Tender No. 17/S/HO/2013

The New India Assurance Co. Ltd.
(Redg. & Head Office)
New India Assurance Building, 87,
M.G. Road, Fort, Mumbai-400 001.

The New India Assurance Co. Ltd. invites Tenders in Two Bid Format (Technical & Price Bid) from Reputed Contractors for Renovation work (Modular Furniture & Electrical, etc) at 7th Floor, Head Office, New India Assurance Building, 87, M.G. Road, Fort, Mumbai-400 001.

Estimated Cost is Rs. 49 Lakhs Approx.
M/s Parelkar & Dallas are the Consulting Architect for this work. Their address is as under :

Mewdows House, 4th floor,
39, Nagindas Master Road,
Fort, Mumbai – 400 001.
Mob : 9821348450 Tele/Fax : 22654107
The blank tenders could be downloaded from our website or to be collected from Estate/Establishment department Head Office from during office hours (Monday to Friday 11 am to 4 pm, excluding Bank holidays) and pre-bid meeting will be held on 19th Nov. 2013 at 11.00 A.M. on 4th floor meeting room at Head Office.

Last date of submission of bids is 03rd December, 2013, before 11:00 A.M. at the following address :

Estate & Establishment Department,
6th Floor, The New India Assurance Co. Ltd.,
87, M.G. Road, Fort,
Mumbai- 400 001.

Chief Manager
Estate & Establishment Dept.
29th October, 2013.

Technical Bid

Tender Document For

"Proposed Refurbishing, Renovation and Electrical Work At 7th Floor"

For **New India Assurance,**

Fort, Mumbai – 400 001.

Architects

Parelkar & Dallas

Architects, Interior Designers & Valuers,
Medows House, 4th Floor, 39, Nagindas Master Road,
Fort, Mumbai - 400 001.
Tel.: 2265 4107, Fax: 2265 7192.
Email: parelkar.dallas@gmail.com

Tender Submitted By:

Name:

Address:

Signature:

Stamp:

SECTION – I – CONDITIONS OF CONTRACT

I N D E X

1. NOTICE INVITING TENDER

To

Sub : Proposed Refurbishing, Renovation and Electrical work at 7th floor for New India Assurance, Fort, Mumbai - 400 001.

Dear sir,

1.01 New India Assurance hereby invites you to tender on item rate basis for the **Proposed Refurbishing and Renovation work at 7th floor for New India Assurance, Fort, Mumbai - 400 001.**

1.02

The "**Tender documents**" for the above may be collected during office hours (Monday to Friday 11 am to 4 pm, excluding Bank holidays) at the address mentioned below OR can be down loaded from company website **http://newindia.co.in**
The cost of tender document is Rs.1000/-(non refundable) payable by cheque / Demand draft drawn in favour of The New India Assurance Co Ltd. In case the Tender document is downloaded from our website, the Tender shall be accompanied by a cheque / demand draft of a Nationalized / Scheduled Bank for Rs 1,000/- (non-refundable) drawn in favour of The New India Assurance Co. failing which the tender offer will be rejected.
Both these DDs / Cheques are to be given separately & NOT with the sealed Tender document.

Pre-bid meeting will be held on **19th November 2013 at 11-00 A.M. on 4th Floor, Meeting room**, **Head Office** for discussion and clarifications to all the intimated tenderer. The tenderers are requested to send their queries in writing 3 days prior to the Pre - Bid meeting at the above address.

1.03 Submission of Tender.

1.02 The Tenders are to be submitted in two separate envelopes, each sealed and clearly identified as to envelope number and contents as indicated below. The two envelopes shall be contained in a large envelope superscribed "Tender for the **Proposed Refurbishing, Renovation and Electrical work at 7th floor for New India Assurance, Fort, Mumbai - 400 001.**

1.04 The tender duly filled in, signed and sealed, should be addressed to the Estate & Establishment Department, 6th Floor, The New India Assurance Co. Ltd., 87, M. G. Road, Fort, Mumbai – 400 001. and should reach him **on 03rd December 2013 before 11.00 hours and will be opened on the same day at 15.00 hours** or as per the convenience of the New India Assurance officials.

1.05 Each Tenderer will be issued two sets (Two tender documents - Section - I & Section - II) of Conditions contract, Specification bill of quantities for preparation of this tender. Tenderers have to return both, the sets of Tenders issued to them while submitting their tender, duly stamped and signed as per instructions. One copy of Tender be stamped as Original and other as duplicate.

1.06 (i) **Envelope No. - 1,**
Envelope shall contain the following:

Earnest Money Deposit (EMD) of Rs. 45,000/-, in the form of the Demand Draft in favour of **New India Assurance-Mumbai**, Unqualified confirmation letter of acceptance of all Commercial and Technical conditions given in the Tender Form.

(ii) **Envelope No. - 2,**

1.03 Envelope No.2 shall contain the complete tender documents in envelopes indicating Section- I & II, (original and duplicate) including Bill of Quantities duly filled and signed on each page by the Tenderer. No Commercial or Technical conditions or qualification of any sort shall be indicated by the Tenderer in the ENVELOPE NO.2. Otherwise the tender shall be liable to be rejected. This envelope shall be superscribed- "ENVELOPE NO.2, TENDER FOR **PROPOSED REFURBISHING, RENOVATION AND ELECTRICAL WORK AT 7TH FLOOR FOR NEW INDIA ASSURANCE, FORT, MUMBAI - 400 001.**

1.07 Tenders received late on account of any reason shall be liable for rejection at the discretion of the Client.

1.08 The tenderer shall quote their item rates strictly in line with the tender stipulations as conditional tenders are liable for rejection.

1.09 The Tender shall be valid for a period of 120 days from the last date of submission of the tender.

l.l0 For any further information on this tender, you may contact the office of the Architect/ Consultant.

l.11 The Client shall not be bound to accept the lowest tender and reserves the right to reject any or all the Tenders without assigning any reason therefore.

Yours faithfully,

2. LETTER OF OFFER

To
The New India Assurance,
Fort, Mumbai – 400 001.

Sub : Proposed Refurbishing, Renovation and Electrical work at 7th floor for New India Assurance, Fort, Mumbai - 400 001.

Dear Sir,

With reference to the tender invited by you for the proposed refurbishing Work, having visited the site and got acquainted with all the site conditions and having examined the Conditions of Contract, Technical Specifications, Schedule of Quantities and other documents forming part of the tender documents, we offer to undertake and complete the works in conformity with the said drawings, conditions of contract, specification, schedule and bill of quantities and other documents as mentioned above for the sum stated in bill of quantities included in this Tender Document or such other sum as may be ascertained in accordance with the said conditions of contract by the Client. I/We undertake to complete the entire works comprised in the Contract within the time stated in the tender.

I/We agree to keep the offer open for a period of _____ days from the date fixed for receiving, the same may be further extended on request before the expiry of the stipulated period by _____ days.

Unless and until a formal agreement is prepared and executed, this tender together with your written acceptance thereof shall constitute a binding contract between us for the due performance of the Contract.

I/We understand that you are not bound to accept the lowest or any other tender you may receive.

I/We send you herewith tender duly filled and hereby agree to pay all charges of whatever nature connected with preparation, stamping and execution of the said contract.

I/We, enclose herewith Earnest Money of Rs. 45,000/- by Demand Draft in favour of New India Assurance, Mumbai, and I/we do hereby agree that this sum shall be forfeited in the event of my *I* our failing to execute the contract when called upon to do so by the Client on accepting my / our tender.

I/We, further agree to pay Initial Security Deposit (ISD) of Rs. 1,00,000/- (inclusive of Earnest Money of Rs. 45,000/-)\within 7 days if our tender is accepted.

I/We, further agree to the deduction of 10% (Ten Percent) from interim payments as Retention Money subject to a limit as specified in the Salient Features of the Contract.

I/We, agree not to employ 'Sub-Contractors' without obtaining specific written permission of the Client.

Date this day of 2013

Signature in the capacity as Partner/Proprietor / Director

Duly authorized to sign tenders for and on behalf of

Witness Address of

Name Tenderer

Occupation

Name of the Partners of the Firm of Directors

Names / of client in which the
Tenderers maintain Accounts.

3.00 Instructions to Tenderers

3.01 The brief description of work to be carried out and its scope are given in the "Conditions of Contract" of these documents.

3.02 The tenderer must obtain for himself on his own responsibility and at his own expenses all the information which may be necessary for the purpose of making a tender and for entering into a contract and must examine the drawings and must inspect the site of the work and acquaint himself with all the information about all the local conditions, means of access to the work, nature of the work and all matters pertaining thereto.

3.03 Access to the Site will be given during the Tender period by appointment. The tenderer shall ascertain the location, size and condition of the areas available for his use as working areas and all other information affecting this Tender.

3.04 The Client will not be responsible and will not reimburse any expenses which may be incurred, or losses to person or property suffered by any Tenderer in connection with his visits for an examination of the site and in the preparation of his tender for submission.

3.05 The tenderers shall note that information, if any, as regards the site and local conditions as contained in these tender documents has been given merely to assist the tenderers and is not deemed to be complete or exhaustive.

3.06 The tenderers shall bear in mind that the Client shall bear no responsibility for the lack of acquaintance of the site and other conditions or any information relating thereto, on their part. The consequences of the lack of any knowledge, as aforesaid on the part of the tenderers shall be at their risk and cost and no changes or claims whatsoever consequent upon the lack of any information, knowledge or understanding shall be entertained or payable by the Client either during tender stage or during the construction period.

3.07 The Tenderers shall before tendering carefully examine the Tender Documents including these Instructions to Tenderers, Conditions of Contract, Appendix, Articles of Agreement, Specifications, Bill of Quantities, and Drawings and other matters referred to therein, the Schedules and the Bill of Quantities, and if there should be or appear to be any ambiguity in / or discrepancy between any of these documents or between figured and measured dimensions and other aspects upon the Drawings, he shall immediately refer the matter to the Architect/ Consultant for clarification, before the pre-bid meeting.

3.08 Conditional tender, if any, may be liable for rejection at the discretion of the Client.

3.09 Filling the tender forms :

3.09.1 The tenderer must use only the forms issued by the Client to fill the rates.

3.09.2 Each page of the tender documents should be signed by the person or persons submitting the tender in token of his/their having acquainted himself/themselves with the Conditions of Contract, Specifications, Special Conditions, etc., as laid down. Any tender with any of the documents not signed shall be liable for rejection.

3.09.3 The tender submitted on behalf of a company should be accompanied by certified copy of Board Resolution authorising the personals to sign on behalf of the company. In case of a firm, the tender shall be signed by all the partners of the firm or by a person who has the necessary authority on behalf of the firm to enter into the proposed contract. Otherwise, the tender may be rejected by the Client.

3.09.4 Tender shall contain full address, Telephone Nos., Fax No., Email address for serving notices/ addendum's required to be served to the Tenderer in connection with the Tender.

3.09.5 The tender Form and the documents attached to it shall not be detached one from the other, and no alteration or mutilation (other than filling in all the blank spaces) shall be made in any of the documents attached hereto.

3.09.6 Rates should be quoted both in figures and words in columns specified. All erasures and alterations made while filling the tender must be attested by the initials of the contractor.

3.09.7 Overwriting of figures is not permitted and failure to comply with either of these conditions will render the tender void at the Client's option. No advice of any change in rate or conditions after opening of the tender will be entertained. In case of discrepancy in rate the original tender shall be taken as correct and binding.

3.09.8 All documents of the tender are to be read in conjunction with each other and rates quoted by the tenderer shall take this aspect into consideration.

3.09.9 The Tender shall include the following information and documents:

a) A construction programme showing the tenderer's proposed sequence of operation together with the estimated time for major activities.

a) Full details of any special methodology or technique the tenderer proposes to use for the construction or for any other purpose.

b) The Tenderer's proposals for supervising the work, including the CV's of the various grades of technical & supervisory personnel/other staff proposed to be deployed during the construction period.

c) Schedules of labour requirements showing category-wise breakup of the labour force, for each month of construction period.

d) Proposal for major construction facilities to be erected on the site including workshops, offices, storage areas and testing laboratories.

e) List of proposed sub-contractors/associates, if any, along with their credentials in respect of the trades of works together with their address.

f) Information regarding any changes from the previous submission made by the Tenderer for prequalification in respect of following aspects.

- Details of business & technical organization.
- Experience
- Financial resources

h) True copy of latest Income Tax & Sales Tax Clearance Certificates & license under Labour Regulations issued by the competent authorities in favour of the Tenderer.

i) The Tenderer shall attach to his tender a copy, duly authenticated by a notary, of the documents containing the constitution of the consortium, company or firm, by which the tender is submitted, so as to indicate the name of the person/s and the manner in which the contract may be entered into by the consortium, company or firm and names of the person/s who would be directly responsible for the due performance of the Contract and can give valid receipt of payment on behalf of the consortium, company or firm.

j) List of all the works in hand at the time of tendering along with the tendered cost, agreed completion date and percentage progress achieved for each of the said works.

k) List of the equipments, form work and staging to be erected/installed/deployed at the site for timely completion of the works.

The information in the following manner must be submitted in envelop no 1
(Technical Bid) with necessary document

ANNEXURE

Technical Qualification Best on following Criteria — Marks rounded of to 60

Academic Qualification of bidder				Marks out of 10
1				

Sr.	Academic Qualification of staff	Experience in your firm	Post	Marks out of 5
1				
2				
3				
4				

Financial Capabilities Last three years audited statement of Accounts by C. A. from FY 2010-11 giving following details					Marks out of 20 (5 each)
Sr.	Details	FY 2010-2011	FY 2011-2012	FY 2012-20-13	
i.	Annual Turnover				
	Net Profit				
ii	Cash and bank balance including (FDR) Confirmation certificate from Bank is required to be produced				
iii	Fixed Assets / Investments as at 31-3-2013				
	Capital Accounts Balance as at 31-3-2013				
iv	Any Special award or recognition / certificate from PSU / Govt. Bodies / Training institutions				

- List of Major works in last 3 years

Sr.	Work Details	Name of Client	Amount	Contact Person Nos.	Marks out of 10
1)					
2)					
3)					
4)					

- List of Satisfactory Works Carried out with New India Assurance

Sr.	Work Details	Amount	Marks out of 5
1)			
2)			
3)			

- Details of similar works completed in last 5 years

Sr. No.	Name of the organization with postal address	Name & designation of contact person & contact nos.	Nature of work & amount	Year	Whether any penalty was imposed	Marks out of 5
1)						
2)						
3)						

	Establishment			Marks out of 5
	Infrastructure / Machinery Details / Establishment in Mumbai			
	Mention the 3 site details around Mumbai for selection committee to visit & examine the quality of your similar works.			
Sr. No.	Name of Site	Name of Client	Contact Person & Nos.	Marks out of 20
1)				
2)				
3)				

3.09.10 Experience of having successfully completed similar works during last 7 years period 2006 April to 2013 March.

i) Three similar completed works costing not less than the amount equal to 40% of the estimated cost.

Or

ii) Two similar completed works costing not less than the amount equal to 50% of the estimated cost.

Or

iii) One similar completed work costing not less than the amount equal to 80% of the estimated cost.

Please attach the necessary documentary evidence.

N.B : Any contractor who has been awarded interior refurbishing work for area exceeding 4000 sq. ft. for commercial premises in New India Assurance & which is an ongoing project as on tender submission date, shall not be eligible to apply.

TECHNICAL BID

1.	Earnest Money Deposit (EMD)	Demand Draft No. _____ dated for Rs. _____ drawn on (Name of the Bank) _____ in favour of New India Assurance payable at Mumbai (To be enclosed with Technical Bid).
INDIVIDUAL / FIRM / COMPANY PROFILE		
Sr. No.	Required Information	
1	Name and registered address of the Individual/ firm/company.	
2	Legal status (Individual / proprietor, partnership firm, limited company, corporation, cooperative society, etc. (Attach a self attested copy of the certificate of incorporation / registration / copy of Partnership deed in case of company / corporation / cooperative society / partnership firm and any certificate issued by any statutory authority in case of Proprietor.)	
3	Name, designation, and telephone nos. of the contact person / persons. Fax No. E-mail id	
4	Month and Year of commencement of service business & whether existing as on date.	
5	Statutory details **(Photocopies to be attached)** • Registration number of the firm. (As per Shop and Establishment act.) • Registration number under the Contract Labour Act. State / Central • Registration number under Labour Welfare Act. • PAN No. • RPFC - Registration number • ESI – Registration number • VAT – Registration number • Service Tax – Registration number.	
5A	Income Tax Acknowledgement for the last 3 years commencing from A.Y. 2010- 2011 along with gross taxable income declared in income tax returns.	A.Y. Gross Income **2010-2011** **2011-2012** **2012-2013**
6	Existing manpower with the Agency & deployed in such services & whether existing as on date.	
7	List of present and past clients as per the following format. The information provided will facilitate evaluation of your Technical Bid.	

Sr. No.	**Name of the organization with complete postal address mentioning Private Sector/ Govt. Body / PSU / Training Institute.**	**Name and designation of the contact person with Tel. / Mobile No (s)**	**Period for which the contract was awarded**	**No. of persons deployed by your firm / company / cooperative society.**	

Commercial Qualification **Marks out of 40**

Rates Quoted by the Bidder			
1st Lowest	2nd Lowest	3rd Lowest	4th Lowest
40/40	30/40	20/40	10/40

Selection	**Marks out of 100**	**Total**
Technical Qualification	Marks obtained out of 60	
Commercial Qualification	Marks obtained out of 40	
Grand Total	Marks obtained out of 100	

3.10 The tender which is not accompanied by a sum of Rs. 45,000/- as Earnest Money Deposit (EMD) in the form of Demand Draft drawn in favour of **New India Assurance, Mumbai**, is liable for rejection. In the event of the Tenderer withdrawing his Tender, before the expiry of _____ days from the date fixed for receiving the Tender or such other extended dates as determined, the Earnest Money will be forfeited, and on the understanding also that if the Tender is accepted, the EMD shall be converted into Initial Security Deposit. The Earnest Money Deposit will be returned to the unsuccessful Tenderers within one month after the date of issue of work order to the successful tenderer or at such date as may have been requested by the Client and accepted by the Tenderer. In case. the Successful Tenderer fails to commence in due time the work awarded to him, the Earnest Money Deposit (EMD) shall be forfeited by the Client.

3.11 The Tenderer (whether or not he submits a tender) shall treat the details of the documents as secret and confidential.

3.12 The Client does not bind himself to accept, the lowest or any tender and reserves the right to accept or reject any or all the tenders, either in whole or in part, without assigning any reasons for doing so. The Client also has the right to re-invite the tender at his sole discretion.

3.13 Time is the essence of the contract and the works must be completed within the time schedule as indicated in Appendix.

3.14 The Contractor must obtain for himself on his own responsibility for taking all relevant permissions from B.M.C. (Mumbai Municipal Corporation), Heritage Committee or any other STATUTORY AUTHORITY at his own expenses. Also all the information which may be necessary for the purpose

of completing a tender and for entering into a contract and must examine the drawings and must consider and inspect the site of work and acquaint himself with all local condition, means of access to the work nature of the work and all matters appertaining thereto. No allowance shall be made tohim for lack of full knowledge of the conditions.

ITEM NO. 3.14 ABOVE MEANS THAT LIAISONING WORK AT CONTRACTOR'S COST FOR TAKING NECESSARY PERMISSION FROM :

a) Asst. Engineer (Bldg. & factories) B.N.C. regarding civil work with addition & alterations. So also furniture work.

b) B.M.C. Ward Hydraulic Department, Water & Sanitary works.

c) B.M.C. Ward Malaria Department for erection of Sintex water tank.

d) Higher capacity meter from B.E.S.T. also carrying out other formalities.

e) Other (Heritage Committee) local authorities.

f) Stability certificate from structural Engineer.

PLEASE ALSO NOTE THAT NO EXTRA ALLOWANCE SHALL BE MADE TO THE CONTRACTOR FOR LACK OF FULL KNOWLEDGE OF THE CONDITIONS. ONLY OFFICIAL RECEIPT PAYMENTS WILL BE MAE BYTHE ORIENTAL INSURANCE CO. LTD. ALSO WIRTTEN PERMISSIONS ARE REQUIRED BEFORE COMMENCEMENT OF THE WORK.

4.00 CONDITIONS OF CONTRACT

INDEX

4.00 Conditions of Contract

4.01 Interpretations and Definitions

In construing these conditions, the Specifications, Bill of quantities and Contract Agreement etc. the following words shall have the meaning herein assigned to them except where the subject or context otherwise requires.

4.01.1 **'Client' / 'Owner'** 'shall mean: New India Assurance with its office address as the New India Assurance and includes the Client's authorised representatives, successors and assigns.

4.01.2 **'Architect'** means Parelkar & Dallas, Medows House, 4th Floor, 39, N. M. Road, Fort, Mumbai – 400001, and their authorised nominees and representatives or such other firms/persons, as shall be nominated by the Client.

4.01.3 **'Engineer'** means 'Project Management Consultant' (PMC) and shall mean _____ or any other Engineer or Consultant appointed by the New India Assurance for the Project Management.

4.01.4 **'Contractor'** shall mean the successful Tenderer whose tender is accepted

i) In the case of partnership firm partners _____ and _____trading as partners in the name and style of and having a place of business at and shall include the partners for the time being of the said firm and the legal representatives of a deceased partner.

ii) In the case of individual Contractor:- Shri _____ trading _____ and shall include his heirs, success and legal successors and legal representatives.

iii) In the case of Company :- _____ a company incorporated under _____ 20 __ and having its registered office at _____ and office at _____ and shall include its successors and assignees.

4.01.5 **"Site"** shall mean the site of the contract works including any building and erections thereon and any other land as aforesaid allotted by the Client for the Contractor's use.

4.01.6 **"Contract"** document shall include the following documents, all duly signed by the contractor.

(i) Notice Inviting Tender
(ii) Letter of offer
(iii) Instructions to tenderer.
(iv) Conditions of Contract and Salient Features of Tender/Contract
(v) Articles of agreement
(vi) Technical specifications
(vii) Bill of quantities
(viii) Drawings
(ix) Clarifications/conditions accepted after the prebid meeting
Letter of acceptance of tender/award of work
(x) Relevant correspondence exchanged from receipt of tender to award of work till the final agreement is executed.

4.01.7 **"Notice in writing"** or "written notice" shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered/ speed post or by courier to the last known private or business address or registered office of the addressee and shall be deemed to have been received.

4.01.8 **"Act of Insolvency"** shall mean any Act of Insolvency as defined by the Presidency Towns insolvency Act, or the Provincial Insolvency Act or any Act amending such original.

4.01.9 **"Net Prices"** :- If in arriving at the contract amount, the Contractor shall have added to or deducted from the total amount of the items in the Tender any sum, either as a percentage or otherwise, then the net 'price of any item in the tender shall be the sum arrived at by adding to or deducting from the actual figure appearing in the Tender as the price of that item and similar percentage or proportionate sum provided always that in determining the percentage or proportion of the sum so added or deducted by the Contractor, the total amount of any Prime Cost items and provisional sums of money shall be deducted from the total amount of the tender. The expression "net rates" or "net prices" when used with reference to the contract or accounts shall be held to mean rates or prices so arrived at.

4.01.10 **"Works"** means the permanent works described in the "Scope of Work" and/or to be executed in accordance with the Contract and includes materials, apparatus, equipments, temporary supports, fittings, and things of all kinds to be provided, the obligations of the Contractor hereunder and work to be done by the Contractor under the contract.

4.01.11 **"Drawings"** means the drawings prepared by the Architect/ Consultant and issued and referred to in the Specifications and any modification of such drawings and such other drawings as may be issued from time to time.

4.01.12 **"Bill of Quantities"** means the Schedule of Quantities of items, materials & rates, summaries, etc., as finally accepted.

4.01.13 **"Specification"** means the specifications given in these documents including relevant Indian standard specification where so required and where such a specification is not available, the specification approved by the Architect/Consultant.

4.01.14 **"Temporary Works"** means all temporary works of every kind required in or about the execution, completion or maintenance of the works.

4.01.15 **"Materials"** means the materials, apparatus, equipments, fittings, fixtures and all such other material which are incorporated in the 'work".

4.01.16 **"Virtual Completion of the Works"** means the completion of the whole of the works substantially in all respects as evidenced by issuance of a Certificate of Completion by the Architect/ Consultant in consultation with the Client.

4.01.17 **"Period of Maintenance/Defect Liability Period"** shall mean the period 12 months (excluding communication period of 15 days) calculate from the date of virtual completion of the works as certified by the Architect/Consultant.

4.01.18 **"Urgent Works"** means any urgent works, which in the opinion of the Architect/ Consultant/Client becomes necessary at the time of execution and/or during the progress of work to obviate any risk of accident or failure or to obviate any risk of damage to the structure or services or required to accelerate the progress of work for which becomes necessary for safety & security or for any other reason, the Architect/Consultant/Client may find it necessary.

4.01.19 **"Market Rate"** means the rate as decided by the Architect/Consultant/Client on the basis of cost of materials, labours and other inputs at site inclusive of any tax, duty, octroi etc. at the time of execution of work.

4.01.20 **"Approved"** means approved in writing, "Approval" means approval in writing.

4.01.21 **"Month"** means calendar month.

4.01.22 **"Week"** means seven consecutive calendar days.

4.01.23 **"Day"** means a calendar day beginning and ending at 00 Hours and 24 hours respectively.

4.01.24 **"Contract Value"** means the total value of the tender as accepted by the Client.

4.01.25 **"Marginal Note/Heading/Catch Lines"**

The Marginal Notes, Headings and catch lines hereto and in the annexure hereto are meant only for convenience of reference and shall not in any way be taken into account in the interpretation of these presents and the annexure hereto.

4.01.26 Words imparting the singular only also include the plural and vice versa where the context requires.

4.02 Scope of Work in Details

4.02.1 Location of Site

The site is located at Fort, Mumbai.

4.02.2 The scope of the work is the construction of **proposed Refurbishing, Renovation and Electrical work at 7th floor for New India Assurance, Fort, Mumbai - 400 001** as detailed in the Drawings, Specifications and Bill of Quantities of this tender.

4.03 Contractor's General Obligations

4.03.1 **Language(s)** The language in which the Contract documents shall be drawn up shall be English only.

4.03.2 **Errors, Omissions and Discrepancies**

i) In case of errors, omissions and/or disagreement between written and scaled dimensions on the drawings or between the drawings and specifications etc., the following order of precedence shall apply:

- Between scaled and written dimension (or description) on drawing, the latter shall be adopted.
- Between the written description of the item in the specifications and descriptions in the Bill of Quantities of the same item, the later shall be adopted.

ii) In all cases of omissions and/or doubts or discrepancies if any of the items or specifications, a reference shall be made to the Architect/Consultant whose elucidation, elaboration or decision shall be considered as authentic. The Contractor shall be held responsible for any error that may occur in the work through lack of such reference and precaution.

4.03.3 **Fossils, etc.**

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site of the Works shall be deemed to be the absolute property of the Client, and the Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall immediately upon discovery thereof and before removal acquaint the Architect/Consultant's representative of such discovery and carry out at the expense of the Client and the instructions of Architects/Consultant representative's to the disposal, or otherwise, of the same.

4.03.4 **Safety of neighboring properties and interference with traffic etc .**

The Contractor shall provide and erect to the approval of the Architect/ Consultant such supports as may be required to protect efficiently all structures and protective guards to trees which may be endangered by the execution of the works or otherwise take such permanent measures as may be required to protect the structures and trees. All operations necessary for the execution of the Works and for construction of any Temporary Works shall so far as in compliance with the requirements of the Contract permits be carried on so as not to interfere unnecessarily or improperly with the public convenience or the access to use and occupation of public or private roads and footpaths or of

properties whether in the possession of the Client or of any other person and the Contractor shall save harmless and indemnify the Client in respect of all claims, demands, proceedings, damages, costs, charges and expense whatsoever arising out of or in relation to any such matters in so far as the Contractor is responsible therefore.

4.03.5 **Work During Night or on Holidays**

Subject to any provision to the contrary contained in the Contract none of the permanent work shall save as herein provided be carried on during the night or on Holidays without the permission in writing of the Architect/Consultant, save when the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works in which case the Contractor shall immediately advise the Architect/Consultant. Provided always that the provisions of this clause shall not be applicable in the case of any work which becomes essential to carry out by rotation or double shifts in order to achieve the progress & quality of the part of the works being technically required continued with the prior approval of the Consultant.

4.03.6 **Watching & Lighting**

The Contractor shall in connection with the Works provide and maintain at his own cost adequate lights, guards, fencing, warning signs and watch & ward staff when and where necessary or as directed by the Architect/Consultant or as directed by duly constituted authority for the protection of the works or for the safety and convenience of the public or others.

All work at night shall be carried out without unreasonable noise and disturbance and with the approval of the Architect/Consultant and in addition that of the local authority, if so applicable. The Contractor shall indemnify the Client from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims, demands, proceedings, costs, charges and expenses whatsoever in regard or in relation to such liability.

4.03.7 (i) **Access for Inspection**

The Client/ Architect/ Consultant and their respective representatives shall at all reasonable times have free access to the work and/or to the workshops, factories or other places where materials are laying or from which they are being obtained and the Contractor shall give to the Client, the Architect, the Consultant and their representatives every facility necessary for checking measurements, inspection and examination and test of the materials and workmanship. Personals not authorized by the Client or Architect or Consultant except the representatives of public authorities shall not be allowed on the works at any time.

(ii) **Examination of Work Before Covering up**

No work shall be covered up or put out of view without the approval of the Architect/Consultant and the Contractor shall afford full opportunity for the Architect/Consultant to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the Architect/ Consultant of any such work or foundations is or are ready or about to be ready for examination and the Architect/Consultant shall without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or for examining such foundations.

(iii) **Uncovering and making openings**

The Contractor shall uncover any part or parts of the Works or make opening in or through the same as the Consultant may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of the Architect/Consultant. If any such part or parts have been covered up or put out of view after compliance with the requirements of sub-clause (i) of this Clause and are found to be executed in accordance with the contract the expenses of uncovering, making openings in or through reinstating and making good the same shall be borne by the Client but in

any other case all such expenses shall be borne by the Contractor and shall be recoverable from him by the Client or may be deducted by the Client from any monies due or which may become due to the Contractor.

4.03.8 **Festivals & Religious Customs**

The Contractor and sub-contractor's agents and employees shall in all their dealings with their workmen and labourers for the time being employed on or in connection with the works have due regard to all recognized festivals and religious and other customs.

4.03.9 **Epidemics**

In the event of any outbreak of illness of an epidemic nature the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of overcoming the same.

4.03.10 **Contractor to Co-operate with Other Contractors.**

The Contractor must co-operate with the other contractors appointed by the Client/Architect/ Consultant so that the work shall proceed smoothly to the satisfaction of the Architect/Consultant.

4.03.11 **Space for the Contractor**

The space to the extent available, at the discretion of the Architect/Consultant, from the said plot will be allocated to the contractor for his stores, offices, erection of plants, workshops etc. Any additional area including area for labour camp etc. shall be arranged by the contractor at his own cost. The Client neither undertakes any responsibility for providing an area more than the above nor will entertain any claim/reimbursement etc. towards arrangement of additional area/land etc. by the contractor.

The Contractor is responsible for obtaining all statutory approval for construction of his all temporary structures in every respect including payment. The Client will only assist the Contractor in obtaining land and approval for providing structures by signing the relevant papers.

4.03.12**Permission to enter the Site**

Save in so far as the Contract may prescribe the extent of portions of the Site of which the Contractor is to be given permission from time to time and the order in which such portions shall be made available to him and subject to any requirement in the Contract as to the order in which the works shall be executed, the Client will within 10 days from the Architect/Consultant's written order to commence the Works given to the Contractor time bound permission to enter the Site as may be required to enable the Contractor to commence and proceed with the programme of work and otherwise in accordance with such reasonable, proposals of the contractor as he shall, by notice in writing to the Architect/Consultant, make and will from time to time as the Works proceed give to the Contractor permission of such further portions of the Site as may be required to enable the Contractor to proceed with the construction of the Works with due dispatch in accordance with the said programme or proposals (as the case may be).

If the Contractor suffers delay or incurs expense from failure on the part of the Client to give permission in accordance with the terms of this clause the Architect/Consultant all grant an extension of time for the completion of the works without any compensation for delay.

4.03.13 **Dimensions and Level**

All dimensions and levels shown on the Drawings shall be verified by the Contractor on the Site and he will be held responsible for the accuracy and maintenance of all the dimensions and the levels.

Figured dimensions are in all cases to be accepted and no dimension shall be scaled. Large-scale details shall take precedence over small-scale drawings. In case of discrepancy the Contractor shall ask for clarification from the Architect/Consultant before proceeding with the work.

4.03.14 **Notice of Operation**

The Contractor shall not carry out any important operation without the consent in writing of the Architect/Consultant/Client.

4.03.15 **Site Meetings**

Progress and quality evaluation meetings will be held at the site every 15 days. The Contractors senior representative in charge of the project along with his site-in-charge and other staff including staff of approved subcontractors and suppliers as required shall participate in these progress review meetings and ensure all follow up actions. Any additional review meetings shall be held if required, as decided by the Architect/Consultant which also shall be attended by the above referred representatives.

4.03.16 **Disposal of Refuse etc**

The Contractor shall cart away from site and deposit where directed by the Client/Architect Consultant all refuse, etc. arising from the Works both as it accumulates at completion of the Works or at the direction of the Architect/Consultant.

It is the responsibility of the Contractor to obtain a certificate from the local authorities concerned to the effect that all rubbish arising out of Contractor's activities at the construction site or any other offsite activities borrow pits and/or disposal area(s) has been properly disposed off. This certificate from the authority shall be dated not later than the (last) Certificate of Completion of Works and is to be enclosed with the Payment Certificate in which the Contractor requests for payment of any Retention money due to him.

4.03.17 **Letter of Intent / Award of Work**

Before signing of the Contract, the Client shall issue by registered post/speed post or by otherwise depositing at the registered office of the Contractor, Letter of Intent /Award to enter into a Contract with the Contractor for the execution of the works in accordance with the contract. Until a formal contract agreement is prepared and executed, the tender documents i.e. Section I & II, and set of drawings together with the relevant correspondence exchanged from receipt of the tender to acceptance and together with the Client's letter of Acceptance/Award shall constitute a binding contract between the parties.

4.03.18 **Contract Agreement**

On receipt of intimation from the Client of the acceptance of his/their tender, the successful tenderer shall be bound to implement the contract and within fourteen days thereof, the successful tenderer shall sign an agreement in accordance with the draft agreement.

4.03.19 **Work by Other Agencies**

The Client /Architect/Consultant reserves the right to use premises and any portions of the site for the execution of any work not included in this contract which it may desire to have carried out by other persons simultaneously, and the Contractor shall allow all reasonable facilities for the execution of such work, but shall not be required to provide any plant or material for the execution of such work except by special arrangement with the Client. Such work shall be carried out in such manner as not to impede the progress of the works included in the Contract and the Contractor shall not be responsible for any damage or delay which may happen to or occasioned by such work

4.03.20 **Contractor to Search**

The Contractor shall, if required by the Architect/Consultant in writing, search, test as shall be necessary to determine the cause of any defect, imperfection or fault under the directions of the Architect/Consultant. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the contract the cost of the work carried out by the Contractor in searching's as aforesaid shall be borne by the Client. But if such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of the contract.

4.03.21 **Setting Out**

The Contractor shall set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof If at any time any error in this respect shall appear during the progress of the works or within the defects liability period the Contractor shall, if so required, at his own expense rectify such error to the satisfaction of the Client/Architect/Consultant.

4.03.22 **Obtaining Information Related to Execution of Work**

No claim by the contractor for additional payment will be entertained which is consequent upon failure on his part to obtain correct information as to any matter affecting the execution of the works, nor will any misunderstandings or the obtaining of incorrect information or the failure to obtain correct information relieve him from any risks or from the entire responsibility for the fulfillment of the contract.

4.03.23 **Contractor to Keep Site Clear**

(i) During the progress of the works the Contractor shall keep the site reasonably free from all unnecessary obstruction and shall store or dispose of any constructional plant and surplus materials and clear away and remove from the site any wreckage, rubbish or temporary works which are no longer required

(ii) **Clearance of Site on Completion**

On the completion of the Works the Contractor 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 works clean and in a workmanlike condition to the full satisfaction of the Client/Architect/Consultant / local authorities not later than 30 days from the virtual completion of the works or by such other later date as fixed by the Client/Architect/Consultant.

4.03.24 **Urgent Repairs**

If by reason of any accident or failure or other event occurring to or in connection with the Works, or any part thereof, either during the execution of the Works or during the Period of Defect Liability/ Maintenance any remedial or other work or repair shall, in the opinion of the Client/Architect/ Consultant their representative be urgently necessary for security and safety of life or for the works or of adjoining property, and the Contractor is unable or unwilling at once to do such work or repair, the Client may employ his own or other workmen do such work or repair, as Client/Architect/ Consultant or their representative may consider necessary. If the work or repair so done by the Client which in the opinion of Client/Architect/Consultant, the Contractor was liable to do at his own expense under the Contract, all costs and charges incurred by the Client shall be deducted by the Client from any payment due or which may become due to the Contractor. Provided always that the Architect/ Consultant or their representative (as the case may be) shall, as soon after the occurrence of any such emergency, as may be reasonably practicable notify, the Contractor thereof in writing.

4.03.25 **Claims**

The Contractor shall send to the Architect/Consultant once in every two months an account giving particulars as complete and fully detailed as required of all claims for any additional expenses to

which the Contractor may consider himself entitled and of all extra or additional/substituted work ordered by the Client/Architects/ Consultant which he has executed during the preceding month subject to provisions under relevant clauses of contract hereof, and no claim for payment for any such work will be considered which has not been included in such particulars. Provided always that the Architect/Consultant shall be entitled to authorise payment to be made for any such work notwithstanding the Contractor's failure to comply with this condition, if the Contractor has, at the earliest practicable opportunity notified the Architect/Consultant in writing that he intends to make a claim for such work and thereafter send complete and detailed particulars of the claim to the Architect/Consultant as directed by the Architect/Consultant but not later than 10 days from the date of notification of his claim.

4.03.26 i) **Labour Laws**

The Contractor shall observe and strictly adhere to all prevailing labour laws inclusive of Contract Labour (Regulation and Abolition) act of 1970 (latest revision) and other safety regulations.

i) Fair Wages

The Contractor shall in respect of all persons employed by him in factories, workshops or other places occupied or used by him for the execution of the Contract including the Works, pay rates or wages, emoluments and expenses and observe hours and conditions of labour not less favourable than those established for the trade or industry in the district where the work is carried out to which the organizations of Clients and trade unions representatives or a substantial proportions of the Clients and workers engaged in the trade or industry in the district are affiliated. In the absence of such established rates and conditions the Contractor shall pay rates or wages and observe hours and conditions of labour which are not less favourable than the general level of wages, hours and conditions observed in the trades or industries similar to those in which the Contractor is engaged.

The Contractor shall comply with the provision of all labour legislation including the latest requirements of all the Acts, Laws, any Regulation or Bylaws or any local or other statutory Authority applicable in relation to the execution of works, such as :

a) Minimum wages Act, 1948 (Amended)
b) Payment of Wages Act, 1936 (Amended)
c) Workmen's Compensation Act, 1923 (Amended Act No 65 of 1976)
d) Contract Labour Regulation & Abolition Act, 1970 and Central Rules 1971 (Amended)
e) Apprentices Act 1962
f) Any other Act or enactment relating thereto and rules framed there under from time to time
g) Industrial Employment (standing order) Act, 1946 (Amended)
h) Personal Injuries (Compensation Insurance) Act, 1963 and any modifications thereof & rule made there under form time to time.
i) Employees' Provident Fund & Miscellaneous Provisions Act, 1952 and amendment thereof.

(iii) **Workmen's Compensation**

If, for any reason, the Client is obliged, by virtue of the provisions of the workmen's Compensation Act, 1923, or any statutory modification or reenactment thereof to pay compensation to a workman employed by the Contractor in execution of the works, the Client shall be entitled to recover from the Contractor the amount of compensation so paid and without prejudice to the rights of the Client under the said Act. The Client shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by the Client to the Contractor under this Contract or otherwise. The Client shall not be bound to contest any claim made against it under the said Act, except on the written request of the contractor and upon his giving to the Client full security to the satisfaction of the Client for all costs for which the Client might become liable in consequence of contesting such claim.

(iv) **Observance by Sub-Contractors**

The Contractor shall be responsible for the observance by sub-contractors employed by him in the execution of this Contract of the provisions hereof and applicable laws, rules and regulations.

4.03.27 **Safety Code and Insurance**

a. **Safety of Site Operations**

The Contractor shall take full responsibility for the safety, stability and adequacy of all site operations and methods of construction including all temporary works, provided that the Contractor shall not be responsible, except as may be expressly provided in the Contract, for the design or specification of the permanent works.

(i) First aid appliances including adequate supply of sterilized dressings and cotton wool shall be kept in a readily accessible place.

(ii) An injured person shall be taken to a public hospital without loss of time, in cases where the injury necessitates hospitalization.

(iii) Suitable and strong scaffolds should be provided for workmen for all works that cannot safely by done from ground.

(iv) No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30 cm. (clear) and the distance between two adjacent rungs shall not be more than 30 cm. When a ladder is used an extra mazdoor shall be engaged for holding the ladder.

(v) The excavated material shall not be placed within 1.5 meters of the edge of the trench or half of the depth of trench whichever is more. All trenches and excavations shall be provided with necessary fencing and lighting.

(vi) 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 fencing or railing whose minimum height shall be one meter.

(vii) No floor, roof or other part of the structure shall be so overloaded with debris or materials as to render it unsafe.

(viii) Workers employed on mixing and handling material such as asphalt, cement mortar or concrete and lime mortar shall be provided with protective footwear and rubber hand – gloves.

(ix) Those engaged in welding works shall be provided with welder's protective eye-shields and gloves.

(x) (i) No paint containing lead or lead products shall be used except in the form of past or readymade paint.

(ii) Suitable facemasks should be supplied for use by the workers when the paint is applied in the form of spray or surface having lead paint dry rubbed and scrapped.

(xi) Overalls shall be supplied by the Contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during the periods of cessation of work.

(xii) Hoisting machines and tackle used in the works, including their attachments, anchorage and support shall be in perfect condition.

(xiii) The ropes used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from defects.

b. **Insurance Policies**

Accidents

The Contractor shall immediately on occurrence of any accident at or about the Site or in connection with the execution of the work report such accident to the Client/Architect/Consultant's representative. The Contractor shall also report such accident immediately to the competent authority whenever such report is required to be lodged by law & take appropriate actions thereof

The Contractor shall be responsible for all injury or damage to persons, animals or things and for all

damage to property which may arise from any factor / omission on the part of the Contractor or any Sub-Contractor or any nominated Sub-Contractor or any of their employees. The liability under this clause shall cover also, interalia any damage to structures, whether immediately adjacent to the works or otherwise, any damage to roads, streets, footpaths, bridges as well as damage caused to the building and other structures and works forming the subject matter of this contract. The Contractor shall also be responsible for any damage caused to the buildings and other structures and works forming the subject matter of this contract due to rain, wind, fire, flood or high tide or other inclemency of weather.

The Contractor shall indemnify and keep indemnified the Client and hold him harmless in respect of all and any loss and expenses arising from any such injury or damage to persons or property as aforesaid and also against any claim made in respect of injury or damage, whether under any statute or otherwise and also in respect of any award or compensation or damage consequent upon such claims. The Contractor shall, at his own expense, effect and maintain till issue of the virtual completion certificate under this contract, with an insurance company approved by the Client/ Architect, an All Risks Policy for Insurance for the full amount of the contract including earthquake risk in the joint names of the Client and the Contractor (the name of the former being placed first in the policy) against all risk as per the standard all risk policy for Contractors and deposit such policy or policies with the Client before commencing the works.

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

The Contractor shall also indemnify and keep indemnified the Client against all claims which may be made against the Client by any person in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own expense, effect and maintain until the virtual completion of the contract, with an Insurance Company approved by the Client a third party insurance policy in the joint names of the Client and the contractor (name of the former being placed first in the policy) against such risks and deposit such policy or policies before commencement of the works. The minimum limit of the coverage under the policy shall be Rs. 10,00,000/- lakhs per person for anyone accident or occurrence and Rs. 15,00,000/- lakhs in respect of damage to property for any one accident or occurrence. The Contractor shall also indemnify the Client against all claims which may be made upon the Client, whether under the Workmen's compensation Act or any other statute in force, during the currency of this contract or at Common Law in respect of any employee of the Contractor or of sub-contractor and shall be at his own expense effect and maintain until the virtual completion of the contract, with an Insurance Company, approved by the Client, a policy of Insurance against such risks and deposit such policy or policies with the Client from time to time during the currency of this contract.

In default of the contractor insuring as provided above, the Client may so insure and may deduct the premiums paid from any money due or which may become due to the contractor.

The contractor shall be responsible for any liability which may not be covered by the Insurance Policies referred to above and also for all other damages to any person, animal or defective carrying out of this contract, whatever, may be the reasons due to which the damage shall have been caused.

The contractor shall also indemnify and keep indemnified the Client against all and any costs, charges or expenses arising out of any claim or proceedings relating to the works and also in respect of any award of damage or compensation arising there from.

Without prejudice to the other rights of the Client against contractors in respect of such default, the Client shall be entitled to deduct from any sums payable to the contractor the amount of any damages, compensation costs, charges and other expenses paid by the Client and which are payable by the contractor under this clause.

The Contractor shall upon settlement by the Insurer of any claim made against the insurer pursuant to a policy taken under this clause, proceed with due diligence to rebuild of repair the works destroyed or damaged. In this event all the monies received from the Insurer in respect such damage shall be

paid to the Contractor and the Contractor shall not be entitled to any further payment in respect of the expenditure incurred for rebuilding or repairing of the materials or goods destroyed or damaged.

The Contractor, in case of re-building or reinstatement after damage shall be entitled to such extension of time for completion as the Architect/Consultant may deem fit, but shall, however, not be entitled to reimbursement by the Client of any shortfall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein.

Without prejudice to his liability under this clause, the contractor shall also cause all nominated sub-contractors to effect, for their respective portions of the works, similar policies of insurance in accordance with the provisions of this clause and shall produce or cause to produce to the Client such policies. The contractor shall not permit a nominated sub-contractor to commence work at the site unless the said insurance policies are submitted. In the event of failure of the sub-contractor to take out such a policy of insurance before commencing the works at the site, the contractor shall be responsible for any claim or damage attributable to the said sub-contractor.

4.04.1 **Investigation and Site Records**

For the purpose of quick communication between the Architect/Consultant and the Contractor or his Agent or Representative, Site records shall be maintained at Site in the manner as described below: Any communication, relating to the works may be conveyed through records in the Site Books. Such a communication from one party to the other shall be deemed to have been adequately served in terms of the Contract. Each site book shall have machine-numbered pages in triplicate and shall be carefully maintained and preserved by the Contractor and shall be made available to the Architect/ Consultant as and when demanded. Any instruction which the Architect/Consultant may like to issue to the Contractor may be recorded by him in the Site Book and two copies thereof taken by the Architect/Consultant for his record. The Contractor or his Agency or Representative may similarly record in the Site Book any communication he may like to send to the Architect/Consultant. Two copies thereof when sent to the Architect/Consultant and receipt obtained thereof, will constitute adequate services of the communication to the Architect/Consultant.

4.04.2 **Construction Records**

The Contractor shall keep and provide to the Architect/ Consultant full and accurate record of the dimensions and positions of all new work and any other information necessary for the Architect/ Consultant to be able to prepare complete drawings recording details of the works as constructed.

4.04.3 **Record Drawings:**

i) **For the drawings issued to the Contractor by the Consultant:**

The Consultant will issue three sets of the drawings to the Contractor for the items for which some changes have been made from the approved drawings as instructed by the Client/Architect/ Consultant. The Contractor will mark the changes made on these copies and return these copies to the Consultant for his approval. In case any revision is required or the corrections are not properly marked the Consultant will point out the discrepancies to the Contractor. The Contractor will have to incorporate these corrections and / or attend to discrepancies either on the copies as above or fresh copies as directed by the Consultant and resubmit to the Consultant for approval. The Consultant will return one copy to the contractor duly approved for his records and forward one copy to Architect for preparation of final as built drawings.

ii) **For the drawings prepared by the Contractor: (shop drawings)**

The Contractor will modify the drawing prepared by him wherever any changes are made consequent to site decisions etc. as approved by the Architect/ Consultant. Two copies shall be submitted of these corrected drawings to the Architect/Consultant for his approval.

The Architect/Consultant shall return one copy of the same, duly approved, if found satisfactory or

advise contractor the changes required or discrepancies, if any. The Contractor shall resubmit the three copies after incorporating all the corrections / changes etc. as required.

On receipt of the approved copy of these drawings contractor shall submit to the Architect/Consultant three copies of the same along with one reproducible copy as directed by the Architect/Consultant for onward sub mission to the Client.

ii) **Drawings & Specifications**

The Contractor shall be furnished by the Architect/Consultant free of cost two copies of each of the Drawings and of the specification and two copies of all further Drawings issued during the progress of the works. Any further copies of such Drawings required by the Contractor shall be obtained by him from the Architect/Consultant on payment of necessary charges to be fixed by the Architect/Consultant. The Contractor shall keep one copy of all Drawings at the office of the works site and the Client/ Architect/ Consultant shall at all reasonable time have access to the same. Before the issue of the final certificate to the Contractor, he shall forthwith return to the Architect/Consultant all Drawings and Specifications.

iv) **Further Drawings and Instructions**

The contractors shall carry out and complete the said work in every respect in accordance with this contract and with the directions of and to the satisfaction of the Architect/Consultant. The Architect/ Consultant may in his absolute discretion and from time to time issue further drawings prepared by them and or written instruction, details, directions and explanations which are collectively referred to as "Architect/Consultant's Instructions" in regard to

- The variation or modification of the design, quality or quantity of items of works or the addition or omission or substitution of any item.
- Any discrepancy in the Drawings or between the Bill of Quantities and/or Drawings and/or Specification.
- The removal from the site of any material brought thereon by the Contractor and the substitution of any other material therefore.
- The removal and/or re-execution of any works executed by the Contractor The dismissal from the works of any persons employed thereupon.
- The dismissal from the works of any persons employed thereupon.
- The opening up or inspection of any work covered up

4.05 **Complying Consultant's instructions :**

The Contractor shall duly execute any work complying with Consultant's instructions forthwith provided always that verbal instructions, directions, explanations given to the Contractor or his representative upon the works by the Consultant shall be notified in writing by the contractor within seven days in case of variation. If not declined in writing within further seven days by the Consultant, it shall be deemed to be Consultant's instructions within the scope of the contract.

4.06 Accounts Receipts & Vouchers

The contractor shall, upon the request of the Client 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 contractor 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 Client/Architect shall be final and binding on the contractor as to the amount of materials the contractor is required to use for any work under this contract.

Production of Vouchers etc.:

The contractor shall when required by the Client/Architect/Consultant produce all quotations, invoices, vouchers and accounts or receipts in connection with quality and expenditure in respect of Provisional sums/Prime cost items and Extra variation items.

4.07 **Rates to Include**

4.07.1 The Contractor shall provide at his cost everything necessary for the proper execution of the works according to the intent and meaning of the Drawings, Bill of Quantities, Conditions of Contract and Specifications taken together with 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 Contractor finds any discrepancy in the Drawings or between the Drawings, Bill of Quantities and Specifications, he shall immediately and in writing refer the same to the Architect/Consultant who shall decide which is to be followed.

4.07.2 **No Compensation for Delays**

The Contractor shall not be entitled to any compensation for any loss suffered by him on account of delays, in commencing or executing the work, whatever the cause of delays may be, including delays arising out of modifications to the work entrusted to him or in any sub-contract connected therewith or delays in awarding contracts for other trades of the project or in commencement of completion of such works or in procuring Government controlled or other building materials or in obtaining water and power connections for construction purposes or for any claim in respect thereof. The Client does not accept liability for any sum towards loss of overheads & profits of the contractor besides the tender rates, subject to such variations as provided for herein.

4.07.3 The rates quoted in the tender shall include all charges for clearing of site before commencement as well after scaffolding, centering, boxing, staging, planking, timbering and pumping out water including bailing, fencing, hoarding, plant and equipment storage sheds, watching and lighting, by night as well as day including Sundays and Holidays, temporary plumbing and electric supply, protection of the public and safety of adjacent roads, streets, cellars, vaults, ovens, pavements, walls, houses, building, and. all other erections, matters or things and Contractor shall take down and remove any or all such centering, scaffolding, staging, planking, timbering, strutting, shoring etc., as occasion shall require or when ordered to do so, and fully reinstate and make good all matters and things disturbed during the execution of work and to the satisfaction of the Architect/Consultant. The rates quoted shall be deemed to be for the finished work to be measured at site. The rates shall also be firm and shall not be subject to exchange variations, labour conditions, fluctuations in octroi, local taxes, railway freights or any conditions whatsoever. Tenderers must include in their rates, Sales tax, Excise duty, Octroi, Sales tax on works contract and any other tax and duty or other levy levied by the Central Government or any State Government or any Local Authority, if applicable and prevalent during the entire contract period. No claim in respect of sales tax, excise duty octroi, Service Tax or other taxes, duties or levies whether existing or levied in future shall be entertained by the Client, unless otherwise mentioned elsewhere in the tender document.

4.07.4 Power, Water & Other Facilities

(i) The rate quoted by the Contractor shall include expenditure for providing all the water required for the proposed work and the Contractor shall make his own arrangements for the supply of good quality potable water, including obtaining Municipal connection for his labour as well as for construction purpose, and all charges for water shall be borne by him. If Municipal water is not available and should it become necessary for Contractor to bore wells for obtaining water for construction purposes or to bring water from outside by tankers, the Client shall not be liable to pay any charges in connection therewith.

(ii) The rate quoted in the tender shall also include electric consumption charges for power. If no power is available at the site, the Contractor shall have to make his own arrangements to obtain power connections and maintain at his own expenses an efficient service of electric light and power and shall pay for the electricity consumed. The Client, as well as the Architect/Consultant, shall give all possible assistance to the Contractor to obtain the requisite permission from the various Authorities, but the responsibility for obtaining the

same shall be that of the Contractor.

(iii) For water and electricity, the Contractor for subsidiary trades appointed by the Client shall be entitled to take connections from the temporary water and electric supply connection obtained by the Contractor, at his cost. The subsidiary contractors shall install a sub-meter for measuring electric / water consumption at their own cost and maintain the wiring / installation in good condition as per the local rules and reimburse the actual consumption charges directly to the Contractor at prevailing market rate plus 15% towards establishment charges. In case of any dispute, the reimbursement charges shall be decided by the Consultant, whose decision shall be final and without appeal.

(iv) All Municipal charges for drainage and water connection for construction purposes shall be borne by the Contractor and charges payable for permanent connections, if any, shall be initially paid by the Contractor and the Client will reimburse the amount on production of receipts.

(v) The contractor shall make suitable arrangement for a stable supply of water, power, sewerage charges and other facilities for the Architect/Consultant's and Client's office. The cost of these facilities towards installation and maintenance shall be borne by the contractor and are deemed to be included in the quoted rates / prices

4.07.5 Rates of all items to include initial and subsequent dewatering of basements and pits etc. as required till the date of virtual completion certificate for the contracted work

4.07.6 i) Excise & Sales Taxes, Works Contract Tax for Works

The Contractor shall pay and be responsible for payment of all taxes, duties, levies, royalties, fees or charges in respect of the works including but not limited to sales taxes, tax on works contract, excise duties and octroi, service tax payable in respect or materials, equipment, plant and other things required for the Contract. All of the aforesaid taxes, duties, levies fees and charges shall be to the Contractor's account and Client shall not be required to pay any additional or extra amount on this account. Variation of taxes, duties, levies, fees etc., if any, till completion of work shall be deemed to be included in the accepted rates and no extra claim save and except what is stated in the next clause 4.5 f (ii) on this account will in any case be entertained.

ii) New Taxes, Duties & Levies, etc.

Additional financial liability due to any new tax or duty or levy if imposed or revised under any statute of law during the currency of the contract, the same shall be borne by the Contractor upto 2% (two percent) of the accepted tender value. Beyond 2%, if any, shall be reimbursed by the Client on the basis of documentary proof of payment.

4.07.7 The contractor must bear in mind that all the works shall be carried out strictly in accordance with the specifications as given in these documents and also in compliance of the requirements of the local public authorities and to the requirement/ direction /satisfaction of the Client/Architect/Consultant.

4.08 **Quality of Materials, Testing and Workmanship**

The contractor shall have to use materials of the makes/manufacturers specified in the list of materials of approved brand and / or manufacture contained in contract documents.

4.08.1 All materials and workmanship shall be the best of the respective kinds described in the Contract and in accordance with the relevant Indian Standards, and in the absence of the same, Architect/ Consultant's instructions and shall be subjected from time to time to such tests as the Architect/ Consultant may direct at the place of manufacture or fabrication or on the Site or at an approved testing laboratory.

The Contractor shall upon the instruction of the Architect/ Consultant or their Representative furnish

him with documentation to prove that the materials & goods comply with the requirements of contract and for requirement stated above. The Architect/Consultant may issue instruction in regard to removal of material from site or any work, if these are not in accordance with the Contract. The Contractor shall provide such assistance instruments, machinery, labour and materials as are normally required for examining, measuring, sampling and testing any material or part of work before incorporation in the /Works for testing as may be selected and required by the Architect/Consultant or their Representative.

4.09 **Absence of Specification**

If the specifications do not contain particulars of materials and works which intention to include which is inferred, all such materials and works shall be supplied and executed as per relevant Indian Standard/CPWD specification whichever available, by the Contractor without extra charge. If the Contractor requires additional information, he shall, in pursuance of request in writing well in advance to commencement of the particular work to the Architect/Consultant who will issue such detail information as necessary within reasonable time.

4.09.1 **Work is to be Carried Out to the Satisfaction of Client/Architect/Consultant**

The Contractor shall carry out all the works strictly in, accordance with Drawings, Detailed Specifications and instructions of the Architect/Consultant. If in the opinion of the Client changes have to be made in the works the Contractor shall carry out the same, and payment, if any, arising out of these shall be made as per the terms of the contract.

4.09.2 **Removal of Improper Work & Materials**

The Architect/Consultant shall, during the progress of the works, have power to order in writing from time to time the removal from the works within such reasonable time or time as may be specified in the order, of any materials which in the opinion of the Architect/Consultant are not in accordance with the Specifications or the instructions of the Architect/ Consultant, the substitution of proper materials, and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the Drawings and Specifications or instructions, and the Contractor shall forthwith carry out such order at his own cost. In case of default on the part of the Contractor to carry out such order, the Client shall have the power to employ and pay other persons to carry out the same, and all expenses consequent thereon, or incidental thereto, as certified by the Architect/Consultant shall be borne by the Contractor, or may be deducted by the Client from any moneys due, or that may become due, to the Contractor.

4.09.3 **Default of Contractor in Compliance**

If the Contractor after receipt of written notice from the Architect/Consultant requiring compliance within ten days fails to comply with such further drawings and/or Architect/Consultant's instructions the Client may employ and pay other persons to execute any such work whatsoever that may be necessary to give effect thereto, and all costs incurred in connection therewith shall be recoverable from the Contractor by the Client on the Certificate of the Architect/Consultant as a debt or may be deducted by him from any moneys due to the Contractor.

4.09.4 **Inspection & Testing During Manufacture**

The Architect/ Consultant shall be entitled during manufacture to inspect, examine and test on the Contractor's premises during working hours the materials and workmanship and check the progress of manufacture of all fabrication materials to be supplied under the Contract, and if part of the said materials is being manufactured on other premises the Contractor shall obtain for the Architect/ Consultant permission to inspect, examine and test as if the said plant were being manufactured on the Contractors premises. Such inspection, examination or testing if made shall not relieve the Contractor from any obligation under the Contract.

4.09.5 **Dates for Inspection & Testing**

The Contractor shall agree with the Architect/ Consultant the date on and the place at which any plant/works will be ready for testing as provided in the Contract and unless the Architect/Consultant shall attend at the place so named on the date agreed the Contractor may proceed with the tests, which shall be deemed to have been made in the Architects/Consultant's' presence, and shall forthwith forward to the Architect/Consultant duly certified copies of the test readings. The Architect/ Consultant shall give the Contractor 24 hours notice in writing of his intention to attend the tests.

4.09.6 **Facilities for Testing at Manufacturer's Works**

Where the Contract provides for tests on the premises of the Contractor or of any sub-contractor the Contractor shall provide such assistance, labour, materials, electricity, fuel, stores, apparatus and instruments as may be requisite and as may be reasonably demanded to carry out such tests efficiently.

4.09.7 Certificate of Testing

As and when fabrication materials shall pass the tests referred in this, the Architect/Consultant shall furnish to the Contractor a certificate in writing to that effect.

4.09.8 **Rejection**

If as a result of such inspection, examination or test of the works (other than a Test on Completion the Architect/Consultant shall decide that such material is defective or not in accordance with the Contract he shall notify the Contractor accordingly stating in writing his objection and reasons therefore. The Contractor shall with all speed make good the defect or ensure that the material complies with the Contract.

Thereafter, if required by the Architect/Consultant, the tests shall be repeated under the same terms and conditions save that all reasonable expenses to which the Client may be put by the repetition of the tests shall be deducted from the Contract Sum.

4.09.9 **Delivery of Materials & Equipment**

Unless the Architect/Consultant shall otherwise direct, no material shall be delivered to site until the Architect/Consultant shall have issued, 10 respect of such material (Certificate of Testing). Likewise Fabrication Materials or Contractor's Equipment shall be delivered to Site only upon an authorization in writing applied for and obtained by the Contractor from the Architect/Consultant.

The Contractor shall be responsible for the reception on site of all Materials and Contractor's Equipment delivered for the purposes of the Contract.

4.09.10 **Inspection & Testing and Reinspection & Retesting**

All deficiencies revealed by testing and inspection shall be rectified by the Contractor at his own expense and to the satisfaction and approval of the Architect/ Consultant. Rectified components shall be subject to retesting and reinspection.

4.09.11 **Inspection Reports**

The Contractor shall provide the Architect / Consultant with five copies of reports of all inspections and tests.

4.10 **Supervision of Work**

4.10.1 **Contractor's Superintendence**

The Contractor shall give all necessary personal superintendence during the execution of the works, and as long, thereafter, as the Architect/Consultant in may consider necessary until the expiry of the "Defects Liability Period" stated hereto.

4.10.2 **Disorderly Conduct**

The Contractor shall at all times take all reasonable precautions to prevent contractor's employees and for the preservation of peace and protection of persons and property in the neighborhood of the works against the same but the contractor shall not interfere with member of any authorized Police Force who shall have free and undisputed access at all times to any part of the Works in the execution of their duties.

4.10.3 **Care of Works**

From the commencement to the certified completion of the whole of Works, the contractor shall take full responsibility for the care thereof and of all Temporary Works and in case any damage loss or injury shall happen to the works or to any part thereof or to any Temporary Works from any cause whatsoever that on completion, the works shall be in good order and condition and in conformity to every respect with the requirements of the Contract and the Architects/Consultant's instructions. The Contractor shall also be liable for any damage to the Works occasioned by him including his subcontractors in the course of any operations carried out by him for the purpose of completing any outstanding work and complying with his obligations under the contract. The Contractor shall indemnify the Client from all risks on this account.

4.10.4 **Assignment**

The whole of the works included in the contract shall be executed by the Contractor and Contractor shall not directly or indirectly transfer, assign or sublet the contract or any part/share thereof or any interest therein without the prior written consent of the Client and no undertaking shall relieve the Contractor from the full and entire responsibility of the contract or from active superintendence of the works during their progress.

4.10.5 **Contractor's Employees**

(i) Contractor's Senior Representative for Execution & Co-ordination of Works

The Contractor shall have on site at all times during working hours throughout the course of the Contract at least one competent senior representative who shall be empowered to make decisions binding on the contractor in respect of all matters likely to arise in connection with the execution & co-ordination of the Works at site and shall keep the Architect/ Consultant and the Client informed at all times about the name and designation of such representative. Contractor's Senior Representative shall have the power to take joint measurement and sign the measurement book/bills. Any directions, explanations, instructions or notices given by the Architect/Consultant to such representative shall be held to be given to the Contractor.

(ii) Contractor's Employees

The Contractor shall provide and employ after approval from the Architect/Consultant on the site in connection with the execution, completion and maintenance of the Works all Consultation staff/technical assistants as are qualified, skilled and experienced in their respective trades, foremen and leading hands as are competent to give proper supervision, ensuring quality & output to the work they are required to supervise, and also such skilled, semi-skilled and unskilled labour as are necessary for the proper and timely execution, completion and maintenance of the works.

(iii) Removal of Contractor's Employees

The Contractor shall on the direction of the Client/Architect/ Consultant immediately dismiss from the works any person employed thereon by him who may, in the opinion of the Architect/ Consultant/Client be incompetent or misconduct's himself and such person shall not be again employed on the works without the permission of the Client/Architects/ Consultant.

(iv) **Unauthorized Persons**

No unauthorized persons are to be allowed on the site. The Contractor shall instruct all such persons to keep out and shall take steps to prevent trespassing.

4.10.6 **Compliance with Statutes, Regulations, Etc.**

The Contractor shall conform to the provisions of any Act of the legislature relating to the works, and to the regulations and bye-laws of any statutory authority, and of any water, electric supply and other companies and/or authorities with whose systems the structure is proposed to be connected, and shall, before making any variations from the Drawing or Specifications that may be necessitated by so regulations, give to the Architect/Consultant written notice, specifying the variation proposed to be made and the reason for making it and apply for instructions thereon. In case, the Contractor shall not within ten days of submission of such notice, receive such instructions, he shall proceed with the work conforming to the provisions, regulations, or bye-laws in question, and any variation so necessitated shall be dealt with under contract.

The Contractor shall bring to the attention of the Architect/Consultant nil notices required by the said Acts. regulations or 'bye-laws to be given to any authority and pay to such authority, or to any public office all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Client/Architect/Consultant.

4.11 **Quantities**

4.11.1 The Bill of Quantities (BOQ), unless otherwise stated shall be deemed to have been prepared in accordance with the Indian Standard Method of Measurement and quantities in B.O.Q. are to be considered as estimated and not accurate. The rates quoted shall remain valid for variation of quantity against each individual item for any increase or decrease in the tendered quantities up to a variation of 25%. For any variation beyond 25% the rate for the respective items may be reviewed on mutually agreed terms as mentioned hereinafter in clause 4.9.

4.11.2 The Client reserves the right to add/delete any items from the bill of quantities at his discretion for which no claims shall be entertained.

4.11.3 The measurement and valuation in respect of the Contract shall be completed within the "Period of Final Measurement" stated in the Salient features of the contract as Appended hereto.

4.11.4 **Contractor to assist the Architect/Consultant for measurement of work**

(i) The Architect/ Consultant may from time to time intimate to the Contractor that he requires the works to be measured, and the Contractor shall forthwith attend or send a qualified representative to assist the Architect/ Consultant or their representatives in taking such measurement and calculations and to furnish all particulars or to give all assistance required by any of them. Should the Contractor not attend or neglect or omit to send such representative, then the measurement taken by the Architect/ Consultant or by their approved representative shall be taken to be correct measurements of the works. Such measurements shall be taken in accordance with the Mode of Measurements detailed in the Specifications. In absence of such specifications relevant Indian standard specifications will be followed.

(ii) Contractor to verify site Measurements

The Contractor shall cheek and verify all site measurements whenever requested by other specialists, Contractors or by nominated or other sub- contractors to enable them to prepare their own shop drawings and pass on the information with sufficient promptness as will not in any way delay the works. A copy of all such information passed on shall be given to the Consultant.

The Architect/ Consultant shall take joint measurements with the Contractor and the measurement shall be entered in the measurement book / sheet by the Architects/Consultants representative.

The Contractor or his Representative may at the time of measurement take such notes and measurements as he may require.

4.12 Variations and Extra Items

4.12.1 The Contractor is bound to carry out any items of work necessary for the completion of the job even though such items are not included in the bill of quantities and rates. Instructions in respect of such additional items and their quantities will be issued in writing by the Architect/Consultant with the prior consent in writing of the Client.

4.12.2 **Variations**

No alteration, omission or variation ordered in writing by the Architect/ Consultant shall vitiate this contract. In case the Architect/Consultant/Client thinks proper at any time during the progress of the works to make any alterations in, or additions to or omissions from, the works or any alteration in the kind or quality of the materials to be used therein, the Architect/Consultant shall give notice thereof in writing to the Contractor or shall confirm in writing within seven days of giving any such oral instructions. The Contractor shall alter, add to, or omit from, as the case may be, in accordance with such notice, but the Contractor shall not do any work extra to or make any alterations or additions to or omissions from the works or any deviation from any of the provisions of the Contract, Stipulations, Specification or Contract Drawings without the previous consent in writing of Consultant and the value of such extras alteration, additions or omissions shall in all cases be determined by the Architect/ Consultant in accordance with the Contract provisions and the same shall be added to or deducted from the Contract value, as the case may be.

4.12.3 **Valuation of Variations**

No claim for extra work shall be allowed unless it shall have been executed under authority of the Client as herein mentioned. Any such extra is herein referred to as authorised extra and shall be made in accordance with the following provisions.

(i) The net rates or prices in the contract shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced herein.

(ii) Rates for all items, wherever possible, should be derived out of the rates given in the contract.

4.12.4 The net prices of the original tender shall determine the value of the items omitted, provided if omissions do not vary the conditions under which any remaining items of works are carried out, otherwise the prices for the same shall be valued under sub-clause (e) hereof

4.12.5 Where the extra works are not of similar character and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items or works are carried out, then the contractor shall within 7 days of the date of receipt of order to carry out the work, inform the Architect/ Consultant of the rate which he intends to charge for such items of work, supported by analysis of the rate or rates claimed and then shall fix such rate or prices as in the circumstances in his opinion are reasonable and proper, based on the market rate.

4.12.6 It is further clarified that for all such authorised extra items where rates cannot be derived from tender, the Contractors shall submit rates supported by rate analysis worked on the "market rate basis", for material, labour, hire / running charges of equipment and wastage's etc. plus 15% towards establishment charges, contractor's overheads and profit.

4.12.7 Where extra work cannot be properly measured or valued, the Contractor shall be allowed day work prices at the net rates stated in the tender of the Priced Bill of Quantities or, if not so stated, then in accordance with the local day work rates and wages for the district; provided that in either case,

vouchers specifying the daily time (and if required by the Architect/Consultant, the workman's) names and materials employed be delivered for verification to the Architect/Consultant at or before the end of the week following that in which the work has been executed.

4.13 Price Variation Adjustment (PVA) Clause

If the price of materials and/or wages of labour required for execution of the work increase/or decrease, the price variation adjustment (PVA) shall be worked out as per provisions detailed below and the amount of the contract shall accordingly be varied, subject to the other condition that compensation for escalation in prices shall be available only for the work done during the stipulated period of the contract including such periods for which the contract is validly extended under the provision of relevant clause of the contract.

In partial modification of (any) provisions made elsewhere in this Manuel (contract) regarding rate quoted in a tender being not subject to any variations, price adjustment to the value of work payable to the contractor at tendered rates shall be made towards variation in the prices of materials and labour supplied by the contractor in the manner specified herein under.

If, after the written order to commence the work and during the operative period of this contract including any authorised extensions of the original stipulated completion period.

4.13.1 There be any variation in the consumer price index-general index - for industrial workers (Base 1982=100) (source data published from time to time in Indian Labour Journal by the Labour Bureau, Government of India)

4.13.2 There be any variation in the All India Wholesale Price Index for all commodities (Base 1981-1982 = 100) (as published from time to time in the RBI Bulletin based on the data issued by the office of the Economic Adviser to the Government of India).

Price Variation Adjustment (PVA) towards (1) labour component and (2) material component for all materials other than steel shall be calculated in accordance with the formula (A) and (B) respectively, given below, subject to stipulations hereinafter mentioned.

Formula (A) for labour

$$VL = (0.87\ P\ X\ \frac{K_1}{100} - S)\ X\ \frac{C_1 - C_0}{C,}$$

Formula (B) for materials-

$$VM = (0.87\ X\ P\ X\ \frac{K_2}{100} - C - S)\ X\ \frac{I_1 - I_0,}{I_0}$$ where

VL = Amount of Price Variation Adjustment -increase or decrease in rupees due to Labour Component. Formula (A) for labour

VM = Amount of Price Variation Adjustment - increase or decrease in rupees on account of materials component.

P = Cost of Work done during the period under consideration (bill period) as per Gross amount of bill excluding, cost of extra or substituted items, rates of which are fixed on prevalent market rates and advances on materials and/or adjustments thereof, if any.

C = Cost of material if any like cement, steel etc. which are either arranged or supplied at actual or fixed rates and consumed in the work done during the period under consideration.

S = Cost of services like power or water supply, hire charges of machinery etc. which are supplied at fixed rates by the Clients to the contractor.

Note : This is generally nil in case of' Clients works.

K_1 = Percentage of labour component as calculated, as indicated in Note (I) below.

K_2 = Percentage of materials component as indicated in Note (2) below.

C_0 = Consumer Price Index - General Index Number for industrial workers ase 1982 = 100) referred to at (a) above, ruling on the last date for receipt of tenders, and as applicable to the centre, nearest to the place of work, for which the index is published.

C1 = Average of above mentioned consumer price index number during the Period under consideration (bill period).

I_0 = All India Wholesale Price Index Number for all commodities referred to at (b) above, ruling on the last date for receipt of tenders and as applicable to the centre, nearest, to the place of work for which the index is published.

I_1 = Average of above mentioned monthly All India Wholesale Price Index Numbers during the period under consideration (bill period).

Note (1) : K_1 shall be taken as under :-

2a	Component of Work: Civil work including ancillary works and external work and R.C.C./tanks, septic tank etc., if any, for sanitary and plumbing work	30
b	Sanitary and plumbing works including fittings and fixtures (internal work only)	20
	Electrical installations work including fittings and fixtures (external and internal works)	20

Note(2) : K_2 shall be taken as under :-

a.	Civil work including ancillary works as detailed under Note (1)(a) above	70
b.	Sanitary and plumbing works including fittings and' fixtures as detailed under Note (l) above	80
c.	Electrical installation work including fittings and fixtures as detailed under Note (l)(c) above	80

Stipulations :

i) PVA clause is operative either way i.e., if the variations in above referred price indicates are on the plus side, PVA shall be payable to the contractor and if they are on the negative side PVA shall be recoverable from the contractor, for the respective bill period of occurrence of fluctuations.

ii) The rates quoted by the contractor shall be treated as firm for the value of work required to be done in the first 6 months of the contract period from the date of written order to commence work, and no PYA is admissible on the same on any grounds whatsoever. The value of work required to be done during the first 6 months of the contract period shall be taken as 80% of the value of work to be done on pro-rata basis in 6 months as compared to the total stipulated completion period. No. PYA is admissible on the value of work required to be done in the first 6 months as worked out above, even if this work is actually done in a period longer than 6 months.

However, in case of any delay in the first 6 months due to genuine reasons which are not

attributable to the contractor and which are beyond his control, such period of delay will be deducted from 6 months, and the value of work to be done will be 80% of the prorate value of work to be done in such reduced period on prorata basis.

iii) a) For works where the original stipulated period of completion is not more than 6 months no PVA whatsoever is permissible under this clause. However, if the period of completion is delayed beyond 6 months on account of genuine reasons which are beyond the control of the contractor, PVA will be admissible on the value of work done only in excess of value of work required to be done on a prorate basis in the first 6 months minus the period of such genuine delay.

b) For purposes of admissibility of PVA all the cumulative period of extensions granted for reasons which are solely attributable to the contractor is excluded from the total extended period of the contract and PVA shall not be admissible on the value of work done during such period of extensions, which are granted for keeping the contract current, but only due to reason for which the contractor was solely responsible. Periods of extensions granted on account of genuine reasons which are not attributable to the contractor and which are beyond his control will, however, be included in the period for which PVA is admissible.

c) Notwithstanding anything to the contrary mentioned in any other clause/clauses of the contract, extensions of the contract period shall be granted by the Architect only with prior approval of the Client. Extensions granted by the Architect without Client's prior approval shall not bind the Client for payment of PVA for work done in the concerned period of extension.

iv. a) Where the total cost of work done beyond the value of work required to be done in the first 6 months (vide note (ii) and (iii) above) does not exceed Rs._____ lakhs the total amount of PVA worked out on the basis of provisions of foregoing stipulations will be limited to an upper ceiling of 10% of such value of work done in excess of value of work required to be done in the first 6 months, minus the cost of cement and steel and any other materials and services issued/arranged by the Client at fixed price i.e. P - (C + S) (these terms being as per definitions given under formulae A and B above).

Where the total value of work done beyond the value of work required to be done in the first 6 months exceeds Rs._____ lakhs the PVA on the first Rs._____ lakhs will be calculated as provided for in the foregoing Para and for the balance value of work done for which PVA is admissible subject to foregoing conditions, the PVA will not have the upper ceiling of 10% but it will be worked out at a lower rate i.e., at 90% of the amount worked out as per the formula A and B referred to earlier.

v) In working out the amount of PVA as per all the foregoing stipulations, value of such extra items or such portions of extra items the rates of which are derived from the prevailing market rates of materials and labour will not be included in the value of work done. Value of only such extra items or such portions of extra items, rates of which are derived from tendered rates will be included in the value of work on which PVA is calculated.

vi) For claiming the payment for PVA the contractor shall keep such books of accounts and other documents, vouchers, receipts etc., as may be required by the Client/Architect/Consultant for verification of the increased claims for reductions, to be made as the case may be and he shall also allow inspection of books, documents by the Site Consultant and Clients Consultant and/or other duly authorised representatives of the Architect/Consultant and furnish such information as may be required or called for to enable verification of the claim within a week of such request.

vii) The contractor is required to submit to the Client through the Architect/Consultant, is claims for PVA separately for each running bill for the individual bill period for the work paid to him by the Client. He will also be required to submit detailed calculations in support of the claims.

viii) No claim will be entertained from the contractor for interest or any other grounds for non-payment or for any delay in payment of PVA due to late publication or non-availability of the necessary price indices or due to delay in preparation of the running or final bills.

ix) The frequency for submitting/claiming PVA bill shall be once in a quarter (three months) based on the latest available indices.

x) In all cases of disputes under this clause the decision of the Client who shall give a reasonable hearing to the contractors person (not through Agents/Advocates) shall be final and binding.

a. Materials Having Basic Price

(i) For materials for which a basic price has been stipulated in the tender, the variation in the actual cost of purchase from the basic price will be considered for adjustment in the tender cost due to incorporation of required quantity of such material in the works over different periods of time as per construction schedule. Rates should be however fair and competitive and verified by market enquiry by the Client/Architect/Consultant and the quantity purchased in every period should be reasonable and advantageous, if any due to bulk purchase may be also taken into account

(ii) Items with fixed basic market rates:-

The materials required for execution of any item for which basic rate in the local market has been provided in the tender, shall be procured by the contractor on the basis of reasonable market rate monitored by the Client or supplied by the Client at the sole discretion of the Client. Every items in the bill of quantities which contains either as a whole or part the amount as basic cost price of the materials shall be varied by substitution of the actual reasonable cost of the materials.

No variation shall be made in respect to the percentage quoted for labour and to cover for overhead and profit on account of variation in the prices, as above,

4.14 <u>Payment of Bills</u>

a. Monthly payments/Interim payments

(i) The contractor shall be paid monthly 1 (one) bill subject to the minimum amount as stipulated in the Salient features annexed to the tender. The bill shall include value of work done and secured advance against materials.

(ii) The Contractor shall be paid by the Client from time to time by installments under Interim Certificate to be issued by the Architect/Consultant to the Contractor on account of the works executed when in the opinion of the Architect./Consultant, work to the approximate value named in the Salient Features (or less at the sole discretion of the Architect/Consultant) has been executed in accordance with this contract, subject, however, to a retention of the percentage of such value named in the Salient Features.

(iii) The payment of interim bill shall be made in the manner stipulated in the Salient Features.

(iv) The Architect/Consultant shall have power to withhold Certification if the works any parts thereof are not being carried out to his satisfaction.

(v) The Consultant may by issuing a Certificate make corrections in any previous Certificate issued by him.

(vi) No payment shall be made to the Contractor if the Contractor fails to insure the works and keep them insured till the issue of the Virtual Completion Certificate.

b. **Secured Advance on Materials at Site**

The Contractor will be paid secured advance against the materials brought and stacked at site for use in permanent works and in the opinion of the Architect/Consultant are required to be procured in advance. The advance paid shall be maximum 70% of the cost of the materials stacked at site at the discretion of Architect/Consultant and the Contractor shall produce necessary vouchers/documents in support of cost of each material.

Where in any Certificate (of which the Contractor has received payment), the Architect/Consultant has included the value of any unfixed materials intended for and/or placed on or adjacent to the works such materials shall become the property of the Client and they shall not be removed except for use upon the works, without the written authority of the Architect/Consultant. The Contractor shall be liable for any loss of, or damage to, such materials.

The materials shall also be in conformity with contract specifications and of approved quality as stated in relevant clauses hereof. This advance shall be made on the basis of the quantity of each material lying at site at the time or preparation of each interim bill. The Contractor shall sign indemnity bond for any Joss either due to theft or fire etc.

c. **Final Bill**

i) The Contractor shall submit final bill within 15 days from the date of issue of virtual completion certificate with all relevant information and details.

ii) The Consultant within 30 days of submission of the final bill, shall issue a certificate of payment against the final bill to the Client who shall hereupon within 6 days from the date of receipt of the certificate, release the balance payment to the contractor after effecting all recoveries including advances and payments against interim certificates

4.15 **Security Deposit :**

a. Security Deposit - The total amount of security deposit shall be equal to 1,50,000/- of the contract value and shall be made up of i) Initial security deposit and ii) Retention Money

b. Retention Money – In addition to the initial security deposit shall be equal to 8% of the value of the work done will be deducted by the Client from each bill paid to the contractor, towards Retention Money.

4.16 <u>Initial Security Deposit (ISD)</u>

4.16.1 Initial security deposit will .be Rs. 1,50,000/- and will be inclusive of Earnest Money Deposit (EMD) and shall be paid in Demand Draft (DD) favouring **New India Assurance, Mumbai.**

4.16.2 Release of Security Deposit

i) Amount equivalent to 100% of the security deposit shall be released by the Client on **completion of the defect liability period.**

4.16.3 All compensation or other sums of money payable by the Contractor to the Client under the terms of this contract may be deducted from the security deposit if the amount so permits and the Contractor shall, unless such deposit has become otherwise payable, within 60 days after such deduction, make good in cash the amount so deducted.

4.16.4 The Contractor shall not assign the Contract. He shall not sublet any portion of the Contract except 'with the written consent of the Client. In case of breach of these conditions, the Client may serve a notice in writing on the Contractor rescinding the Contract whereupon the security deposit shall, stand forfeited to the Client, without prejudice to his other remedies against the Contractor.

4.16.5 The security deposit of the contractor will be forfeited if he fails to comply with any of the conditions of the contract.

4.17 **Virtual Completion Certificate**

The works shall not be considered as completed until the Architect/ Consultant has certified in writing that they have been virtually completed. The Defects Liability Period shall commence from the date of virtual completion as certified by the Architect/Consultant.

4.18 Determination of Contract by Contractor

If the payment of the amount payable by the Client under Certificate of the Architect/Consultant s shall be in arrears and unpaid for thirty days after notice in writing requiring payment of the amount as aforesaid shall have been given by the Contractor to the Client, or if the works be stopped for three months by the Client or by any injunction or other order of any Court of Law, then the Contractor shall be at liberty to determine the Contract by giving notice in writing to the Client, through the Architect\Consultant, and he shall be entitled to recover from the Client, payment for all works duly and properly executed at site. The Contractor shall bear all other expenditure.

In arriving at the amount of such payment the net rates contained Contractor's original Tender shall `be followed or where the same may not apply valuation shall be made in accordance with the relevant terms of the contract

4.19 **Defects Liability Period**

Any defects, shrinkage, settlement or other faults which may appear within the Defects Liability Period" stated in the Salient Features hereto or, if none stated, then within 12 months after the date of the virtual completion of the works as certified by the Architect/Consultant, arising in the opinion of the Architect/Consultant from materials or workmanship not in accordance with the contract, shall upon the direction in writing of the Architect/Consultant, and within such reasonable time as shall be specified therein, be amended and made good by the Contractor, at his own cost and in case of default the Client may employ and pay other persons to amend and make good such defects, shrinkage, settlements or other faults, and all damages, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the Contractor and such damage, loss and expenses shall be recoverable from him by the Client or may be deducted by the Client, upon the Architect's/ Consultant's Certificate in writing, from any money due or that may become due to the Contractor, or the Client may in lieu of such amending and making good by the Contractor deduct from any monies due to the Contractor, a sum, to be determined by the Consultant equivalent to the cost of amending such work and in the event of the amount retained hereof being insufficient, recover the balance from the Contractor, together with any expenses the Client may have incurred in connection therewith. Should any defective work have been done or material supplied by any Sub- Contractor employed on the works who has been nominated or approved by the Architect/Consultant, the Contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the Contractor and been subject to the provisions of this Contract. The Contractor shall remain liable under the provision of the Clause notwithstanding the signing of any certificate or the passing of any accounts, by the Architect/Consultant. The Contractor will not be responsible for defects arising out of fair wear & tear & damage caused by Client's personnel during the use of the building after being occupied.

4.20 **Final Completion Certificate**

On successful completion of entire, works covered by the Contract to the full satisfaction of Client and Architect/ Consultant and after the Defect Liability Period, the Contractor shall ensure that the following works have been completed to the satisfaction of Architect/Consultant: (a) clear the site of all scaffolding, wiring, pipes, surplus materials, Contractor's labour, equipment and machinery (b) demolish, dismantle and remove all Contractor's site offices and quarters and other temporary works, structures and constructions and other items and things whatsoever brought upon or erected at the site or any land allotted to the Contractor by the Client and not incorporated in the permanent works (c)

remove all rubbish, debris etc. from the site and the land allotted to Contractor and shall clear, level and dress, compact the site as required and said land to the satisfaction of the Client and Architect/Consultant (d) shall put the Client in undisputed custody and possession of the site and all land allotted by the Client to the Contractor (e) All defects have been attended & rectified to full satisfaction of the Client and Consultant during the Defect Liability Period. Unless the Contractor shall have fulfilled the provisions of the clause, the works shall not be deemed to have been completed.

Upon the satisfactory fulfillment by Contractor as stated above, the Contractor shall be entitled to apply to the Architect/Consultant for a Final Completion Certificate in respect of the entire work.

If the Architect/Consultant is satisfied of the completion of the work relating to which the Completion Certificate has been sought, the Architect/Consultant in consultation with the Client shall within 15 days of the receipt of the application for Completion Certificate, either issue a Completion Certificate in respect of the works for which the Completion Certificate has been applied, or notify to the contractor reasons for not issuing the certificate and advise the contractor to rectify the deficiencies, if any where found in the works. This issuance of a Final Completion Certificate shall be without prejudice to the Client's rights and Contractor's liabilities under the Contract, including the contractor's liability for the Defect Liability Period nor shall the issuance of a completion Certificate in respect of the works or work at any site be construed as a waiver of any right or claim of the Client against the Contractor in respect of work or the works at the at the site and in respect of which the Final Completion Certificate has been issued.

The balance retention money will be released only after issuance of final completion certificate by the Architect/Consultant in consultation with the Client and also after giving no claim certificate by the contractor to the Client.

4.21 **Provisional Sums**

Every provisional sum other than Prime Cost items under sub-clause (i) of this clauses set out in the Bill of Quantities whether for work to be executed by the Contractor which has not been specified in detail when the Contract is entered into or for work to be executed by a nominated Sub-Contractor as hereinafter defined together with the charges and profits, if any, which the Contractor shall have added to such sums shall be deducted from the Contract Value and in lieu thereof the following shall be added to the Contract Value. Where work to which the provisional sum relates has been ordered by the Architect/Consultant and executed by the Contractor the value of the work so executed valued in accordance with Contract.

Various items together with lumpsum amounts for each of them have been indicated under a separate heading of Provisional Sums, in the B.O.Q. These items are such for which details have not been finalised when the contract is entered into. These items will be got executed either through or through a nominated Sub-Contractor, entirely at the discretion of the Client and shall be paid on the basis of actual cost of each item plus a percentage rate to be quoted by the Contractor to cover his efforts towards co-cordination/ assistance including his overheads and profits. No claim shall be entertained if any or all items under the heading of provisional sums are deleted by the Client from the scope of work to be executed by the Contractor. No further escalation shall be payable on these items. The amounts for these items shall not be considered for variation in contract value.

4.21.1 Use of Provisional Items

All sums set out in the Bill of Quantities which shall be stated to be provisional .shall be used only at the direction and sole discretion of the Client/Architect/Consultant and if not used either wholly or in part, unused amount shall be deducted from the Contract Value. The provisional sum as well as payments made to contractor for assistance/co-ordination/carrying out of works therein shall not be considered for deciding variation in contract value.

4.22 Assignment of Sundry Works to Sub-Contractors Material Suppliers

Bills/claims of all Specialists, Merchants, Tradesman and others executing any work of supplying and fixing any goods for which prime cost items or provisional sums are included in the Bill of Quantities shall be finalised by the contractor in consultation with the Architect/Consultant and approval of the Client subject to the following terms and conditions:

4.22.1 That the Sub-Contractor shall indemnify the Contractor against the same obligations in respect of the Sub-Contract as the Contractor is under in respect of this contract.

4.22.2 That the Sub-Contractor shall indemnify the Contractor against claims in respect of any negligence by the Sub-Contractor, his servants or agents or any misuse by him or them of any scaffolding or other plant, the property of the Contractor or under any Workmen's Compensation Act in force.

4.22.3 Payment shall be made to the Sub-Contractor within fourteen days of his receipt of payment from the Client. The exercise of this power shall not create privy of contract between Client and Sub-Contractor.

4.23 Liquidated Damages

If the Contractor fails to complete the works by the date stated in the Salient Features or within any extended time thereof and the Consultant certifies in writing that in his opinion the same ought to have been reasonably completed by the original completion date or extended completion date, as the case may be. The Contractor shall pay the Client the sum named in the Salient Features as "Liquidated Damages" for the period during which the said works shall so remain incomplete or the Client may deduct such damages from any monies due to the Contractor. The quantum of liquidated damages shall be 0.5% of the accepted tender amount of the tender per week, subject to a maximum of 7.5% of the accepted tender amount. (as stated in Salient Features).

4.24 **Commencement of Works**

Within 10 days from the date when the contract is awarded/the letter of intent is issued to the contractor or the date of handing over of site whichever is later, the contractor shall begin the works and shall regularly proceed with and complete the same (except for painting or any other decorative work which the Architect/Consultant may desire to delay) on or before the "Date of Completion" stated in the Appendix subject nevertheless to the provisions for extension of time hereinafter contained. The Contractor shall bear all expenses and charges for special or temporary way leaves required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional accommodation outside the Site required by him for the purpose of the Works.

4.25 **Programme of Works**

4.25.1 **Detailed Programme to be Furnished**

Within 15 days of receiving letter of Intent / Award the Contractor shall prepare and submit a detailed programme of works in the form of a Bar Chart / Mile stone network showing all activities & the order of procedure in which he propose to carry out the works. Within 15 days from the date of submission the Architect/Consultant shall convey to the Contractor his comment / approval on the programme.

The contractor shall be required to submit the CPM chart for the various activities involved in this work including dependencies etc., and regularly monitor the progress of construction accordingly.

4.25.2 Programme to be Modified

Subject to the provisions of Clause of Time for completion hereof, if at any time it should appear to the Consultant that the actual progress of the works does not conform to the approved programme referred to in sub-clause (a) of this Clause, the Contractor shall produce a revised & detailed programme showing the modifications to the original programme necessary to ensure the completion of the works within the time for completion as defined in Clause of Time for completion hereof

4.25.3 **Cash Flow**

The detailed programme shall also show the estimated Cash flow required for each month to complete the works.

4.25.4 Progress Report/Photographs

Four copies of monthly progress reports containing the following shall be submitted by the contractor to the Client through the Architect/Consultant on or before 3rd day of the next fortnight.

(i) Monthly detailed progress report showing the progress of individual activities of programme as achieved at site till such period and being suitably marked on the approved network diagram, or as directed by the Consultant, shall be provided by the Contractor indicating the actual state. of progress during the course of the contract, together with other details of procurement & delivery schedules of materials/equipments, as required by Client.

(ii) Four copies of coloured photographs in 8" x 10" size showing important location progress of work.

(iii) Labour report in the form prescribed by the Architect/Consultant.

(iv) Equipment & machinery report in the form prescribed by the Architect/Consultant. / Supervisory staff report in the form prescribed by the Architect/Consultant

4.26 **Disruption of Progress**

The Contractor shall give adequate but not less than 4 weeks time written notice to the Architect/ Consultant whenever planning or progress of the Works is likely to be delayed or disrupted unless any further drawing or order, including a; direction, instruction or approval, is required to be issued by the Architect/Consultant. The notice shall include details of the drawing or order required explaining why and by when it is required and of any delay or disruption likely to be suffered if it is late.

4.27 **Default of Contractor**

If the Contractor being an individual or a firm commits any "act of insolvency", or shall be adjudged an insolvent or being an Incorporated Company shall have an order for compulsory winding up made against it or pass an effective resolution for winding up voluntarily or subject to the supervision of the Court and the Official Assignee or the Liquidator in such acts of insolvency or winding up, as the case may be, shall be unable within seven days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Architect/ Consultant, that he is able to carry out and fulfill the Contract and to give security therefore, if so required by the Architect/Consultant.

Or if the Contractor (when an individual, firm or incorporated Company) shall suffer execution or other process of Court attaching property to be issued against the Contractor.

Or shall suffer any payment under this Contract to be attached by or on behalf of any of the creditors of the Contractor.

Or shall assign or sublet this Contract without the consent in writing of the Client.

Or shall charge or encumber this Contract or any payments due or which may become due to the Contractor hereunder.

Or if the Architect/Consultant all certify in writing to the Client that the Contractor.

4.27.1 Has abandoned the Contract, or Has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the works for seven days after receiving from the Consultant's notice to proceed with the work or

4.27.2 Has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or

4.27.3 Has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Consultant written notice that the said materials or work were condemned and rejected by the Consultant under these conditions,

4.27.4 Has neglected or failed persistently to observe and perform all or any of the acts, matters or things by this contract to be observed and performed by the Contractor for seven days after written notice shall have been given to the Contractor requiring the Contractor to observe or perform the same.

Then and in any of the said cases the Client may, notwithstanding any previous waiver, after giving seven days notice in writing to the Contractor, determine, the Contract, but without thereby affecting the powers of the Architect/Consultant or the obligations and liabilities of the Contractor, the whole of 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 Contractor. And further, the Client by his agents or servants may enter upon and take possession of the works and all plants, tools, scaffoldings, sheds, machinery, steam and other power utensils and materials lying upon the premises or the adjoining lands or roads and use 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 agency. The Contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other Contractor or other person or persons employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or as soon, thereafter, as convenient the Architect's/Consultant's a give a notice m writing to the Contractor to remove his surplus materials and plant and should the Contractor fail to do so within a period of fourteen days after receipt thereof by him, the Client may sell the same by public auction, and give credit to the Contractor for the net amount realized. The Consultant shall, thereafter, ascertain and certify in writing under his hand what (if anything) shall be due or payable to or by the Client, for the value of the said plant and materials so taken possession of by the Client and the expense or loss which the Client shall have been put to in procuring the works to be completed and the amount, if any, owing to the Contractor and the amount which shall be so certified shall thereupon be paid by the Client to the Contractor or by the Contractor to the Client, as the case may be, and the Certificate of the Architect/ Consultant shall be final and conclusive between the parties.

4.28 **Force Majeure:**

Force Majeure Events

Force Majeure Event means any of the Non-Political Events, the Political Events or the Other Events set out hereunder:

(a) is beyond the control of the Party claiming to be affected thereby ("the Affected Party"),
(b) prevents the Affected Party from performing or discharging its obligations under this contract and
(c) the Affected party has been unable to overcome or prevent despite· exercise of due care and diligence.

Non-Political Events

Any of the following events which prevents the Affected Party from performing any of its obligations for a continuous period of not less than 7 days from the date of its occurrence, shall constitute a Non-Political Event:

(a) earthquake, flood, inundation, landslide;

(b) storm, tempest, hurricane, cyclone, lightning, thunder or other extreme atmospheric disturbances;

(c) fire caused by reasons not attributable to the client or the Contractor or any of the employees or agents of the client or the Contractor;

(d) acts of terrorism;

(e) strikes, boycotts, labour disruptions or any other industrial . disturbances not arising on account of the acts or omissions of the client or the Contractor;

(f) any failure or delay of the Contractor caused by any of the aforementioned Non-Political Events, for which no offsetting compensation is payable to the client by or on behalf of the Contractor.

Political Events

(a) Change in Law for which no relief is provided and which has resulted in Material Adverse Effect.

Other Events

Any of the following events which prevents the Affected Party from performing any of its obligations for a continuous period of not less than 7 days from the date of its occurrence, shall constitute the Other Event:

(a) war, hostilities (whether war be declared or not);
(b) invasion, act of foreign enemy, rebellion, riots, weapon conflict or military actions, civil war;
(c) ionising radiation, contamination by radio activity from nuclear fuel, any nuclear waste, radioactive toxic explosion;
(d) volcanic eruptions;
(e) any failure or delay of a Contractor caused by any of the aforementioned Other Events, for which no offsetting compensation is payable to the client by or on behalf of the Contractor.

Obligations of the Parties

(a) Obligation to Notify

(i) As soon as practicable and in any case within 7 days Of the date of occurrence of a Force Majeure Event or the date of knowledge thereof, the Affected Party shall notify the Architect/Consultant and the other Party of the Force Majeure Event setting out, inter alia, the following in reasonable detail :

a) the nature and extent of the Force Majeure Event;

b) the estimated Force Majeure Period,

c) the nature of and the extent to which, performance of any of its obligations under this Contract is affected by the Force Majeure Event.

d) the measures which the Affected Party has taken or proposes to take to alleviate/mitigate the impact of the Force Majeure Event and to resume performance of such of its obligations affected thereby.

e) any other relevant information concerning the Force Majeure Event, and/or the rights and obligations of the Parties under this Agreement.

(ii) As soon as practicable and in any case within 5 days of notification by the Affected Party in accordance with the .preceding clause (1) the Parties shall along with the Architect/ Consultant, meet, hold discussions in good faith and where necessary conduct physical inspection/survey of the Project in order to:

(a) assess the impact of the underlying Force Majeure Event,

(b) to determine the likely duration of Force Majeure Period and,

(c) to formulate damage mitigation measures and steps to be undertaken by the Parties for resumption of obligations the performance of which shall have been affected by the underlying Force Majeure Event.

(iii) The Affected Party shall during the Force Majeure Period provide to the client with regular (not less than weekly) reports concerning the matters set out in the preceding clause (ii) as also any information, details or document, which the client may require.

(b) **Performance of Obligations**

If the Affected Party is rendered wholly or partially unable to perform any of its obligations under this contract because of a Force Majeure Event, it shall be excused from performance Of such obligations to the extent it is unable to perform the same on account of such Force Majeure Event provided that:

(i) the excuse from performance shall be of no greater scope and of no longer duration than is necessitated by the Force Majeure Event;

(ii) the Affected Party shall make all reasonable efforts to mitigate or limit damage, if any, caused or is likely to be caused to the Project as a result of the Force Majeure Event and to restore the Project in accordance with the Good Industry Practice and its relative obligations under this Contract;

(iii) the Affected Party shall take all remedial measures including duly prosecuting and exhausting all such remedies available to the Affected Party under the Applicable Laws;

(iv). when the Affected Party is able to resume performance of its obligations under this contract, it shall give to the other Party written notice to that effect and shall promptly resume performance of its obligations hereunder

(ci) the Affected Party shall continue to perform such of its obligations which are not affected by the Force Majeure Event and which are capable of being performed in accordance with this contract.

4.29 **Determination/Termination of Contract by Client**

4.29.1 The Client shall in addition to any other power enabling him to determine the Contract have power to determine the Contract at any time by giving not less than fourteen (14) days notice in writing to the contractor and on the expiry of such notice the Contract shall be deemed to be determined without prejudice to the claims of either party in respect of any antecedent breach thereof.

4.29.2 Compliance with Architect's/ Consultant's Direction on Determination

If the Contract shall be determined under the provisions of the clauses 4.16 and 4.27(a) the contractor shall with all reasonable dispatch comply with the directions of the Architect/Consultant in respect to :

(i) Cancellation of outstanding commitments

(ii) Performance of further work required for the protection of work executed

(iii) The removal of Constructional Plant, Temporary Works and materials from, the Site

(iv) Any other matters arising out of the Contract with regard to which the Architect/Consultant decides that directions are necessary or expedient.

4.30 Payment on Determination /Termination

In the event of the Contract being determined under the provisions of this clause the sum payable to the Contractor shall be such sum as would have been payable under Clause (0) Arbitration hereof as if the contract had been determined by the Client under the provisions of Clauses 4.16 and 4.27(a) hereof and

(i) The reasonable cost of complying with the Architect's/Consultant's directions under sub-clause (ii) hereof and

(ii) Such reasonable sum as may be agreed between the parties or in default of agreement settled by arbitration in respect of the Contractor's overheads including any sums properly and necessarily incurred as the direct result of such determination.

(iii) The Architect/ Consultant has a right to ascertain the happening of any contingency, including but not limited to the contingencies listed below, which would vest in the Client certain powers including, but not limited to, taking possession of the work so far as it has been performed, and to completing the work either by himself or by employing some other Agency, retaining property of Contractor, such as materials, plant or money already due to the Contractor :

a) Failure of Contractor to proceed with or complete the works in the time or manner stipulated
b) Contractor's bankruptcy.
c) Failure of Contractor to commence the work.
d) Failure of Contractor to regularly proceed with the work for a certain fixed period.
e) Failure of Contractor to proceed to the satisfaction of the Client or the Architect/ Consultant.
f) Failure of Contractor to proceed with the work for any reason independent of prevention by Client.
g) If in the Consultant's opinion, the Contractor is not exercising due diligence and proceeding with such dispatch as will enable the works to be duly completed in time.
h) Failure of Contractor in complying with the orders and directions given by the Architect/ Consultant.
i) Failure of Contractor in complying with the Specification, stipulations, conditions or Drawings.
j) The Contractor being guilty of any default in the fulfillment of the contract.
k) The Contractor leaves the work unfinished.
l) Failure of Contractor, after due notice, to rectify defective work.
m) The Contractor renouncing materials from site and
n) Failure of Contractor to maintain the works

4.31 **Time for Completion**

The entire work is to be completed in all respects within the time stated in Salient Features of the contract and such extended time as may be allowed under the contract. Time is the essence of the contract and shall be strictly observed by the contractor.

If required in the contract or as directed by the Architect/Consultant, the contractor shall complete certain portion of the work before the completion of the whole of the work. However the completion date for whole of the work shall not change for above.

4.32 **Extension of Time for Completion**

If in the opinion of the Architect/Consultant the works be delayed for reasons beyond the control of the contractor, the Architect/ Consultant make a fair and reasonable extension of time in case for completion of the contract works. If the Contractor needs an extension of time for the completion of the work or if the completion of work is likely to be delayed for any reasons beyond the due date of completion stipulated in the contract, the Contractor shall apply to the Client for extension of time in writing at least 30 days before the expiry of the scheduled time and while applying for extension of time, Contractor shall furnish the reasons in details and his justification, if any, for the delays. While granting extension, the Architect/ Consultant hall notify the contractor the period of time which will not qualify for levy of liquidated damages.

For the balance period in excess of original stipulated period and authorised extension of time granted i.e. period not qualifying for levy or liquidated damages, by the Client, the provision of liquidated damages as stated under Clause 4.21 Liquidated Damages will become applicable. Further, the

contract shall remain in force even for the period beyond the due date of completion irrespective whether the extension is granted or not.

4.33 **Rate of Progress**

The whole of the materials, plant and labour to be provided by the Contractor and the mode, manner and speed of execution and maintenance of the Works are to be; of a kind and conducted in a manner to the satisfaction of the Architect/Consultant should the rate of progress of the Works or any part thereof be a anytime be in the opinion of the Architect/ Consultant too slow to ensure the completion of the whole of the. Works by the prescribed time or extended time for completion, the Architect/ Consultant shall so notify Contractor in writing and the Contractor shall thereupon take such steps as considered necessary by the Consultant to expedite progress so as to complete the Works by the prescribed time or extended time for completion. Such communications from the Architect/Consultant neither shall relieve the contractor from fulfilling obligations under the contract nor he will be entitled to raise claims arising out of such directions.

4.34 Settlement of Disputes/Arbitration

4.34.1 Settlement of Disputes and Differences

The Contractor shall try to settle the matters, pertaining to this contract first with the Architect/ Consultant, The decision of the Architect/Consultant may be in the form of a certificate, instruction or otherwise. The decision, opinion, direction certificate for payment with respect to all or any of the matters of the Architect/Consultant shall be final and conclusive and binding on the Contractor and shall be without appeal.

All other disputes and differences of any kind what so ever the Contractor and the Architect/ Consultant arising out of or in connection with the contract or carrying out the works (whether during progress of work or within defects liability period and whether before or within 365 days of determination *I* abandonment /breach of the contract) shall then be referred by the Contractor to the Client giving inter alia full details of matter under dispute and reasons thereof The Client shall within a period of 60 days from the receipt of such reference from the contractor, give his decision in writing. If the Contractor is dissatisfied with the decision of the Client, he can refer the matter for arbitration by serving a written notice of the Client, he can refer the matter for arbitration by serving a written notice on the Client, through the Consultant within a period of 28 days of such decision. The notice shall specify the matters with full details, amounts which are in dispute and referred for arbitration along with list of Documents relied upon.

4.34.2 Serving of Notice on the Contractor

Any notice to be given to the Contractor under the terms of the Contract shall be served by sending the same by registered post to / or leaving the same at the Contractor's principal place of business (or in the event of the Contractor being a Company to/or at its registered office).

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 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 Client will send within thirty days of receipt of the notice, to the contractor a panel of three names of persons who shall be presently unconnected with the organization for which the work is executed.

The contractor shall on receipt of the names as aforesaid, select anyone of the persons named to be appointed as a sole Arbitrator and communicate his name to the Client within thirty days of receipt of the names. The Client shall thereupon without any delay appoint the said person as the Sole Arbitrator. If the contractor fails to communicate such selection as provided above within the period specified, the Client 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 contractor shall be withheld on account of such proceedings, except the amounts under dispute.

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 Act 1992 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.

4.35 **Salient Features of the Contract**

Sr.No.	Item	Ref. to Clause/Page	Description
1	Contact Value	4.1 - 15	Total value of the item rate Tender as accepted by the Client.
2.	Date of Commencement	4.24 – 40	10 days from the date of letter of intent or the date of handing over of the site whichever is later.
3.	Time of Completion	4.31 – 46	16 weeks from the date of Commencement including rainy season.
4.	Earnest Money Deposit	4.16 – 37	Rs. 50,000/- (Rupees Fifty Thousand Only) in the form of Demand Draft in favour of New India Assurance, Mumbai.
5.	Initial Security Deposit	4.16 – 37	Rs. 1,50,000/- (including Earnest Money Deposit) in the form of Demand Draft in favour of New India Assurance.
6.	Retention Money	4.15 – 37	Additional 10% of every interim bills.
7.	Security Deposit	4.15 – 37	Total of items 5 and 6 above limited to 5% of the contract value.
8.	Release of Security Deposit	4.16.2 – 38	a) After satisfactory completion of Defect Liability Period.
9.	Defects Liability Period	4.19 – 38	12 Months after completion of work (excluding Notice period of 15 days) from the date of virtual Completion Certified by the Architect/Consultant)
10.	Liquidated Damages	4.19 – 38	0.5% of Contract value per week or part for delay there of subject to a maximum of 7.5% of Contract value. (Also applicable at interim stages of work i.e. milestones)
11.	Secured advance on Materials	4.14.b – 37	70% of Value of materials derived from the respective tender item or the bill value whichever is less.
12.	Period of bill & Minimum value of work for Interim certificate.	4.14 – 36	One bill per month subject to Rs.16,00,000/- (minimum)

13.	Payment of Interim Bill	4.14 – 36	Adhoc payment 75% of the value of the works as assessed by the Architect/Consultant within 8 working days and balance payment will be made within 15 days both from the date of Architects/P.M.C's certificate for payment.
14.	Submission of final bill	4.14-c – 37	Within 60 days from the date of virtual completion as certified by the Architect/P.M.C.
15.	Payment of Final Bill	4.14-c – 37	Within 30 days from the date of certification by the Architect/P.M.C. and on receipt of no due certificate from the contractor.
16.	Price Variation	4.13 – 33	Applicable as provided for.

ELECTRICAL WORKS:

TECHNICAL SPECIFICATIONS

1.0 The following Technical Specifications are made applicable for the Stated Job and shall be rigidly adhered to while supplying and installing the materials at site.

1.1 **CODES AND STANDARDS :-**

1.1.1 The following Codes and Standards shall be applicable for continuous performance of all electrical equipments to be supplied, delivered at site, erected, tested and commissioned. The Electrical equipments offered shall comply to the relevant Indian Standard Specifications, Fire Insurance Regulations, Tariff Advisory Committee's Regulations, and in particular to Indian Electricity Rules in all respects with all its latest amendments up-to-date.

1.1.2 For guidelines to the tenderers, few of the Indian Standards are indicated below :-

IS 116	Circuit Breakers for AC System.
IS 159	Busbars and Busbar connections.
IS 3043	Code of Practice for earthing.
IS 3072	Code of Practice for Installation of Switchgear.
IS 3106	Code of Practice for Selection, Installation and Maintenance of Fuse (upto 650 Volts)
IS 3202	Climate Proofing of Electrical Equipment
IS 3427	Metal enclosed Switchgear and Control Gear.
IS 3837	Accessories for rigid steel conduits.
IS 4047	Heavy Duty Air Break Switches and composite Switch Fuse Units for voltage not exceeding 100 Volts.
IS 4064	Switch Fuse Units for Industries etc.
IS 4237	General requirements for Switchgears not exceeding 1000 Volts.
IS 4615	Switch Socket Outlets.
IS 5133 (Part-I)	Sheet Steel Boxes.
IS 5216	Guide for safety procedures and practices in electric work.
IS 5578	Guide for marking of insulated conductors.
IS 5820	Pre-cast concrete cable covers.
IS 5908	Method of measurement of electrical installation in building.
IS 6381	Specifications for construction and testing of electrical apparatus.
IS 1818	Isolator and Earthing Switches.
IS 1947	Flood Lights.
IS 2147	Degree of Protection provided for enclosure for Switchgear.
IS 2208	HRC Cartridge Fuse Units upto 650 Volts.
IS 2251	Code of Practice for Danger Notice Plates.
IS 2268	Call Bells/Buzzers.
IS 2274	Code of Practice for wiring installations (exceeding 650 Volts)
IS 3854	Switches for domestic and similar purpose.

IS 2312	Exhaust fans.
IS 2309	Code of Practice for Lightning Protection.
IS 2418	Tubular fluorescent lamps for General Lighting Service.
IS 2509	PVC Electrical conduits.
IS 2516	A.C. Circuit Breakers.
IS 2667	Fittings for rigid steel conduits for electric wiring.
IS 2675	Enclosed distribution fuse boards and cutouts for voltage upto 1000 Volts.
IS 2705	Current Transformers.
IS 3070 (Part-I)	Lightning Arrestors.
IS 2834	L.T. Capacitors.
BS 162	Electric Power Switchgear for Indoor and Outdoor Installations.
IEC Pub 26	Circuit Breakers.
IS 374	Ceiling Fans.
IS 375	Marking and arrangement for Switchgear Boards Main connections and Auxiliary Wiring.
IS 415	Tungsten Filament lamps.
IS 694	PVC insulated cable and cords for Power/Lighting.
IS 722	Three Phase Watt Hour meters with MDI.
IS 732	Electrical wiring installation (upto 650 Volts)
IS 1087	Single pole tumbler switch 5 Amps.
IS 1248	Direct acting Electrical Indicating Instruments.
IS 1293	3 Pin Plugs and Socket Outlets.
IS 1554	PVC Insulated Cables - Heavy Duty.
IS 1567	Metal Clad Switches upto 100 Amps.
IS 1651	Lead Acid Cell Batteries.
IS 1653	Rigid Steel Conduits for Electric Wiring
IS 1771	Industrial Light Fittings with accessories.
IS 6946	Pliable (flexible) non-metallic conduits for electrical.

The entire electrical installation work shall be strictly complied with the Codes Standards, Rules and Regulations framed under the Indian Electricity Act. Further, it shall be carried out as per the Regulations and Rules set out by "Tariff Advisory Committee and/or Fire Insurance Regulations".

Any other IS Codes As applicable at the time of execution over and above whatever stated above.

Some of the Rules framed under Indian Electricity Rules of 1956 and all amendments thereof more particularly complied to :-

35, 43, 44, 44-A, 45 (Part-I), 50, 51, 59, 61 (a), 61 (c), 62, 63 (2), 65, 66, 67, 68, 69 and 92 (2).

1.0 SPECIFICATION FOR L.T. SUB-STATION EQUIPMENT

Scope:

1.1 This Specification covers the design, manufacture, testing and supplying of all substation equipment required to be installed to complete the sub-station in all respect and to complete the installation in working condition.

Applicable Standards:

1.2 All relevant Indian Standards shall be applicable with latest amendments. Also any other specific application is required, and then the same shall be complied to.

440 Volts grade Warning Boards:

1.3 440 Volts Red Warning Boards of made up of Aluminum sheet and having size of 150 mm x 150 mm x 3 mm thick painted with self illuminated fluorescent “RED” Color paint shall be fixed at prominent places. These shall have minimum 2 languages inscribed on it, mainly Local Language,

and English . The Warning Boards shall also have the usual Electrical Shock inscriptions as well as the small mark of Danger on it. These shall be fixed out side of all the electrical rooms and as per directions of Consultant/ Engineer in charge.

Rubber Mating :-

1.4 Rubber Matting shall be placed on the floor in the front of the Medium Voltage Panels. The Rubber Matting shall be of approved quality of size not less than 1000 mm (wide) x 10 mm (thick). The length of the rubber matting shall be such as to cover the entire working area in front of all the equipment's placed in the Main LT Room. These shall further comply to relevant standards under Indian Electricity Rules and Codes of Standards. The mats shall be so designed to withstand 1100 Volts for 1 minute and leakage of current shall not exceed 160 mA/square meter.

Fire buckets, extinguishers and charts :-

1.5 Fire buckets, Fire extinguishers and charts shall be supplied as per the list given below. The fire buckets shall be made up of galvanised Iron Sheets of approved thickness and painted Red with letters of 'FIRE' written on it. 5 such buckets shall form one set and they shall be hung by means of hook arrangement from a stand prepared out of Round steel bars with supporting frame. This frame work shall also be painted 'RED'.

1.6 The fire buckets shall be filled with clean, dry and pebble free sand ready for immediate use for extinguishing fires.

1.7 There shall be two such sets kept ready one in the switchyard under a proper weather protection shed and the other inside the HV/LV Room. The number of Fire extinguishers shall be as per the inspectorate. These shall be CO_2 type and shall be tested at least once in six months on the site, after erection. This shall be as per relevant Indian Standards of minimum 6.8 Kgs. Instructions charts of restoration of persons suffering from Electric shocks in English, Hindi and local language shall be displayed in an enclosed wooden/glass frame work, one in the LV Room and the other in the H.V. Room.

1.8 The Contractor has to also ensure the following things during the execution of the job or before starting of any wok/job.

1.8.1 The Rate quoted by the contractor shall include all the associated civil work like cutting, chasing walls, making holes in wall/ceilling for cables and conduits, cable trays, grouting of panels, DB's etc and making good of the same.

1.8.2 The Contractor shall employ full time Degree holder site Engineer having minimum Twelve Years experience in the field. Further he should also employ Two Nos. full time Diploma holder site supervisor having minimum Seven years experience.

1.8.3 The Contractor should produce copies of the Supervisors & Workmen licences prior to start of any work at site.

1.8.4 When there are differences between Specifications and Schedule of quantities, the superior of the two will be applicable. No additional payment will be entertained on this account. Also Consultants decision in this matter will be final and binding on both the parties.

1.8.5 Any changes made by the Architects/Consultants even after approval of shop or working drawings are to be incorporated in the said drawings without any extra cost. The owner will not entertained any claim on this account. Also the contractor has to submit minimum six copies of drawings for approval.

1.8.6 All the Measurements shall be taken as per IS standards.

1.8.7 All Tool, Tackle, lifting or any other equipment needed for completion of the job is to be included in scope. No extra payment will be made to the contractor on this account.

1.8.8 The Contractor has to submit Seven Copies of the As Built Drawings plus Four CDs for record purpose. Also the contractor has to submit one set of drawings on Reproducible tracing film.

1.8.9 The Contractor has to submit Six copes of Operation and Maintenance manuals. Out of Six copies, One copy should be Original.

2.0 415 V MEDIUM VOLTAGE PANELS

2.1 GENERAL

This section covers the detailed requirements of medium voltage switchboard for 415 volts, 3 phase, 50 Hz, 4 wire system.

2.2 STANDARDS AND CODES

Updated and current Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract.

Low Voltage switchgear Assemblies		IEC 60 439-1/IS 8623
Low Voltage switchgear & control gear		IEC 60 947 /IS 13947 : 1993
Part I	:	General rules
Part II	:	Circuit Breakers
Part III	:	Switches, disconnectors, switch disconnectors and fuse combination units
Part IV	:	Contactors and Motor starters
Part V	:	Control circuit devices and switching elements.

Degree of Protection of Enclosures for low voltage switchgear. IEC60529 /IS 2147 : 1962

Internal arc tests AS3439 /1

2.3 SWITCHBOARDS

General

2.3.1 The LV switchboards shall be Totally Type Tested (TTA) as per the standards IEC60439-1. The switchboards and the associated equipment including switchgear, control gear, Busbar supports, Busbar orientation, Busbar links etc shall be identical in construction to the assembly which has undergone the type test. The drawings of the type-tested assemblies shall be made available for inspection.

2.3.2 The designs of the switchboards should be with switchgear manufacturer, and all the mechanical drawings must be available in the factory before hand.

2.3.3 Switchboards shall have a short circuit level withstand as per Schedule of Quantities and drawings.

2.3.4 In general Short circuit withstand levels shall be

i. For main Bus rating above 4000A - 100 kA for 1 sec

ii. Other main Switchboards - minimum 50 kA

iii. Distribution boards upto 1000A - 30 kA.

2.3.5 The enclosures shall be designed to take care of normal stress as well as abnormal electro-mechanical stress due to short circuit conditions. All covers and doors provided shall offer adequate safety to operating persons and provide ingress protection of IP 42 unless otherwise stated. Ventilating openings and vent outlets, if

2.3.6 provided, shall be arranged such that same ingress protection of IP 42 is retained. Suitable pressure relief devices shall be provided to minimize danger to operator during internal fault conditions. The design should have undergone Internal Arc tests for different types of feeders

2.3.7 Switchboards shall also have test certificate for Seismic withstand.

2.3.8 The switchboard along with ACBs and connections shall be type tested at CPRI /Independent international test house for short circuit, temperature rise, protective earth short circuit test and dielectric tests of the ratings required.

2.3.9 For operator safety IP2 X (touch proof) protection to be available even after opening the feeder compartment door. The compartmentalization to be achieved by using metal separators only.

2.3.10 As specified in the BOM the switchboard shall be form 4b, For form of separation only metallic covers shall be used,

Switchboard Configuration

2.3.11 The Switchboard shall be configured with Air Circuit Breakers, MCCB's, MCB's and other equipment as called for in the schedule of quantities.

2.3.12 The MCCBs shall be arranged in multi-tier formation whereas the Air Circuit Breakers shall be arranged in Single or Double tier formation only to facilitate operation and maintenance.

2.3.13 The Switchboards shall be of adequate size with a provision of spare space to accommodate possible future additional switch gear.

Constructional Features

2.3.14 The Switchboards shall be metal clad totally enclosed, floor mounted free standing type of modular extensible design suitable for indoor mounting.

2.3.15 Switchboards construction shall employ the principle of compartmentalization and segregation for each circuit.

2.3.16 Incomer and bus section panels or sections shall be separate and independent and shall not be wired with sections required for feeder. The incomer panel shall be suitable for receiving bus trunking of rating specified.

2.3.17 Switchboards shall be made up of requisite vertical sections, which when coupled together, shall form continuous dead front switchboards.

2.3.18 Switchboard shall be readily extensible on both sides by addition of vertical sections after removal of the end covers.

2.3.19 The switchboards shall be designed for use in high ambient temperature and humid tropical conditions as specified. Ease of inspections, cleaning and repairs while maintaining continuity of operation shall be provided in the design.

2.3.20 Metal based neoprene gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust and vermin proof to provide a degree of protection shall be as stipulated in schedule of quantities. The unused openings within the switchboards shall be closed using suitable grommets.

2.3.21 Special care to be taken to ensure effective earthing of the frame and doors of the switchboards. The frame and doors shall be connected to the main earthing terminal through a 2.5 sq mm copper cable.

2.3.22 Each vertical section shall be provided with a rear or side cable chamber housing the cable end connections and power/control cable terminations. There should be generous availability of space for ease of installation and maintenance with adequate safety for working in one vertical section without coming into contract with any live parts. The design of the switchboard shall allow standard extension chambers if required to accommodate cables.

2.3.23 Some switchboards may be required to be installed against the wall, for such application-documented designs shall be available.

2.3.24 Switchboard panels and cubicles shall be fabricated with CRCA Sheet Steel of thickness not less than 2.0 mm and shall be folded and braced as necessary to provide a rigid support for all components. The doors and covers shall be fabricated from CRCA sheet steel of thickness not less than 2 mm. Joints of any kind in sheet metal shall be seam welded and all welding slag ground off and welding pits wiped smooth with plumber metal.

2.3.25 All panels and covers shall be properly fitted and square with the frame. The holes in the panel shall be correctly positioned.

2.3.26 Switchboard shall be provided with "Danger Notice Plate" conforming to relevant Indian Standards.

Switchboard Dimensional Limitations

2.3.27 The overall height of the switchboard shall be limited to 2200 mm for all the Busbar ratings and type of switchboards.

2.3.28 The height of the operating handle, push buttons etc shall be restricted between 300 mm and 2000

mm from finished floor level.

2.3.29 Other dimensional limits if any are specified separately.

Switchboard Compartmentalization

2.3.30 For compartmentalized switchboards, separate totally enclosed compartments shall be provided for horizontal busbars, vertical busbars, ACBs, MCCBs, and cable alloys.

2.3.31 The main board shall be with Form 4b Construction.

2.3.32 Earthed metal or insulated shutters shall be provided between drawout and fixed portion of the switchgear such that no live parts are accessible with equipment drawn out. Degree of protection within compartments shall be at least IP 2X.

2.3.33 Sheet steel hinged lockable doors for each separate compartment shall be provided and duly interlocked with the breaker in "ON" and "OFF" position.

2.3.34 For all Circuit Breakers separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contactors and control MCB etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, busbars and connections.

2.3.35 For Some MCCB feeders for critical loads like UPS it may be required to have operation only after opening the door, all other facilities like padlock able rotary handle to be provided for such feeder. It shall be possible to do this change during execution of order

2.3.36 Each switchgear cubicles shall be fitted with label in front and back identifying the circuit, switchgear type, rating and duty. All operating device shall be located in front of switchgear only.

2.3.37 A horizontal wire way with screwed cover shall be provided at the top to take interconnecting control wiring between vertical sections.

2.3.38 Separate cable compartments running the height of the switchboard in the case of front access boards shall be provided for incoming and outgoing cables.

2.3.39 Cable compartments shall be of adequate size for easy termination of all incoming and outgoing cables entering from bottom or top. The construction shall include necessary and adequate and proper support shall be provided in cable compartments to support and clamping the cable in the cable alley / cable chamber.

Switchboard Bus Bars

2.3.40 Busbars shall be made of high conductivity 99.9% purity, high strength Copper of ETP grade. Bus bars shall be of rectangular cross sections suitable for full load current for phase bus bars and half / full rated current for neutral bus bar or as stipulated in schedule of quantities. Busbar shall be suitable to withstand the stresses of fault level as specified in schedule of quantities. The certification for conductivity of the copper shall be made available from third party certifying agency.

2.3.41 The bus bar system may comprise of a system of main horizontal bus bars and auxiliary vertical bus bars run in bus bar alloy on either side in which the circuit could be arranged with front access for cable entrances

2.3.42 The bus bars shall be supported on non-breakable, non-hygroscopic epoxy resin or glass fiber reinforced polymer insulated supports able to withstand operating temperature of 110 C at regular intervals, to withstand the forces arising from a fault level as stipulated in schedule of quantities. The material and the spacing of the Busbar supports should be same as per the type tested assembly

2.3.43 Auxiliary buses for control power supply, space heater power supply or any other specified service shall be provided. These buses shall be insulated, adequately supported and sized to suit specific requirement. The material for auxiliary supply bus will be insulated electrolytic copper. Wires.

2.3.44 Clearances : The minimum clearances to be maintained for enclosed indoor air insulated bus bars for medium voltage applications shall be as per IEC guidelines.

Switchboard Interconnection

2.3.45 All connection and tap offs shall be through adequately sized connectors appropriate for fault level at location. This shall include tap off to feeders and instrument/control transformers.

2.3.46 For unit ratings upto 250 amps, PVC insulated 105 dg withstand copper conductor wires of adequate size to carry full load current shall be used. The terminations of such interconnections shall be crimped. Solid connections shall be used for all rating of above 250 amps..

2.3.47 All connections, tappings, clamping, shall be made in an approved manner to ensure minimum contact resistance. All connections shall be firmly bolted and clamp with .even tension. Before assembly joint surfaces shall be filed or finished to remove burrs, dents and oxides and silvered to maintain good continuity at all joints. All screws, bolts, washers shall be zinc plated. Only 8.8 grade nuts and bolts shall be used for busbar connections.

Drawout Features

2.3.48 Air Circuit Breakers shall be provided in fully drawout cubicles, unless otherwise stated. These cubicles shall be such that drawout is possible without disconnection of the wires and cables. The power and control circuits shall have self-aligning and self-isolating contacts. Mechanical latches shall be integated in ACB at service, test and isolated position to ensure that Breaker is firmly latched in respective position. It shall not be possible to move the breaker from the position unless latch is manually operated.

2.3.49 MCCBs in the main switchboards shall be with Plug- in arrangement.

Instrument Accommodation

2.3.50 All voltmeter and ammeter and other instruments shall be flush mounted type of size 96 mm X 96 mm conforming to class 1 of IS 1248 for accuracy. All voltmeter shall be protected with MCBs.

2.3.51 Instruments and indicating lamps shall not be mounted on the Circuit Breaker Compartment door for which a separate and adequate compartment shall be provided and the instrumentation shall be accessible for testing and maintenance without danger of accidental contact with live parts of the Switchboard.

2.3.52 For MCCBs, instruments and indicating lamps can be provided on the compartment doors.

2.3.53 The current transformers for metering and for protection shall be mounted on the solid copper/aluminium busbars with proper supports.

2.3.54 On all the incomers of switch boards ON/OFF indicators lamps shall be provided suitable for operation on AC 230 volts supply. All lamps shall be protected by MCBs.

2.3.55 For Incomer Load Managers and for important outgoing feeders Digital Energy meterss shall be provided. Also add on modules for RS485 port, programmable contacts, analogue output etc to connect to remote BMS/SCADA system shall also be provided.

Wiring

2.3.56 All wiring for relays and meters shall be with PVC insulated copper conductor wires. The wiring shall be coded and labeled with approved ferrules for identification. The minimum size of copper conductor control wires shall be 2.5 sq. mm. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall used at both end of wires. All control wires meant for external connections are to be brought out on a terminal board. The cables and control wires shall be suitable for withstanding 105 deg C.

Space Heaters

2.3.57 Anti- condensation heaters shall be fitted in each cubicle together with an ON/OFF isolating switch suitable for electrical operation at 230 volts A.C 50 Hz single phase of sufficient capacity to raise the internal ambient temperature by 5O C. The electrical apparatus so protected shall be designed so that the maximum permitted rise in temperature is not exceeded if the heaters are energized while the switchboard is in operation. As a general rule, the heaters shall be placed at the bottom of the cubicle.

Ventilation Fans

2.3.58 The Switchboard shall be provided with panel mounting type ventilation fans in each panel with switchgear rated for 4500 amp and above. The fan shall be interlocked with switchgear operation. The degree pf enclosure protection to be maintained even with Fans.

Earthing

2.3.59 Continuous earth bus sized for prospective fault current to be provided with arrangement for connecting to station earth at two points. Hinged doors / frames to be connected to earth through adequately sized flexible braids.

Sheet Steel Treatment And Painting

2.3.60 Sheet steel used in the fabrication of switchboards shall undergo a rigorous cleaning and surface treatment seven tank process comprising of alkaline degreasing, descaling in dilute sulphuric acid and a recognised phosphating process after which a coat of primer paint compactively with the final paint shall be applied over the treated surface. Final paint coat of oven baked powder coating, of minimum 50 micron thickness, of sheet approved by Engineer-in-Charge shall then be provided.

Name Plates And Labels

2.3.61 Suitable engraved white on black name plates and identification labels of metal for all Switchboards and Circuits shall be provided. These shall indicate the feeder number and feeder designation.

Type test reports.

2.3.62 Switchboard configurations offered shall be CPRI /Independent international test house tested for all the tests as per IEC60439-1 and internal arc tests. Copies of the test certificates shall be submitted with the tender.

Testing at Works

2.3.63 Copies of type test carried out at ACB/ MCCB manufacturers works and routine tests carried out at the switchboard fabricators shop shall be furnished along with the delivery of the switchboards. Engineer-in-Charge reserves the right to get the switchboard inspected by their representative at fabricators works prior to dispatch to site to witness the followings.

a) Physical variation and dimensional check
b) Verification of bill of material
c) Functional check
d) HV test
e) IR test

2.4 SWITCHGEAR

MOULDED CASE CIRCUIT BREAKERS

General

2.4.1 The circuit breakers shall comply with the requirement of IEC 60 947 / IS 13947: 1993. MCCBs shall be suitable for nominal voltage of 3 phase 660 Volts AC 50 HZ supply.

2.4.2 The circuit breaker shall comply with the isolation function requirement of IEC 60 947-2 section 7.1.2 to be marked as suitable for isolation / disconnection to facilitate safety of operating personnel while the breaker is in use.

2.4.3 The circuit breaker shall provide class II insulation between the front cover and internal power circuits to avoid any accidental contact with the live main current carrying path with the front cover open.

2.4.4 The MCCBs shall be of double break contacts.

Constructional features

2.4.5 The MCCBs shall be made of halogen free high strength heat resisting and flame retardant thermo setting insulating material.

2.4.6 Three phase MCCBs shall have a common handle for simultaneous operation and tripping of all the three phases.

2.4.7 The contact tips shall be made of suitable arc resistant sintered alloy. Terminals shall be of liberal design with adequate clearances

2.4.8 Suitable arc extinguishing devices shall be provided for each contact.

Operating mechanism

2.4.9 The operating handle of the MCCBs shall be quick make / break, trip free type.

2.4.10 The operating handle of the MCCBs shall have suitable, ON, OFF and TRIPPED indicators.

2.4.11 The operating handle and mechanical trip push button shall be at the front of and integral with the circuit breaker

2.4.12 MCCBs shall be capable of limiting the fault currents. The maximum thermal I2 t shall be indicated by the manufacturer. These characteristics shall allow high cascading performance with MCCBs / MCBs downstream.

2.4.13 MCCBs shall comprise of the mechanism designed to trip the circuit breaker in the event of high value short circuit currents.

2.4.14 The electrical endurance of MCCBs shall be more or equal to that specified by IEC 60 947-2 standard.

2.4.15 Earth fault protection if specified should be an integral part of the breaker, direct operating type & adjustable

2.4.16 MCCBs range shall have established and documented discrimination charts readily available

2.4.17 MCCBs should be of the same family.

2.4.18 For optimum selection of the ratings and breaking capacities, range MCCBs should have established cascading charts to enhance capacity of the downstream MCCBs.

Circuit Breaker Interlocking

2.4.19 MCCBs shall be provided with following interlocking devices.

1.0 Handle interlock to prevent unnecessary manipulations of the breaker.

2.0 Door interlock to prevent door being opened when the breaker is in ON position

3.0 Deinterlocking device to open the door even if the breaker is in ON position.

Circuit breaker auxiliaries

2.4.20 The circuit breaker shall be provided with following accessories, if specified in drawings/ schedule of quantities

1.0 Shunt trip

2.0 Under voltage trip

3.0 Alarm switch

4.0 Auxiliary switch

Type test certificate

2.4.21 The contractor shall submit type test certificate from an international recognized test house for the circuit breakers offered.

MINIATURE CIRCUIT BREAKERS

2.4.22 The MCBs shall be of completely moulded design suitable for operation at 240/415 Volts 50 Hz system.

2.4.23 The MCB's shall have a rupturing capacity of 10 KA at 0.5 pf.

2.4.24 The MCB's shall have inverse time delayed thermal overload and instantaneous magnetic short circuit protection..

2.4.25 All the Miniature Case Circuit Breakers shall comply fully with IEC 8828-1996 and should have

uniform breaking capacity of 10 KA.

2.4.26 All the MCBs shall comply with Isolation function.

2.4.27 All the accessories of the MCB should be Snap fit type in design.

2.4.28 The Power loss per pole of the MCB shall be less than as specified in relevant codes of IEC standards and Manufactures shall submit the test certificate for the same.

Current Transformers

2.4.29 Current transformers shall comply with the requirements of IS.2705. They shall have ratios, outputs and accuracy as specified/required.

Indicating Meters and lamps:-

2.4.30 All indicating instruments shall be of digital type, flush mounting industrial pattern.

2.4.31 All the Indicating lamps shall be of the LED type. All the Lamps shall be color LED lamps. Lamps and lenses shall be easily replaceable from the front. All the Lamps should be Tested and certified as per IS 13947 (Part II) 1993. All the lamps shall be provided with leakage voltage glow protection. All the lamps shall be Immune to vibrations. The Power Consumption of the lamps should not be more than 0.5 Watts at 230 Volts A.C. The Lamps should be suitable for –30% to + 20% of operating Voltage. The Lamps Housing material shall be Flame Retardant ABSTRYNOL with ribbed Poly Carbonate Lens. The Enclosure shall be IP 65 as per IS 13947- (1) of 1993. The Rated Insulation Voltage shall be 500 Volts and Insulation shall be above 500 Mega Ohms. The Termination shall be Totally enclosed/finger Touch proof glass filled nylon and suitable for 2.5 sq. mm FRLS wires with M 3 brass screws. All the Lamps shall be provided with color LEDs.

Relays :-

2.4.32 Circuit breakers shall be provided with integrally mounted Microprocessor based Releases. The Releases shall have a set of 3 phase characteristics which shall be adjustable over wide range to provided discrimination between a multiplicity of devices.

2.4.33 Microprocessor based relays shall be used for all applications including auto changeover. These relays shall be draw out type with built-in test facilities. All the Microprocessor Relays shall conform to IEC 60255-5. LED indication shall be provided in these relays capable of being reset without opening the relay case.

Control Switches:-

2.4.34 Control switches shall be of the heavy duty rotary type with escutcheon plates clearly marked to show the operating position. They shall be semi-flush mounting with only the front plate and operating handle projecting.

2.4.35 Circuit breaker control switches shall be of the spring return to neutral type, while instrument selector switches shall be of the stay-put type.

Push Buttons

2.4.36 Push buttons shall be of the momentary contact, push to actuate type, fitted with self reset contacts and provided with integral escutcheon plates marked with its functions.

Cable Terminations :-

2.4.37 Cable entries and terminals shall be provided in the switchboard to suit the number, type and size of aluminum conductor power cables and copper conductor control cable specified in the detailed specifications.

2.4.38 Provision shall be made for top or bottom entry of cables as required. Generous size of cabling chambers shall be provided, with the position of cable gland and terminals such that cables can be easily and safely terminated. The minimum depth of the panel shall be restricted to suit for this purpose.

2.4.39 Barriers or shrouds shall be provided to permit safe working at the terminals of one circuit without accidentally touching that of another live circuit.

2.4.40 Cable risers shall be adequately supported to withstand the effects of rated short circuit currents without damage and without causing secondary faults.

2.4.41 Cable sockets shall be of copper and of the crimping type as specified.

Control Wiring

2.4.42 All control wiring shall be carried out with color coded 1100 Volts grade single core FR wires of approved make conforming to IS 694 of 1990. All the wires should be unilay in construction with more than 99.99% purity Copper. All the wires stranding should be of fine wires CLASS-5 Construction in accordance with VDE 0295 or IEC 60228. The Oxygen contents in Copper should not be more than 10 parts in million. The

2.4.43 Copper should be cold drawn and on line annealed. All the wires should be tested as per relevant IS and latest IEC standard. The Wire manufacture should submit the certificate from original supplier for purity and oxygen contents in Copper. The outer PVC insulation should be Flame Retardant as per IEC 332.1 The color coded wires should be used. For Potential Circuits "Red", "Yellow" and "Blue" Color wires to be used. For Neutral Black Color is to be used. For Earth Yellow/Green Wires is to be used. For Control's Wiring Gray Color wires are to be used. For CT and PT 2.5 sq. mm wires are to be used.

2.4.44 Wiring shall be neatly bunched, adequately supported and properly routed to allow for easy access and maintenance.

2.4.45 Wires shall be identified by numbered ferrules at each end. The ferrules shall be of the ring type and of non-deteriorating material. They shall be firmly located on each wire so as to prevent free movement.

2.4.46 All control circuits fuses shall be mounted in front of the panel and shall be easily accessible.

Terminal Blocks :-

2.4.47 Terminal blocks shall be of 500 volts grade of the suitable type. Insulating barriers shall be provided between adjacent terminals. All the Terminal Block shall be of approved make.

2.4.48 Terminal blocks shall have a minimum current rating of 10 Amps. Provision shall be made for label inscriptions.

Labels

2.4.49 Labels shall be of anodized aluminum, with white engraving on black background. They shall be properly secured with fasteners.

Tests

2.4.50 The Following tests shall be conducted on all the Panels and Distribution Boards before the same are dispatched to the site from the vendors place. All the Tests shall be carried out in accordance with relevant IS codes and in presence of the Representative of Owner/ Consultant .

2.4.51 Visual inspection of Panels and checking the bill of materials as per the approved drawings and Mechanical ON/OFF operation of the components.

2.4.52 Checking of Protective Measures and electrical continuity of the protective circuits.

2.4.53 High Voltage Test by applying 2.5 kV, 1 minute for checking insulation of equipment and the Material used and recording the leakage current .

2.4.54 Megger tests before and after High Voltage Test at Vendors Factory.

2.4.55 Heat Run Test On Main L.T Panel .

2.4.56 Primary Injection Test for Checking of functioning of Meters and Relays.

2.4.57 Testing of all the Microprocessor Releases at vendors factory and at site before commissioning of the ACBs and MCCBs. The Release should be tested by OEM only and necessary settings of

releases to be done at site in consultation with Consultants.

2.4.58 Milli Volt Drop Test across the Bus-Bars Joints / ACB / MCCB / SFU / MCB and any other Equipment.

2.4.59 Testing of Breakers through Remote operation for ON/OFF and connectivity and operation of Breakers through the software and RS 485 Port.

2.4.60 Physical verification of all components.

2.4.61 Any other tests as desired by Owner / Consultant.

Manufacturing Facilities

2.4.62 Sheet steel manufacturing shall be done according to the drawings on in house CNC cutting and bending machines.

2.4.63 In house facility to be available for seven tank pre treatment process and powder coating facilities The Pretreatment and painting process shall be regularly checked for the stability of the process the final paint thickness should be 60 to 80microns.

2.4.64 The manufacturer must have established stores with proper procedures for checking incoming material, stocking, rejection etc so that non-Quality material does not enter the shop.

2.4.65 In house facility for routine testing of the switchboards

2.4.66 The complete facility should have ISO 9001 certification.

3.0 TECHNICAL SPECIFICATIONS FOR L. T. CAPACITORS

3.1 Scope :

This specifications covers the design, manufacture, supplying and testing of Gas Filled L.T. Capacitors required to be installed in L.T. Room of the sub-station for correction of the power factor.

3.2 Standards :

All relevant Indian Standards shall be made applicable with latest amendments and in particularly IS 133340/41, IEC 831-1-1996, IEC 831-2-1995, EN 60831-2-1996, VDE 560-46:3/95, VDE 560-47:3/95 and any other specific application is required, then the same shall be complied to.

3.3 Specifications :

3.3.1 The capacitors are to be provided with Extruded Aluminum , Easy disposal, Non populating case with IP 20 enclosure, indoor mounting. The containers shall be made up of Extruded Aluminum and should be heat-proof, dust-proof, indoor type and PCB environment .

3.3.2 The containers should be scratch and rust proof.

3.3.3 Terminal provided should be Double , Three way SIGUT terminal strip with protection against electric shock hazard. 9According to IP 20 /IP 54 to VDE 0106 part 100)

3.3.4 The capacitor should be able to handle in rush current up to 200 times the rated current and should be corona free.

3.3.5 The raw materials should be Non PCB inert gas and polypropylene film should be provided as dielectric.

3.3.6 The dielectric loss should be very low in the order of 0.25 Watts/kVAR or lower.

3.3.7 Each unit shall have over pressure tear off fuse, self healing technology, explosion proof construction, touch proof terminals Eco friendly, non flammable.

3.3.8 The Capacitors shall be of the 3 Phase, Delta connected natural or forced cooled type with capacitance tolerance of +5% . the capacitor should be able to perform up to humidity of 95% and discharge module resistor should be included.

3.3.9 The basic unit shall be of 5 kVAR to 50 kVAR as basic step or any other step as specified in the schedule of quantities.

3.3.10 The Capacitor banks shall be erected directly inside the panel on the mounting stands and with complete treatment done to the stand. The stand shall be effectively double earthed to the earthing grid.

3.4 Discharge Resistance :

3.4.1 The Capacitors shall be provided with discharge resistor module so that residual voltage of the capacitor shall be reduced to 50 Volts or less within one minute after the capacitor is disconnected from the source of supply.

3.5 Testing :

3.5.1 The Capacitor bank shall be subject to all routine and acceptance tests as specified in relevant Indian Standards at the factory and the actual test results shall be furnished.

3.5.2 Residual voltage after switching of the capacitors shall be less than 50 Volts after one minute.

3.5.3 Insulation resistance shall be tested with a 1000 volts meggar between phases and phase to earth.

3.5.4 Each discharge resistor shall be tested for its working.

3.5.5 Loss angle test will be conducted and power losses shall not exceed 2.5 Watts / kVAR.

3.5.6 The value of discharge resistance shall be furnished at the time of testing.

4.0 MEDIUM VOLATGE CABLES

4.1 GENERAL DESCRIPTION POWER CABLES

4.1.1 Electrolytic grade of Aluminium / high conductivity annealed copper conductor, as per IS : 8130, XLPE insulation, all sector shaped cores laid up with PP filler and PP tape (in case of extruded PVC inner sheath), taped/ extruded PVC inner sheath as per IS : 5831, armoured as per IS : 3975 and overall Flame Retardant ST2 PVC sheath as per IS:5831, 1100 Volts grade cable as per IS : 7098 (I).

4.2 LT CABLES - GENERAL DESCRIPTION :

4.2.1 Plain annealed electrolytic grade of Copper conductor, as per IS : 8130, PVC insulation as per IS : 5831, cores laid up, STI PVC inner sheath as per IS : 5831, armoured as per IS : 3975 and overall STI PVC sheath as per IS : 5831, 1100 Volts grade cable as per IS : 1554 (I).

CONDUCTOR :

4.2.2 Conductor shall be stranded above 10 sqmm in case of Aluminium cables, and above 6 sqmm in case of copper cables, below which it shall be solid conductor. On customer demand stranded conductor can be supplied. Stranded conductor are shaped and compacted to reduce dimension and give a smoother profile.

4.2.3 Strand details shall be as below :

1.5 to 10 sqmm (CU)	-	7 Strands
6 to 10 sqmm (AL)	-	1 Strands
16 to 50 sqmm (CU/AL)	-	7 Strands
70 to 150 sqmm (CU/AL)	-	19 Strands
185 to 300 sqmm (CU/AL)	-	37 Strands
400 to 630 sqmm (CU/AL)	-	61 Strands
800 to 1000 sqmm (CU/AL)	-	91 Strands.

INSULATION :

4.2.4 Insulation shall be of cross linked polyethylene with IR value more than 100 Mega . ohm/km for power cables and shall be of PVC type A with IR value more than 50 Mega Ohm/km for PVC cables.

XLPE :Insulation having dielectric strength between (25 – 30 kV/MM)

PVC Type A : Insulation having dielectric strength between (30 – 36 kV/MM).

INNER SHEATH :

4.2.5 Inner sheath of ST-2 PVC along with Polypropylene (PP) fillers, in case of Taped Inner Sheath.

4.2.6 For extruded PVC inner sheath (if required) PP Fillers shall be provided with a binder of PP Tape.

ARMOUR :

4.2.7 ISI Marked armour, as per IS : 3975 should be provided over inner sheath to guard against mechanical damage. Armour should be galvanized steel wire/ strip. In case of single core cables used in A.C Systems, armouring should be non magnetic hard drawn aluminium wire/ strip. Round steel wire should be used where diameter over inner sheath is less than 13mm and flat steel strip armour when diameter over inner sheath exceeds 13 mm. Round wire can be provided on specific request.Armour coverage to be more than 95% to achieve better mechanical projection and low armour resistance.

OUTERSHEATH :

4.2.8 Outer sheath is of extruded ST-2 Flame Retardant PVC compound, black in colour as per IS : 5831. Having Oxygen index value of min 30%.

4.2.9 Outer sheath shall be resistant to terminate and rodent attack.

MARKING OVER OUTER SHEATH :

4.2.10 Progressive sequential marking, size marking, voltage grade, manufacturers name at every one meter shall be provided on the outer sheath.

PACKING :

4.2.11 Cables shall be supplied in non-returnable wooden or returnable steel drums of heavy construction as per IS : 10148. Wooden drums are properly seasoned, sound and free from defects. Drum shall be treated with antioxidants, and painted with good quality paint to increase the life of the packing drum.

DRUM LENGTHS :

4.2.12 Standard lengths for each size of power and control cables shall be 500/1000 mtrs. The cable length per drum shall be subject to a tolerance of +/-5% of the standard drum length.

4.2.13 A clear space at Min. 40mm shall be left between the cables and the lagging.

4.2.14 Each drums shall carry the manufacturers name, the purchaser's name, type, size and length of the cable, sequential marking detail, net and gross weight stenciled on sides of drum. An arrow and suitable accompanying wording shall be marked on one end of the reel indicating the direction in which it should be rolled.

4.2.15 Packing shall be sturdy and adequate to protect the cables from any injury due to mishandling or other conditions encountered during transportation, handling and storage. Both cable ends shall be sealed with PVC end caps.

4.2.16 Cable drum above 1600 m should be provided with MS bush plate for spindle hole.

TESTING AND INSPECTION

4.2.17 ROUTINE TEST :

a) Conductor resistance test.
b) High voltage test.
c) Partial discharge test (for screened cable only)
(to be carried out on full drum length).

4.2.18 TYPE TEST :

a) Tests on conductor
b) Annealing test for copper
c) Tensile test (for aluminium)
d) Wrapping test (for aluminium)
e) Resistance test
f) Test for armouring wire/ strips
g) Tensile strength & elongation at break
h) Thickness of zinc coating (Dip Test)
i) Torsion/ Winding test
j) Resistivity Test
k) Mass of Zinc coating test
l) Test for thickness of insulation and sheath

4.2.19 Physical tests for insulation

a) Tensile strength & elongation at break
b) Ageing in air oven
c) Hot set test
d) Shrinkage test
e) Water absorption (gravimetric)

4.2.20 Physical test for outer sheath

a) Tensile strength & elongation at break
b) Ageing in air oven
c) Shrinkage test
d) Hot deformation
e) Insulation resistance (volume resistivity test)
f) High voltage test
g) Flammability test
h) Bleeding and blooming test (for outer sheath).
i) Partial discharge test.
j) Bending test.
k) Impulse withstand test.

4.2.21 ACCEPTANCE TEST :

a) Annealing test (for copper)
b) Tensile test (for Aluminium)
c) Wrapping test (for Aluminium)
d) Conductor resistance test
e) Test for thickness of insulation and sheath
f) Hot sheath test (for insulation)
g) Tensile strength and elongation at break test (for insulation & sheath)
h) Partial discharge test (for screen cable only)
i) High voltage test.
j) Insulation resistance test.

4.2.22 SPECIAL TESTS FOR FRLS CABLES :

i) Oxygen Index Test as per ASTM-D-2863
ii) Temp. Index Test as per ASTM-D-2863
iii) Acid Gas Generation test (HCL) as per IEC-754(I)
iv) Smoke Density test as per ASTM-D-2843
v) Flammability tests
a) As per IEC 332-P-I
b) As per IEC 332-P-3
c) Swedish Chimney As per SS-424-14-75 (Class F 3)
IEEE – 383.

5.0 TECHNICAL SPECIFICATIONS - EARTHING

5.1 **Scope :**

5.1.1 Earthing system to be provided shall comprise of Maintenance free earthing and bare copper earth wires or Galvanised earth wires as called for acting as earth continuity conductor.

5.1.2 Maintenance free Earthing Electrode shall be manufactured from mild steel tubes and hot dip galvanized, to ensure maximum conductivity and prolonged service life. The product should have been tested by independent testing laboratories like Central Power Research Institute (CPRI), Bangalore, Central Electrical testing Laboratory (CETL), Kakkalur and the CEIG, Chennai and Trivandrum and IIT Chennai.

5.1.3 Lightning Protection system shall comprise of earth electrode of Cu or GI plate in earth pits, earth bus of down conductors of Cu or GI flats.

5.1.4 Earthing of Compound, Flood Lighting and Road Lighting poles shall be done by using Cu or GI plates in earth pits near pole and 7/16 size galvanised strained wire for connecting to the pole or as specified in the Schedule or in drawings.

5.1.5 Entire earth system shall conform to the Code of Practice as per IS. 3043 of 1987.

5.2 General Requirement :

5.2.1 Enclosures and frame work of all current carrying equipment and accessories, structural steel/columns shall be adequately earthed to a single earthing system, unless separate earthing systems are specifically stipulated. All electrical equipment shall be earthed at two distinct points.

5.2.2 Earth loads and risers shall follow as direct and short a path as possible. Suitable risers shall be provided as directed if equipment is not available when earthing is installed.

5.3 Maintenance Free Earthing Electrode:

Construction

5.3.1 The Pipe-in-Pipe Technology shall have two 'B' class mild steel pipes one inserted inside the other. Both the pipes shall be subjected to hot dip galvanization: 80 - 100 micron on the outer electrode and 250 - 300 microns inside the electrodes. The empty space inside the electrodes shall be tightly filled with a specially developed Crystalline Conductive Mixture and then sealed. For uniform distribution of fault current an earthing electrode must be cylindrical in shape. The surface being circular the distance from the centre to any point is always equal. This is to facilitate uniform distribution of fault current from electrode to earth. The current density is highest in soil within a few feet of the electrode surface. The density should be as low as possible in the medium adjacent to the electrode which should be such as to cause the current density to decrease rapidly within a distance from the electrode. This is to ensure that a pipe electrode has a much lower resistance than a plate of equal surface area.

Crystalline Conductive Mixture

5.3.2 It shall contain natural elements and compounds, which are high conductive as well as anti corrosive. The Crystalline Conductive Mixture shall not disintegrate or collapse when the outer electrode becomes inactive.

Features:

i)	Length	:	3000MM (3Meter) / 2000MM (2-Meter) as specified in the Schedule of Quantities
ii)	Outer Electrode Dia	:	80MM
iii)	Inner Electrode Dia	:	40MM
iv)	Terminal Hole Dia	:	4MM
v)	Outer Electrode Wall Thickness	:	16swg (1.626mm)
vi)	Inner Electrode Wall Thickness	:	12swg (2.641mm)
vii)	Hot dip Galvanization	:	Outer Electrode 80-100 µ
viii)	Hot dip Galvanization	:	Inner Electrode 250-300 µ
	Space inside Electrode	:	Tightly filled with Crystalline Conductor Mixture

5.3.3 Back Fill Compound (B.F.C) shall be a specially developed compound containing eco friendly materials. It should capable of absorbing & retaining moisture for a long period. It should reduce the soil resistivity. It should help in faster dissipation of fault current, least fluctuation of ohmic value and eliminate the use of salt & charcoal around the electrode.B.F.C shall have all the qualities of a ideal backfill material for an earthing system. It should easily be compacted and when water is added, it should absorb at least 13 times its dry volume. It should continuously holds to its own shape & adheres to any surface it touches. These are required to resolve the issues of compatibility & soil / rod contact that are crucial to earthing system.

5.3.4 An Augur / drill / bore for a hole of 8 - 10 inches in diameter to a suitable depth of 2 or 3 meters (electrode length) shall be required for installation.

INSTALLATION

1. The backfill compound shall be mixed thoroughly with dug out soil.
2. A handful of compound soil mix shall be put into the pit.
3. The naked electrode shall be placed at the centre of pit.
4. The empty space around electrode shall be filled with backfill compound in small quantities.
5. Some water shall be poured in to the pit and while gradually allowing the trapped air to escape by poking the pit with a long wooden rod
6. This refilling process shall be gradually continued till electrode is buried in the pit, up to a coloured, normally green, patch painted on the top portion of electrode.
7. It shall be ensured that pit is not watery.
8. The electrode shall be compound with compound firmly so that it stands firmly in pit.
9. A few buckets of water are poured around the pit.
10. The earth resistivity of electrode shall be tested. If result is satisfactory, it shall be connected with equipment.
11. In case of result not being satisfactory, some time shall be allowed for electrode system to set

in soil.

12. Again the ohmic value shall be checked and connect with equipment.
13. In hard soil conditions, the only the compound shall be used for packing the electrode and above procedure shall be followed.

5.4 Earth Bus and Earth Continuity Conductor :

5.4.1 Earth bus is a copper strip or flat of specified size interconnecting all earth electrodes.

5.4.2 Switchgears and Power Distribution Boards shall be earthed by a copper flat strip.

5.4.3 Panels, DBs and motors up to 30 kW rating shall be earthed by two earth continuity conductors, as specified. Minimum size of continuity conductor shall be 25 x 3 mm bare copper strip..

5.4.4 Road Lighting Poles shall be earthed with Cu stranded wire conductor while for lighting and power wiring bare copper conductor shall be provided unless otherwise specified to use insulated conductor.

5.5 Earth Bus Station :

5.5.1 Earth Bus Station shall be provided to facilitate tapping of earth continuity conductor from earth bus/grid very conveniently. It will comprise of a 400 mm long 50 x 6 mm bare copper strips/flat fixed with rawl plugs/bolts securely on wall/column above floor level. Spacers of 20 mm to 25 mm shall be provided to keep the flat away from wall and facilitate connections of earth conductor for which 6 mm dia holes 8 to 10 numbers are provided with proper size brass nuts, bolts, and washers. Earth bus shall be connected to it.

6.0 LIGHTING FIXTURES

6.1 Scope :

6.1.1 Manufacture, Test, Supply and Delivery at site, Erection in proper position testing and commission the specified Light Fittings. All the fittings shall have Electronic Ballasts of Approved make.

6.2 Standards :

6.2.1 Light Fittings covered against this specifications shall comply with the relevant latest Indian Standards and Codes and more specifically to IS 2418 for tubular fluorescent lamps, and IS 1771 for Industrial Fittings with metallic reflector.

6.3 Construction :

6.3.1 The atmosphere where these fittings are to be installed will be humid and conducive to chemical corrosion. Suitable protection against the same shall be offered. The fittings shall be suitable for 240 Volts. Single phase A.C. supply (+)/(-) 5% and frequency 50 Hz. (+)/(-)3%.

6.3.2 The complete fittings and its accessories such as Ballasts, Side holders shall be fixed and pre wired. All fittings shall be provided with one internal and one external earthing terminal of appropriate diameter GI/Passivated Brass complete with one spring and two flat washers. The fluorescent fittings shall be complete with high frequency ballast, lamp holders, terminal block (4 way), etc. and fully wired upto terminal block.

6.4 Lighting Fittings Components/Accessories

Electronic Ballast :-

6.4.1 All the Electronic ballast shall be compact in design and high frequency type having low power loss, good heat dissipation, with no humming. The HF ballast should not interfere with the Computers. The H.F Ballasts should not have any “H” mark on it. The Electronic Ballast should have total harmonic distortion less than 10%. The Electronic Ballast should have constant light out put i.e in case of variation in supply voltage the light out put of the lamp should remain constant. The Ballast should have following compliances and approvals.

i) RFI Less than 30 MHz EN 55015
ii) RFI more than 30 MHz EN 55022 A
iii) Harmonics EN 61000-3-2

iv)	Immunity	EN 61547
v)	Safety	IEC 928
vi)	Performance	IEC 929
vii)	Vibration & Bump Tests	IEC 68-2-6FC & IEC 68-2-29Eb
viii)	Quality Standard	ISO 9001
ix)	Environmental Standard	ISO 14001

6.4.2 All the Ballasts should be flicker free warm start. The ballast should have constant light output irrespective of mains voltage fluctuations within 202-254 Volts. In case of the Mains fluctuations within 202-254 Volts the luminous flux should not change more than +/- 4%. The ballast should have Low harmonics distortion The total harmonic distortion should be less than 10%. The Earth leakage Current should be less than 0.5 mA per ballast and ignition time should be less than 2 sec. Further the ballast should have over voltage protection i.e. it should able to sustain for 48 hrs at 320 Volts AC and 2 hours at 350 Volts AC. The Ballast should either of Philips make having Cat No. EB-PERFORMER (EB-P 220-240 1/36 RS) for Single Tubes or EB-PERFORMER (EB-P 220-240 2/36 RS) for double tubes or approved equilvent make .

Lamp Holders:

6.4.3 These shall be rotary, spring loaded resilient type, either moulded from Urea-Formaldehyde.

Fluorescent Lamps:

6.4.4 These shall be of High Lumen out put and of approved colors and of Philips or any other approved make similar to Philips True Light and of stated wattage.

7.0 CABLE TRAYS

7.1 Scope :

7.1.1 1.0 Cable Trays shall be of perforated type, hot dip galvanized and associated accessories tees, bends, elbows and reducers shall be fabricated from 12 gauge (2.5 mm) mild steel.

7.1.2 Cable tray accessories shall be hot dip galvanized.

7.1.3 Cable trays shall not have sharp edges, burrs or projections that may damage the insulation jackets of the wiring.

7.1.4 Cable trays shall not have side rails or equivalent structural members cable trays shall include fittings or other suitable means for change in direction and elevation of runs.

7.2 Cable Tray Mounting

Unless otherwise specifically noted on the relevant layout drawing, all cable tray mounting works to be carried out the following :

7.2.1 Cable tray mounting arrangement type to be as marked on layout drawing.

7.2.2 Assembly of tray mounting structures shall be supplied fabricated, erected & painted by the electrical contractor.

7.2.3 Tray Mounting structures shall be welded to plate inserts or to structural beams as approved by the Project Manager.

7.2.4 Wherever embedded plates & structural beams are not available for welding the tray mounting structure electrical contractor to supply the MS plate & fix them to floor slab by four anchor fasteners of minimum 16 mm dia having minimum holding power of 5000 Kg, at no extra cost.

7.2.5 Maximum loading on a horizontal support arm to be 120 Kg/metre of cable run.

7.2.6 Width of the horizontal arms of the tray supporting structures to be same as the tray widths specified in tray layout drawings, plus length required, for welding to the vertical supports.

7.2.7 The length of vertical supporting members for horizontal tray runs will be to suit the number of tray tiers shown in tray layout drawings.

7.2.8 Spacing between horizontal support arms of vertical tray runs to be 300 mm.

7.2.9 Cable trays will be welded to their mounting supports.

7.2.10 Minimum clearance between the top most tray tier and structural member to be 300 mm.

7.2.11 Cable in vertical race ways to be clamped by saddle type clamps to the horizontal slotted angles. Clamps to be fabricated from 3 mm. thick aluminium strip at site by the electrical contractor to suit cable groups.

7.2.12 The structural steel (standard quality) shall be according to latest revision of IS : 2062 & IS 808 Rev III of 1989 . Welding shall be as per latest revision of IS : 816 Rev I of 1969. All structural steel to be painted with one shop coat of red oxide and oil primer followed by a finishing coat of aluminium alkyd paint where any cuts or holes are made on finished steelwork these shall be sealed against oxidation by red oxide followed by the same finishing paint. Steel sheet covers wherever indicated to be similarly painted.

8.0 POINT WIRING USING MILD STEEL CONDUITS8.1 Scope :

8.1.1 The conduits shall be stove enameled PVC conduits screwed duly ISI marked and manufactured as per IS: 9537 Part I & II including latest amendments, if any, and in accordance with the requirement set out in the schedule of quantities.

8.1.2 The conduit accessories shall also be PVC FRLS.

8.1.3 Conduits shall be provided with couplers for straight joints and Inspection bends wherever required.

8.2 Conduit Capacity :

8.2.1 The maximum capacity of a conduit for drawing in Flame Retardant Low Smoke (FRLS) wires shall be in accordance with IS 2274. The minimum size of conduit to be used shall not be less than 20 mm (approx.) and not more than two circuits connected to same phase be bunched in one conduit. Two different phases are not allowed in one conduit.

8.2.2 Commonly used sizes of 650/1100 Volts Flame Retardant Low Smoke (FRLS) wires and conduit capacities are as tabulated below :-

Size of Wire	Voltage Grade	Capacity of the Conduit 20 mm	25 mm
1.5 sq.mm.	650/1100	5 Nos.	8 Nos.
2.5 sq.mm.	650/1100	5 Nos.	6 Nos.
4.0 sq.mm.	650/1100	3 Nos.	5 Nos.
6.0 sq.mm.	650/1100	2 Nos.	3 Nos.
10.0 sq.mm.	650/1100	.....	3 Nos.

8.3 Point Wiring :

8.3.1 The wiring shall be of the looping in system as different from the tree system. Connectors should not be used without specific prior approval. Looping in on the phase side shall be at the switches and that on the neutral side at the ceiling roses. Every light point, fan point and plug point shall have individual control switch unless stated otherwise. Earthing shall be provided for all the points according to the statutory requirement wherever necessary. The number of points per circuit shall not exceed 8 in any case.

8.3.2 The point wiring in conduit consists of wiring from the branch distribution board in conduit with its ancillary work, such as inspection bends, junction boxes and FRLS wires upto the fixed terminals of ceiling roses, connectors, batten holders, etc. depending upon the type of point.

8.3.3 For easy identification, wires with different colours shall be used for phase and neutral as far as practicable.

8.3.4 The control switches for lights, fans, wall sockets and fan regulators shall suitably be grouped on sheet steel cases of all welded design fabricated out of 1.2 mm (approx.). Generally, the bakelite sheet shall be 3 mm thick where SP Piano type flush mounting switches are to be accommodated and in all other cases it shall be 5 mm thick. The bakelite sheet cover shall be fitted above the sheet steel case and shall be leveled on the outer edges. Control accessories for one circuit only

shall be grouped on a sheet steel case. Not more than 2 ceiling fan regulators shall be mounted on a sheet steel case. Suitable earthing terminal shall be provided on the sheet steel case. All the conduits entering and leaving D.B. shall be bonded together with 4 sq.mm bare aluminium/copper wire and earth clips (as mentioned in the schedule.).

8.3.5 Point Wiring by using Flame Retardant Low Smoke (FRLS) Wires :-

8.3.6 This shall be similar to point wiring in conduit system. The fixing of cables shall, however, be according to the specifications.

8.3.7 All the Flame Retardant Low Smoke (FRLS) wires shall be of 650 V grade for lighting and power wiring.

8.3 Mains and Sub-Mains Wiring :

8.3.8 This shall include the cost of all Flame Retardant Low Smoke (FRLS) wires conduit, conduit accessories, clamps spacers, Flame Retardant Low Smoke (FRLS) wires on battens depending upon the type of wiring, all masonry work, such as cutting, neat finishing of walls, floor openings etc. Only approximate lengths are included in the Schedule of Quantities and Rates, but the actual lengths of the mains and sub-mains executed will be measured between terminating points and will be paid for. Where the mains and sub-mains pass through the flooring, or through the wall, the same shall pass as specified in 3(b) above. Mains and Sub-Mains risers in conduit shall be bonded together with 4.0 sq.mm. bare aluminium/copper as specifically mentioned in Schedule and earth clips on each floor landing/mid-landing. The Flame Retardant Low Smoke (FRLS) wires are provided as mains and sub-mains, the same shall be fixed as per specifications.

8.4 **Switches, Sockets & Ceiling Roses :Ceiling Roses :**

8.4.1 These shall be of bakelite and of approved make and colour and shall not contain fuse terminals. These shall be provided with brass ceiling plate and M. T. Brass screws and washers with cord grip for termination of wires.

Plate type, moulded design - switches on white Urea Power pressed cover plates:

8.4.2 These shall be of single pole, double pole, two ways, one way or otherwise as called for in the Schedule. These shall be manufactured as per relevant IS Codes and shall amply to Indian Electricity Rules. The minimum rating shall be 5 Amp at 250 V AC.

Socket Outlets With Plugs:

8.4.3 These shall be with porcelain base, in 2 Pin and earth design of best quality, suitable for single phase, 250 volts supply. The earth pin shall be effectively connected to the nearest conduit or earth connections in distribution board with not less than 3 sq mm (No. 14 SWG) copper wire. The socket outlet shall be complete unit shall be with ratings of 5 Amps. 250 Volts or 15 Amps 250 Volts to suit individual requirement as stated in Schedule of Quantities and Rates. The socket outlets shall be in flush mounting or on plate designs as called for in the Schedule of Quantities.

S E C T I O N - II

SPECIFICATIONS FOR INSTALLATION OF ELECTRICAL EQUIPMENT

1.0 Specification for Marking of Panels and Nomenclature:

1.1 All Panels shall borne the Nomenclature as suggested in the tender. The same shall be embossed on steel plates and not painted. All Panels shall also bear the name of the Consultants of the project. All panels shall also indicate the line diagram and the method of receiving Power from upstream Panel /Switch.

2.0 Specification for Installation of Main L.T. Panel :-

2.1 The Main L.T. Panel shall be installed in the electrical room allotted at site. The panels shall be properly assembled if dispatched in sections. All bus bars fish plates will be thoroughly cleaned, greased and bolted to instructions. The Main Panel will be mounted on base frame of adequate size using 100 x 50 x 6 mm ISMC channels fabricated to meet the design of the base frame of the Main L.T. Panel. The fabricated frame shall be welded in design and shall undergo metal treatment process as stated in the specifications elsewhere. The base-frame shall have adequate size Anchor Fasteners which shall be grouted in the flooring. The base-frame of the panels will then be aligned with the fabricated base-frame already grouted. The whole structure will be rigid and will not in any way move while operating any of the switchgears. If found necessary, then, additional supports by way of angles horizontally bolted to the panel and grouted in the nearby wall shall be done. The entire erection of the panel shall have a neat and aesthetic appearance.

3.0 Specification for Installation of Power Control Centers and A.P.F.C. Panel.

3.1 The PCCs and APFC panels shall be installed in the electrical room allotted at site. The panels shall be properly assembled if dispatched in sections. All bus bars, fish plates shall be thoroughly cleaned, greased and bolted to instructions. The Main Panel shall be mounted on a base frame of size 100 x 50 x 6 mm ISMC channels fabricated to meet the design of the base frame of the PCCs or APFC Panel. The fabricated frame shall be welded in design and will undergo metal treatment process as stated in the specifications elsewhere. The base-frame shall have adequate size Anchor Fasteners which shall be grouted in the flooring. The base-frame of the panels will then be aligned with the fabricated base-frame already grouted.

3.2 The whole structure shall be rigid and will not in any way move while operating any of the switchgears. If required, additional supports by way of angles horizontally bolted to the panel and grouted in the nearby wall shall be provided. The entire erection of the panel shall have a neat and aesthetic appearance.

4.0 Specifications for Installation of Sub-Power and Sub-Lighting Distribution Boards and Power & Lighting Distribution Boards.

4.1 Before erecting the SLDB and SPDB and LDBs and PDBs at site, a thorough inspection shall be done by the Contractor and report to the Architect / Consultants if any difficulties are envisaged for erection. Thereafter, an erection sketch shall be prepared, indicating the dimensions and the clearances between the Boards. A similar marking shall also be made at site.

4.2 All Power and Distribution Boards shall be tested for mechanical endurance. After checking wiring and cable connections, the entire boards shall be erected in places indicated and marked on the plan. All touching up work of points shall then be done and foundation bolts grouted. All necessary holes and civil works shall be done as per directions. The Panel after duly testing shall be put to commission for trial. All the lighting and power distribution boards shall be mounted directly on wall.

5.0 Specification for installation of L.T. Capacitors :-

5.1 L.T. Capacitor shall be neatly arranged and installed in tier formation. Proper checks should be done to ensure proper banking and number of L.T. Capacitors banked together. The Capacitors after installation and cable joints, shall be finally checked for any leakage etc. The L.T. Capacitors banks shall be fixed on angle iron frame work firmly granted in the floor and

fixed as MS Channels frames. All Joints shall be checked for proper connections and after conducting all tests, the Capacitor Banks shall be commissioned. The Capacitor Banks shall be commissioned. The operation of banks shall also be tested and terminal voltages discharge should be tested and noted prior to commissioning.

Specifications for installation of MV/LV cables :-

General

5.2 MV Cables shall be inspected prior to laying, laid tested and commissioned in accordance with drawings, specifications, relevant Indian Standards Specifications and cable Manufacturer's instructions. The Cable shall be delivered at Site in original drums with manufacturer's name clearly written in the drum.

5.3 The recommendations of the cable manufacturer with regard to jointing and sealing shall be strictly followed.

Inspection :-

5.4 All cables shall be inspected upon receipt at site and checked for any damage during transit.

5.5 While selecting cable route for external lighting, sewage effluent pipes, Fire Hydrant Pipes etc. shall be avoided; where this is not feasible, special precautions as decided by the Architect / Consultants, shall be taken.

Proximity to communication cables :-

5.6 Power and communication cables shall as far as possible cross at right angles. Where power cables are laid in proximity to communication cables the horizontal and vertical clearances shall not normally be less than 60 cms.

Laying methods :-

5.7 Cables shall be laid direct in ground, in pipes/ closed ducts, in open ducts or on surface depending on environmental and site conditions.

5.8 During the preliminary stages of laying the cables, consideration should be given to proper location of he joint position so that when the cables are actually laid the joints are made in the most suitable places. As far as possible water logged locations, carriage ways, pavements, proximity to telephone cables, gas or water mains, inaccessible places, ducts pipes racks etc. shall be avoided for joint position.

Laying direct in ground :-

5.9 General : This method shall be adopted where the cable route is along roads etc. and where no frequent excavations are encountered and where re-excavations is easily possible without affecting other services.

Trenching :-

5.10 Width of trench : The width of the trench shall first be determined on the following basis:

a) The minimum width of trench for laying single cable shall be 35 cm.
b) Where more than one cable is to be laid in the same trench in horizontal formation, the width of trench shall be increased such that the inter-axial spacing between the cables, except where otherwise specified shall be at least 20 cm.
c) There shall be a clearance of at least 15 cm between axis of the end cables and the sides of the trench.

Depth of Trench :-

5.11 The depth of the trench shall be determined on the following basis :

a) Where cables are laid in single tier formation, the total depth of trench shall not be less than 75 cm. for cables up to 1.1 kV and 1.20 m for cables above 1.1 kV.
b) When more than one tier of cables is unavoidable and vertical formation of laying is adopted, depth of trench in above shall be increased by 30 cm for each additional tier to be formed.

Excavation of Trenches

5.12 The trenches shall be excavated in reasonably straight lines. Wherever there is a change in direction, suitable curvature shall be provided complying with the requirements of the manufacturer.

5.13 Adequate precautions should be taken not to damage any existing cable(s), pipes or other such installation in the proposed route during excavation. Wherever bricks, tiles or protective covers or bare cables are encountered, further excavation shall not be carried out without the approval of the Architect / Consultants.

5.14 If there is any danger of a trench collapsing or endangering adjacent structures, the sides should be well shored up with timbering and/or sheeting as the excavation proceeds. Where necessary, these may even be left in places when back filling the trench.

5.15 Excavation through lawns shall be done in consultation with the staff of the department/owner concerned.

5.16 The bottom of the trench shall be level and free from stone, brick bats etc. The trench shall then be provided with a layer of clean, dry sand cushion of not less than 8 cm in depth.

Laying of Cable in trench :-

5.17 At the time of issue of cable for laying the cores shall be tested for continuity and insulation resistance.

5.18 When the cable has been properly straightened, the cores are tested for continuity and insulation resistance and the cable is then measured. In case of PVC cables suitable moisture seal tape shall be used for this purpose. All wastage to be contractors account.

5.19 Cable laid in trenches in a single timer formation shall have a covering of clean, dry sand of not less than 17 cms. above the base cushion of sand before the protective cover is laid.

5.20 In the case of vertical multi-tier formation after the first cable has been laid, a sand cushion of 30 cms. shall be provided over the initial bed before the second tier is laid. If additional tiers are formed, each of the subsequent tiers also shall have a sand cushion of 30 cms. as stated above. The top most cable shall have a final sand covering not less than 17 cms. before the protective cover is laid.

5.21 At the time of original installation, approximately 3 m of surplus cable shall be left on each end of the cable and on each side of underground joints (straight through /Tee/Termination) and at entries and places as may be decided by the Architect / Consultants. The surplus cable shall be left in the form of a loop. Where there are long runs of cable length, loose cable may be left at suitable intervals as specified by the Architect / Consultants.

5.22 Unless otherwise specified, the cables shall be protected by second class bricks of not less than 20 cm x 10 cm x 10 cm (nominal size) protection covers placed on top of the sand, (bricks to be laid breadth wise) for the full length of the cable to the satisfaction of the Architect / Consultants. Where more than one cable is to be laid in the same trench, this protective covering shall cover all the cables and projects at least 5 cm. over the sides of the end cables.

Back filling :-

5.23 The trenches shall be then back filled with excavated earth free from stones or other sharp edged debris and shall be rammed and watered, if necessary, in successive layers not exceeding 30 cm. Unless otherwise specified, a crown of earth not less than 50 mm. in the center and tapering towards the sides of the trench shall be left to allow for subsidence. The crown of earth however should not exceed 10 cm. so as not to be a hazard to vehicular traffic.

5.24 The temporary reinstatements of roadways should be inspected at regular intervals, particularly during the wet weather, and any settlement should be made good by further filling as may be required. After the subsidence has ceased, trenches cut through roadways or other paved areas shall be restored to the same density and material as the surrounding area and repaved to the satisfaction of the Architect / Consultants

5.25 Where road turns or lawns, have been cut to kerb stones displaced, the same shall be repaired and made good except turning / asphalting to the satisfaction of the Architect/Consultants and all surplus earth or rock removed to places as specified.

Route Marker :-

5.26 Route marker shall be provided along straight runs of the cables at locations approved by the Architect/Consultants and generally at intervals not exceeding 100 m. Markers shall also be provided to identify change in the direction of the cable route and also for location of every underground joint.

5.27 Route markers shall be made out of 100 mm x 100 mm x 5 mm GI/Aluminum plate, welded or bolted on to 35 mm x 35 mm x 6 mm angle iron 60 cm. long. Such plates marker shall be mounted parallel to and 0.5 m or so away from the edge of the trench.

5.28 The word `cable` and other details such as voltage grading size etc. as furnished by the Architect /Consultants shall be inscribed on the marker.

Single Core Cables:-

5.29 Three single core cables forming one three phase circuit shall normally be laid in close trefoil formation and shall be bound together at intervals of approximately 1 m. The relative position of the three cables shall be changed at each point, complete transposition being effected in every three consecutive cable lengths. The joints shall be clearly marked in an approved manner to indicate the circuit and phases. The arrangement for laying a number of parallel cables shall be as detailed of IS : 1255/1967.

Laying in Pipes/Closed Ducts :-

5.30 In locations such as road crossing, entry to buildings, on poles, in paved areas etc. cables shall be laid in pipes or closed ducts.

5.31 Stone ware pipes, GI, CI or Spun reinforced concrete pipes shall be used for such purposes. In the case of new construction, pipes as required shall be laid along with the Civil Works, and jointed as per the instructions of the Architect / Consultants. The size of the pipe shall be decided by the Architect / Consultants and shall not be less than 10 cm in diameter for a single cable and not less than 15 cm for more than one cable. These pipes shall be laid directly in ground without any special bed except for SW pipe which shall be laid over 10 cm. thick cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate of 40 mm nominal size) bed. No sand cushioning or tiles need be used in such situations. Unless otherwise specified, the top surface of pipes shall be at a minimum depth of 1 m. from the ground level when laid under roads, pavements etc.

5.32 Where steel pipes are employed for protection of single core cables feeding AC load, the pipe should be large enough to contain both cables in the case of single phase system and all cables in the case of poly-phase system.

5.33 Pipes for cable entries to the building shall slope downwards from the building and suitably sealed to prevent entry of water inside the building. Further, the mouth of the pipes at the building end shall be suitable sealed to avoid entry of water.

5.34 All chases and passage necessary for the laying of service cable connections to buildings shall be cut as required and made good to the original finish and to the satisfaction of the Architect / Consultants.

5.35 Cable grips/draw wires and winches etc. may be employed for drawing cables through pipes/closed ducts etc.

Laying of Cables in open ducts/Trenches:

5.36 Trenches with suitable removable covers shall be preferred in sub-stations, switch rooms, plant rooms, etc.

5.37 The cable ducts should be of suitable dimensions so that the cables can be conveniently laid. If necessary, cables may be fixed with clamps on the walls of the duct or taken in troughs in duct. The duct should be covered with removable slabs or chequered plates.

5.38 Ducts may be filled with dry sand after the cable is laid and covered as above or finished with cement plaster specially in high voltage applications.

5.39 Splices or joints of any type shall not be permitted.

5.40 As far as possible laying of cables with different voltage ratings in the same duct shall be avoided.

5.41 Where considered necessary, hooks or racks shall be provided for supporting the cables in masonry/concrete cable ducts, cable troughs. Otherwise cables shall be laid direct in the trench or trough etc. While deciding the layout of cables in such ducts, care should be exercised to ensure, that, unnecessary crossing of cables is avoided.

Laying on Surface :-

5.42 The cables may be laid in troughs or brackets at regular intervals or directly cleated to wall/ceiling. When laid over bracket supports, the cables shall be clamped to prevent undue sag.

5.43 Cable clamps shall be made from materials such as mild steel or Aluminum only. In case of single core cables the clamps shall be non-magnetic materials. A suitable non-corrosive packing shall be used for clamping unarmoured cables, to prevent damage to the cable sheath.

Cable Identification Tags :-

5.44 Wherever more than one cable is laid/run side by side, marker tags as approved, inscribed with cable identification details shall be permanently attached to all the cables in the manholes/open ducts etc. These shall also be attached to various cables laid direct in ground at suitable intervals as decided by the Architect / Consultants before trenches are filled up.

Testing :-

5.45 All cables before laying shall be tested with a 500 Volts megger for 1.1 kV grade or with a 5,000 Volts megger for cables of higher voltages. The cable cores shall be tested for continuity, absence of cross phasing, insulation resistance to earth/sheath/armor and insulation resistance between conductors.

5.46 All cables shall be subjected to above mentioned tests during laying, before covering the cables by protective covers and back filling and also before the jointing operations.

5.47 In the absence of facilities for pressure testing, it is sufficient to test for one minute with 1,000 Volts megger for cables for 1.1 kV grade and with 5,000 Volts megger for cables of higher voltages.

Completion Plan and Completion Certificate :-

5.48 The work shall be carried out in accordance with the drawings enclosed with the tender and also in accordance with the modifications thereto from time to time approved by the Architect / Consultants.

5.49 At Completion, all layout drawings should be on Auto-cad and on 1:100 scale. The contractor is required to submit 5 sets of as built drawings on A-1 Size white paper along with 5 sets of Rewritable CDs. The Virtual Completion certificate can be issued to the contractor only when he submit all the shop drawings, As built drawings, Operation and Maintenance Manual to owner, Architect/Consultant and PMC.

a. Layout of Cable Work.

b. Length, size, type and grade of cables. Method of laying i.e. direct in ground, in pipes etc.

c. Location of each joint with jointing method followed.

d. Route marker and joint marker with respect to permanent land marks available at site.

e. Name of work, Job Number, accepted tender reference, date of completion, names of Division and Sub-Division, names of Contractor with their signature and scale of drawing.

6.0 Specifications for Earthing Grid and Earth Stations :-

6.1 The earthing system shall comply with the relevant standard as laid down in the Fire Insurance and Indian Standard Specifications.

6.2 Specifications for Maintenance Free Earthing Elecgrode:-

1. The backfill compound shall be mixed thoroughly with dug out soil.
2. A handful of compound soil mix shall be put into the pit.
3. The naked electrode shall be placed at the centre of pit.
4. The empty space around electrode shall be filled with backfill compound in small quantities.
5. Some water shall be poured in to the pit and while gradually allowing the trapped air to escape by poking the pit with a long wooden rod
6. This refilling process shall be gradually continued till electrode is buried in the pit, up to a coloured, normally green, patch painted on the top portion of electrode.
7. It shall be ensured that pit is not watery.
8. The electrode shall be compound with compound firmly so that it stands firmly in pit.
9. A few buckets of water are poured around the pit.
10. The earth resistivity of electrode shall be tested. If result is satisfactory, it shall be connected with equipment.
11. In case of result not being satisfactory, some time shall be allowed for electrode system to set in soil.
12. Again the ohmic value shall be checked and connect with equipment.
13. In hard soil conditions, the only the compound shall be used for packing the electrode and above procedure shall be followed.

6.3 The Earthing stations for Pipe and Plate Earthing shall be as per drawings. Entire Civil works, Salt, Charcoal in proper proportions, Watering chamber with wire mixing etc. shall be done. The Earth tapes wherever indicated shall be obtained by using Earth Megger. The results should comply with the Standards bid down by the Indian Standard Specifications.

6.4 The Lightning Arrestors shall be fixed on angle from frame work secured to the building walls at the top most painted and at all other points wherever indicated on the plan. They shall be connected to earth by using G.I. tapes of appropriate size. The entire unit shall have completed earth grid running around the unit and the same shall be inter-connected. The entire works of earthing should be complete in all respects such as welding the GI tape joints, tapping etc. There shall be no place where earthing strips are not connected to earth stations. G.I. tape shall be fixed on walls or laid in prepared trenches or chiseled in ground and redone etc. as per directions.

7.0 Document, Certificates, Drawings and Spare Requirements :

7.1 The intent of this specification is to give a guideline of the Contractor to furnish in reproducible all sets of relevant papers and lists of spares for the continuous performance of the Owner`s Building. Nothing shall absolve the Contractor from not furnishing any information documents and/or papers that have not been specifically stated herein.

a) Document :- All relevant documents for maintenance, manuals procedures and data of all Electrical Equipment's supplied and erected by the Contractor on the site. The documents shall be bound and furnished to the Owner.

b) Certificates : All relevant tests certificates etc. and as more specifically stated in clause, shall be furnished. Contract shall also furnish all such certificates issued by the original manufacturer towards guarantee of performance of all equipment's supplied by the Contractor.

c) Drawings : All working and erection drawing of the final erected plan of all electrical installation work in reproducible of equipment's such as MV Panel Distribution Boards, Cable routing, sizing, connection diagrams, circuits, wiring diagram and conductor sizes, lengths, terminations details, operational charts, recorded readings, load details etc. shall be furnished to the Owner. The Owner reserves the right to the mode of submission of such details being furnished by the Contractor.

d) The Contractor shall, notwithstanding anything stated otherwise, shall furnish list of recommended maintenance tools, spares, fuses, sets, codes, catalogues, appropriate pricing, original equipment manufacturer's addresses etc. to the Owner. Prior to such furnishings contractor shall make a proper assessment of all such requirements and then proceed to make the lists. The Contractor shall also be deemed to have understood the requirements, in such a way that it ensures a continuous operation and functioning of the Electrical Equipment under the stated ratings, conditions and specifications.

I/We hereby declare that I/We have read and understood the above instructions which have been issued as conditions of the contract.

W I T N E S S **(Signature of the Tenderer)**

SECTION - III

TESTING, MANUFACTURER`S TESTS PRECOMMISSIONING TESTS AND COMPLETE COMMISSIONING

T E S T I N G

1.0 General

1.1 At the completion of the work, the entire installation shall be subjected to the following tests :-

a) Insulation Continuity Test.
b) Insulation Resistance Test.
c) Earth Continuity Test.
d) Earth Resistivity Test.

1.2 Besides the above tests, any other test specified by the Local Authority shall also be carried out.

2.0 Testing of Wiring :-

2.1 All the wiring system shall be tested for continuity of circuits, short circuits and earthing after the wiring as completed and before energizing.

3.0 Insulation Resistance Test: -

3.1 The insulation resistance shall be measured by applying between earth and the whole system of conductors, or any section thereof, with all fuses in place and all switches closed and except in concentric wiring all lamps in position of both poles of the installation otherwise electrically connected together, a direct current pressure provided that it does not exceed 60 volts for medium voltage circuit. Where the supply is derived from AC three phase system the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral. The insulation resistance measured as above shall not be less than 50 divided by the number of points on the circuit provided that the whole installation shall not be required to have an insulation greater than one mega ohm.

3.2 The insulation resistance shall also be measured between all conductors connected to one phase conductor of the supply and all the conductors connected to the middle wire of the neutral or to the other phase conductors of the supply. Such a test shall be carried out after removing all metallic connections between the two poles of the installation and in those circumstances the installation shall not be less than that specified above. The insulation resistance between the case of frame work of housing and power appliances, and all live parts of each appliance shall not be less than that specified in the relevant Indian Standard Specifications or where there is no such specification shall not be less than half a mega ohm.

4.0 Testing of Earth Continuity Test :-

4.1 The earth continuity conductor metallic envelopes of cable shall be tested for electric continuity and the electrical continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.

5.0 Testing of Polarity of Non linked single pole switches :

5.1 In a two wire installation a test shall be made to verify that all non-linked single pole switches have been fitted in the same conductor through out and such conductor shall be labeled or marked for connections, to an outer or phase conductor or to the non-earthed conductor of the supply. In the three of four wire installation a test shall be made to verify that every non-linked single pole switch fitted in a conductor to one of the outer or phase conductor of the supply. The entire electrical installation shall be subject to the final acceptance of Architect / Consultants as well as the local authorities.

6.0 Earth Resistivity Test :-

6.1 Earth Resistivity Test shall be carried out in accordance with Indian Standard Code of Practice for earthing IS 3043 - 1966. All tests shall be carried out in the presence of the Architect / Consultants/PMC.

7.0 Testing, Manufacturer's Tests Pre-commissioning Tests and Complete Commissioning :-

7.1 The general intent of this specification is to mention all the relevant tests to be done and results to be furnished to Owner/Consultant/PMC by the contractor, prior to commissioning of the electrical work. These are guidelines, however, the Contractor shall carryout all such tests and complete all formalities as per relevant Indian Standard Specifications, Fire Insurance Requirements and/or Electricity Rules and Regulations as per Government as per Government Gazette and Publications.

Testing of Equipment :-

7.2 All equipment before installing on the site work shall be tested and all such results produced to the Owner. Nothing shall absolve the Contractor from re-performing any tests that the Contractor may be called upon specifically by the Architect / Consultants.

Manufacturer's Tests :-

7.3 The Contractor shall specifically perform all tests such as type, routine tests on all equipment such as Medium Voltage Panels, Light Fixtures etc. The details of such tests shall be furnished by the Contractor to the Owner/ Architect / Consultants and obtain their approval in the matter. All costs incidental to such tests shall be deemed to have been included in the specific them for that equipment and no extra charge shall be payable by the Owner.

Pre-commissioning Tests :-

7.4 All tests underlined herein and/or called by the local Electrical Authorities, Government Officials and as laid down in relevant Indian Standard Specifications and/or Rules and Regulations stated in Indian Electricity Act shall be strictly complied megger, on M.V. side the reading shall not exceed 1 ohm and for H.V. side not exceeding 0.5 ohm.

Commissioning :-

7.5 The Contractor shall obtain the written permission and sanction of commissioning the equipment from Electrical Inspector of I.E.& L. Department of Government of Maharashtra State, if required under the specific rules of the Government.

7.6 All costs, visit fees etc. incidental to such obtaining sanctions shall be to the Contractors` Account, except statutory fees payable under relevant Indian Electricity Act or Rules.

7.7 Contractor shall furnish all the necessary test and tests-reports to the Electrical Supply Authorities and furnish all formalities required to comply as per the Rules and Regulations on laid down for release of Electrical Supply to the Building. If called on, the Contractor shall carry out all such tests and prove the results to the entire satisfaction of the local and electric supply authorities. All costs and expenses incidental to the release of electric supply shall be to the Contractors account and no demand whatsoever shall be made to the Owner, except for any security deposits that the supply authorities would deem it necessary for charging of the line etc.

7.8 All such documents forwarded and/or letters and/or correspondence exchanged to this regard shall be made available for inspection and the Contractor shall furnish 3 sets of such documents and drawings for the Owner`s records.

7.9 After release of electric supply to Owner, the Contractor shall furnish six sets of all tests and test reports declared to the Supply authorities and shall record the initial reading of the L.T. Meter and shall furnish all such documents, officially exchanged between the Contractor and the Supply authorities for the record of Owners.

7.10 Contractor shall also attend and furnish the relevant completion certificate from the Electrical Inspector, I.E & L. Department, Government of Maharashtra and/or any other authority thereof, such as Pollution Control Board, various Government Bodies, Electrical Inspector, and supply Authorities whichever may be applicable.

7.11 The Contractor shall maintain a close liaison with the Supply Authorities and keep informed to the Architect / Consultants/Owners of the entire developments and planning i.e. being done by the Supply Authorities. It is the primary responsibility of the Contractor to approach Supply Authorities for obtaining Electrical Loads Sanctions. All formalities connected with this work shall be to the account of the Contractor except for official fees or deposits or any other statutory obligations.

I / We hereby declare that I/We have read and understood the above instructions which have been issued as conditions of the contract.

W I T N E S S **(Signature of the Tenderer)**

SECTION - IV
LIST OF APPROVED BRANDS/MAKES OF EQUIPMENT REQUIRED UNDER THIS TENDER.

The following are the list of approved brands/makes of equipment required under this tender. Please note that wherever there is a multiple choice of brands/makes approved, any one make as nominated by the Owners/Consultants will have to be supplied by the Contractor without any extra cost to the owners. No deviation in this will be accepted by the owners.

Sr. No.	Description	Approved Makes	Makes/Brands being offered by the Contractor.
1.	Low Tension, 415 Volts AC Air Circuit Breaker, 3/4 Pole 50 Hz. 50 KA-STR. Micro Processor Based	MERLIN GERIN SIEMENS 3WL WITH L & T	
2.	Low Tension, XLPE Armoured, 1.1 kV grade, Aluminium/ Copper conductor cables type A2XFY/YRY.	RR KABLE/ POLYCAB/ UNIVERSAL/ FINOLEX KEI	
3.	Low Tension, TPN SFU with HRC fuses, 415 Volts, AC, 3 Phase, 50 Hz.	ABB/ MERIN GERIN SIEMENS/L&T	
4.	Low Tension, Moulded Case Circuit Breaker, 415 Volts AC, 3 Phase 50 Hz.,Microprocessor/Thermal Release	MERLIN GERIN LEGRAND/ L&T SIEMENS	
5.	Low Tension, Gas Filled Capacitors 440 Volts, 50 Hz., 3 Phase	EPCOS INDIA/ L & T	
6.	Indicating Lamps Holders with LED type lamps.	ALTOS/SCHNEIDER TECHNIK/SIEMENS	
7.	Selector Switches for Ammeter/Voltmeter.	SALZER/ KAYCEE	
8.	Load Managers, Digital type Ammeters, Voltmeters, PF meters, Frequency Meters.	DIRIS/TRINITY CONZERV/ SCHNEIDER	

Sr.		Approved	Makes/Brands being

No.	Description	Makes	offered by the Contractor.
9.	Digital Energy Meters.	DIRIS/CONZERV/ L&T	
10.	Microprocessor Relays.	ABB/SEGC/DEIF GE POWER/ SIEMENS/L&T	
11.	Panel wires, Gray/Black colour in 660/1100 Volts. grade (FR).	RR KABEL/POLYCAP FINOLEX	
12.	Cable Glands - Siemens Single Compression type.	COMET/ BRACO / JAINCO	
13.	Lugs, Crimping type, tinned copper heavy duty only.	DOWELL'S/ COMET / BRACO	
14.	HRC Control fuses with bakelite / type moulded fuse holders.	GE/SIEMENS L&T / ABB	
15.	Push Button Stations type, in different colour codes.	TECHNIK/ SIEMENS/ VAISHNAV	
16.	Terminal Blocks, Push On type.	WAGO/HELU ELEMEX	
17.	MV TTA Panels	SCHNEIDER BLOK SET/ SIEMENS 8 PV	
18.	Sandwich type Bus Duct and Rising Mains	CONTROLS AND SWITCHGEAR/ MERLIN GERIN/ GODREJ	
19.	Starters/Contactor/ Timers.	TELEMECANIQUE SIEMENS/BCH	
20.	Miniature Circuit Breaker of 10 KA Breaking Capacity and Boards.	MERLIN GERIN/ L&T HAGER/ MDS- LEXIC/ SIEMENS/	

Sr. No.	Description	Approved Makes	Makes/Brands being offered by the Contractor.

21.	CTs 1100 Volts grade Cast Resin Only	AUTOMATIC ELECTRIC/ KAPPA/RECO
22.	Automatic Power Factor PANELS & Relay	BELUCK / POWERMATRIX/ CONZERV
23.	Load Manger with RS 485 Port & Software	DIRIS / TRINITY CONZERV/SCHNEIDER
24.	All Light Fittings	PHILIPS/THORN/PIERLITE/WIPRO
25.	PVC Conduits.	PRECISION/AKG
26.	PVC Conduit Accessories	PRECISION/AKG
27.	FRLS Wires in 660/1100 Volts grade for point wiring.	VINAY ELECTRICAL / RR KABLE/ POLYCAB RAJNI GANDHA
28.	Switches and Sockets 6 / 16 Amps. Modular Type.	VINAY ELECTRICAL /ANCHOR /CRABTREE/ LEGRAND
29.	LED Fitting	SUNGRID ENERGY /WIPRO/PHILIPS/THORN
30.	Lamps/Tubes.	SUNGRID ENERGY / PHILIPS / OSRAM /WIPRO
31.	Electronic Ballast for Light Fittings as per Technical Specifications	PHILIPS / CROMPTON
32.	Hand/Face Drier	ASKON/AUTOMATS ASHRA MARKTING
33.	All type of Fasteners	HILTI/FISHER
34.	Paints & Primers	ASIAN/DUCO
35.	Industrial Plug & Socket Interlock Type	LEGRAND/GEWISS MOELLER/MERLIN GERIN
36.	Lead Acid Battery	EXIDE/HBLNIFE
37.	DATA ACCESSARIES	DIGILINK/ D LINK / LEGRAND

Sr. No.	**Description**	**Approved Makes**	**Makes/Brands being offered by the Contractor.**

38	DATA CABLES	DIGILINK/ D LINK / LEGRAND
39	Any other Item.	SAMPLE FOR APPROVAL OF THE CONSULTANTS

In case any of the makes for any of the materials is missed out in the above list, then the contractor shall inform the Consultants about the same and obtain the approval. Thereafter, he can proceed with the supply of the equipment.

I / We hereby declare that I / We have read and understood the above instructions which have been issued as conditions of the contract.

W I T N E S S **(Signature of the Tenderer)**

5.0 ANNEXURES

5.01 **Annexure - A**

ARTICLES OF AGREEMENT

(On stamppaperofRs.100/-)

ARTICLE OF AGREEMENT made on this _____ day of _____ two thousand and _____ BETWEEN **New India Assurance, Mumbai** having its office at _____ hereinafter called **'Client'** (which expression shall include its successors and assigns wherever the context or meaning shall so require or permit) of the one part and _____

_____

hereinafter called the **'Contractor'** (which expression shall include its successors and assigns wherever the context or meaning shall so require or permit) of the other part.

WHEREAS the Client is desirous of **Proposed Refurbishing and Renovation work at 7th floor for New India Assurance, Fort, Mumbai - 400 001,** as mentioned, and has got drawings, specifications and the bill of quantities prepared by Parelkar & Dallas, Medows House, 4th Floor, 39, N. M. Road, Fort, Mumbai – 400 001, which have been signed by or on behalf of the parties hereto.

AND WHEREAS the Contractor has agreed to execute upon and subject to the conditions set forth herein and to the conditions set forth in the special conditions and in the Bill of Quantities and conditions of contract (all of which are collectively hereinafter referred to as 'The said terms and conditions', the works, shown upon the said drawings and! or described in the said specifications and included in the said bill of quantities at the respective rates therein arrived at or such other sum as shall become payable there under (herein after referred to as the said 'contract value')

NOW THEREFORE THIS AGREEMENT WITNESSTH THAT:

1. In consideration of the said Contract Value to be paid at the times and in the manner set forth in the said terms and conditions, the contractor shall upon and subject to the said terms & conditions execute and complete the works shown on the said drawings and as described in the specifications and / or bill of quantities, annexed hereto .. The correspondence from the date of purchase of Tender Form and up to the date of work order shall form part of the contract.

2. The word "Architect" in the said conditions shall mean M/s Parelkar & Dallas or in the event of their ceasing to be the Architects-for whatever reason such other person or persons as shall be appointed by the Client for that purpose provided always that no person subsequently appointed to be Architect shall be entitled to disregard any opinion or decision of approval or instructions given or expressed in writing by the Architect for the time being.

3. The Client shall pay the Contractor the said Contract Value or such other Slim as shall become payable at times and in the manner specified in the said terms and conditions.

4. The said terms & conditions and Appendices thereto shall be read and construed as forming part of this agreement and the parties hereto shall respectively abide by and submit themselves to the said terms and conditions and perform the agreement on their part respectively in the said terms & conditions contained.

5. Tender documents containing notice to the Contractors, conditions of the contract, Salient Features, Special Conditions of contract, Technical specifications and schedule of quantities with the rates entered therein, shall be read and studied as forming part of this agreement and the parties hereto shall respectively abide by and submit themselves to the conditions and stipulation and perform the agreements on their part respectively in such conditions contained.

6. This contract is neither a fixed Lumpsum Contract nor a piece Work Contract but is a Contract to carry out the work in respect of the entire work as defined in the contract documents to be paid for according to actual measured quantities at the rates contained in the bill of quantities or as provided in the said contract documents.

7. The Client reserves to itself the right of altering the Drawings and nature of the work by adding to or omitting any items of work having portions of the same carried out without prejudice to this Contract.

8. The contract herein contained shall comprise not only the works mentioned above but all subsidiary works connected therewith the same site at may be ordered to be done from time to time by the said Project Management Consultant/Architects for the time being, even if such work may not be shown on the said drawings or described in the said schedule of specifications and quantities.

9. a) The contractors represent that they have experienced and competent staff which will enable them to ensure proper quality check on the materials and who will ensure that the contractors will carry out proper tests as required by the specifications and will supervise the day to day working and execution of the contract works.

   b) If the contractors have any doubt about the quality of any materials or any difficulty in supervision of the day to day work it shall be the duty of the contractors to report the matter in writing forthwith to the Project Management Consultant! Architects for the time being to suspend the portion of the work about which difficulty is experienced, and the contractors will abide by the direction of the Project Management Consultant/Architects.

   c) The contractors covenant and warrant that completed items of the work as well as the entire work on completion will be in conformity with the Specifications and the terms and conditions of this contract and will be of proper quality and description.

10. Time shall be considered as the essence of this Contract and the Contractor hereby agrees to commence the work soon after the site is handed over to him from the date of letter of intent subject nevertheless to the provision for extension of time as provided for in the said conditions and complete the entire work within the stipulated period as per the tender conditions.

11. All payments by the Client under this contract will be made only at _____

12. All disputes arising out of or in any way connected with this agreement shall be deemed to have arisen at _____ and only courts in _____ shall have jurisdiction to determine the same.

13. That the several part of this Contract have been read by the Contractor and fully understood by the Contractor. The Contractor shall not be entitled for the payment for the quantities beyond the tendered quantities unless ordered for by specific written instructions from the Project Consultant/Architect/Client.

14. This agreement shall be signed in triplicate, the original whereof shall be kept in the custody of the Client, the duplicate with the contractor, the triplicate with the Architect. Stamp duty shall be borne and paid by contractor.

IN WITNESS WHEREOF THE Client and the Contractor have set their respective hands to these presents and two duplicates hereof the day and year first herein above written. (lf the contractor is a partnership or an individual.)

I WITNESS WHEREOF THE Client has set its hands to these its duly authorised official and the Contractor has caused its common seal to be affixed hereunto and the said two duplicates / has caused these presents and the said two duplicates hereof to be executed on its behalf, the place, day, month and year first hereinabove written (lf the contractor is a Company).

Signature Clause.

SIGNED AND DELIVERED BY

_____ by the hand of

Shri
In the presence of

(1) _____
Address _____

(2) _____
Address _____
Witness
SIGNED AND DELIVERED BY
By the hand of
Shri
And duly constituted attorney

5.02 Annexure - B

(PROFORMA)

FORM OF INDENTURE FOR SECURED ADVANCE

THIS INDENTURE made the _____ day of _____ 20 between _____ (hereinafter called the contractor which expression shall where the context so admits or implies be deemed to include his executors, administrators and the assigns) of one part and _____
(hereinafter called the _____ shall where the context so admits or implies be deemed to include its successors in office and assignees) of the other part.

WHEREAS by an agreement No. _____ dated _____
(hereinafter called the said agreement) the Contractor has agreed
_____

AND WHEREAS the Contractor has applied to the _____
that he may be also allowed advance on the security of materials absolutely belonging to him and brought by him to the site of the works, the subject of the said agreement for the use in the construction of the works as he has undertaken to execute at rates fixed for the finished work (inclusive of the cost of materials and labour and other charges) and whereas the _____
_____ has agreed to advance to the contractor an amount upto Rs. _____
(Rupees _____ only) on the security of the quantities and other particulars of the materials on the security of which the advance or advances are made as detailed in the secured advance account forming part of the running account bill preferred from time to time and signed by the Contractor for the said works.

NOW THE INDENTURE WITNESSETH that in pursuance of the said agreement and in consideration of amounts aggregating to the sum of Rs. _____ (Rupees _____only) on or after the execution of these presents paid to the Contractor by the _____
(The receipt whereof the Contractor hereby acknowledge) Contractor both hereby covenant and agree with the _____ and declare as follows:

1. That the said sum aggregating to Rs. _____ (Rupees _____only) so advanced by the _____ to the Contractor as aforesaid shall be employed by the Contractor in or towards expediting the execution of the said works and for no other purpose whatsoever.

2. That the materials detailed in the said running Account Bills which have been offered to and accepted by the _____ as Security are absolutely the Contractor's own property, and free from encumbrances of' any kinds and the contractor will not make any application for or receive a further advance on the security of materials which are not absolutely his own property and free from encumbrances of any kind and the contractor hereby agree to indemnify the _____ against all claims to any material in respect of which an advance has been made to him as aforesaid.

3. That the materials detailed in the said Running Account Bills (hereinafter called the said materials) shall be used by the Contractor solely for the execution of the said works in accordance with the directions of the Consultant and in terms of the said agreement.

4. That the Contractor shall make at his own cost all necessary and adequate arrangement for the proper watch, safe custody and protection against all risk of the said materials and that until used in construction as aforesaid the said materials shall remain at the site of the said works in the Contractor's custody and on his own responsibility and shall at all times be open to inspection, by the event of the said materials or any part thereof being stolen, destroyed or damaged the contractor will

forthwith replace the same with other materials of like quality of repair and make good the same as required by the Consultant.

5. That the said materials shall not on any account be removed from the site of the said work except with the written permission of the Consultant or an officer authorised by him on that behalf.

6. That the advance shall be payable in full when or before the Contractor receives payment from the _____ of the price payable of him or the said work under the terms and the provisions of the said agreement provided that if any intermediate payments are made to the Contractor on account of work done, then on the occasion of each such payment the _____ will be at liberty to make recovery from the Contractor's Bill for such payments by deducting there from the value of the said material they actually used in the construction and in respect of which recovery has not been made previously the value for this purpose being determined in respect of each description of materials at the rates at which the amounts of the advances made under these presents were calculated.

7. That if the contractor shall at any time make any default in the performance or observance in any of the· terms and provisions of the said agreement the total amount of the advance or advances that may still be owing to the _____ together with the interest thereon at twelve percent annum from the date of repayment will, with all costs, charges, damages and expenses incurred by the in the recovery thereof or the enforcement of the security or otherwise by reason of the default of the contractor shall become payable by the Contractor and the Contractor hereby covenants and agree with the to repay and pay the same respectively to him accordingly.

8. That the contractor hereby gives charge all the said materials for the repayment to the _____ of the said sum amounting to Rs. _____ (Rupees _____ only) and all cost / charges, damages and expenses payable under these presents provided always and it is hereby agreed and declared that notwithstanding anything in the said agreement and without prejudice to the powers contained therein if and wherever the money owing shall not be paid in accordance herewith, the _____may at any time thereafter adopt all or any of the following courses as he may deem best:

a) Seize and utilize the said materials or any part thereof in the completion of the said works on behalf of the contractor in accordance with the provisions. in that behalf contained in the said agreement debiting the contractor with the actual cost of effecting such ompletion and the amount due in respect of advance under these presents and crediting the contractor with the value of work done as if he had carried it out in accordance with the said agreement and the rates thereby provided. If the balance 18 against the contractor he IS to pay the same to _____ on demand.

b) Remove and sell the public auction the seized materials or any part thereof and out of the moneys arising from the sales retain all the sums aforesaid repayable to the _____under these presents and pay over the surplus (if any) to the Contractor.

c) Deduct all or any part of the money owing out of the security deposits or any sum due to the Contractor under the said agreement.

IN WITNESS WHEREOF _____ and _____
by the order and under the direction of the _____ having hereunto set their respective hands the day and year first above written.

Signed, sealed and delivered by the
said contractor:

Signature :
Name :
Address :

Signed by the order and direction
Of the
Signature :
Name :
Address :

5.03 Annexure – C

(PROFORMA)
On Rs. _____Stamp as per

FORM OF INDEMNITY BOND

KNOW all men by these presents that I/We _____ do hereby execute indemnity Bond in favour of _____ and amongst other offices, at _____ and M.s _____ _____ having their office at _____ _____ on this _____ day of _____ 20

WHEREAS THE _____ have appointed _____ as the Civil Contractors for their proposed Building at _____ and M/s _____ as their Consultants.

THE DEED WITNESS AS FOLLOWS :
I/We, _____ hereby do indemnify and keep same harmless (1) _____ and (2) M/s _____ against and from :

1. any third party claim, civil or criminal complaints/liabilities, site mishaps and other accidents or disputes and/or damages occurring, or arising out of any mishaps at the site due to fault work, negligence, faulty construction and/or for violating any law, rules and regulations in force, for the time being while executing/executed civil works by me/us.

2. any damages, loss or expenses due to or resulting from any negligence or breach of duty on the part of me/us or any sub-contractor/s if any, servants or agents.

3. any claim by an employee of mine/ours or of sub - contractor/s, if any, under the Workmen Compensation Act and Clients Liability Act, 1939 or any other law rules and regulations in force for the time being and any acts replacing and/or amend the same or any of the same as may be in force at the time and under any
law in respect of injuries to persons or property arising out of and in the course of the execution of the contract work and/or arising out of and in the course of employment of any workmen/employee.

4. any act or omission of mine/ours or sub-contractor/s if any, out/their servants or agents which may involve any loss, damage, liability, civil or criminal action.

IN WITNESS WHEREOF THE _____
Has set his/their hands on this day of _____ 20

SIGNED AND DELIVERED BY THE
AFORESAID _____

IN THE PRESENCE OF WITNESS:
1)

2)

Price Bid

Tender Document For

"Proposed Refurbishing, Renovation and Electrical Work At 7th Floor"

For **New India Assurance,**

Fort, Mumbai – 400 001.

Architects

Parelkar & Dallas

Architects, Interior Designers & Valuers,
Medows House, 4th Floor, 39, Nagindas Master Road,
Fort, Mumbai - 400 001.
Tel.: 2265 4107, Fax: 2265 7192.
Email: parelkar.dallas@gmail.com

Tender Submitted By:

Name:

Address:

Signature:

Stamp:

Item No	Description of Item	Unit	Qty	Rate	Amt.
	FURNITURE ITEMS				
1	**TABLES :**				
	Providing, keeping in place or fixing work tables made out of 18/19 mm thick commercial grade block board or plywood for tops and vertical supports, externally finished with selected pattern, colour of approved make laminate having 1.5 mm thick to be used for top and 1.00 mm thick for vertical supports. Under the Table top readymade FRP pull out tray on bearing channels shall be provided for key board as shown in the drawing, also the table shall have Teak wood foot rest of size 50 x 70 as marked in the drawing, finished in melamine polish as per approved shade. The trolley for keeping C.P.U. shall be either readymade or fabricated as specified. The table shall be provided with 3 Nos. drawer cabinets at one end under the table top, made out of 18 mm commercial play wood boxing externally finished with 1 mm thick laminate of approved pattern and make. Top 2 Nos. drawer shall be 150 mm deep and the lower one of 357 mm deep made in 12 mm commercial ply for sides and 18 mm thick for front internally finished in French polish and externally visible wooden sections shall be melamine polish , complete as per drawing including handles, necessary hardware and locks etc.				
1-a	**Senior Officer tables**	Nos.	2.00		
	Same as item No. 1 above complete as per drawing and as instructed by the Architect. Size – 1500 mm long x 900mm wide Refer Drg. No. NIA-8				
1-b	**Officer's Table**	Nos.	38.00		
	Same as Item No. 1 above but smaller in size complete as per drawing and as instructed by the Architect. Size 1350 mm long x 750 mm wide Refer Drg. No. NIA-9				
1-c	**Staff Table**	Nos.	16.00		
	Same as Item No. 1 above but smaller in size and without have\ing drawer cabinet under the table top, complete as per drawing and as instructed by the Architect. Size – 1200 mm long x 600 mm wide Refer Drg. No. NIA-2				

Item No	Description of Item	Unit	Qty	Rate	Amt.
	FURNITURE ITEMS				
1-d	**Sub Staff Table :**				
	Same as Item No. 1 above but smaller in size and without having FRP pull out tray for key board and readymade trolly for keeping C.P.U. as specified in other tables, finished including polishing as instituted, complete as per drawing with all hardware, handles and locks etc. Size : 1200 mm long x 600 mm wide. Refer Drg. No. NIA-10				
2.	**Conference Table :**	No.	1.00		
	Providing and keeping in position conference table made out of 18 or 19 mm thick commercial ply for top round in shape having 1.5 mm thick laminate finish of approved colour and make, all the border of top shall hav teak wood round shape molding of size 35 mm x 25 mm thick as per detail drawing finished with melamine polist. The t mm thick clear glass with machine edge polish shall be provided over laminated solid top, the top shall be supported on teak wood members of tapering shape out of 70 mm x 50 mm x 325 mm long for lower base and 100 mm x 50 mm x 425 mm long for upper supports provided with nylon bushes at floor level. The teak wood support frame shall be melamine polish as approved by the Architect complete as per drg. No. NIA-11 and as instructed by the Architect including required hareware etc. Size 1200 mm diameter x 750 mm high. Refer Drg. No. NIA-11				
3.	**Storage Units :**				
	Providing and supplying or fixing various storage units made out of 18 or 19 mm commercial ply for top, vertical supports, shutters, drawer front facia and shelves backing ply shall be 6 mm thick and all drawers internal sides shall be made in 12 mm commercial ply and bottom base in 6 mm commercial ply. All the exposed edges of ply shall be covered with 6 mm thick teak wood lipping patti. The drawers shall run on ball bearing channels as approved, stainless steel sateen finish handles shall be provided to pull out the drawers, the top of units shall be finished in 1.5 mm thick laminate and external faces of vertical faces in 1.00 mm thick laminate of approved shade and make, the exterior visible teak wood shall be melamine polished and internal area of plywood shall be finished in French polish, complete including necessary hardware as per drawings and as instructed by the Architect.				
3-a	**Side storage unit at Staff Work table**	Sq.M.	9.4		
	Providing and supplying or fixing storage unit at side of staff				

Item No	Description of Item	Unit	Qty	Rate	Amt.
	FURNITURE ITEMS				
	work tables made same as item No. 3 above having 4 Nos. of drawers 100 mm high each at top level and 360 mm high 2 nos. at lower half. Complete as per drawing and instructions of the Architect. Size : 750 mm long x 400 mm deep and 657.0 mm high. Refer Drg. No. NIA-2				
3-b	**Side Storage unit at Sub Staff Work Table.**	Sq.M.	1.00		
	Providing and supplying or fixing storage units at side of sub staff work table same as Item No. (3) and (3-a) above, complete as per drawing and instructions of the Architect. Size – 750 mm long x 400 mm deep and 657 mm high. Refer Drg. No. NIA-10				
3-c	**Side storage Unit at Officers Work Tables**	Sq.M.	23.00		
	Providing & keeping in place of fixing storage units at side of Officers work table same as Item No. (3) and (3-a) above, complete as per drawing and instructions of the Architect. Size : 900 mm long x 400 mm deep and 632 mm high Refer Drg. No. NIA-9				
3-d	**Side Storage Unit at Senior Officers Work Tables :**	Sq.M.	3.00		
	Providing, keeping in place or fixing storage units at side of senior Officers worktable same as Item No. (3-c) above also in overall size complete as per drawing and instructions of the Architect. Refer Drg. No. NIA-7				
3-e	**Low height storage Unit at Senior Officers Cubical :**	Sq.Mt.	3.00		
	Providing, keeping in place or fixing low height storage units in Senior Officers cubical same as item No. (3) and similar in pattern like (3-a) but with slight variation in drawers size and nos. The unit shall have 6 Nos. of drawers each 260 mm high placed in two rows in 3 bays and last 2 bays shall have 2 Nos. openable shutters. Complete as per drawings and instructions of the Architect including necessary hardware and finishes. Size – 2250 mm long x 400 mm deep x 632 mm high. Refer Drg. No. NIA-6				
3-f	**Low Height Storage Units at Passages**	**Sq.Mt.**	70.00		
	Providing, keeping in place or fixing low height storage units in the passages same as item No. (3) and similar in pattern like (3-a) but with slight variation in design having all drawers and without openable shutters at last bay as given in Item No. (3-e(above. All the drawers shall be of 369 mm high place in 3 rows vertically and length wise it is varying as per space available complete as per drawings and the instructions of the Architect, including hardware, polishing etc.				

Item No	Description of Item	Unit	Qty	Rate	Amt.
	FURNITURE ITEMS				
	Size :i) 3336 mm length x 400 mm deep x 1200 mm high ii) 2775 mm length x 400 mm deep x 1200 mm high iii) 1350 mm length x 400 mm deep x 1200 mm high Rest as per site measure Refer Drg. No. NIA-12				
4.	**Low Height Partitions :**	Sq.Mt.	97.00		
	Providing and fixing low height partitions at staff cubicals, section divisions and cluster dividers made out of appropriate Aluminum sections 50 mm x 50 mm at 600 mm centre to centre for horizontal and vertical grid of frame work and central post of 75 mm x 75 mm at meeting junction of cross partitions to hold the cross partitions. All the concealed Aluminum members of frame work shall be without anodizing and outer exposed members of aluminum frame work if any shall be of approved shade and grade of colour anodizing, both the faces of metal framework shall have 12 mm thick commercial ply panels fixed prospering and the same shall be finished with approved pattern, shade and make laminate 1.00 mm thick properly glued from both the sides, the partition shall have skirting band of 75 mm high as shown in the drawing and finished with 1.00 mm thick laminate of approved shade and make. The partition shall be of laminated finish upto 900 mm height and above that 300 mm high & 8 mm thick clear glass panel with decorative film as approved pressed on it, the glass panel to be fixed with appropriate approved make stainless steel patch fittings to the solid partition below as show in the drawing, complete as per drawing No. NIA-3, 4 & 5 and as per the instructions of the Architect. Size – length varies (refer plan) x 1200 mm height				
5.	**Painting in Acrylic Emulsion Paint :**				
5-a	Painting of walls – providing and applying Acrylic Emulsion paint of approved quality, colour and make in 2 coats or even more to achieve good results over one coat of appropriate primer base to wall, column, wood or plaster boards etc., including scrapping off existing paint and applying the wall putty till the surface is made leveled and smooth to receive Acrylic paint, complete with scaffolding if required and cleaning the area of the painting work, complete as instructed by the Architect.	Sq.Mt.	350.00		
5-b	**Painting of Ceiling :**	Sq.Mt.	425.00		
	Providing and applying acrylic emulsion to ceiling area same as item No. 5-a above, complete as instructed by the Architect.				
5-c	**Painting in Textured paint :**	Sq.Mt.	Q.R.		
	Providing and applying three coats of Textured paint or if required more to achieve correct effect, over one coat of primer				

Item No	Description of Item	Unit	Qty	Rate	Amt.
	FURNITURE ITEMS				
	coat and base preparation as per manufacturer's specifications complete as per the instructions of the /architect				
6.	**Roll on curtain blinds for windows :**	Sq.M.	28.00		
	Providing and fixing position vertical roller blinds of Teflon material in approve colour, pattern and make and properly fixed in position with all the required fittings and fixtures required for smooth functioning of roll on action of curtain Blinds, complete as instructed by the Architect.				
7.	**Chairs :**				
7-a	Providing and keeping in position chairs for all staff, sub staff are common in design as approved by the Architect from available option of the manufacturers, revolving and push back type having separate seat and low back made out of minimum 12 mm thick plywood base frame covered with foam rubber cushions 50 mm thick for seat and 40 mm thick for back, covered with white markeen cloth and finally finished with approved colour, pattern and type of fabric. The chair shall be provided with soft PVC armrest as approved and fixed properly, the chair shall be fixed on 4 Nos. legged M. S. powder coated black/brown heavy duty mild steel stand with castors and height adjustable system, complete as instructed by the Architect. Fabric basic rate around Rs. 300/- per meter (all inclusive) Finished chair cost range – approximately around Rs. 3,500/- each.	No.	18.00		
7-b	Providing and keeping in position chairs for officers as per approved design by the Architect from available options of the manufacturers, revolving and tilting type having polypropylene/PVC molded panel seat back (medium high) with foam rubber cushion for seat 65 mm thick and 50 mm thick for back, covered with white markeen cloth and finaly finished with approved colour, pattern and type of fabric. The chair shall be provided with soft polypropylene armrest as approved and fixed properly, the chair shall be fixed on 4 Nos. legged anodized Aluminum stand with castors and height adjustable system, complete as instructed by the Architect. Fabric basic rate around Rs. 350/- per meter (all inclusive) Finished chair cost range – approximately around Rs. 4,700/- each.	No.	38.00		
7-c	Providing and keeping in position chairs for conference room same as item No. 7-b above but having cushion of foam rubber 70 mm thick for seat and 60 mm thick for back and superior quality fabric for final covering, also provided with 5 legged anodized Aluminum stand with castors and height adjustable system, complete as approved and instructed by the Architect	No.	5.00		

Item No	Description of Item	Unit	Qty	Rate	Amt.
	FURNITURE ITEMS				
	Fabric basic rate around Rs. 400/- per meter (all inclusive) Finished chair cost range – approximately around Rs. 5,800/- each.				
	Grand Total (in Figure)				
	Grand Total (in Words)				
Note: The Rates Quoted To Be Inclusive Of All Taxes As Applicable. Any Taxes Mentioned Over And Above The Tender Total Amount Will Not Be Considered.					

PROPOSED ELECTRICAL WORKS AT 7TH FLOOR FOR NEW INDIA ASSURANCE, FORT, MUMBAI

	SUMMARY SHEET	
PART NO.	**DESCRIPTION OF THE PART**	**AMOUNT**
1.0	Main Distribution Boards	
2.0	Cables Mains & Sub Mains	
3.0	Earthing And Earthing Strips	
4.0	Point Wiring & Conducting Work	
5.0	Supply & Installation Of Lighting Fixtures & Fans	
6.0	Telephone Network	
	GRAND TOTAL OF ALL PARTS (Rs.)	

PROPOSED ELECTRICAL WORKS AT 7TH FLOOR FOR NEW INDIA ASSURANCE, FORT, MUMBAI.

Sr. No.	Short Description	Unit	Qty	Unit Rate	Amount (Rs.)
	PART - I :- DISTRIBUTION BOARDS.				
1.0	Supply and Installation of 2 No. of 20 Amps.,DP MCB of approved make with built in O/C, S/C releases with enclouser box and 1 MCB shall be connected to the 16A mobile socket of each server rack . The Breaker shall be suitable for 415 Volts 50 Hz., AC supply. The breaker shall have breaking capacity of 10 KA for 1 Sec. for server rck only	No	1		
2.0	**Ligting Distribution Boards MCB Type :-**				
	Providing and fixing on angle iron frame work Lighting distribution boards MCB type of approved make only and comprising of the following. The rate shall also include supply and Installation of frame fabricated using minimum 25 x 6 mm M.S. Angles and minimum 25 x 6 mm GI flats and painting of these frames using seven tank painting process and powder coated paint having shade No. RAL 7032 all complete as required and as per final direction and approval of Consultants.				
2.1	**Incomer :-**				
	1 No., 40 Amps., d Pole, 10 Ka Braking Capacity "B" Curve MCB ,32A DP 30mA ELCB per ph				
2.2	**Out goings :-**				
	10 Amps TPN, 6 ways/Phase MCB DB comprising of 18 Nos., 10 Amps., Single pole MCBs.				
	The above board shall be enclosed in design with powder coated paint all complete and as per final direction and final approval of the Architect/ Consultant.	No.	1		
3.0	**Power Distribution Boards MCB Type For Computer (UPS) Supply :-**				
	Providing and fixing on angle iron frame work power distribution boards MCB type of approved make only and comprising of the following. The rate shall also include supply and Installation of frame fabricated using minimum 25 x 6 mm M.S. Angles and minimum 25 x 6 mm GI flats and painting of these frames using seven tank painting process and powder coated paint having shade No. RAL 7032 all complete as required and as per final direction and approval of Consultants.				
3.1	**Incomer :-**				

	1 No., 32 Amps., DP Miniature Circuit Breaker "C" type suitable for 415 Volts, 50 Hz. 10 kA Breaking Capacity.				
3.2	**Out goings :-**				
	16 Amps SPN, 8 ways MCB DB comprising of 8 Nos., 16 Amps., Single pole MCBs having "C" Curve.				
	The above board shall be enclosed in design with powder coated paint all complete and as per final direction and final approval of the Architect/ Consultant.	No.	1		
4.0	**Raw Power Distribution Boards MCB Type :-**				
	Providing and fixing on angle iron frame work Lighting distribution boards MCB type of approved make only and comprising of the following. The rate shall also include supply and Installation of frame fabricated using minimum 25 x 6 mm M.S. Angles and minimum 25 x 6 mm GI flats and painting of these frames using seven tank painting process and powder coated paint having shade No. RAL 7032 all complete as required and as per final direction and approval of Consultants.				
4.1	**Incomer :-**				
	1 No., 40 Amps., FP/DP, 10 Ka Braking Capacity "C" Curve MCB .				
4.2	**Out goings :-**				
	16/20 Amps., 8ways, TPN, MCB DB comprising of 8 Nos., 24 Amps., Single pole MCBs.				
	The above board shall be enclosed in design with powder coated paint all complete and as per final direction and final approval of the Architect/ Consultant.	No.	1		
4.3	Supply and installation of power supply for AC outdoor units of 1 nos of 63A FP MCB with weatherproof metal enclouser as per final direction and approval of consultants	No.	1		
4.4	Supply, receive, store at site, erect in position 100 mm x 100 mm x 3 mm thick Danger Notice Boards as required and as per final direction and approval of Consultant.				
	a) 415 V Enameled 'Danger' board.	No.	1		
	TOTAL OF PART :- I C/F To SUMMARY SHEET				-
	Short Description				
PART-II :- CABLES, MAINS AND SUB-MAINS :-					

5.0	Supply, handling, laying effecting proper connections testing and commissioning of following sizes of 1.1 KV grade PVC insulated Aluminium/Copper conductor cables laid over GI supports, GI cable Trays or fixing on walls including clamping the cable to supports in an approved manner as required complete with Copper earthing as specified for continuous earthing along with the cable. (Earthing will be measured separately and need not be quoted under this item) all complete as required and as per final direction and approval of the Consultants.				
a)	4 Core x 10 sq.mm., PVC Insulated Copper Conductor Armoured Cable.	R.M	24		
b)	3.5 Core x 25 sq.mm., PVC Insulated Aluminium Conductor Armoured Cable.	R.M	10		
c)	4 Core x 16 sq.mm., PVC Insulated Copper Conductor Armoured Cable.	R.M	0		
d)	3 Core x 2.5 sq.mm., PVC Insulated Copper Conductor Armoured Cable.	R.M	50		
e)	1 Core x 16 sq.mm., PVC Insulated Copper Conductor Flexible Cable.	R.M	0		
5.1	Supply and making terminal joints for the following sizes of 1.1 KV grade PVC insulated Aluminium/Copper conductor cables including providing heavy duty tinned copper lugs, crimping type; insulation tape, Heavy duty Single compression type brass glands effecting and terminating the cables in Equipment/Panel all complete as required as per final direction and approval of the Architect/Consultant.				
a)	4 Core x 10 sq.mm., PVC Insulated Copper Conductor Armoured Cable.	No	10		
b)	3.5 Core x 25 sq.mm., PVC Insulated Aluminium Conductor Armoured Cable.	No	4		
c)	4 Core x 16 sq.mm., PVC Insulated Copper Conductor Armoured Cable.	No	0		
d)	3 Core x 2.5 sq.mm., PVC Insulated Copper Conductor Armoured Cable.	No	4		
e)	1 Core x 16 sq.mm., PVC Insulated Copper Conductor Flexible Cable.	nos	0		
5.2	Supplying, Receiving, Storing and fixing in position at site,100 x 40mm Al racewayv in flooring with suitable alluminum clam for fixing on floor by using 25 x 8mm screw for Data and power as per final	Mtr	140		

	direction and the approval of the consultant.				
5.3	Supplying, Receiving, Storing and fixing in position at site, floor outlet boxes having a size of 300 x 300 x 50 mm fabricated using 14 Gauge White CRCA Sheets complete with powder coating with metal treatment done all complete as required and as per the final direction and the approval of the Consulatnst. The rate shall also included supply and fixing of 2mm thick SS Brush Finsh plate with ncessary counter sink SS screws all complete as required and as per the final direction and the approval of the Consulatnst.	No	12		
5.4	Supplying, Receiving, Storing and fixing in position at site, floor outlet boxes having a size of 250 x 250 x 50 mm fabricated using 14 Gauge White CRCA Sheets complete with powder coating with metal treatment done all complete as required and as per the final direction and the approval of the Consulatnst. The rate shall also included supply and fixing of 2mm thick SS Brush Finsh plate with ncessary counter sink SS screws all complete as required and as per the final direction and the approval of the Consulatnst.	No	9		
5.6	Supplying, Receiving, Storing and fixing in position at site, floor outlet boxes having a size of 150 x 150 x 50 mm fabricated using 14 Gauge White CRCA Sheets complete with powder coating with metal treatment done all complete as required and as per the final direction and the approval of the Consulatnst. The rate shall also included supply and fixing of 2mm thick SS Brush Finsh plate with ncessary counter sink SS screws all complete as required and as per the final direction and the approval of the Consulatnst.	No	30		
5.7	Supplying, Receiving, Storing and fixing in position at site, 25 mm dia , 1.8mm thick PVC conduit in floor for extention of Data and power point as approval of the consultant.	mtr	100		
	TOTAL OF PART :- II C/F TO SUMARY SHEET				**-**
	Short Description				
PART - III : EARTHING AND EARTHING STRIPS.					
6.0	All earth pits shall be as per IS 3043 with latest amendments.				
6.1	Supply and commissioning of earthing chemical power for existing earth pits to enhance the value of earth pit as per IS standards.with additional jointing kit and masonry work.	No.	1		
6.2	Providing and fixing in position, the following sizes of earthing strips or wires including providing all fixing accessories and effecting proper connections and as per final directions and approval of the Architect/ Consultant.				
a)	25 x 3 mm Tinned Copper tapes with heat shrinkable PVC Black Colour sleeves.	Mtr	0		

b)	10 Sq.mm Green Clour Copper Earth Wire	Mtr	50		
c)	12 SWG bare copper earth wire.	Mtr.	100		
d)	8 SWG bare copper earth wire.	Mtr.	0		
	TOTAL OF PART III C/F TO SUMMARY SHEET				-
	Short Description				
PART-IV : POINT WIRING AND CONDUITING WORK :-					
Notes:					
	These notes shall apply to all the relevant wiring items described in the schedule of items given below :-				
1	All points wiring, circuit wiring, sub mains wiring shall be done using PVC conduits of minimum 1.6mm				
	thickness and shall comply with IS 2509 of 1973 or amendments there of and FIA approval.				
2	All switch boards under the point wiring shall be the standard boxes available and the same shall be				
	suitable for concealed work. The boxes should be of Electro Plated as per the Manufactures standard				
	practice and should be suitable to accommodate number of control switches fan regulators, sockets,				
	etc. as indicated in drawings.				
3	The entire wiring shall have continuous 2.5 sq.mm. approved make FR Copper conductor earth wire				
	for earth continuity having Green colour in 660/1100 volts grade.				
4	The point wiring shall comply to IS 732.				
5	The entire work has to be carried out under the direct supervision of PMC/Consultant.				
6	All materials under this schedule shall deemed to be included by the Contractor in his scope.				
7	The entire work to be carried out as per the specifications laid down in the tenders, approved drawings,				
	and as per final directions of PMC/Consultant/Architects.				
8	The point wiring shall include wiring of light/fan outlet of any length from distribution board via switch or				
	to the point and including providing circuit wiring, in minimum 25 mm dia PVC Conduit of 1.6 mm and				
	using minimum 2.5 sq.mm FR Copper Conductor wires having Uniley bunching Class 5 Construction				
	and having 99.99% Purity Copper and of approved make for Circuit and Point wiring and of 1100 Volts				
	Grade and 2.5 sq.mm Yellow/Green Colour Copper wire for Earthing in 1100 Volts grade. All the FR				
	wires should be of approved make.				
10	The entire work of the point wiring may be split into two parts i.e. partially to be laid on PVC angle brackets				
	ceiling supported or through existing floorings. It is understood that the bidder have included all the costs				
	towards chasing the floors, removing the debris and redoing the flooring using cement mortar. All such				
	costs shall be deemed to have been included.				

7.0	Providing point wiring for following light point using 2 x 2.5 sq.mm. and circuit wiring using 2.5 sq.mm FR copper conductor wires of RR make in PVC conduits of approved make minimum 25 mm dia and 1.6 mm wall thickness heavy duty with necessary junction boxes/pull boxes complete with flush mounted shock proof accessories like 6 Amp single pole modular type switches of approved make fixed on manufactures standard electro plated boxes with earthing screw. The Switch Boards shall be flushed with wall and continuous earthing up to fixture and switch boards using minimum 2.5 sq.mm. FR green colour copper earth wire of RR make and terminating the point in angle holder/ batten holder/ ceiling rose if required near the fixture all complete and as per final approval of Consultant.				
a)	Primary lighting point / fan point	No.	25		
b)	Secondary light points.	No.	70		
7.1	Providing wiring for 3 pin, 6 Amps., switched socket outlet installed on Lighting Board using 2 x 2.5 sq.mm. FR copper conductor wires of RR make and minimum 2.5 sq.mm. copper conductor FR green colour earth wire of Lapp make for continuous earthing to 6 Amps., 2 pin and earth socket outlet mounted on Lighting switchboard complete with 6 Amps., modular type indicator switch of approved make flush mounted and 6 Amps., 2 Pin and earth flush mounted socket outlet all complete as required and as per final approval of the Consultant. (Half point)	No.	10		
7.2	Providing wiring for 6 Amps, UPS switched socket outlet independently mounted using 3 Core x 2.5 Sq.mm FR Copper Conductor flexiable wires of approved make for the first work station and 3 Core x 1.5 sq. mm Copper conductor FR wires of approved make from First Work Station to Second/Third Work station 6 Amps Socket outlet. The wiring shall be carried out in under floor race ways or extending the point using 25 mm dia 1.6 mm wall thckness PVC conduits of approved make. The Switch Sockets shall be ficxed on suitable sized manufactures standard electro plated boxes near the point. The rate shall also include supply and installation of 3 Nos, 6 Amps., 5 Pin and Earth Socket outlet, and 1 Nos, 16 Amps., single pole modular type indicator switch on each work station with interconnections all complete as required and as per final approval of the Consultant.**(Three Work Station shall be connected on one circuit will call as one Set)**	Set	10		
7.3	Providing wiring for 6 Amps, UPS switched socket outlet independently mounted using 3 Core x 2.5 Sq.mm FR Copper Conductor flexiable wires of approved make for the first work station and 3 Core x 1.5 sq. mm Copper conductor FR wires of approved make from First Work Station to Second Work station 6 Amps Socket outlet. The wiring shall be carried out in under floor race ways or extending the point using 25 mm dia 1.8 mm wall thckness PVC conduits of approved make. The Switch Sockets shall be ficxed on suitable sized	Set	55		

	manufactures standard electro plated boxes near the point. The rate shall also include supply and installation of 3 Nos, 6 Amps., 5 Pin and Earth Socket outlet, and 1 Nos, 16 Amps., single pole modular type indicator switch on each work station with interconnections all complete as required and as per final approval of the Consultant.**(Two Work Station shall be connected on one circuit will call as one Set)**				
7.4	Providing wiring for 6/16 Amps, Raw Switched socket outlet independently mounted using 3 Core x 2.5 Sq.mm FR Copper Conductor flexiable wires of approved make for the First Point and 3 Core x 1.5 sq. mm Copper conductor FR wires of approved make from First Point to Second Point The wiring shall be carried out either in under floor race ways or using 25 mm dia 1.6 mm wall thckness PVC conduits of approved make. The Switch Sockets shall be fixed on suitable sized manufactures standard electro plated/ PVC boxes near the point. The rate shall also include supply and installation of 1 No, 6/16 Amps., 5 Pin and Earth Socket outlet, and 1 Nos, 16 Amps., single pole modular type indicator switch on each loaction with interconnections all complete as required and as per final approval of the Consultant.**(Three Sockets shall be connected on one circuit will call as one Set)** for director and cabin's	Set	3		
7.3	Providing wiring for 20 Amps. 2 Pin and Earth, approved make interlock Switch Socket outlet (IP 42) with Surface mounted boxes using 3 Nos 2.5 Sq. mm. FR insulated Copper conductor wires of RR make make in minimum 25 mm dia 1.6 mm wall thickness PVC Conduits of approved make with necessary junction boxes/pull boxes including supply and fixing of 20 Amps 2 Pin and earth interlock Switch socket outlet with 20 Amps. plug top with inter-connections all complete as required and as per final direction and approval of the Consultant	No.	1		
7.4	Providing of electrical technician at site for the installation of 10 no. light fitting , raw power points and general purpose of troblor shooting of electrical faults . The technitian shall be on site of 8 hr / day. Or as instructed bt architech/ consultants as needed.	No.	1		
7.5	SITC of 25mm MS conduit of apporved grade for alarm at security/ counter table shall be installed with the bell points and 5A switch .	No.	1		
	TOTAL OF PART IV C/F TO SUMMARY SHEET				-
	Short Description				
PART-V : SUPPLY AND INSTALLATION OF LIGHTING FIXTURES & FANS.					
Notes:					
	The rates for lighting fixtures and fans shall include all accessories and supply of all materials that may				
	be required to make the fixture complete in all respects such as :-				
1.0	All the fixtures shall be suitable for single phase, 50 cycles, 230 Volts, AC supply system.				

2.0	All light fixtures shall be provided with HF ballast having THD Less than 10% as described in the schedule.				
3.0	All fixtures shall be factory wired with copper conductor wires.				
4.0	All fixtures shall be supplied with fluorescent lamps/incandescent bulbs or any other special type bulbs				
	as called for in the item.				
5.0	All the fixtures shall be quoted of approved make only.				
8.0	Supply, Receiving, Storing at site, fixing in position, testing and commissioning of the following 4/2 Feet long fluorescent tube-light fixtures with all accessories such as spring loaded side holders, HF ballast, MS housing to house HF ballast complete with supply of 36/18 Watts approved Colour Trulite fluorescent tubes of approved make all complete as required and as per final direction and approval of Consultant.				
a)	Supply and Installation of 2 No. 18 Watt LED approved tube of Philip make .or equivalent make of THORN, WIPRO, PIERLITE ETC which shall be installed in the cove light	No.	40		
b)	LED fixtures of Philips make at site. Supply and Installation of LED approved colour LED lamps of Philips make or equivalent make of THORN, WIPRO, PIERLITE, CG ETC	No.	24		
8.1	Supply, fixing in position, testing and commissioning at site, 1200mm diameter single phase ceiling fans with regulator, all complete as required and as per final directions and approval of the Architect/ Consultant.	No	30		
8.2	Supply, fixing in position, testing and commissioning at site, 300mm diameter single phase WALL fans with regulator, all complete as required and as per final directions and approval of the Architect/ Consultant.	No	3		
	TOTAL OF PART-V C/F TO SUMMARY SHEET :-				-
PART- VI :- DATA NETWORK					
9.0	Providing telephone wiring from SERVER RACK TO W/S using Molex or approved make CAT–6 Geega Speed wires of required length through trunking and extending the same using MS conduit of minimum 25 mm dia and 1.6 mm wall thickness of Gerad make concealed in wall in floors/chasing or through floor raceways existingin the floors with necessary junction boxes/pull boxes for Telephone Point. The rates shall also includes Supply and fixing of 100 MPS, Cat-6 Information Outlet with Dust cover and approved color face plates of Molex make and suitable size G.I box concealed in wall/ structure all complete as required and as per final direction and approval of the Consultant.	No.	60		

9.1	Supply, Receiving, Storing at site, fixing in proper position testing and commissioning of 1mtr long patching Cord suitable for Giga Speed and of approved make all complete as required and as per final direction and approval of Architect/ Consultant.	No.	60		
9.2	Supply, Receiving, Storing at site, fixing in proper position testing and commissioning of 6U wall mounted rack with power supply with 3 nos of 24 port patch panels and 750mm lonf patching cables,of approved make all complete as required and as per final direction and approval of Architect/ Consultant.	No.	1		
9.3	supply and installationn of cat -6 cables with terminatio at patch panel ends with testing and labling with submission of test reports. As per final direction and approval of consultants.	No.	120		
	TOTAL OF PART- VI : C/F TO SUMMARY SHEET :-				**-**