. Conduit fittings shall be of the same material as the conduits.

Flexible metallic conduits shall be used for termination of connections to equipment such as motors or other apparatus to be disconnected at periodic intervals. Flexible metallic conduits shall also be used for termination of connections to level switches, level electrodes, limit switch, pressure, pressure switches etc.

Conduits or pipes shall run along walls, floors, and ceilings, on steel supports, embedded in soil, floor, wall or foundation, in accordance with approved layout drawings.

Exposed conduit shall be adequately supported by racks and clamps or straps or by other approved means. Conduit supports shall be erected square, and true to line and grade with an average spacing of one support for every 2 meters of conduit length.

Each conduit run shall be marked with its designation.

All installed conduits shall have their ends temporarily closed by caps, wooden plugs, or other approved means until cable is pulled.

Closures shall be made in such a way that they do not get dislodged easily.

When one or more cables are trained through a conduit, conduit size shall be such that the total cross sectional area of the cable does not exceed 60% of the internal cross sectional area of the conduit.

The Contractor shall be responsible for boning of metal pipes or conduits in which cables have been installed to the main earthing system. Joints, metal sheath and armour of cables shall be bonded to the earth system in an approved manner. The entire system of conduit after installation shall be tested for mechanical and electrical continuity throughout and permanently connected to earth by means of a special approved type-earthing clamp efficiently fastened to the conduit. Gas or water pipes shall not be used as an earth medium.

INSTALLATION OF CABLES

(a) The contractor shall install, test and commission the cabled specified in the technical specification in accordance with Contractor's drawings and approved by the Engineer. Cables shall be laid directly buries in earth, or cable racks, in buildup trenches, on cable trays and supports, in conduits and ducts or bare on walls, ceiling etc. as per approved drawing. Contractor's scope of work includes unloading, laying, fixing, joining, bending, and terminating of the

cables. The Contractor shall also supply the necessary materials and equipment required for joining and terminating of the cables.

All apparatus, connections and cable work shall be designed and arranged to minimize rise of fire and any damage, which might be caused in the event of fire. Wherever cables pass through floor or wall openings or their partitions suitable bushes of an approved type shall be supplied and put into position by the contractor. If required by the Engineer, the Contractor shall seal the cables into the bushes using fire-resisting materials to prevent the spreading of fire through each partition.

Inspection on receipt, unloading, storage and handling of cables shall be in accordance with IS: 1255 and other Indian Standard Codes of Practice.

Standard cable grips and reels shall be utilized for cable pulling. I unduly difficult pulling occurs, the Contractor shall check the pull required and suspend pulling until further procedure has been approved by the Engineer. The maximum pull tension shall not exceed the recommended value for the cable measured by the tension dynamometer. In general, any lubricant that does not injure the overall covering & does not set up undesirable conditions of electrostatic stress or electrostatic charge may be used to assist in the pulling of insulated cables in conduits and ducts.

After pulling the cable, the Contractor shall record cable identification and date pulled neatly with waterproof ink on linen tags and shall securely attach such identification tags. Identification tags shall be attached to each end of each cable with non-corrosive wire. The said wire must be non-ferrous material on single conductor power cable. Tags may further be required at intervals on long runs of cable son cable trays and in pull boxes. Cable and joint markers and RCC warning covers shall be provided wherever required.

Sharp bending and kinking of cables shall be avoided the bending radii for various types of cables shall not be less than those specified below:

I. 11 kV PVC Multicore armoured cables: 15 times the overall dia of the cable.

II. 650/1100V PVC insulated cable. : 10 times the overall dia of the cables.

If shorter radius appears necessary, no bend shall be made until clearance and instructions have been received from the Engineer's Representative.

Power and control cables shall be laid in separate cable racks/trays.

Where groups of HV, LV and control cables are to be laid along the same route, suitable barriers to segregate them physically shall be employed.

When power cables are laid in the proximity of communication cables, minimum horizontal and vertical separation between power and communication cables shall be normally 600mm, but in any case not less than 460mm for single core cables and 300mm for Multicore cables. Power and communication cables shall as far as possible, cross at right angles to each other.

Where cable cross roads and water, oil, gas or sewage pipes, the cables shall be laid in reinforced spun concrete or steel pipes. For road crossings the pipe for the cable shall be buried at not less than one-meter depth.

Cable laid in ground shall be laid on a 50mm riddled earth bed. The cables shall then be covered on top and at their sides with riddled earth to a depth of about 150mm. This is then gently up to a depth of about 100 mm above the top of uppermost cable covers which are placed centrally over the cables. The protective cable covers for LV cables may be of earthenware and for HV cables of reinforced concrete. The specification of protective covers shall be generally as per Appendix 'C' of IS: 1255. the RCC covers shall have one hole at each end, to tie them to each other with GI wires to prevent displacement. The trench is then back filled with the excavated soil and well rammed in successive layers of not more than 300 mm in depth, with the trenches being watered to improve consolidation where necessary. To allow for subsidence, it is advisable to allow a crown of earth not less than 50 mm in the center and tapering towards the sides of the trench.

Each cable shall be pulled into the particular conduit and shall be taken from the particular reel designated for the run. All cables shall be neatly trained without interlacing. In hand holes, pull boxes or junction boxes having any dimension over 1000mm, all conductors shall be cabled and/or racked in an approved manner care shall be taken to avoid sharp bending or stressing cable beyond manufacturer's recommendations in pulling. Cable shall be protected at all times from mechanical injury and from absorption of moisture at unprotected ends.

In each cable run some extra length shall be kept at a suitable point to enable on or two straight through joints to be made, should the cable develop a fault at later date.

Cables on cable racks, on cable trays and in conduits shall be formed to avoid bearing against edges or trays, racks, conduits or their supports upon entering or leaving trays, racks or conduits. Cables shall be racked or laid directly into cantilevered cable trays where practicable, but in some cases it may be necessary that cables are pulled or threaded into trays. To facilitate visual tracing, cables in trays shall be laid only in single layers and unnecessary crossing of cables shall be avoided. Cables on trays shall finally be clamped in an approved manner.

Cable splices will not be permitted except where permitted by the Engineer. Splices shall be made by the Contractor for each type of wire or cable in accordance with the instructions issued by cable manufacturers and the Engineer. Before splicing, insulated cables shall have conductor insulation stepped and bound or penciled for recommended distance back from splices to provide a long leakage path. After splicing, insulation equal to that on the spliced conductors shall be applied at each splice.

At cable terminal points where the conductor and cable insulation will be terminated, terminations shall be made in a neat, workmanlike and approved manner by men specialized in this class of work. The Contractor shall make terminations for each type of wire or cable in accordance with instructions issued by cable manufacturers and the Engineer.

Control cable terminations shall be made in accordance with wiring diagrams, using colour codes, numbering ferrules approved by the Engineer for the various control circuits, by code marked wiring diagrams.

When control cables are to be fanned out and cabled together with cord, the Contractor shall make connections to terminal blocks, and test the equipment for proper operation before dabbles are corded together. If there is any question as to the proper connection, the Contractor shall make a temporary connection with sufficient length of cable so that the cable can be switched to another terminal without splicing. After correct connections are established through operating the equipment, cables shall be cut to their correct lengths, connected to terminals in the specified manner, and corded together where necessary to hold them in place in a workmanlike manner.

Jointing of cables shall be in accordance with relevant Indian Standard Codes of Practice and manufacturer's special instruction. The Contractor shall supply materials and tools required for cable jointing work, including cold setting bituminous compound. Cables shall be firmly clamped on either side of a straight through joint at a distance of not more than 300mm away, from the

joints. Indication tags shall be provided at each joint and at all cable terminations.

Cable seals shall be examined to ascertain if they are intact and that cable ends are not damaged. If the seals are found to be broken the cable ends shall not be joined until after due examination and testing by the Engineer. Before jointing is commences, insulation resistance of both sections of cable to be joined shall be checked by mugger.

After installation and alignment of motors, the Contractor shall complete the conduit installation, including a section of flexible conduit between the motor terminal box and cable trench / tray. The Contractor shall install and connect the power, control and heater supply cables as per equipment manufacture's drawings if any. The Contractor shall be responsible for correct phasing of the motor power connections and shall interchange connections at the motor terminal box if necessary, after each motor is test run.

Connections to recording instrument, float switches, level electrodes, limit switches, pressure switches, thermo-couples, thermostats and other miscellaneous equipment shall be done as per manufacturer's drawings and instructions.

Metal sheath and armour of the cable shall be bonded to the earthing system of the station. The size of conductor for boning shall be appropriate with the system fault current.

All new cables shall be mugger tested before joining is completed al L.V cables shall be mugger tested. 1100/650-volt grade cables shall be tested by 1000 Volt mugger.

Cable cores shall be tested for

a) Continuity
b) Absence of crow phasing
c) Insulation resistance to earth
d) Insulation resistance between conductors.
e) Contractor shall furnish all testing kit and instruments required for field-testing.

POWER AND CONTROL CABLE TERMINATIONS

Cable boxes shall be of approved design with adequate clearances between phases and between phases and earth, in accordance with relevant standards.

Cable boxes shall be complete with combined armour and earthing clamps.

Suitable compression type cable glands shall be provided for power and control cables.

Provision shall be made for earthing the body of each cable box.

Equipment terminal blocks for power connections shall be complete with adequate phase segregating insulating barriers and suitable crimping type of lugs for connecting the insulated cable tails.

Where more than one core is terminated on each phase, unnecessary bending of cable cores shall be avoided, without decreasing the length of the insulated cable tail and the electrical clearances, which would normally be obtained when using one core per phase.

All switchboards shall, unless otherwise specified, facilitate bottom cable entry. Removable gland plates shall be mounted at least 300mm above the base of the panel. If the gland plates are provided inside the switchboards cubicles, entries in the base of the cubicle must be adequately vermin proofed.

The individual cores of power and control cables shall be neatly dressed and supported at regular intervals inside the switchboards, before connecting them to the relevant terminals.

TECHNICAL SPECIFICATIONS FOR CABLING

1.0 SCOPE

This specification covers the requirements for supply, the installation, testing and commissioning of the cabling system.

2.0 STANDARDS

The following standards shall apply:

IS: 1554 Part I

IS: 2098 Part II

IE Wiring regulation.

3.0 CABLE SPECIFICATIONS:

3.1 Power Cables:

Power cables for use on 415 V system shall be of 1100 Volts grade, aluminium stranded conductor, PVC insulated, PVC sheathed steel wire / tape armoured and overall PVC sheathed. Power Cables for 11 KV system shall be aluminium conductor, XLPE insulated, screened, PVC bedded galvanised steel flat armoured and PVC sheathed cable. Cable shall confirm to relevant IS Specification.

4.0 MISCELLANEOUS MATERIALS SPECIFICATIONS:

4.1 Connectors:

Cable termination shall be made with aluminium / tinned copper crimped type solderless lugs of approved make for all aluminium conductors and stud type terminals.

4.2 Cable Identification:

Cable tags shall be of 2 mm thick, 20 mm wide aluminium strap or plastic

identification tags of suitable length to contain cable number, equipment no. etc.,

4.3 Cable Glands:

Cable Glands to be supplied shall be nickel plated Brass / double compression type.

4.4 Cable Trays:

This shall be either prefabricated or site fabricated angle iron trays as per the drawing. Cable trays shall be suitable for a cable weight of 50 kg / meter running length of tray.

5.0 CABLE LAYING:

5.1 Cables shall be laid in the routes marked in the drawing. Cable routing given on the layout drawings shall be checked in the field to avoid interference with structures, heat sources, drains, piping, air conditioning duct, etc., and minor adjustments shall be done to suit the field conditions wherever deemed

necessary without any extra cost. Procurement of cables shall be on the basis of actual site measurements.

5.2 High voltage, medium voltage and other control cables shall be separated from each other by adequate spacing or running through independent pipes, trenches or cables trays, as applicable.

5.3 Bending radius of the cable shall not be less than 12 times the diameter of the cable.

5.4 Cables shall be laid in complete, uncut lengths from one termination to the other whenever the length required is not more than Standard lengths manufactured.

5.5 Cables shall be neatly arranged in the trenches / trays in such a manner so that criss - crossing is avoided and final take off to the motor / switch gear is facilitated.

5.6 All cables will be identified close to their termination point by cable numbers as per cable schedule. Cable numbers will be punched on aluminium straps (2 mm thick) securely fastened to the cable and wrapped around it. Alternatively, plastic cable tags may be used.

Even underground cable shall be provided with identity tags of lead securely fastened every 30 Mtr. of its underground length with atleast one tag at each end before the cable enters the ground. In unpaved areas, cable trenches shall be identified by means of markers. These posts shall be placed at location of changes in the direction of cables and at intervals of not more than 30 Mtr. and at cable joint locations.

5.7 RCC Cable trenches with removable covers will be provided by the Owners. Cables shall be laid in 3 or 4 tiers in these trenches on steel supports. Removal of concrete covers for purposes of cable laying and reinstating them in their proper positions after the cables are laid shall be done by the electrical contractor at no extra cost.

5.8 In the case of cables directly buried underground in excavated cable trenches with sand cushion and protective brick cover minimum depth of buried trench shall be 750 mm for low voltage and 900 mm for H.V cables. The depth and the width of the trench shall be as per drawing.

Before cables are placed, the trenches bottom shall be filled with a layer of sand. This sand shall be leveled and cables laid over it. These cables shall be covered with 150 mm of sand on top of the largest diameter cable and sand shall be tightly pressed. A protective covering of 75 mm thick second class

red bricks shall then be laid flat. The reminder of the trench shall then be back-filled with soil, rammed and levelled.

5.9 Where cables pass through foundation walls or other underground structures, the necessary ducts or openings will be provided in advance for the same. However, should it become necessary to cut holes in existing foundations or structures, the electrical contractor shall determine their location and obtain approval of the Engineer-in-charge before cutting is done. The cable entries through pipes from outside to inside the buildings shall be sealed water tight with approved type of sealant to avoid water entering into the building.

5.10 At road crossing and other places where cables enter pipe sleeves adequate bed of sand shall be given to that the cables do not slack and get damaged by pipe ends.

5.11 Cables installed above ground shall be run in trays, exposed on walls, ceilings or structures and shall be run parallel or at right angles to beams, walls or columns.

5.12 Individual cables or small groups which run along structures / walls etc., will be clamped by means of 16 SWG G.I saddles on 25 x 6 mm saddle bars at intervals not exceeding 300 mm for cables upto 25 mm dia and at 500 mm for higher size cables. The cost of saddle and saddle bars shall be deemed to have been included in the installation of cables and no separate payments shall be made on this account.

5.13 Cable laid on supporting angle in cable trenches, structures, columns and cable trays shall be suitably clamped by means of G.I Saddles / Clamps.

5.14 Supporting steel shall be painted before laying of cables. The painting shall be done with one coat of red lead paint and two coats of approved bituminous aluminum paint unless otherwise specified.

6.0 TERMINATION:

6.1 All PVC Cables upto 1.1 KV grade shall be terminated at the equipment / switch boards by means of compression type cable glands.

6.2 The cable armouring shall be earthed at both the ends.

6.2.1 Cable termination upto 4 sqmm shall be insertion type and others solderless crimped type Aluminum / Copper Sockets. Conductor jelly shall be applied before crimping after cleaning the surface.

7.0 TESTING:

7.1 M. V Cables testing shall be done with 1000 Volts Meggar and that of H.V Cables with 5 KV Meggar. The following test shall be done

a. Continuity on all phases.
b. Insulation Resistance between Conductor and between Conductors to earth.

All tests and recorded done in the presence of Engineer - in - charge and shall form part of completion document.

8.0 MODE OF MEASUREMENT:

8.1 Cables will be measured on the basis of common rate per unit length irrespective of the type of laying. The cost shall include cable, clamps, excavation, sand filling, protective brick layer and refilling, cable markers and installation, testing and commissioning.

8.2 Cable trays shall be measured on weight basis and the cost shall include wall / ceiling supports, painting, etc.,

8.3 Cable termination will be measured as one unit for payment. The cost shall include glands, lugs, nuts, joint material, earthing of glands, installation, testing and commissioning.

TECHNICAL SPECIFICATIONS FOR CABLE MANAGEMENT SYSTEM –TRAYS

GENERAL:

The cable management system shall consist of well designed, field proven products based on popularly accepted international practices.

It shall be flexible, possible to use in various configurations. Accessories required to use in such configuration must be available as standard.

Manufacture and finish shall be complete at the works. No welding should be expected to be done at site for installation.

All products used indoors /outdoors shall be Hot Dip Galvanized.

The successful cable management products vendor should be in a position to offer various products to support and route, like power, data & voice cabling, on floors, under floors and above floor locations.

SUPPORT FOR CABLE TRAYS:

Shall be Flexible system consisting of Slotted Verticals usable in single fashions with racks on one side only or in box configurations with racks on two opposing sides.

The system should be fixable to walls, columns, ceilings, floors and also from floor to ceiling.

Wall clamps, footplates, ceiling plates and telescopic coupler channels etc., which are required for fixing as above should be available as standard equipment.

Racks with Tapered section lowest at free end should be engaged easily with Vertical stand sections.

Racks should have slots to fix cables / conduits or trays.

All sections like stand, racks, clamps shall be of minimum 2.5mm thickness (12swg).

All mounting shall be of 3.5mm to 6mm thickness.

All products for the support system shall be Hot Dip Galvanized as per IS: 2629 to achieve uniform zinc coating not less than 60 microns at any spot.

LADDER TYPE CABLE TRAYS:

Shall consist of a Bolted rung assembly of field proven design. It shall consist of side rails of 2.5 mtr standard lengths and Slotted rung spaced 250mm center to center.

Coupler, Coupler fasteners, tray assembly fasteners should form the part of the equipment.

The Ladders should be light sheet metal constructions yet robust enough to carry a cable load of 50 kg/m on a span of 1.25 mtrs.

The design shall be flexible enough to accommodate change of widths at site.

Sections of 1.6/2mm shall be standard for different widths of trays as detailed in BOQ.

However, where locations demand lighter sections those too shall be detailed in BOQ.

Horizontal bends, Vertical internal / external, tees, crosses shall be standard products.

Hinged or flexible coupler assemblies for Vertical / Horizontal route changes shall be available as standard as also reducers (offset couplers).

Covers shall be of Pre-galvanized sheet 18swg (1.25mm up to 300w) & 16swg (1.6mm on higher widths) construction possible for easy mounting on to trays.

Provision to add on earth flat holding clamps, trays fixing clamps should be part of cable tray design.

Perforated cable trays of 1.6mm / 2mm thickness and standard lengths 2.5 mtrs as detailed in BOQ shall be offered by bidder if required. Finish shall be as specified earlier.

Wire ways of enclosed type with covers, cover screws, coupler, coupler screws of PreGalvanized sheet constructions or of powder coated finish with all accessories shall be offered by bidder as detailed in BOQ. Such Wire ways should be suitable for surface laying or on / under floors.

CONSTRUCTION

The cable trays shall be either ladder or perforated type. The cable trays and accessories shall be fabricated out of hot rolled steel sheets, which shall be hot dipped galvanized. The complete assembled cable tray sections shall be corrosion resistant, high strength and with extreme smooth surface. Accessories Cable tray manufacturer shall supply suitable accessories for clamping the cable trays on cable tray supports from ceiling and beams of the building structure. Cable trays shall be supplied with GI coupler plates, hardware, nuts bolts and washers for joining the standard lengths of cable tray section.

LOAD DEFLECTION CRITERIA

For tray system design in addition to self-load, following criteria shall be applied to determine section and thickness of cable tray.

Support span	3000	mm
Cable load for 300 mm	50	Kg / m
Cable load for 400 mm	75	Kg / m
Cable load for 500 mm	85	Kg / m
Cable load for 600 mm	100	Kg / m

In addition to this 70 Kg/m concentrated load at the center span shall be considered.

Allowable mid span deflection < 7 mm

SURFACE PREPARATION

For treatment and preparation of surface of fabricated trays, seven tank process shall be employed comprising of the following cleaning all the members, plates shall be free from grease, paints or any foreign matter. A chemical solvent as trichloroethylene / carbon tetrachloride or a combination of solvent cleaning and heating shall be employed. Immediately after degreasing the material shall be rinsed with hot / cold water. Pickling Hydrochloric acid and sulphuric acid solutions may be used from pickling. After pickling the material shall be rinsed in running water. After surface treatment, cable trays shall be galvanized.

GALVANIZING

Zinc confirming to grade Zn 98 of IS 209 shall be normally used for galvanizing. As far as practicable, the fabricated tray and accessories shall not be sunk to the bottom of the bath. Tray and accessories shall be galvanized at the lowest possible temperature, which will allow free drainage of zinc from the work piece during withdrawal. The thickness of the coating shall be minimum 100 microns. The zinc deposited shall not be less than approximately 720 gm/sq.m. The thickness shall be checked by a magnetic method as per IS 3203.

Small components handed in baskets shall be centrifuged to remove excess of Zinc immediately after galvanizing while the coating is still in molten condition. Hardware such as nuts and bolts shall be Electro galvanized / zinc passivated.

PAINTING

If necessary at site - only, especially after cutting / jointing. The metal surface after cleaning shall be prepared by applying a coat of phosphate paint and a coat of yellow zinc chromate primer. After preparation the tray surface shall be spray painted with two coats of yellow paints.

EARTHING

The cable tray /floor raceways shall be provided with brass earth clamps every 3000mm for connecting suitable copper wire earth continuity.

ADDITIONAL REOUIREMENTS

1. GENERAL:

Withstanding the definition of wiring in I.E.E. regulations, or elsewhere, wiring shall so far this contract is concerned, include all work items / accessories in the complete wiring circuit from tapping the point in the sub main or distribution board to the following:

The switch /ceiling rose or connector / socket outlet / bell push / bookplate / call bells, buzzers.

i) The following shall be deemed to be included in the point wiring:

1. Circuit wiring from the relevant distribution board.
2. Switch and ceiling rose / connector
3. Wire as required up to lamp holder in the case of wall brackets, bulk circles and all other fittings, fan regulators and looping inside switch boards.
4. Bushed PYC conduit of suitable size where cables pass through walls and ceiling below ceiling level to 1.5M above upper floor level.
5. Earth wire from 3 pin socket to the respective distribution board.
6. Continuous run of earth wire on complete lighting, fan wiring, to respective distribution board.
7. All wood or metal boards and boxes, sunk or surface type including those required for mounting fan regulators and switches (excluding those under distribution boards and main control switches)
8. Round blocks for housing connectors / ceiling rose.
9. All fixing accessories such as clips, nails, screws, or rawl plugs, wooden plugs etc., as required.

ii). SIZES OF WIRES:

All wires shall be PYC insulated single core copper stranded conductor as specified and shall be 250 / 1100 V grade. The smallest conductors for lighting and circuits shall be 1.5 Sq. mm. and 2.5 Sq. mm. of copper respectively using the following colour codes as per standard practices.

Phase - 1	Phase - 2	Phase – 3	Neutral	Earth
Red	Yellow	Blue	Black	Green.

iii). FITTINGS WIRES:

The use of fittings wires shall be restricted to the internal wiring of light fittings. The sub circuit leads shall terminate in ceiling roses or connectors from which they will be carried into the fittings.

iv). Connections to the switches, sockets etc., wherever possible shall be through crimped pin type plugs.

v). FLEXIBLE CORDS:

For sort connections to appliances, fans and pendants shall be 250 / 440 V grade (3 or 4 core) with tinned copper wires, insulated, twisted and sheathed with strengthening cord The colour of sheath shall be to Engineer-In charge's approval.

2. WIRING IN CONDUITS: [FOR EXTERNAL WORK UNDER SUSPENDED CONDITIONS ONLY]

2.1. CONDUITS

a) Rigid steel conduits shall be of heavy gauge welded black enameled of 16 SWG sheet up to 40mm dia. and 16SWG sheet above 40mm dia. with threaded / screwed type accessories and when laid shall free from edges and burrs.
b) All rigid non-metallic conduits shall confirm to IS 2509 / 1973 & IS 9537 (part3) / 1983 either threaded or plain type and shall be used with corresponding accessories.

2.2. SIZES:

Shall be selected in accordance with IS codes depending upon the size and number sizes to be drawn, the minimum dia. being 19mm / 20mm.

2.3. JOINTS CONDUITS:

Conduit pipe shall be joined by means of screwed couplers and screwed accessories only. In long straight runs of conduit inspection type of couplers (for surface conduits) or running threads with couplers and jam nuts with bared threaded portion suitably protected by anti-corrosive paint shall be provided. Threading shall in all cases be sufficiently long enough [from I mm to 27mm] long to accommodate pipes to full threaded portions of couplers or accessories. Cut ends of conduits pipes shall have no sharp edges nor any buffers left, to

avoid damage to the insulations of conductors while pulling them through such pipes and all such ends shall be neatly protected by approved bushes of proper size, of P.V.C. or of well-seasoned TW, painted or of porcelain, Bakelite or rubber.

2.4. PVC CONDUIT CONNECTIONS: [ALL OTHER CONCEALED WORKS ARE WITH PVC CONDUITS]

PVC conduits shall be joined by means of screwed or plain couplers depending on whether the conduits are screwed or plain. Where there are long runs of straight conduit, inspection boxes shall be provided at intervals as approved by the Engineer-In charge. The threads of pipe and sockets shall be free from grease and oil and shall be thoroughly cleaned before making the screwed / plain joints. Proper jointing materials as recommended by manufacturers of these conduits shall be used for jointing of PVC pipes. Use PVC couplers and connectors for PVC pipe connections and ations in boxes. All the joints shall be watertight.

boxes and running joints shall be provided at suitable places to allow for subsequent s if any, without undue dismantling of conduit system. Diagonal run of conduits shall be as far as possible. Junction between conduit and adaptable boxes, back outlet boxes, switch and the like must be provided with entry spouts and smooth PYC bushes. Joints between conduits and iron clad distribution boards and control gear shall be effected by means of conduit couplers into each of which will be coupled smooth PYC bush from the inside of box or case. Conduit system shall be erect and straight as far as possible. Traps where water may accumulate from condensation are to be avoided, and where unavoidable suitable provision for draining the water shall be made. All jointing methods shall be subject to the approval of Engineer-In charge.

Separate conduits shall be provided for the following system.

1. 15 Amps Power outlets for air conditioning, heaters, refrigerators and such appliances
2. 5 Amps outlets and lighting system
3. Fire alarm system / Telephone system
4. Equipment wiring

2.5. BENDS IN CONDUIT:

Wherever necessary, bends or diversions may be achieved by means of bends / or circular inspection boxes with adequate and suitable inlet and outlet screwed joints. In case of recessed system, each junction box shall be properly secured and flush with the finished wall surface, so that the conductors inside the conduits are easily accessible. No bends shall have reading less than 2 1/2 times the outside diameter of the conduit. Heat may be used to soften the PYC the conduit for bending. Caution should be exercised in using the PVC conduits in location where ambient temperature is 50 Celsius or above. Use of PVC conduit in places where ambient temperature is 60 Celsius or above is prohibited.

PVC conduits shall not be used in outdoor exposed system. G.I. pipe conduits shall be used for outdoor system.

2.6. FIXING OF CONDUITS:

Conduits and junction boxes shall be kept in position while the walls, slabs and floors are under construction/ renovation and proper hold-fasts shall be provided. Conduits shall be so arranged as to facilitate easy drawing of wires though them. Adequate junction boxes of approved shape and size shall be provided. Where conduits cross expansion joints in the building, adequate devices shall be used to take care of any relative movement. All conduits shall be installed in such a manner that no damage occurs due to other pipe networks. A conduit shall not come in contact with any wooden members unless otherwise specified. Conduit stubs in floors / slabs shall be kept as short as possible above the finished floor level in order to avoid any damage on them. After conduits, junction boxes, outlet boxes, and switch boxes are installed in position, their outlets shall be properly plugged or covered so that water, mortar, insects or any other foreign matter does not enter into the conduit system. Exposed conduits shall be fixed by means of space bar saddle at intervals not more than 1000mm in normal and 500mm from both sides of fitting or accessories. The saddles shall be of 3 mm X 19 mm galvanized mild steel flat, properly treated with primer and painted, securely fixed to support by means of nuts and bolts and brass machined screws as required. Conduits shall be laid in a neat and organized manner as directed and approved by the Engineer-In charge.

Conduit runs shall be planned so as not to conflict with any other service pipes lines / ducts.

Where exposed conduits are suspended from the structure they shall be clamped firmly and rigidly to the hangers of design to be approved by the Engineer-In charge. Where hangers are to be anchored to reinforced concrete members, appropriate inserts and necessary devices for their fixing shall be left in position at the time of concreting. Making holes or openings in the concrete will generally not be allowed. In case of unavoidable situations prior permission of the Engineer-In charge shall be used.

2.7. PROTECTION:

To minimize condensation or sweating inside the conduit pipes, all outlets of conduits system shall be adequately ventilated as directed and approved by Engineer-In charge. All screwed and socketed connections shall be adequately made fully water tight by the use of proper jointing materials i.e. 'Tropolin' for PVC conduit and white lead for metal conduit.

2.8. OUTLETS:

All outlets for fittings, switches etc., shall be boxes of suitable metal of 'surface or flush' mounting type. Wall thickness shall not be less than of 16g covered with a sheet 1/8" (3mm) thick perfect or 3mm thick decorative laminated hylam as may be specified, in front giving minimum clear depth of 75mm. All MS boxes, irrespective of sizes, shall have a fully threaded stud welded inside, for earth termination.

2.9. CONDUCTORS:

All Conductors used in conduit wiring shall unless otherwise specified be stranded. No single core cable of nominal cross-sectional area greater than 16 sq. mm. shall be enclosed alone in a conduit and used for alternating current.

2.10. INSPECTION BOXES:

Suitable inspection boxes, with ventilating holes in the covers shall be provided in a conduit wiring, at spacing not more than 12 meters apart or two solid 90-degree bends or equal to permit periodical inspection and facilitating removal of wires if necessary.

2.11. ERECTION AND EARTHING OF CONDUIT:

The conduit of each circuit or section shall be completed before conductors are drawn in. The entire system of conduit after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth confirming to the requirements specified under section 12 (below). Earthing by means of special approved type earthing clamps efficiently fastened to conduit pipe in a workman like manner for perfect continuity between each wire. And conduits crossing gas or water pipes, and others, which are liable to mechanical damage, they shall be adequately protected.

2.12. GUIDE WIRE:

Suitable fish or pull wire shall be drawn in all conduit before they are embedded. Steel conduits, even if galvanized, run in under-floor screed shall be painted with a heavy coat of emulsified bitumen.

3.0. WIRING IN CONCEALED CONDUIT

3.1. Conduits buried in concrete in structure shall be put in position and securely fastened to the enforcement and the system got approved by the Engineer-In charge / Structural Consultant before concrete is poured. Proper care shall be taken to ensure that the conduits are neither dislocated at the time of pouring concrete. Suitable fish or pull wire shall be drawn in all conduits they are embedded.

3.2. MAKING OF CHASE:

The Chase in the wall is neatly made and be of ample dimensions to permit the conduit to be fixed in the manner desired. In the case of building under renovation, chase shall be provided in the wall, ceiling, etc., at the time of renovation and shall be filled up neatly after erection of conduit and brought to the original finish of the wall, ceiling etc.

3.3. The conduit pipe shall be fixed by means of staples or saddles not more than 500mm apart. Fixing of standard bends or elbow shall be avoided as far practicable and all curves maintained by bending the conduit pipe itself with radius long enough to permit easy drawing in of conductors. All threaded joints of conduit shall be treated with approved preservative compound to secure protection against rust.

3.3. INSPECTION BOXES:

Suitable inspection boxes shall be provided as at 9.2 (Flush mounted).

3.4. TYPES OF ACCESSORIES TO BE USED:

All outlets such as switches, wall sockets, etc. may be either flush or of surface mounting type.

3.5. The outlets box shall be same as in Clause 9.2 ante and shall be mounted with the wall. The metal box shall be efficiently earthed with conduit by the stud vide 9.2.

4.0. WIRING IN SURFACE CONDUITS:

4.1. Conduit pipes shall be fixed on the approved heavy gauge metal saddles, properly secured to walls or ceilings through suitable teakwood plugs (or other approved varieties) with round or cheese circle screws for rust proof material, at intervals of not more than 500 mm on straight runs, with saddles not more than 300 mm on either side of couplers or bends or similar fittings, from such fittings. The conduits shall be run neatly parallel or at right angles to walls and painted in different colors to distinguish light, power and telephone lines. Inspection boxes shall be provided as at.

5.0. ARMOURED AND UN-ARMOURED PVC CABLE ON SURFACE:

a) This system of wiring is suitable for providing sub-mains for low / medium voltage installation. All such cables used shall confirm to the relevant I.S. Specification.

b) FIXING ON WALL / CELING:

PVC insulated, steel tape or wire armoured and PYC-sheathed cable on walls, ceiling etc., shall be run on proper wooden / MS cleats with GI saddles placed at such distance apart as

to neatly and adequately support the cable all along the run. The wooden cleats shall be secured on the wall / ceiling by flat circle screws to rawl / Phil plugs.

c) PASSING THROUGH WALL:

A teakwood box or extending through the whole thickness of the wall shall be buried in the wall and the cable shall be carried so as to allow 12mm clear space on the three sides of the cable or the cable shall carry in an approved bush of well-seasoned teakwood duly painted, or other approved arterial. The cable shall in no case be buried directly in masonry or plaster.

turns or twists on the conductor. The cables should be laid along wall / ceiling in the best workman like manner, so as to give a neat appearance. Excessive sharp bends to the cable shall be avoided.

d) STRIPPD.IG OF OUTER COVERING:

While cutting and stripping the outer covering of the cables, care shall be taken to see that the sharp edge of cutting instrument does not damage the PYC insulation of the conductors. The insulation shall be stripped off near the connection terminals as far as possible taking care again to see that the conductor is not damaged.

e) END TERMINATION:

The connecting terminals of the armoured and Un-armoured cable shall be terminated on the iron clad main switch / distribution board etc., by using proper size brass / alloy supporting glands. In case of armoured cables, the armoured cables shall be supported into the gland and connected to the earth as per standard / conventional practice. Terminations at both ends shall be made with cable lugs.

6.0. EARTHNG:

a) Except for equipment provided with double insulation, all non-current carrying metal parts of electrical installations are to be earthed properly. All metal conduits, cable sheaths, switchgear, distribution fuse boards, etc., shall be bonded together and connected to an efficient earth electrode.

   Medium Voltage energy consuming plant and equipment shall have two separate and distinct connections to the earth.

   In the case of MV /L T panels, 2 nos. of earth bus bars of copper or aluminum of suitable section shall be run on the back side of the panel and earth bus bars and the individual switches shall be interconnected by means of copper or 01 wire of suitable gauge as specified.

b) EARTHING CONDUCTOR:

Earthing conductor shall be of higher conductivity copper or Al or any other suitable approved material to give equivalent conductivity and shall not less than half the largest current carrying conductor or 14 SWO (7 / 00.029) but subject to an upper limit of 65 sq.mm. For equipment exceeding 750 KVA the size shall be as per IS. 1886-1961.

c) INSTALLATION:

The buried earthing leads will be protected from mechanical injury by 12mm Al pipe recessed in wall and floor where considered necessary and 'carried up to the earth electrode. It shall be fixed over its entire length with clamps, saddles, staples, etc. The earthing lead shall be securely bolted and soldered to the electrode with bolts and washer of the base metal. The earthing lead shall be securely connected at the other end to the main board and all its mountings and looped to all other clad switches and distribution boards.

7.0. UNDERGROUND CABLES:

a) HIGH/ MEDIUM / LOW TENSION:

Cables should be double tape / wire armoured over lead covering and XLPE as specified in the schedule of work. All joints of cables should be in joint boxes and filling in of the compound shall be done as per IS specifications using best quality of materials. In case of the PYC insulted armoured cables, joining will be done with approved quick setting epoxy compound with suitable jointing kit. The jointing work should be carried out by a competent authorized cable jointer.

b) SPACING BETWEEN CABLES:

Where more than one cable is laid in the same trench the actual space between the cables should be normally be 250 mm apart leaving a clear distance of 150 mm from the cable and the trench walls.

c) LAYING OF CABLES:

Before the cables are laid, a 75mm layer of sand base is to be provided for cushioning. The cables after being uncoiled from the rollers, and before laid into a trench, should be drawn in straight length. After the cable is laid a 230mm wide duct is to be formed with two well burnt brick laid on the edge one on either side of the cable and bridged by a well burnt brick laid flat on the top supporting bricks on edge, with sand filled in and around the cable. The trench is then filled with excavated earth, laid in layers, watered and consolidated, the surplus earth being disposed of.

Cable markers with 3mm thick plates of suitable size, with 40mm X 40mm X 6mm supporting vertical MS angle iron welded to plate duly painted in two coats, for protection

against corrosion, or with 50mm thick RCC slab of suitable size, making done with details of cables and depths at which cables are laid, duly painted on them, shall be provided at ground level after being suitably embedded in cement concrete (I :3:6) blocks of 200mm X 200mm X 200mm and spaced at distances of about 30 mts. Centre to centre and in every change in direction.

When more than one cable is to be laid, the width of the trench will be suitably increased and cables laid side by side confirming to specifications as above. In such case there shall be a separate brick duct for every cable. In case the cables cannot be laid side by side at one level they may be laid in formation in same trench. When laying with cables, care should be taken to see that the paper insulated cables are bent, straightened slowly, sharp radius being avoided. The minimum safe bending radius for single core cable is 20 diameters, and for multi core cables 10 diameters. and for armoured cable 12 diameters, the diameter being the overall diameter of the cable. Where the cables are required to cross the roads water / sewer lines etc., they should normally be taken through pipe sleeves at least 100mm in diameter, which may either of stoneware, steel or spun reinforced concrete. For more than one cable the diameter should not be less than 150 mm. Steel pipe shall be used where it is not possible to obtain sufficient depth to withstand impact from traffic.

d) Rate for cables shall include costs for all operations described above unless otherwise separately provided for elsewhere.

e) CABLE INSIDE BUILDING:

Cable laid inside the building should be properly protected and be carried either in ducts with suitable covers of slabs or chequered plates or fixed to walls by clamps, brackets or cable trays.

f) TESTING OF CABLES:

High voltage tests should be undertaken to ensure that no damage has occurred during the laying operation and that the joints are in order. Cable of 1.1 K V suitable for low and medium voltage should withstand for 15 minutes, 3,000 volts Direct Current applied between the conductor and sheath. In the absence of high pressure testing equipment, it is sufficient to test for 1 minute with 1000 volts. If the test results are to be found not satisfactory, the Contractor shall arrange for having this set right at his cost, including removal of rejected materials, relaying etc.

8.0 RECEPTION AND DISTRIBUTION OF MAIN SUPPLY:

8.1 MARKING OF APPARATUS

a) When a board is connected to voltage higher than 250v all the terminals or leads of the apparatus mounted on it shall be marked in the following colours to

indicate the different poles or phases to which the apparatus or its different terminals may have been connected.

Three Phases Red, Blue and Yellow
1 Neutral Black

b) Where four wire three phase wiring is done, the neutral shall preferably be in one colour and each of the other three wires in another colour.

c) Where a board has more than one switch, each switch shall be marked to indicate which section of the installation it controls. The main switch shall be marked as such and when there is more than one main switch in the building, each switch shall be marked to indicate which section of the installation it controls.

d) All marking required under this clause shall be clear and permanent.

9. CLEARANCE AND SAFETY

For all switch boards, control panels, power control centres, a clear front space of not less than 1000 mm. shall be provided in front of the equipment. In case, where the equipment is provided with drawout unit, a minimum clearance of 2,000 mm shall be provided.

For all electrical equipment a minimum clearance headroom of 500mm shall be provided.

All motors located away from the feeding and control panels and for which control desk of posts are not within visible location, shall be provided with readily accessible and easily operated, locally mounted lockable type 'stop' pushbuttons in the control circuits.

All electrical equipment operating on 415 V or higher voltage shall be provided with caution notice boards of approved type and shall be affixed permanently in a conspicuous position.

Where a group of equipment is located within a switch / control room or within a fenced area, ice board shall be fixed at the entrance. Where a group of equipment is located within a control room or within a fenced area, the notice boards of approved type and shall be e entrance. G parts of the equipment which are exposed and liable to cause hazard to the operating Intendance personnel shall be suitably protected by metallic guards.

In front of the entire (all) switch boards rubber mats shall be provided for personnel safety.

Open type control panel or open type busbars shall not be installed inside the plant/ building.

10. SAFETY

The Contractor shall maintain a readily accessible place for first aid appliances including adequate supply of sterilized dressings and cotton wool.

Injured person shall be taken to a public hospital without loss of time.

Single ladder shall be over 8 metres in length. The width between the side rails shall not š than 30 cm. Clear and the distance between two adjacent rungs shall not be more than 30 cm. a ladder is used an extra mazdoor shall be engaged for holding the ladder.

Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable ending or railing whose minimum height shall be one metre.

Workers employed on mixing and handling material such as asphalt, cement, mortar shall be provided with protective footwear and rubber hand gloves.

Hoisting machine and tackle used in the works, including their attachments, anchorage and supports shall be in perfect condition.

The Engineer-In charge / Employer reserves the right to instruct the Contractors to take additional safety precautions if found necessary. All workers shall be provided with helmet, Safety Shoes and Safety belts. SAFETY CODE FIRST AID At every work place, there shall be maintained in readily accessible place first aid appliance including supply of sterilized dressings and sterilized cotton wool. The appliance shall be kept in good condition, and in large work place, they shall be placed in charge of a reasonable person who shall be readily available during working hours. At large work places, where hospital facilities are not available within easy distance of the works, first aid posts shall be established and be run by a trained compounder. In every work place, there shall be provided and maintained at suitable places, easily accessible to labor sufficient cold water fit for drinking. SCAFFOLDS Suitable scaffolds shall be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration work which can be done safely from ladders. When a ladder is used, it shall be of rigid construction made either of good quality wood or steel. The steps shall have a minimum width of 450 mm and a maximum rise of 300 mm. Suitable hand holds of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper than ¼ to 1 (1/4 horizontal and 1 vertical).

1. Scaffolding or staging more than 4 m. above the ground floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly bolded, braced or otherwise secured, at least 1 m. above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

2. Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform, gangway or stairway is more than 4 m. above ground level or floor lever, they shall be closely boarded and shall have adequate width and be suitably fenced as described in (2) above.

3. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1 m. Wherever there are open excavations in ground, they shall be fenced off by suitable railing and danger signals to be installed at night so as to prevent persons slipping into the excavations.

4. Safe means of access shall be provided to all working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 m. in length while the width between side rails in rung ladder shall in no case, be less than 290 mm. for ladder up to and including 3 m. in length. For longer ladders this width shall be increased at least 20 mm for each additional meter of length.

5. A Sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineer obtained prior to construction.

OTHER SAFETY MEASURES

6. All personnel of the contractor working within the plant site shall be provided with safety helmets. All welders shall wear welding goggles while doing welding work and all metal workers shall be provided with safety gloves. Persons employed on metal cutting and grinding shall wear safety glasses.

7. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public.

PERSONAL SAFETY / PROTECTIVE EQUIPMENTS

Necessary personal safety equipment as considered adequate by the Engineer should available for the use of the person employed on the site and maintained in a n suitable for immediate use, and the contractor should take adequate steps to n proper use of equipment by those concerned.

a. Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.

b. Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes shall be provided with protective goggles.

c. Those engaged in welding works shall be provided with welder's protective eyesight lids.

d. Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

e. When workers are employed in sewers and manholes, which are in use, the contractor shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into manholes and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public.

f. The contractor shall not employ men below the age of 1 8 years and women on the work of painting with products containing lead or any toxic material in any form. Wherever men above the age of 18 are employed on the work of such painting, the following precautions should be taken:

i). No paint containing lead or lead products shall be used except in the form of paste or readymade paint. Paints like vinyl and epoxies having toxic fumes should be applied after following all precautions laid down by manufacturers.
ii) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

iii) Overalls shall be supplied by the contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.

8. When the work is done near any public place where there is risk of drowning all necessary Equipments should be provided and kept ready for use and all necessary steps taken for prompts rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

MAKE OF MATERIALS		
1	MCB, MCCB, RCCB.	LEGRAND, LARSEN TUBRO, HAGER.
2	Distribution Boards	LEGRAND, LARSEN TUBRO, HAGER.
3	UG Cables /Telephone cables	POLYCAB, RR CABLE, FINOLEX, HAVELLS
4	Copper Wires	POLYCAB, RR CABLE, FINOLEX, HAVELLS.
5	MS Conduit	BEC, BHARATH, AKG, BIMCO
6	PVC Conduit	AVON PLAST, ANCHOR, PRECISION.
7	Accessories for PVC Conduit	AVON PLAST, ANCHOR, PRECISION.
6	Switches / Sockets & Pop up Box.	LEGRAND – MYRIUS, HONEYWELL MK-BLENZE PLUS.
7	Fittings	PHILIPS,WIPRO, OSRAM.
8	Fans	Crompton/Usha/Orient
9	Cable Tray (GI)	CABLOFOIL, PROFAB, OBO,MK.
10	LEDS chip	Philips LUMILEDS, WIPRO, OSRAM
11	UPVC Race way	OBO, Legrand.
12	Cable Lugs , Glands	Comet, Simens, Dowells, Hex.
13	Network Cable with accessories	D Link, Molex, Digilink, Amp.
14	Sockets with accessories (Data, Telephone)	D Link, Molex, Digilink, Amp.
15	Krone Box with Connectors	Krone.
16	Network Rack	Netrack, Valrack
17	Patch panel, patch cord	D Link, Molex, Digilink, Amp, Comscope.
18	Telephone Instrument - Analog	Beetel, Panasonic
19	Telephone Instrument –Digital	(Make - Matrix)
20	ANY OTHER MATERIALS	Subjected to approval from Consultants / Clients

[A] CHECK LIST: Details of Enclosures.

Sl.No	Description of item	Enclosed Page. No
1.	Tender Document including Letter of Proforma A	
2.	Audited Balance Sheet and Profit & Loss statement for the past three financial years duly certified by a Chartered Accountant.	
3.	Solvency certificate by a Scheduled Bank	
4.	Certificates / Reports for: a) Firm / Company registration b) Completion certificates c) Performance Reports d) Solvency Certificate	
5.	Details of key technical and administrative personnel employed by the firm/ company.	
6.	Any other important information.	
7.	Have you enclosed the entire drawings placed in the website	
8.	Manufacturers Authorization letter	
9	Copy of UTR Number for EMD	

Date and Place:

SIGNATURE OF APPLICANT(S)

Note: Exceptions of the above, if any, shall be clearly mentioned with details by the tenderer for evaluation/consideration if any.Even though an applicant may satisfy the above requirements, he would be liable to disqualification if he has:

(a) Made misleading or false representation or deliberately suppressed the information in the forms, statements and enclosures required in the tender document.

(b) Record of poor performance such as, abandoning work, not properly completing thecontract, or financial failures / weaknesses etc.

ASSISTANT GENERAL MANAGER (Estate)
INDIAN BANK
CORPORATE OFFICE,
CHENNAI