SBI INFRA MANAGEMENT SOLUTIONS PVT LTD
(WHOLLY OWNED SUBSIDIARY OF SBI)

INVITES TENDERS ON BEHALF OF SBI LHO, HYDERABAD.
IN A SINGLE BID THROUGH E-TENDERING PROCESS.
Contractors who are on the panel of SBI, Hyderabad Circle, (LHO) for electrical works in the appropriate category are only eligible. (Contractors should submit proof of the same)

FOR
SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 3 WAY RMU AND 2 WAY RMU
AT
STATE BANK INSTITUTE OF INNOVATION AND TECHNOLOGY (SBIIT), ROAD NO:12,
BANJARA HILLS, HYDERABAD.

The Vice president & Head,
SBI Infra Management Solutions Pvt. Ltd.
Ground Floor, Adj Commercial Branch, SBI LHO campus,
Bank Street, Koti,
Hyderabad – 500 095
Phone:040-23466310/46
<table>
<thead>
<tr>
<th></th>
<th><strong>NOTICE INVITINGTENDER. (NIT)</strong></th>
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<tbody>
<tr>
<td>1. Name of the Work</td>
<td>SITC of 3 way RMU and 2 Way RMU at SBIIT, Banjarahills</td>
</tr>
<tr>
<td>2. Eligibility of the contractor</td>
<td>Electrical contractors empanelled with SBI, LHO, Hyderabad for appropriate category.</td>
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<tr>
<td>3. Estimated cost of work:</td>
<td>Rs.12,66,820.00plus GST as applicable</td>
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</tbody>
</table>
| 4. Earnest Money Deposit. (EMD) | **Rs. 13000/-**  
all Drafts/BCs shall be in favour of “SBIIMS, Hyderabad”. Payable at Hyderabad.  
**Up load copy of EMD / one time EMD in etender.sbi.** |
| 5. Tender Cost | Rs.1500/-  
**Up load copy of tender cost( receipt of SBI collect) in etender.sbi. Offline tender cost will be not acceptable and we will treat it as rejected.** |
| to be paid through State Bank Collect **ONLY** as detailed under;  
1) login https://www.onlinesbi.com  
2) Select SB Collect from Top Menu, click the check box and “Proceed”  
3) Select “All India” in “State of Corporate/Institution” & Select “Commercial Services” in “Type of Corporate/Institution” then “Go”  
4) Select “ SBI Infra Management Solutions Pvt. Ltd” in Commercial Services Name and “Submit”  
5) Select “Tender Application Fee” in “Payment Category” and enter the “Tender ID” exactly as given in first page top of this tender(characters in uppercase only).  
6) Fill up all fields such as email, GST No., Mobile No, Vendor/Firm Name etc and make payment.  
7) Enclose payment receipt having unique reference Number. along with EMD. |
| 6. Time of Completion: | 60 DAYS. |
| 7. Payment terms | Minimum ₹8 Lakh in each running bill |
| 8. Date of download of tender documents from Bank’s web site http://www.sbi.co.in under “procurement news”. | From 27.04.2020 to 14.05.2020 |
| 9. Last date and time for submission of online e-tender. at https://etender.sbi | Date: 14.05.2020 by 3.00 P.M. |
| 10. Date and Time of opening of e-Tenders: (Technical Bid and Price Bid) | Date: 14.05.2020 at 3.10 P. M. (IST). |
| 11. Address of opening of tender | Vice President, SBI Infra Management Solutions Pvt. Ltd., Office, Ground floor, Adj to commercial branch, SBI LHO campus, Bank Street, Kothi, Hyderabad – 500 095. Technical Bid of those firms / contractors who do not submit EMD shall be rejected. Those who are already submitted the one time EMD need not to be submitted again. Representatives of Bidder may be present during opening of Bids. However Bids would be opened even in the absence of any or all the bidder’s representatives. |
| 12. EMD & Tender cost to be submitted at: | EMD should be submitted physically at above mentioned address before due date. Contact: Vice President. 040-23466346. vg.reddy@sbi.co.in |
13. **Bidder Contact Details.**

Bidder to provide following information.

1) Name of Company.
2) Contact Person.
3) Mailing address with Pin Code.
4) Telephone number and Fax number.
5) Mobile Number and E-MAIL.

14. **Agency for arranging online bidding.**

- e-Procurement technologies Limited, Ahmedabad.
- e-Procurement technologies Limited, Ahmedabad.

Primary Contact Numbers:-
- M:- 908100427, 9904407997

Sujith Nair:- 079-68136857, sujith@eptl.in

<table>
<thead>
<tr>
<th>Name</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaymeet Rathod</td>
<td>079-68136829, <a href="mailto:jaymeet.rathod@eptl.in">jaymeet.rathod@eptl.in</a></td>
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<tr>
<td>Vinayak Khambe</td>
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<tr>
<td>Nandan Valera</td>
<td>079-68136843, <a href="mailto:nandan.v@eptl.in">nandan.v@eptl.in</a></td>
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<tr>
<td>Hemangi Patel</td>
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</tr>
<tr>
<td>Kanchan Kumari</td>
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</tr>
<tr>
<td>Deepak Narekar</td>
<td>079-68136853, <a href="mailto:deepak@eptl.in">deepak@eptl.in</a></td>
</tr>
<tr>
<td>Anshul Juneja</td>
<td>079-68136840, <a href="mailto:anshul.juneja@eptl.in">anshul.juneja@eptl.in</a></td>
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<td>Salina Motani</td>
<td>079-68136831, <a href="mailto:salina.motani@eptl.in">salina.motani@eptl.in</a></td>
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<tr>
<td>Devang Patel</td>
<td>079-68136859, <a href="mailto:devang@eptl.in">devang@eptl.in</a></td>
</tr>
</tbody>
</table>

- Primary Contact person : Ms. Shubhangi Banodiya,
  Contact No.: 079-68136826/6824/6868, +91-9879996111
  Email: shubhangi@auctiontiger.net
- Secondary contact person: Mr. Samjad khan
  Contact No.: 079-68136868, +91-9265871720
  Email: samjad@auctiontiger.net
- Alternate Contact No.: Mr. Yashrajsinh Rathod:- 079-68136815, 9879996111, yashrajsinh@auctiontiger.net

15. **Initial Security Deposit** 2% including EMD.

16. **Defects Liability Period** 12 Months (Twelve months)

17. **Total Security Deposit** 5 % of contract value including initial security deposit.

18. **Liquidated Damages** 0.50% per week subject to max 5% of the value of work

19. **Validity** 90 days

20. **Working time** Contractor has to work round the clock including holidays, for which no extra payment will be paid

The SBIIMS reserves the right to accept or reject any or all the tenders without assigning any reason whatsoever.
INSTRUCTIONS TO THE TENDERERS

1.0 Scope of Work

Sealed Tenders are invited by M/s SBIIMS, Hyderabad for and behalf of State Bank of India for the work of SITC of RMUs at…SBIIT, Banjara Hills.

1.1 Site and Its Location

The proposed work is to be carried out at SBIIT, Banjara Hills.

2.0 Tender Documents

The work has to be carried out strictly according to the conditions stipulated in tender consisting the following documents and the most workmanlike manner,

- Instructions to Tenderers
- General Conditions of Contract
- Special Conditions of Contract
- Additional Conditions for Electrical Installation
- Technical Specifications
- Drawings
- Priced Bid

2.1 The above documents shall be taken as complementary and mutually explanatory of one another but in case of ambiguities or discrepancies, shall take precedence in the order given below:

- Priced Bid
- Technical Specifications
- Additional Conditions for Electrical Installation
- Special Conditions of Contract
- General Conditions of Contract
- Instructions to Tenderers

2.3 The tender documents are not transferable.

3.0 Site Visit

3.1 The tenderer must obtain himself on his own responsibility and his own expenses all information and data which may be required for the purpose of filling this tender document and
enter into a contract for the satisfactory performance of the work. The Tenderer is requested satisfy himself regarding the availability of water, power, transport and communication facilities, the character quality and quantity of the materials, labour, the law and order situation, climatic conditions local authorities requirement, traffic regulation etc;

The tenderer will be fully responsible for considering the financial effect of any or all the factors while submitting his tender.

4.0 Earnest Money

4.1 The tenderers are requested to submit the Earnest Money as specified in the NIT

4.2 EMD in any other form other than Demand Draft will not be accepted. Tender not accompanied by the EMD in accordance with clause 4.1 above shall be rejected.

4.3 No interest will be paid on the EMD.

4.4 EMD of unsuccessful tenderers will be refunded within 30 days of award of contract.

4.5 EMD of successful tenderer will be retained as a part of security deposit.

5.0 Initial Security Deposit

The successful tenderer will have to submit a sum equivalent to 2% of contract value less EMD by means of Demand Draft drawn in favour of State Bank of India within a period of 15 days of acceptance of tender.

6.0 Security Deposit

6.1 Total security deposit shall be 5% of contract value. Out of this 2% of contract value is in the form of initial security deposit which includes the EMD. Balance 3% shall be deducted from the running account bill of the work at the rate of 10% of the respective running account bill i.e. deduction from each running bill account will be 10% till total 3% of contract value
is reached. 50% of the total security shall be paid to the contractors on the basis of architect’s certifying the virtual completion. The balance 50% would be paid to the contractors after the defects liability period as specified in the contract.

6.2 No interest shall be paid to the amount retained by the Bank as Security Deposit.

7.0 Signing of Contract Documents

The successful tenderer shall be bound to implement the contract by signing an agreement and conditions of contract attached herewith within 15 days from the receipt of intimation of acceptance of his tender by the Bank. However, the written acceptance of the tender by the Bank will constitute a binding agreement between the Bank and the successful tenderer whether such formal agreement is subsequently entered into or not.

8.0 Completion Period: As specified in the NIT

9.0 Validity of Tender

Tenders shall remain valid and open for acceptance for a period of 3 (Three) months from the date of opening price bid. If the tenderer withdraws his/her offer during the validity period or makes modifications in his/her original offer which are not acceptance to the Bank without prejudice to any other right or remedy the Bank shall be at liberty to forfeit the EMD.

10.0 Liquidated Damages

The liquidated damages shall be 0.5% per week subject to a maximum of 5% of contract value.

11.0 Rates and Prices

In case of item rate tender

11.1

The tenderers shall quote their rates for individual items both in words and figures in case of discrepancy between the rates quoted in words and figures the unit rate
quoted in words will prevail. If none is quoted for a particular item then contractor shall not be paid for that item when it is executed. The amount of each item shall be calculated and the requisite total is given. In case of discrepancy between the unit rate and the total amount calculated from multiplication of unit rate and the quantity the unit rate quoted will govern and the amount will be corrected.

11.1.2 The tenderers need not quote their rates for which no quantities have been given. In case the tenderers quote their rates for such items those rates will be ignored and will not be considered during execution.

11.1.3 The tenderers should not change the units as specified in the tender. If any unit is changed the tenders would be evaluated as per the original unit and the contractor would be paid accordingly.

The tenderer should not change or modify or delete the description of the item. If any discrepancy is observed he should immediately bring to the knowledge of the Architect/Bank.

11.1.4 Each page of the BOQ shall be signed by the authorized person and cutting or overwriting shall be duly attested by him. Which is not applicable for online tender.

11.1.5 Each page shall be totaled and the grand total shall be given. Which is not applicable for online tender.

11.1.6 The rate quoted shall be firm and shall include all costs, allowances, taxes, VAT, levies, etc. except GST. GST will be reimbursed by the Bank.
GENERAL CONDITIONS OF CONTRACT

1.0 Definitions

“Contract” means the documents forming the tender and the acceptance thereof and the formal agreement executed between State Bank of India (Client) and the contractor, together with the documents referred therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Architects/Bank and all these documents taken together shall be deemed to form one contract and shall be complementary to one another.

1.1 In the contract the following expressions shall, unless the context otherwise requires, have the meaning hereby respectively assigned to them.

1.1.1 ‘SBI’ shall mean State Bank of India (client) a body Corporate created under State Bank of India Act 1955, having its Corporate Centres at State Bank Bhavan, Marine Drive, Mumbai 400 021 and a LHO at Hyderabad and include the client’s representatives, successors and assigns.

1.1.2 ‘Architects/Consultants’ shall mean M/s……………………………………………….

1.1.3 ‘Site Engineer’ shall mean an Engineer appointed by the Bank as their representative to give instructions to the contractors.

1.1.4 ‘The Contractor’ shall mean the individual or firm or company whether incorporated or not, undertaking the works and shall include legal personal representatives of such individual or the composing the firm or company and the permitted assignees of such individual or firms of company.

The expression ‘works’ or ‘work’ shall mean the permanent or temporary work described in the ‘Scope of Work’ and/or to be executed in accordance with the contract and includes materials, apparatus, equipment, 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.

1.1.4 ‘Engineer’ shall mean the representative of the Architect/consultant.

1.1.5 ‘Drawings’ shall mean the drawings prepared by the Architects and issued by the Engineer and referred to in the specifications and any modifications of such drawings as may be issued by the Engineer from time to time. ‘Contract value’ shall mean the value of the entire work as stipulated in the letter of acceptance of tender subject to such additions thereto or deductions therefrom as may be made under the provisions hereinafter contained.

1.1.6 ‘Specifications’ shall mean the specifications referred to in the tender and any modifications thereof as may time to time be furnished or approved by the architect/consultant. “Month” means calendar month.

1.1.7 “Week” means seven consecutive days.

1.1.8 “Day” means a calendar day beginning and ending at 00Hrs and 24Hrs respectively.
CLAUSE

1.0 Total Security Deposit

Total Security deposit comprise of:

Earnest Money
Deposit Initial
Security Deposit
Retention Money

(a) Earnest Money Deposit:

The tenderer shall furnish EMDas specified in the NIT in the form of Demand draft or bankerscheque drawn in favour of SBIIMS, Hyderabad, on any Scheduled Bank. No tender shall be considered unless the EMD is deposited in the required form. No interests hall be paid on this EMD. The EMD of the unsuccessful tenderer shall be refunded soon after the decision toaward the contractistaken without interest. The EMD shall stand absolutely forfeited if the tenderer revokes his tender at any time during the period when he is required to keep his tender open acceptance by the SBIIMS or after it is accepted by the SBIIMS the contractor fails to enter into a formal agreement or fail to pay the initial security deposit as stipulated or fail to commence the work within the stipulated time.

a) Initial Security Deposit (ISD)

The amount of ISD shall be 2% of accepted value of tender including the EMD. Balance of ISD (i.e. excluding EMD) is to be submitted in the form of D/D drawn on any scheduled bank and shall be deposited within 15 days from the date of letter of acceptance of tender.

b) Retention Money

Besides the ISD as deposited by the contractor in the above said manner the retention money shall be deducted from the running account bill at the rate of 10% of the gross value of work done by the contractor and claimed in each bill provided the total sec
The ISD plus Retention Money shall both together not exceed 5% of the contract value. 50% of the total security deposit shall be refunded to the contractor without any interest on issue of Virtual Completion certificate by the Architect/consultant. The balance 50% of the total security deposit shall be refunded to the contractors without interest within fifteen days after the end of defects liability period provided the contractor has satisfactorily attended to all defects in accordance with the conditions of contract including site clearance.
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3. ARTICLES OF AGREEMENT

ARTICLES OF AGREEMENT made the ___________ day of __________ 2018
between ________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
of _____________________________________________________________________
_______________________________________________________________________
(hereinafter called the “Employer”) of the one part and ___________________________
of ________________________________________ (hereinafter called “The Contractor”) of the other
part, where as the Employer is desirous of getting the work of “______________________________________________________________________” executed and
has caused drawings, conditions of contract, specifications and schedule of quantities etc.,
describing the works prepared by SBIIMS, Hyderabad.

AND WHEREAS the SAID DRAWINGS numbered as per list attached inclusive of and the
conditions of contract, specifications and schedule of quantities etc., 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 in the Schedule hereto (hereinafter referred to as “Said Conditions”) the works shown
upon the said drawings and described in the same specifications and included in the said
schedule of quantities for such sum as may be ascertained to be payable in terms of the Bills of
Quantities, and which sum is estimated to be Rs. ____________ (Rupees____________________________________________________ (hereinafter referred to as “Said Contract Amount”).

Signature of Contractor

Signature of Employer
NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the said sum to be paid at the times and in the manner set forth in the said conditions, the contractor shall upon and subject to the said conditions, execute and complete the work shown in the said drawings and described in the said specifications.

2. The Employer shall pay the contractor the said sum or such sums as shall become payable hereunder at the times and in the manner specified in the said conditions.

3. The term “Architect” in the said conditions shall mean the said SBIIMS, or in the event of their ceasing to be the Architect for the purpose of this contract, such other person as shall be nominated for that purpose by the Employer, not being a person to whom the contractor shall object for reasons considered to be sufficient by the Arbitrator mentioned in the said conditions provided always that no persons subsequently appointed to be the Architect under this contract shall be entitled to disregard or over-rule any previous decision or approval or direction given or expressed by the Architect for the time being.

4. Tender documents containing work order Notice to the Contractor, Conditions of Contract, Appendix thereto, Special Conditions of Contract, 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 stipulations and perform the agreement on their part respectively in such conditions contained.

5. The contract is neither a fixed lumpsum contract or a piece work contract, but is a contract to carry out work in respect of the entire works to be paid for according to actual measured quantities, including variations from BOQ at the rates contained in the Schedule of rates and Probable bill of quantities or as provided in the said conditions.

6. The Employer through the Architect, reserves to himself the right of altering the drawings and natures of the work, of adding/substitution to or omitting any items of work or having portions of the same carried out through alternate agencies without prejudice to this contract.

7. Time shall be considered a the essence of this agreement and the contractor hereby agrees to commence the work soon after the site is handed over to him but within 15 days reckoned from the date of issue of work order to execute the work, as provided for in the said conditions and complete the entire work in 15 days subject to nevertheless to the provisions for extension of time.
8. This agreement and contract shall be deemed to have been made in Hyderabad and any questions or dispute rising out of or in any way connected with this Agreement and Contract shall be deemed to have arisen in Hyderabad and only the courts in Hyderabad shall have jurisdiction to determine the same. The limitation period will be 90 days from the date of dispute having arisen.

AS WITNESS our hand this _____________ day of ____________ 2018

Signed by the said in the presence of:

WITNESS : SIGNATURE

NAME : 

ADDRESS : 

EMPLOYER

WITNESS : SIGNATURE

NAME : 

ADDRESS :
4. APPENDIX TO GENERAL CONDITIONS OF CONTRACT

1. Earnest Money Deposit (EMD) : AS SPECIFIED IN NIT

2. Initial Security Deposit (ISD) : 2% of contract value including EMD.

3. Period of completion : AS SPECIFIED IN NIT

4. Defects Liability period : 12 months after completion as recorded in the completion certificate.

5. Agreed Liquidated Damages : ½% of contract amount per week of delay subjected to a maximum of 5% of contract value.

6. Period of final measurement : Three months after completion as recorded in the completion certificate.

7. Minimum value of work to be Executed for issue of interim Certificates for making payment : First & Final

8.a) Retention money from each bill : 10% of gross value of each interim bill, subject to 8(b) below.

8.b) Total retention money including Earnest money and initial security Deposit : 5% of the contract value.

9. Release of Security deposit after Virtual completion. : 50% of the total security to be released along with final certificate of payment, but only after removing all his materials, equipment, labour, huts/force, temporary sheds/stores, all his installations, machinery etc., from the site. Balance payment to be released on submission of Bank Guarantee on any Scheduled Bank, Other than SBI, and its associated banks in the prescribed manner and valid till the completion of defects liability period of 12 months plus 3 months.

10. Period for honouring certificate : 15 working days from date of Architects certificate of payment for interim bills and 45 working days for final certificate.

WITNESS :

DATE : SIGNATURE OF THE CONTRACTOR WITH DATE

Signature of Contractor Signature of Employer
5. INDEX TO GENERAL CONDITIONS OF CONTRACT

1. Interpretations
2. Scope of Contract
3. Drawings and Specifications
4. Schedule of Quantities
5. Sufficiency of Schedule of Quantities
6. Errors in schedule of Quantities
7. Contractor to provide everything necessary
8. Authorities, Notices, Patent rights and royalties
9. Materials and workmanship to conform to description.
10. The setting out
11. Removal of all offensive matters
12. Opening up works
13. Contractor’s superintendence and representative on the work
14. Dismissal of workmen
15. Access to works
16. Employer’s representative/PMC
17. Assignment of sub-letting
18. Sub contractors
19. Variations not to vitiate contract
20. Measurement to works
21. Prices of Extras etc., Ascertainment of
22. Unfixed materials
23. Removal of improper work and materials
24. Defects after completion
25. Certificate of virtual completion
26. Other persons engaged by the Employer
27. Insurance in respect of damage to persons and property
28. Contractor’s All risk policy
29. Minimum amount of third party Insurance
30. Commencement and completion
31. Delay and extension of time
32. Damages for Non-completion
33. Failure by contractor to comply with Architect’s instructions
34. Architect’s delay in progress.
35. Supervision of works
36. Prime cost and provisional sums
37. Certificates and payments
38. Notices
39. Termination of contract by the Employer.
40. Termination of contract by the contractor.
41. Matters to be finally determined by the Architects
42. Settlement of dispute (Arbitration)
SPECIAL CONDITIONS OF CONTRACTOR

1. 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 the delays may be, including delays arising out of modifications to the work entrusted to him or in any subcontract connected there with or delays in awarding contracts for other trades of the project or in commencement or completion of such works in obtaining water and power connections for construction purpose or for any other reason what so ever and the Employer shall not be liable for any claim in respect thereof. The Employer does not accept liabilities for any sum besides the tender amount, subject to such variations as are provided for herein.

2. The successful tenderer is bound to carry out any items of work necessary for completion of the job if such instructions in respect of such additional items and their quantities will be issued in writing by the Architects with the prior consent in writing of the Employer.

3. The contractor must bear in mind that the work shall be carried out strictly in accordance with specifications made by the Architects.

4. The rates quoted in tender shall also include electric consumption charges for power. If no power is available at site the contractor shall have to make his own arrangement to obtain power connection and maintain at his expense an efficient service of electric light and power and shall pay for the electricity consumed. The Employer 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 contractor.

5. Contractor shall strictly comply with the provisions of safety code in addition to all local rules and regulations.

6. The contractor shall be responsible for the observance of all rules and regulations framed by the government under the contract labour act. The Employer shall be entitled to deduct all losses, damages that he might suffer on account of non-observance of these rules by the contractor, from the amount payable to the contractor.

7. Time shall be considered the essence of this contract. The entire work must be completed within 45 DAYS from the commencement of the work. If the completion of the work is delayed beyond 1 month, a penalty at the rate of ½ % per week over the contract value will be imposed subjected to a maximum of 5%.

If the work is delayed beyond 30 days after the date of completion, the remaining work will be carried out through other agencies at the risk and cost of the contractors under the contract with prevailing market rates.

8. The successful tenderer shall submit the phased programme of execution of different items of work within 2 days after receipt of acceptance letter.

9. Payment will be made First & Final and will be made within a period of TWO weeks after the bill is submitted to the Employer’s Office with Architects Certificate.

10. Before filling in the tender the contractor will check all the drawings and schedule of quantities and will get an immediate clarification from SBIIMS / Architects on item not clearly understood. No claims for any loss or compensation will be entertained on this
11. All the work shall be carried out as per detail drawings and specifications or as directed by SBIIMS / Architects.

12. The rates quoted in the tender shall be for the finished items of work. They shall include all the charges labour, materials, transportation of material equipment, double scaffolding water and electric charges, tool and plants, marking out and cleaning of site, to do all things necessary to provide complete finished item for work consistent with the specifications attached to this tender document. The rates shall be inclusive of octroi duty, excise duty, packing and forwarding, loading or unloading or any other duties or fees levied by any government, public or local bodies. The rates shall be firm and shall not be subject to exchange variations, labour conditions or any other conditions whatsoever.

13. The calculations made by the tenderer should be based upon the probable quantities of the several items of work which are furnished for the tenderer's convenience in the schedule of quantities, but it must be clearly understood that the contract is not a lumpsum contract, that neither the probable quantities nor the value of individual items nor the aggregate value of the entire tender will form part of the contract and that SBIIMS / Architects do not in any way assure the tenderer or guarantee that the work would correspond there to.

14. Adequate engineering and technical staff to be appointed at site. ELECTRICAL contractor should inform of their number and qualification. An Approval of SBIIMS / Architects should be taken prior to appointing such technical staff on site.

15. The contractor shall keep the tender submitted by him open for acceptance for a minimum period of three months from the date of it's submission. When once the tender is accepted the rates quoted by the successful tenderer shall be firm and the variation in rates of any one or all the items on any account shall not be allowed during the entire duration of the contract.

16. During the execution of work, contractor must check the work with his drawings. The contractor shall be responsible for all the errors in this connection and shall have to rectify all the defects at his own cost, failing which the client reserves the right to get the same rectified at the risk and cost of contractor.

17. No claim for extra item or deviation from specification shall be entertained unless the same is pointed out and accepted as such before the work is taken in hand or within 15 days of work by the successful tenderer.

18. The contractor shall comply with all bye- laws and tax regulations (including GST) of local and other statutory authorities having jurisdiction over the works and shall be responsible for the payment of all the fees and other charges and for giving and receiving of all necessary notices drawings and test certificates.
19. The successful tenders shall properly safeguard against damage or injury to the public and to any property or thing and shall alone be responsible for any such damage and injury to any person or persons or thing arising in connection with it's execution of work. The successful tenderer shall protect and hold harmless the SBIIMS against any or all claims for any such injury or damage.

20. The work in every respect during the progress and till final acceptance by the SBIIMS, including raw materials delivered at the site to be incorporated or used in ELECTRICAL work by the successful tenderer will be at his own risk. Any loss or damage to any such material or work shall immediately be replaced by the successful tenderer at his own expense.

21. The SBIIMS shall have the right to direct the contractor to purchase and use the materials from any source for proper execution of work.

22. The employer / SBIIMS / Architects or their authorized representatives shall have full power for inspecting the contractor's works or at any place from which the material is obtained. Acceptances of any such materials shall no way relieve the contractor of his responsibility for meeting the requirements and/or analysis not called for in the specifications shall be borne by the SBIIMS in case the material or work is found defective or of inferior quality. Tests and/or analysis shall be done in the laboratory approved by the client and the contractor shall permit SBIIMS and/or the client's or their authorized representative to be present during any of the tests and/or analysis.

23. INSURANCE

The contractor shall indemnify SBIIMS up to CAR Policy (Contractor’s All Risk Policy) against all claim which may be made against SBIIMS by any member of the public or the third party in respect of anything which may arise in consequence thereof and shall at his own expense arrange to effect and maintain up to one month after the virtual completion from an office approved by SBIIMS a policy of insurance in the joint names and deposit such policy or policies with SBIIMS from time to time during the currency of this contract. The contractor shall also indemnify SBIIMS against all claims which may be made upon the SBIIMS under the workman'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 any sub contractor and shall at his own expenses effect and maintain up to one month after virtual completion of the contract from an office approved by SBIIMS a policy or policies of insurance in the joint names of SBIIMS and the contractor as aforesaid. The contractor shall be responsible for any other thing which may exclude from the insurance policies above referred to and also for any other damage to any property arising out of and incidental to the negligent or defective carrying out of this contract.

He shall also indemnify SBIIMS in respect of any costs, charges or expenses arising out of any claim or proceedings and also in respect of any award of compensation or damage arising therefrom. SBIIMS shall be at liberty and is hereby empowered to deduct the amount of any damages, compensation caused, charges and expenses arising or occurring from or in respect of any such claims or damages from any sum or sums due or to become due to the contractor.
24. WORKMAN AT SITE:

The contractors workpeople shall not be allowed to live on the site at any time throughout the contract nor to trespass beyond the limits of the site. The contractor will be held responsible for any acts of trespass by his workpeople.

25. DIMENSIONS:

Figures dimensions are to be taken in preference to scaled dimensions in all cases. Before commencing any work the contractor shall verify all measurements. If any discrepancies are found they shall immediately be brought to the notice of the Architects.

26. DISCREPANCIES

All the items shown on the drawings or specifications are taken to be included in both. Any discrepancies, which occur in either the drawings or specifications, shall immediately be brought to the attention of the Architects.

27. CUTTING AND MAKING GOOD

Where it is found necessary to interfere with finished work in order to execute this contract, the contractor will be required to do all necessary work at his expenses. Only approved hangers and bolts or other metal fixing devices shall be used to secure frames, panels and other units in position. Wooden plugs will not be permitted. Holes shall be formed with electric drills whenever possible. Structural members shall not be cut or drilled without prior consent of the client.

28. MAINTENANCE AND GUARANTEE

The whole of the work to be performed under this contract shall be completed to the satisfaction of the Architects/Bank.

The contractor without additional charge to SBIIMS renew or replaces any works which prove faulty from workmanship or materials and fully maintain the whole installations for a period of 6 months after the commencement of defects liability period of the main contract and a sum of 5% of the contract amount shall be retained by SBIIMS for his period.

29. PREVENTION OF SPOIL DUMPING

The contractor shall take all reasonable steps to prevent spoil, rubbish, debris, surplus materials, etc., arising from a work being dumped on an area other than a recognized or approved tipping area and the Contractor will be held responsible for and shall indemnify SBIIMS against any claim or loss arising therefrom.
30. LEAVE PERFECT:

The Contractor shall remove all rubbish and superfluous material from the site of the works with all reasonable speed from time to time and at completion. On no account shall W.C's or the SBIIMS's receptacles to be used for this purpose.

The client reserves its right to clear contractors un cleared debris at contractors own cost without any reasons & not more than one notice will be given for this.

31. SETTLEMENT OF DISPUTES AND ARBITRATION:

Except where otherwise provided in the contract all questions and disputes relating to the meaning of the specifications, design, drawings and instructions herein before mentioned and as to the quality of workmanship of materials used on the work or as to any other question, claim, right matter or thing whatsoever in any way arising out of our relating to the contract, designs, drawings, specifications, estimates, instructions orders or these conditions or otherwise concerning the work or the execution or failure to execute the same whether arising during the progress of work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter:

(a) If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the Architect or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the contractor shall forthwith give notice in writing of his claim, or dispute to The Vice President, SBI Infra Management Solutions Pvt. Ltd., Circle Office, Ground Floor, State Bank of India, Adj to commercial branch, SBI LHO CAMPUS, Bank Street, Kothi, HYDERABAD – 500 095and endorse a copy of the same to the Architect, within 30 days from the date of disallowance thereof or the date of deduction or recovery. The said notice shall give full particulars of the claim, grounds on which it is based and detailed calculations of the amount claimed and the contractor shall not be entitled to raise any claim nor shall the bank be in any way liable in respect of any claim by the contractor unless notice of such claim have been given by the Contractor to The Vice President, SBI Infra Management Solutions Pvt. Ltd., Circle Office, Ground Floor, Adj to Commercial branch, State Bank of India, LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095in the manner and within the time as aforesaid. The contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to The Vice President, SBI Infra Management Solutions Pvt. Ltd., Circle Office, Ground Floor, Adj to Commercial Branch, State Bank of India, LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095in writing in the manner and within the time aforesaid.
(b) The Vice President, SBI Infra Management Solutions Pvt. Ltd., Circle Office, Ground Floor, Adj to Commercial Branch, State Bank of India, LHO campus, Bank Street, Kothi, HYDERABAD – 500 095 shall give his decision in writing on the claims notified by the contractor. The contractor may within 30 days of the receipt of the decision of The Vice President, SBI Infra Management Solutions Pvt. Ltd., Circle Office, Ground Floor, Adj Commercial Branch, State Bank of India, LHO campus, Bank Street, Kothi, HYDERABAD – 500 095 submit his claims to the conciliating authority namely the Circle Development Officer, State Bank of India, Local Head Office, Hyderabad for conciliation along with all details and copies of correspondence exchanged between him and The Vice President, SBI Infra Management Solutions Pvt. Ltd., Circle Office, Ground Floor, Adj to Commercial Branch, State Bank of India, LHO campus, Bank Street, Kothi, HYDERABAD – 500 095.

(c) If the conciliation proceedings are terminated without settlement of the disputes, the contractor shall, within a period of 30 days of termination thereof shall give a notice to the concerned Chief General Manager of the Bank for appointment of an arbitrator to adjudicate the notified claims failing which the claims of the contractor shall be deemed to have been considered absolutely barred and waived.

(d) Except where the decision has become final, binding and conclusive in terms of the contract, all disputes of differences arising out of the notified claims of the contractor as aforesaid and all claims of the Bank shall be referred for adjudication through arbitration by the Sole Arbitrator appointed by the Chief General Manager. It will also be no objection to any such appointment that the Arbitrator so appointed is a Bank Officer and that he had to deal with the matters to which the Contract relates in the course of his duties as Bank Officer. 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 in the manner aforesaid by the said Chief General Manager. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor.

It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed in respect of each dispute along with the notice for appointment of arbitrator.

It is also a term of this contract that no person other than a person appointed by such Chief General Manager as aforesaid should act arbitrator.

The conciliation and arbitration shall be conducted in accordance with the provisions of the Arbitration & Conciliation Act 1996 or any statutory modification or re-enactment thereof and the rules made thereunder.

It is also a term of this contract that if any fees are payable to the arbitrator these shall be paid equally by both the parties. However, no fees will be payable to the arbitrator if he is a Bank Officer.
It is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their settlement of claims and counter statement of claims. The venue of the arbitration shall be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any, of the arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parities. The cost of the reference and of the award (including the fees, if any of the arbitrator) shall be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part thereof, shall be paid and fix or settle the amount of costs to be so paid.

32. TERMINATION OF CONTRACT BY EMPLOYER:

If the contractor (being an individual or a firm) commit any “Act of Insolvency”, or shall be adjudged as insolvent, or shall make an assignment or composition of the greater part in number of amount of his creditors, or shall enter into a Deed of Assignment with his creditors, or (being an incorporated Company) shall have an order made against him or pass an effective Resolution for winding up either compulsorily, or Subject to the supervision of the court or voluntarily, or if the official Assignee of the contractor shall repudiate the Contract, or if the Official Assignee or the Liquidator in any such winding up shall be unable, within seven days after notice to them requiring him to do so, to show to the reasonable satisfaction of the Architect that he is able to carry out and fulfill the Contract and if required by the Architect to give a security there for, or if the contractor shall suffer any payment under this contract to be attached by or on behalf of any of creditors of the Contractor, if the Contractor shall assign or sublet the contract without the consent in writing of the Architect first obtained, or if the contractor shall charge or encumber this Contract for any payments due or which may become due to the Contractor thereunder, or if the Architect shall certify in writing to the SBIIMS that in his opinion the Contractor:

(a) Has abandoned the Contract, or
(b) Has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the work for fourteen days after receiving from the Architect written notice to proceed, or
(c) Has failed to proceed with the work with such due diligence and failed to make such due progress as would enable the works to completed within time agreed upon or
(d) Has failed to remove materials from site or to pull down and replace works within seven days after receiving from Architect written notice that the said materials or work where condemned and rejected by the Architect under these conditions or
(e) Has neglected or failed persistently to observe and perform all or any of the acts, matters or things required 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, or
(f) Has to the detriment of good workmanship or in defiance of the Architects instructions to the Contrary, submit any part of the contract or has used in the permanent works important materials which are substandard and not as per specification fraudulently making the Architect/SBIIMS to believe that it is the specified material.
Then and in any of the said caused the SBIIMS with the written consent of the Architect 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 or the obligations and liabilities of the Contractor, the whole of which shall continue to be in force as fully as if the contract has not been so determined and as if the works subsequently executed and being executed by or on behalf of the contractor. And further, SBIIMS with the consent of the Architect by his agents or servants may enter upon and take possession of the works and all plant, tools, scaffoldings, shed, machines, steam and other power utensils and materials lying upon 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 workman in carrying on and completing of the works or by employing any other Contractor or any other person or persons to complete the works and 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 work shall be completed, or as soon thereafter as convenient, the Architect shall give a notice in writing to the Contractor, to remove his surplus material and plant and should the Contractor fail to do so within a period of fourteen days after receipt thereof by him, the SBIIMS may sell the same by public auction and shall give credit to the Contractor for the amount so realized. The Architect shall thereafter shall assertion and certify in writing under his hand what (if anything) shall be due or payable to or by the SBIIMS, for the value of the said plant and materials so taken possession of by SBIIMS, and the expense or loss which the SBIIMS shall have been put to in getting the works to be so completed, and the amount, if any owing to the Contractor and the amount which shall be so certified shall, thereupon, be paid by SBIIMS to the Contractor or by the Contractor to SBIIMS as the case may be, and the certificate of the Architect shall be final and conclusive between the parties.

33. The mode of measurements shall be as per IS: 1200.

34. The contractor should co-ordinate with other agencies viz., INTERIOR, HVAC (Air-Conditioning), Civil, LAN cabling etc.,

35. CONTRACTOR SHOULD WORK AT ODD HOURS, ON HOLIDAYS TO KEEP UP TIME SCHEDULE.

36. The Contractor shall not be eligible for any material advance.
SPECIAL CONDITIONS AND SAFETY CONDITIONS

The contractor is hereby advised to read the following conditions carefully before quoting rates and to be strictly adhered during execution of work.

SPECIAL INSTRUCTIONS

a) Contractor shall submit copies of all statutory compliance certificates such as ESIC, PF, Contract labour registration, shop & establishment and or any other local authority registration as applicable.

b) All workmen, engineers, supervisors shall be converted as per ESIC, PF & minimum wages act.

c) All workmen, engineers, supervisors shall undergo employment medical check up through company recognized medical officer and submit copies of test report.

Contractor to provide proof of monthly remittances with regard to the workmen deployed at the site.

Contractor is responsible to ensure that his workmen are confined to their work area and comply with all safety, security and administrative instructions given by the site engineer.

Contractor shall provide identification badges to all his people.
On completion of day’s work, the entire area shall be kept clean and neat. All debris, surplus material etc., shall be removed immediately from the site.

Any such standard material used during execution will be rejected and fully deducted from the bills.

The contractor has to carry out the work in coordination with the other appointed agencies. The contractor should study the situation at site and organize the work accordingly. Whenever work needs to be done in coordination with other agencies, the contractor shall work out the actual time required to complete his part of the job in respects and inform the company.

Revision of rates is not allowed and will be not paid for any reason due to unexpected increase in the cost of the materials or delay in completing the works etc., No labour hutment is allowed inside the premises.

The areas is in “No smoking Zone” therefore smoking is strictly prohibited.
All workmen, Mastri, supervisor and Engineers wearing shoes and safety helmets are only allowed to enter the gate.

Every day contractor / his supervisor should take necessary “Work permit” from the company engineer before starting the job.
Workers are not allowed to sleep during night and cook good inside the premises.

Work to be carried out only under supervision of the qualified engineer.

Contractor should strictly following safety guidelines.
Contractor should use only angle/pipe scaffolding. Wooden scaffolding is not allowed.
All contractor’s people need to undergo induction/safety training and formal interview by company selection committee.

Contractor shall submit a copy of competency certificates like wiremen license, supervisor’s
license, IBR welder license etc., issued by competent authority before starting the work.

Contractor shall maintain daily master roll book for his people at site. Based on that, ESIC & PF contribution to be made.

COMPANY SAFETY GUIDE LINES

WORKING BELOW GROUND LEVEL:

Check that there are no underground cables/ water/sewage lines prior to start of work area. If found inform site in-charge. Disconnect power supply to any cables found in work areas with permission.

For pits deeper than 3 feet workmen should be provided with lifelines. Ladders should be provided for quick escape from the pit. Provide firmly supported side shuttering or shoring to prevent accidental collapse of earth into pits; cordon off the area around the pit to prevent accidental falls. (cordon must be at least 3 feet beyond the pit edge) excavated earth from the pit must be stacked only beyond the cordon.

Refill the pit promptly on completion.

In case pits need to be left open for any reason, ensure proper covers over the pits.

WORKING AT HEIGHTS:

All personnel working at heights beyond 1.8M should wear safety belts.

Ensure that safety belts are tied security to anchors while working at heights.

Ensure that debris is cleared on a daily basis from work spots.

Ensure that rigging is well anchored to solid supports prior to erecting items like trusses at a height.

Ensure that a nylon safety net is securely fitted under the trusses to provide safety against accidental falls to personnel (who will need to have safety belts securely fastened) working on the trusses and roofing. Alternatively well-supported platforms with protected railings should be used a height suitable for personnel to work while standing.

Ensure that roof top ladders are used while laying and working on the roof.

Ensure that ladders used for climbing to heights are firmly secured against slippage.

All scaffolding should be in steel frames.

Scaffolding should be provided with 3 feet wide working platforms. The platforms should be provided with protective railings.

WORKING WITH ELECTRICITY

Ensure proper earthing of all electrical machines used.

Ensure that all connections are taken throughout earth leakage’s circuit breakers. Providing
ELCB on the main distribution board prevents accidental shocks.

Ensure that welders always use suitable welding goggles and gloves while welding.

Ensure availability of 2 CO2 type fire extinguishers at any easily accessible location at site for fire fighting.

Provide a paid of fire buckets filled with dry sand for fire fighting at site.

As far as possible DC generators sets shall be used instead of AC transformer sets.

Contractor shall get his welding sets certified by inspector of electrical department.

The welding transformer shall be fed through an armored cable.

All connections from main to individual M/C (such as cutter, planer, compressor etc) to be taken through shielded cable and 3-pin plug only.

The potable machines should be of fully insulated or plastic body. No metal body is allowed.

During welding the earthing to be provided directly to the member to be welded throughout cable only not using any reinforcement rod/angles.

PERSONAL PROTECTIVE GEAR

Following is a list of items to be provided to workmen by the contractor as and when required the items must be ISI certified.

- Safety shoes
- Hard hats
- Safety belts
- Goggles
- Gloves
- Safety nets
- Roof top ladders

GENERAL

BREAKING WORKS:

Workmen engaged in breaking stones/chipping of concrete should wear safety goggles.
OTHER CONDITIONS:

CONTENTS:

A) SPECIAL CONDITIONS
B) TECHNICAL SPECIFICATIONS

Chapter 1 INTERNAL ELECTRIFICATION
Chapter 2 POWER CONTROL CENTERS
Chapter 3 LAYING OF CABLES
Chapter 4 EARTHING
Chapter 5 STANDARD DRAWINGS
  GI PIPE EARTH STATION
  COPPER PLATE EARTH STATION

C) RECOMMENDED MAKES OF MATERIAL

D) SCHEDULE OF QUANTITIES

SPECIAL CONDITIONS

1. General:

1.1 These special conditions shall be read in conjunction with the description of the item of work in the Bill(s) of Quantities, the particular Specifications, Local Statutory Regulations, Indian Standards Specifications/Codes and the drawings. All the above quoted documents, shall be considered supplementary to each other. However, in the case of conflict amongst the various provisions the owner's and the consultants opinion will be final and shall be adopted.

1.2 The tenderer is advised to inspect the site to ascertain the nature of site, access thereto, local facilities for procurement of materials and working labour rates prevalent in the area, in fact all matters affecting his prices and execution of the work. The tenderer shall be deemed to have full knowledge of the site and drawings whether or not he actually inspects them.

2. Rates

2.1 The rates quoted shall be deemed to allow for all minor extras and constructional details which are not specifically shown on drawings or given on the specifications but are essential in the opinion of the Engineer-in-charge to the execution of works to confirm to good workmanship and sound engineering practice. The Consultant/SBIIMS reserves the right to make any minor changes during the execution without any extra payment.

2.2 The Consultants/SBIIMS decision to clarify any item under minor changes, minor extras and constructional details shall be final, conclusive and binding on the Contractor.

2.3 The rates quoted by the Contractor shall be net so as to include all requirements described in the contract agreement and no claim whatsoever due to fluctuations in the price of material and labour will be entertained.
2.4 The rates quoted by the Contractor shall include for supplying materials and labour necessary for completing the work in the best and most workmanship like manner to the satisfaction of the Consultant/SBIIMS and which in the opinion of the Consultant cannot be made better, and for maintaining the same. The rates shall be complete in all respects also including cost of materials, erection, fabrication, labour, supervision, tools and plant, transport, sales and other taxes, royalties, duties and materials, contingencies, breakage, wastage, sundries, scaffoldings, etc., on the basis of works contract. The rates quoted shall include all transport, insurance, octroi, or any other levies applicable under the statute.

3.0 Materials:

3.1 The Contractor shall ensure to the satisfaction of the Consultant/SBIIMS that the materials are packed in original sealed containers/packing bearing manufacturer's markings and brands etc., except where the gross quantity required is a fraction of the smallest packings. Materials not complying with this requirement shall be rejected.

3.2 Testing of Materials:

a) When required by the Consultant / SBIIMS, the Contractor shall provide all facilities at site or at manufacturer's works or in an approved laboratory for testing the materials and/or workmanship. All the expenditure in respect of this shall be borne by the Contractor unless specified otherwise in the Contract. The Contractor shall, when required to do so by the Consultant shall submit at his own cost, manufacturer's certificate of tests, proof sheets, mill sheets etc., showing that the materials have been tested in accordance with requirements of these specifications. The samples for Tests shall be selected by SBIIMS/ Consultant.

4.0 Rectification of Defects:

4.1 Any defect in the work done or materials used in the works pointed out by the Consultant / SBIIMS shall be rectified within a week or such extended time as may be allowed in this failing which the said defect shall be got rectified by the Consultant at the risk and cost of the Contractors.

5.0 Conduit and Cables Layout:

5.1 Prior to the pulling of wires, the Contractor shall verify the conduits laid at site by Civil Contractors and satisfy themselves about the adequacy of the same. The contractors shall prepare Wiring layout along with Conduit layout and submit for approval. Prior to laying of the cables, the Contractor shall submit to the Consultant / SBIIMS detailed layout plans of the cable network and get the same approved. The layout plans shall contain particulars regarding size and routes of the cables. The Cables shall be procured only after approval of Layout Drawings.
6.0 **Regulations & Standards**:  

6.1 The installation shall conform in all respects to Indian Standard Code of Practice for Electrical Wiring Installation IS:732 and IS:2274. It shall also be in conformity with the current Indian Electricity Rules and Regulations and requirements of the local Electric Supply Authority in so far as these become applicable to the installation. Wherever this specification calls for higher standard of material and/or workmanship than those required by any of the above regulations then this specification shall take precedence over the said regulations and standards.

7.0 **Shop Drawings**:  

7.1 The Contractor shall prepare and submit to the Consultant / SBIIMS for the approval of detailed fabrication drawings for Main LT Panels/ SwitchGears/ Rising Mains special boxes and Distribution Board, switch board, special any other equipment to be fabricated by Contractor within 7 days of signing of the contract.

8.0 **Completion Drawings**:  

8.1 At the completion of the work and before issuance of certificate of virtual completion the contractor shall submit to the consultant/SBIIMS layout drawings drawn at approved scale indicating the complete wiring system "As Installed". These drawings shall in particular, give the following information.

(a) Run and size of conduits, inspection, junction and pull boxes.

(b) Location and rating of sockets and switches, controlling the light and power outlets.

(c) Number and size of conductors in each circuit.

(d) Location and details of distribution boards, mains, switches, switchgear and other particulars.

(e) A complete wiring diagram, as installed and schematic drawings showing all connections in the complete electrical system.

(f) Location of telephone outlets, T.V. Music & Fire Alarm outlet boxes, junctions boxes, sizes of various conduits.

(g) Locations of all earthing stations, routs and size of all earthing conductors, manholes etc.

(h) Layout and particulars of all cables.
9.0 Manufacturer's Instructions:

9.1 Where manufacturers have furnished specific instructions, rating to the materials used in this job, covering points not specifically mentioned in the documents, these instructions shall be followed in all cases.

10.0 Completion Certificate:

10.1 On completion of the Electrical Installation a certificate shall be furnished by the Contractor counter signed by a licensed supervisor, under whose direct supervision the installation was carried out.

This certificate shall be in the prescribed form as required by the local supply authority. The Contractor shall be responsible for getting the drawings and Electrical Installation inspected and approved by the local Authority concerned.

11.0 Qualified Competent Supervision:

11.1 The Contractor shall employ competent fully licensed, qualified full time Engineer to direct the work of Electrical installation in accordance with drawings and specifications. The Engineer shall be available at all times on the site to receive instructions from Consultant in the day to day activities, throughout the duration of the contract. The foremen shall co-relate the progress of the work in conjunction with all relevant requirements of the supply authorities.

12. Approval from SEB/ Electrical Inspectorate:

The Contractor shall prepare and submit all the relevant drawings as per the Requirement of AP TRANSCO/ Electrical Inspectorate and obtain the Approvals from CEIG, CEA, Hyderabad. No incidental expenses will be paid towards the same. Only statutory fees if any will be paid by SBIIMS.
TECHNICAL SPECIFICATIONS
CHAPTER 1
INTERNAL ELECTRIFICATION

1.0 Scope:
This specification is intended to cover the requirements of supply, installation, testing and commissioning of electrical wiring installation and other accessories required for its satisfactory operation. This covers the essential requirements or precautions regarding wiring installations for ensuring satisfactory and reliable service.

2.0 Standards:

3. Construction
Wall mounted switch boards shall be installed such that the bottom is at a minimum height of 1.35 m above finished floor level wherever applicable, as indicated in the drawing.

Equipment which is on the front of a switch board shall be so arranged that inadvertent personnel contact with live parts is unlikely during the manipulation of switches, changing of fuses or similar operation.

In every case in which switches and fuses are fitted on the same pole, these fuses, shall be so arranged that the fuses are not live when their respective switches are in 'OFF' position.

No fuses other than fuses in instrument circuit shall be fixed on the back or behind a switch board panel or frame.

4. Capacity of circuit:
Lighting Circuits shall not have more than a total of ten points of fans, 5A socket outlets and light points and its total load shall not exceed 800 watts. Lights, fans, and 5A socket outlets can be wired on a single common circuit. If fan circuit is drawn separately, circuit shall not be used more than eight points and load shall not exceed more than 800 watts. In the circuit, the neutral and earth wires can be looped up to 10 points. From distribution boards Neutral & Earth wires shall be run for every circuit.

The power circuits shall not have more than two outlets per circuit if load to be fed by each outlet is less than 1KW, and if load is more than 2KW, each outlet shall be connected to a separate circuit.

Switches: All switches shall be placed in the live conductor of the circuit and no single pole switch or fuse shall be inserted in the earth or earthed neutral conductor of the circuits. Single pole switches (other than for multiple control) carrying not more than 15 amperes may be of the piano flush type and the switch shall be 'ON' When the knob is down.
Lamp holders: Lamp holders for use on brackets and the like shall have not less than 1.3 cm nipple and all those for use with flexible pendant shall be provided with cord grips. All lamp holders shall be provided with shade carriers. Where centre contact Edison screw lamp holders are used, the outer or screw contact shall be connected to the ‘middle wire’ or the neutral or to the earthed conductor of the circuit.

Lamps: All incandescent lamps, unless otherwise specified shall be hung at a height of not less than 2.5 m above the finished floor level.

Ceiling rose: a) A ceiling rose or any other similar attachment shall not be used on circuit, the voltage of which normally exceeds 250 volts.

A ceiling rose shall not embody fuse terminals as an integral part of it.

Every socket outlet shall be controlled by a switch. The switch controlling the socket shall be on the ‘live’ side of side line. 5 Amps and 15 Amps socket-outlet shall normally be fixed at any convenient place 60 cm above the floor level or near such level as indicated in drawing. 15 Amps socket outlets in kitchen shall be fixed at convenient place 23 cm above the working platform. In a room containing a fixed bath or shower, there shall be no socket outlet and there shall be no provision for connecting a portable appliance.

5 Recessed MS conduit wiring system

a) Making of chase: The chase in the wall shall neatly be made and shall be of suitable dimension to permit the conduit to be fixed in the manner desired by the Engineer-in-charge. In the case of buildings under construction, chases shall be provided in the wall, ceiling, etc. at the time of their construction and shall be filled up neatly after erection of conduit and brought to the original finish of the wall.

b) Fixing of conduit in chase: The conduit shall be fixed by means of staples or by means of saddles not more than 600 mm apart. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with a long radius which will permit easy drawing-in of conductors. All the threaded joints of rigid steel conduits shall be treated with approved preservative compound to ensure protection against rust.

c) Inspection boxes: To permit periodical inspection and to facilitate replacement of wires, suitable inspection boxes shall be provided at convenient locations. They shall be mounted in flush with the wall. The minimum size of inspection boxes shall be 75 x 75 mm. Suitable ventilating holes shall be provided in the inspection box covers.

d) Types of accessories to be used: All outlets, such as switches and sockets, may be either of flush mounting type or of surface mounting type.

The switches and other outlets shall be mounted on such boxes. The metal box shall be efficiently earthed with the earth continuity wire run along the conduit.
When crossing through expansion joints in buildings, the conduit sections across the joint may be through flexible copper bellows of the same size as PVC conduit. The number of wires that can be drawn through a conduit shall be strictly as per IS 732 and as mentioned in Drawings.

6. MS Conduits:

MS conduit shall be black enameled and of thickness not less than 16SWG and of size minimum 19 mm dia. The Conduit shall conform to IS 9537/ Part II

Bunching of cables: Separate conduits shall be used for bunching of conductors of AC supply and DC supply for lighting and small power outlet circuits.

All outlets of conduit systems shall be properly drained and ventilated, but in such a manner so as to prevent the entry of insects etc. as far as possible.

Bends in conduit: Wherever necessary, bends or diversions may be achieved by bending the conduits or by employing normal bends, inspection bends, inspection boxes, elbows or similar fittings.

In case of plain conduit, heat may be used to soften the conduit for bending and forming joints. Positioning of conduit in close proximity to hot surfaces should be avoided.

7. TESTING OF WIRING:

The following tests shall be carried out on all types of wiring on completion of the work and before energizing the installation:

i) Insulation resistance test,

ii) Electrical continuity test,

iii) Earth continuity test,

iv) Earth electrode resistance test,

v) Switch polarity test.

i) Insulation Resistance test:
The insulation resistance shall be measured by using 500 v megger between the following points.

Phase and neutral conductor with all fuses in position and all switches in closed condition and main switch in OFF position with lamps and other devices removed.

Between earth and whole system of conductors with all fuses in place, all switches closed and all lamps in position.
Between all conductors connected to one phase of the supply of the above tests shall not be less than 50 divided by the number of points on the circuit. Where a whole installation is being tested, a lower value than that given by the above formula is acceptable subject to a minimum of one megaohm.

The insulation resistance in megaohm as obtained by each of the above tests shall not be less than 50 divided by the number of points on the circuit. Where a whole installation is being tested, a lower value than that given by the above formula is acceptable subject to a minimum of one megaohm.

(ii) Electrical continuity test:

Each and every circuit shall be tested for electrical continuity by using a multimeter.

(iii) Earth continuity test:

The earth continuity conductor including metal conduit shall be tested for electrical continuity and the resistance of the same along with the earthing lead measured from the connection with the earth electrode to any point in the earth continuity conductor in the complete installation shall not exceed one ohm.

(iv) Earth electrode resistance test:

The earth electrode resistance shall be tested as specified in section

(v) Switch polarity test:

Test shall be made to verify that all switches in every circuit have been fitted in the same conductor throughout and such conductor shall be marked for connection to the phase conductor.

8 Distribution Boards:

All the distribution boards shall be with MCBs as described in the respective schedule.

The distribution boards shall be controlled by a switch fuse, miniature circuit beaker or an isolator as described in the respective schedule. Each outgoing circuit shall be provided either with MCB or a fuse on the phase. The neutral shall be connected to a common link and be capable of being disconnected individually for testing purposes.

The distribution boards shall be located as indicated in the respective electrical working drawings and as directed by Engineer - in - charge. The distribution boards shall be fixed on wall in the niche provided and marked with the details of circuits, source of supply, size of incoming wires Etc.,

All marking shall be clear and legible.

The total load of the consuming devices shall be evenly distributed between the number of ways of distribution board.

The consuming devices circuit shall be connected to distribution board in proper sequence, so as to avoid unnecessary crossing of wires.
Cables shall be connected to a terminal only by crimped lugs.

Cables shall be rigidly fixed in such a manner that a clearance of at least 2.5cm is maintained between conductors of opposite polarity or phase and between the conductors and any material other than insulating material.

The incoming and outgoing cables shall be neatly bunched.

9. MOUNTING HEIGHTS:

The Mounting heights of various fixtures shall be as specified in the Drawings.
CHAPER 2
POWER CONTROL CENTRES

1.0 Scope:
This specification is to cover the requirement of design, supply, installation, testing and commissioning of LT power control centres / main switch boards with all components, Instruments, fittings and accessories for efficient operation without any trouble.

2.0 Standards:
The PCC specified herein, unless otherwise stated shall conform to the relevant and latest revisions of Indian standards and Indian Electricity Rules.

3.0 Design and construction:
3.1 Design requirements: The power control centres shall be suitable for operation on 440volt, 3 phase, 4wire 50HZ system to withstand a short circuit level of 50 KA RMS symmetrical.

The PCC shall be designed for operation in high ambient temperature upto 45 degrees centigrade and high humidity upto 95% and tropical atmospheric conditions. Means shall be provided to facilitate ease of inspection, Maintenance and Servicing.

3.2 Constructional requirements:
The power control centre shall be of

i) Metal clad, cubicle, indoor, free standing type suitable for Mounting on Built up Trenches with U Channels of adequate size.

ii) Made up of the requisite vertical sections, which when coupled together shall form continuous dead front switch board.

iii) Dust and damp protected, the degree of protection shall be better than IP - 54 as specified in IS-2147.

iv) Readily extendable on both sides by the addition of vertical sections after removal of the end covers.

v) Single front construction with the circuit beaker feeder and switch fuse feeders suitable for operation from the front of the panel.

The PCC shall have the feeder ratings as per the schematic diagrams enclosed with the schedule and constructed only of materials capable of withstanding the mechanical, electrical and thermal stresses as well as the effects of humidity, which are likely to be encountered in normal service.
3.3 Vertical Sections: Each vertical section shall comprise a front framed structure rolled folded sheet steel channel section of minimum 2 mm thickness rigidly bolted together. This structure shall house the components contributing the major weight of the equipment such as circuit breaker, switch fuse units, main horizontal busbars, vertical risers and other front mounted accessories. The structure shall be mounted on a rigid base frame of folded sheet steel of minimum of 2.5 mm thickness and 100mm height. The design shall ensure Structural stability during Transit and also during Operation after Commissioning. Suitable cable chamber housing the cable end connections and power / control cable terminations shall be provided. The design shall ensure generous availability of space for ease of installation and maintenance of cabling and adequate safety for working in one vertical section without coming into accidental contact with live parts in the adjacent section.

A cover plate at the top of the vertical section shall be provided with necessary ventilating arrangements. Any aperture for ventilation shall be covered with a perforated sheet having less than 1 mm diameter perforations to prevent entry of vermin.

3.4 Sheet Steel Cubicle:

3.4.1 The sheet steel cubicle shall be designed in fully segregated multitier formation. Each cubicle shall have hinged front access door with easy operating fasteners. All the doors and covers shall be heavily gasketed to make the compartment dust tight. Each cubicle shall have a covering at the bottom to make a dust and vermin proof construction. Door hinges shall be of concealed type.

The cubicle shall be of minimum 2 mm thick sheet steel. Sheet steel shrouds and partitions shall be of minimum 1.6 mm thickness. All sheet steel work forming the exterior of switch boards shall be smoothly finished, leveled and free from flaws. The corners shall be rounded. The minimum Thickness of Gland plates shall be 3mm.

3.4.2 The apparatus and circuits in the power control centers shall be so arranged as to facilitate their operation and maintenance at the same time to ensure the necessary degree of safety. Apparatus forming part of the control centers shall have the following minimum clearance.

i) between phases - 25 mm,

ii) between phase and neutral - 25 mm,

iii) between phases and earth - 25 mm,

iv) Between neutral and earth - 19 mm,

When, for any reason, the above clearances are not available suitable insulation shall be provided. Clearance shall be maintained during normal service conditions. Creepage distances shall comply with those specified in relevant standards.

3.4.3 All insulating materials used in the construction of the equipment shall be non hygroscopic duly treated to withstand the effect of high humidity, high temperature and tropical ambient service conditions.
3.4.4 Functional units such as circuit breakers and fuse switches shall be arranged in multitier formation, except that not more than One air circuit breaker housed in a single vertical section.

3.4.5 Metallic/insulated barriers shall be provided within vertical sections and between adjacent sections to ensure prevention of accidental contact with:

i) Main busbars and vertical risers during operation, inspection or maintenance of functional units and front connected accessories.

ii) Cable terminations of one functional unit, when working on those of adjacent unit/units.

3.4.6 All doors/covers providing access to live power equipment/circuits shall be provided with tool operated fasteners to prevent unauthorized access.

3.4.7 Provisions shall be made for permanently earthing the frames and other metal parts of the switchgear by two independent connections.

3.5 Metal treatment and finish:
All steel works used in the construction of the switch boards shall have undergone a suitable rigorous metal treatment process so as to remove oxide scales and rust formation and to facilitate a durable coating of the paint on the metal surfaces and also to prevent the spreading of rust, in the event of the paint film being mechanically damaged.
Two coats of Anti Corrosive primer followed by a finishing coat of Epoxy spray power coating of the shade 631 of IS:5 (i.e. Siemens grey) shall be given. The total thickness of paint shall not be less than 25 micron.

3.6 Bus Bars:

3.6.1 The busbars shall be housed in non-segregated sheet steel compartments in the cubicle at convenient locations with provision for access to the buses from the front of the panel. The busbar shall be suitably braced with DMC/SMC supports to provide a through fault withstand capacity of 50 KA RMS symmetrical for one second and a peak short circuit withstand capacity 150 KA minimum. The neutral as well as the earth bus shall be capable of withstanding the above fault level.

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

3.6.4 High tension bolts, nuts and spring washers shall be provided at all busbar joints.

3.6.5 The continuous rating of the busbar shall be 125% of the rated current. Maximum temperature of the bus and the connections shall not exceed 85 degrees centigrade. The busbars shall be of liberal design for the required current rating i.e. 0.8Amp/sq.mm.

The main phase busbars shall have continuous current rating throughout the length of each power control centre and the neutral busbars shall have continuous rating of at least 50% of phase busbars.
3.6.6 Connections from the main busbars to functional circuits shall be arranged and supported so as to withstand without any damage or deformation, the thermal and dynamic stresses due to short circuit currents.

All busbars and tapings shall be provided with color coded sleeves for phase identification.

All joints/tapping points of the buses shall be suitably shrouded to prevent accidental contact.

4.0 Circuit Breakers:

4.1 General:

4.1.1 Circuit breakers shall be of triple pole / four pole, air break, horizontal draw out /Fixed type, as given in the schedule of work and comply with the requirements of relevant IS with latest amendments and shall have the following:

i) A short circuit breaking capacity of not less than 50 KA RMS at 415 volts, 50 Hz AC.

ii) A short circuit making capacity of 105 KA.

iii) A short time withstand capacity of 150 KA for one second.

iv) Electrical overload performance at 6 times the rated current, 100% of the rated voltage as recovery voltage at 0.5 power factor.

v) Dielectric test of 2.5 KV applied for one minute on main circuits.

4.1.2 The circuit breakers shall be fitted with detachable arc chutes on each pole designed to permit rapid dispersion, cooling and extinction of the arc. Interphase barriers shall be provided to prevent flash over between phases.

4.1.3 Arcing contacts shall be of hard wearing material copper tungsten or silver tungsten and shall be easily replaceable. Main contacts shall be of silver plated copper of high pressure type and generous cross section.

4.2 Operating Mechanism:

The operating mechanism shall be of robust design, with minimum number of linkages to ensure maximum reliability. Manually operated circuit breakers shall be provided with spring operated closing mechanism which are independent of speed of manual operation. Electrically shall be independent of the motor which shall be used slowly for charging the closing spring.

The operating mechanism shall be such that the breaker is at all times free to open immediately when the trip coil is energized.
Mechanical operation indicators shall be provided to show open and close positions of the breaker. Electrically operated breakers shall be additionally provided with mechanical indications to show charged and discharged conditions of the charging spring.

Means shall be provided for slow closing and opening of the breaker for maintenance purposes, and for manual changing and closing of electrically operated breakers during emergencies.

4.3 Protection:

Provisions shall be available for fitting a minimum of five trip devices - three over current, as shunt trip and an under voltage release or two over current and earth fault release, a shunt trip and one under voltage release. The breakers shall be of the shunt or series trip type as specified in the schedule.

4.4 Housing of Circuit Breaker:

Circuit breakers shall be individually housed in sheet metal castle provided with hinged doors. The breaker along with its operating mechanism shall be mounted on a robust carriage moving on guide rollers within the castle. Isolating contacts for both power and control circuits shall be of robust design and fully self-aligning. The assembly shall be designed to allow smooth and easy movement of the breakers within its castle.

The breaker shall have three distinct positions within the castle as follows:

i) `Service' position: With main and auxiliary contacts connected.

ii) `Test' position: with power contacts fully disconnected and control circuit contacts connected.

iii) `Isolated' position: with both power and control circuit contacts fully disconnected.

It shall be possible to achieve any of the above positions with the castle doors closed. Mechanical position indicators shall be provided for the three positions of the breakers.

4.5 Interlocking:

4.5.1. The moving portion of the circuit breaker shall be interlocked so that:

i) It shall not be possible either to isolate it from the connected position, or to plug it in from the Isolated position with the breaker closed.

ii) The circuit breaker can be closed only when it is in one of the three positions or when it is fully out of the castle.

iii) It shall not be possible to open the hinged door of the castle unless the breaker is drawn to the isolated position.
iv) Inadvertent drawl of the circuit breaker too far beyond the supporters is prevented by the suitable stops.

4.5.2 Provisions shall be available for the padlocking of the circuit breaker access flame in any of the three positions.

4.5.3 Automatically operated safety shutters shall be provided to screen the fixed isolating contacts when the breaker is drawn out from the castle.

4.5.4 The moving portion of the circuit breaker shall be provided with a heavy duty, self aligning earth contact, which shall make before and break after the main isolating contacts during insertion into with drawl from the service position of the breaker. Even in the isolated position positive earthing contact should exist.

4.5.5 Auxiliary switches directly operated by the breaker operating mechanism and having 4 ‘NO’ and 4 ‘NC’ contacts, shall be provided on each breaker. The auxiliary switch contacts shall have a minimum rated thermal current of 10 amps.

5.0 **Switch Fuse Units** :

5.1 General:

The switch fuse units shall be of the load break, heavy duty, cubicle type conforming to the requirements IS and of AC 23 duty.

The switch fuse units shall be capable of withstanding the thermal and electromagnetic stresses caused by short circuits for the time of operation of the associated fuse links.

The switch fuse units shall be double break and have quick make break mechanism, designed to ensure positive operation.

All switch fuse contacts shall be silver plated at the current transfer surfaces.

The unit shall be provided with a front operating handle. The ON and OFF positions of the switch handle shall be clearly marked.

5.2 Interlocks and Safety:

Interlocks shall be provided so as to prevent opening of the unit door when the switch is in the ON position and also to prevent closing of the switch with the door not properly secured. It should however be possible for a competent person to operate the switch shall be suitable for locking with switch in the OFF position by means of a padlock.

The interior arrangement of the switch fuse unit shall be such that all 'Live' parts are shrouded.
5.3 HRC Fuses:

The switch fuse units shall be fitted with High rupturing capacity cartridge fuse links with ISI marking for a rupturing capacity of not less than 80 KA at 415 volts. The fuse links shall be mounted in a drawout carriage, thus ensuring positive isolation of contacts during fuse replacements.

6.0 Current Transformers.

Current transformers shall comply with the requirements of relevant latest amendment IS. They shall have ratios, outputs and accuracy as specified in the schedule.

7.0 Indicating/Integrating Meters:

All indicating instruments shall be of flush mounted industrial pattern conforming to the relevant latest amended IS. The instrument shall have non reflecting bezels, clearly, divided and indelibly marked scales, and shall be provided with zero adjusting devices in the front. Integrating instruments shall be of flush mounted switch board pattern complying with the requirements of relevant latest IS.

8.0 Relays: Circuit breakers shall be provided with integrally mounted relays as specified in the schedule.

The relay shall have a set of three phase characteristics, which shall be adjustable over a wide range, to provide discrimination between a multiplicity of devices. The relay shall be able to provide over current and earth fault protection. Also UV and Shunt trip Relays are to be provided.

9.0 Control switches/Selector switches: Control switches/Selector switches shall be of the heavy duty rotary type, with plates clearly marked to show the operating position. They shall be of semi-flush mounted type with only the front plate and the operating handle projected.

Circuit breakers control switches shall be of the spring return to neutral type.

10.0 Indicating lamps and push buttons:

Indicating lamps shall be of the LED type of low watt consumption, provided with series resistors where necessary and with translucent lamp covers. Bulbs and lenses shall be easily replaceable from the front.

Push buttons shall be of the momentary contact, push to actuate type fitted with self-reset contacts and provided with plates marked with its junctions.
11.0 **Cable terminations:**

Cable entries and terminals shall be provided in the switch board to suit the number, type and size of aluminum conductor power cables and copper conductor control cables as indicated in the schematic diagram.

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 glands and terminals such that cables can be easily and safely terminated.

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

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

Cable sockets shall be of copper and of the crimping type/soldering as required.

12.0 **Control wiring:** All control wiring shall be carried out with 1100/650 V grade single core Copper cable conforming to relevant IS having stranded copper conductors of minimum 2.5 sq.mm. section for CT Wiring and 1.5sq.mm for Control/indicating Instruments.

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

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

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

13.0 **Terminal blocks and labels:**

Terminal block shall be of 500 volts grade of the stud type. Insulating barriers shall be provided between adjacent terminals.

Terminal block shall have minimum current rating of 10 amps and shall be shrouded.

Provisions shall be made for label inscriptions.

Labels shall be made of anodized aluminum, with white engraving on black background. They shall be properly secured with fasteners. Danger plate of size and descriptions as recommended in the relevant IS shall be provided on the PCC.
14.0 **Tests:**

i) The power control centre shall be completely assembled, wired, adjusted and tested for operation under simulated conditions to ensure correctness of wiring and interlocking and proper functioning of all components.

ii) Each power control centre and components shall be subjected to standard routine tests as per applicable clauses of relevant standards.

iii) All current carrying parts and wiring of power control centre shall be subjected to power frequency voltage withstand test.

15.0 **Drawings:** After the award of the contract the contractors shall submit three copies of the following drawings for approval of the Department.

i) Outline dimensional drawing of the PCC showing the general arrangement indicating the following:
   
   a) Busbar clearances;
   
   b) Power and control cable entry points;
   
   c) Configuration of busbars;
   
   d) Details of support insulations and spacings;
   
   e) Outgoing power cable termination arrangements.

ii) Single line diagram of power control centre showing Protection, Metering etc.

iii) Cubicle wiring diagram.

iv) List of Firements with Ratings & makes / Models

16.0 **Installation Testing and commissioning:**

The power control centre shall be installed over the cable trench/cable pit using suitable size of MS channel including grouting of the channel with necessary bolts and nuts. Proper earthing of PCC shall be done using two independent copper/GI strip of sizes as indicated in the schedule. The channel shall be painted with one coat of red oxide primer and two coats of anticorrosive enamel paint of proper shade as directed by the Engineer-i-charge.

The pre-commissioning tests as required shall be done and the PCC shall be commissioned.
CHAPTER 3
LAYING OF CABLES

1.0 Scope:

This specification is intended to cover the requirements of installation and energizing of PVC/XLPE/PILCDSTA power cables including jointing of cables.

2.0 Standards:

The power cable and its fixing accessories shall comply with the latest relevant Indian Standards and National Electrical Code.

3.0 Laying of Cables:

3.1 General:

3.1.1 Before the commencement of cable laying, it shall be ensured by the Engineer-in-Charge that only ISI marked cables are used. It shall be the responsibility of the contractor to check the soundness and correctness of the size of the cable while taking delivery of the cable from stores. Any defect noticed shall be brought to the notice of the issuing authorities immediately. If any defects is noticed after the cable is laid or during the process of laying, it shall be brought to the notice of the Engineer-in-Charge and upon his satisfaction, that the cable is not damaged due to bad handling, it will be the entire responsibility of the contractor to retrieve the cable already laid and return the defective cable to store and take fresh length of the cable from the store and relay the same.

3.1.2 The material such as bricks, sand, cable route markers, RCC slab of best quality as approved by the Engineer-in-Charge only shall be used for cable laying works.

3.1.3 The contractor shall provide all the necessary labour, tools, plants and other requisites at his own cost for carrying out pumping of water and removing of water from trenches, if any, where required.

3.1.4 Installation shall be carried out in a neat, workman-like manner by skilled, experienced and competent workman in accordance with standard practices.

3.1.5 While laying the cable care shall be taken to avoid formation of kinks and also damage to the cable. In the case of cable bends, it shall not have bent radius lesser than 20 times the overall diameter of the cable.

3.1.6 A cable loop of about five meters length and as directed by the Engineer-in-Charge / SBIIMS shall be provided at the following locations.

a) Near the termination points
b) Near to the straight through joint

3.1.7 The method of cable laying and routing of cables, shall in every case be as directed by the Engineer-in-Charge / consultant / SBIIMS.
3.1.8 Whenever cable passes through hume pipes/GI pipes embedded across the wall in a building, both the ends of the pipe shall be suitably sealed.

3.1.9 Identification tags indicating the size of the cable and feeder designation shall be securely attached at both ends of the cable. Such tags shall also be attached to the cable at intervals of 50 Mtrs. The materials of the tag shall be of either 12 SWG GI sheet. In case of plastic, the details have to be engraved and incase of GI sheet, the details should be punched. Cable route markers shall be provided at the intervals of 200 M with a minimum of one number route marker. The details of the route markers shall be as per the drawing. At the locations of straight through joints, necessary joint-markers shall be provided.

3.1.10 When cable runs vertically, it shall be clamped on mild steel flats or angle iron fixed on walls and are spaced at such intervals as to prevent buckling of the cables. All steel work shall be painted with a coat of red oxide and thereafter finished with suitable anticorrosive paints.

3.2 Cable laid in ground:

3.2.1. All MV cables (up to 1.1 KV) shall be laid at a minimum depth of 0.75 M & HT cables (1.1 KV to 11 KV) shall be laid at a depth of 1.0 M when laid in ground. When cable pass through roads, nallahs etc. they must be protected by either hume pipe or GI pipe of suitable dimensions.

3.2.2. Excavations of trenches shall be carried out as indicated in the drawing. The width of the trench at the bottom shall be 0.4 M for one cable. In case the total number of cables laid in trenches is more than one, then the width shall be such that the spacing between the cables is maintained as shown in the drawing. Before the cable is laid in the trench the bottom of the trench shall be cleared from stones and other sharp materials and filled with sand layers of 75 mm, as shown in the drawing.

3.2.3. While removing the cable from the drum, it shall be ensured that the cable drum is supported on suitable jacks and the drum is rotated to unwind the cable from the drum. The cable should never be pulled while unwinding from the drum. It shall be ensured that the cables are run over the wooden rollers placed in the trench at intervals not exceeding 2 M.

3.2.4. After placing the cables in the trench shall be filled in layers ensuring that each layer is well rammed by spraying water and consolidated. The extra earth shall be removed from the place of trench and deposited at a place as directed by the Engineer-in-Charge/consultant / SBIIMS.

3.2.5. The HT cables shall be provided with RCC slabs (marked HT cable) on top as protection.

3.3 Cables laid in built up trench:

3.3.1. Before the commencement of cable laying the cable trench shall be drained properly. Cable shall be laid as explained in item 3.2. Cable shall be properly clamped to the cable supports, which are provided in the cable trench. The method of clamping shall suit the size of the cable and the cable supports, which are provided in the cable trench. The method of clamping shall suit the size of the cable and the cable supports, as directed by the Engineer-in-Charge / SBIIMS.
Care shall be taken while removing and replacing the trench cover slab. It is the responsibility of the contractor to make good any damaged trench covers.

3.4. **Cable terminations and straight through joints**:

3.4.1. All cable jointing materials such as straight through joint boxes, cable compound, cable lugs, insulation tapes etc. shall be of best quality and as approved by the Engineer-in-Charge / SBIIMS.

3.4.2. Cable glands for strip / armoured cables shall include a suitable armour clamp for receiving and securely attaching the armouring of the cable in a manner such that no movement of the armour occurs when the assembly is subjected to tension forces.

The cable gland shall not impose on the armouring, a bending radius not less than the diameter of the cable. The clamping ring shall be solid and of adequate strength.

Provision shall be made for attachment of an external earthing bond between the metallic covering of the cable and the metallic structure of the apparatus to which the cable box is attached.

3.5 **Sealing boxes**:

3.5.1 A sealing box, irrespective of the class of insulation of the cable for which it is intended, shall be so designed that it may be filled with compound after connecting the cable specially in flame proof/hazardous areas.

3.5.2 All parts and connection for attaching the armouring, wiping or clamping the metallic sheath in a sealing box, shall be easily accessible. This may be achieved by splitting the box or by providing a suitable cover or other such means.

3.5.3 The joints in the box shall prevent leakage of the compound.

3.5.4 Provision shall be made to ensure that the cores of the cable are efficiently sealed to prevent moisture penetrating along the strands or the cable conductors.

3.5.5 The sealing box shall be provided with compound filling orifices with suitable covers or plugs of size that will permit easy pouring of the compound.

In all cases where screwed plugs are used, one or more air vents shall be provided to ensure complete expulsion of air and total filling of the box with compound.

3.5.6 The box shall be of sufficient length to allow for manipulation of the insulated cover without damage to them or to the insulation.

3.5.7 A sealing box intended to be attached directly to the apparatus shall be designed such that the box together with the connected cable may be detached from the apparatus without disturbing the sealing compound.
3.5.8  Cable sealing and dividing boxes intended for use in the flame proof areas shall comply additionally with the relevant requirements of IS:2148-1968.

4.0 Testing

Once cable is laid, following tests shall be conducted in the presence of Engineer-in-Charge, before energizing the cable:

i) Insulation resistance test (Sectional and Overall).
ii) Sheathing continuity test.
iii) Continuity and conductor resistance test.
iv) Earth test.
v) High voltage test.

Tests conducted shall be as per Indian Standards and National Electrical Code.
CHAPTER 4
EARTHING

1.0 SCOPE:

This specification is intended to cover the requirements of supply, installation, testing and commissioning of
a) Pipe earthing
b) Plate earthing
c) Strip earthing

2.0 STANDARDS:

Earthing installations shall conform to the Indian Electricity Rules - 1956, as amended from time to time and IS 3043-1989 "code of practice for earthing", with latest amendments.

3.0 Earth electrode arrangement:

3.1 Pipe electrode:

3.1.1 Electrode shall be made of CI pipe having a clean surface and not covered with paint, enamel or poorly conducting material. Galvanized pipe shall not be smaller than 100 mm ID. Earthing with pipe electrode shall be done as per the details indicated in IS : 3043/87.

3.1.2 Electrodes shall be embedded below permanent moisture level.

3.1.3 The length of pipe electrodes shall not be less than 2.5 m. If rock is encountered, pipes shall be driven to a depth of not less than 2.5 m with suitable inclination. Pipe shall be in one piece and deeply driven.

3.1.4 To reduce the depth of burial of an electrode without increasing the resistance, a number of rods or pipes may have to be connected together in parallel. The distance between two electrodes in such a case shall not be less than twice the length of the electrode. The earthing lead shall be connected by means of a through bolt, nuts and washers and cable socket.

3.2 Plate electrode:

For plate electrodes, minimum dimensions of the electrode shall be as under.

3.2.1 GI plate electrode: 600 x 600 x 6 mm thick.
3.2.2 Copper plate electrode: 600 x 600 x 3.15 mm thick
3.2.3 The electrode shall be buried in ground, with its faces vertical and top not less than 2.5 M from the surface of the ground.

3.2.4 Earthing using plate electrode shall be done as per details, indicated in drawing.

3.2.5 Plate electrodes shall have a galvanized iron water pipe, buried vertically and adjacent to the electrode. One end of pipe shall be at least 5 cm above the surface of the ground and need not be more than 10 cm. The internal diameter of the pipe shall be at least 19 mm. The length of pipe under the earth's surface shall be such that it shall be able to reach the center of the plate. The earthing lead shall be securely bolted the plate with two bolts, nuts, check nuts and washers.

3.3 Strip or conductor electrodes:
3.3.1. Strip electrode shall not be smaller than 25 x 1.6 mm, if of copper and 25 x 3 mm, if of galvanized iron and steel. If round conductors are used as earth electrodes, their cross sectional area shall not be smaller than 3 sq.mm, if of copper and 6 sq.mm, if galvanized iron and steel.

3.3.2. Conductor shall be buried in trenches not less than 0.5 m deep.

4.0 General:

i) All materials used for connecting the earth lead with electrode shall be of GI in case of GI pipe and GI plate electrodes, and of tinned brass in case of copper plate electrode. The earthing lead shall be securely connected at the other end to the main board.

ii) The earthing lead from electrode onwards shall be suitably protected against mechanical injury by routing the earth wire / strip through a suitable size of GI pipe.

iii) All medium voltage equipments shall be earthed by two separate and distinct connections with the earth. In the case of high and extra high voltages, the neutral points shall be earthed by not less than two separate and distinct connections with the earth, each having its own electrode at the generating station or substation.

iv) All materials, fittings etc. used in earthings shall conform to Indian standard specifications wherever they exist. In the case of materials for which Indian standard specifications do not exist, such materials shall be approved by the Engineer-in-Charge.

v) The earth electrode shall be kept free from paint, enamel and grease.

vi) It shall be ensured that similar materials for respective earth electrodes and earth conductors are used.

vii) Earth electrode shall not be installed in proximity to a metal fence.

viii) Copper/GI strip shall be connected to the respective earth electrodes, either by brazing or welding respectively. The Copper/GI strip shall be jointed only either by brazing or by riveting at the end of over lapping portions. The overlap shall not be less than 50 mm.

ix) Earthing clamps used for supporting earth strips shall be made of such materials so as to avoid bimetallic action between strip and clamps.

5.0 Testing:

The earth resistance of each electrode shall be measured by using a reliable and calibrated earth megger and the value shall be as per IS/IE rules.

**SPECIFICATIONS FOR ELECTRICAL WORKS**

**H.T SWITCHGEAR PANEL (VCB - VACUUM CIRCUIT BREAKER)**

**GENERAL**

This specification covers the assembly, factory test, supply, site erection, testing a commissioning of 11 KV VCB, outdoor switchgear cubicle (1 module), complete in all
respects with all equipment fittings and accessories for efficient and trouble-free operation as specified here in under.

The switchboard shall be suitable for the following system:

**Rated Voltage** : 3 Phase, 11 KV Earthed System

**Maximum System Voltage** : 12KV

**Rated Frequency** : 50Hz

**Ambient Temperature** : 45°C

### STANDARD & CODES

Unless otherwise stated, HT switchboard shall conform to the following relevant Indian standards and Indian Electricity Rules and Regulations.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Standard</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IEC-62271-100/IS13118</td>
<td>Circuit Breaker</td>
</tr>
<tr>
<td>2</td>
<td>IEC-600298 / 600694</td>
<td>Switchgear</td>
</tr>
<tr>
<td>3</td>
<td>IS -2705 (1992)</td>
<td>Current Transformers</td>
</tr>
<tr>
<td>4</td>
<td>IS -3156 (1992)</td>
<td>Voltage Transformer</td>
</tr>
<tr>
<td>5</td>
<td>IS -3231 (1987)</td>
<td>Relays</td>
</tr>
<tr>
<td>6</td>
<td>IS -1248</td>
<td>Ammeter &amp; Voltmeter</td>
</tr>
<tr>
<td>7</td>
<td>IS -375</td>
<td>Arrangement of Breakers Bus bars main connection and auxiliary wiring.</td>
</tr>
<tr>
<td>8</td>
<td>IEC -687/CBIP Report</td>
<td>Tri Vector Meter</td>
</tr>
<tr>
<td>9</td>
<td>IEC-60129</td>
<td>Alternating current dis-connectors (isolators) and earthling switches.</td>
</tr>
<tr>
<td>10</td>
<td>IEC - 60044.1</td>
<td>CT</td>
</tr>
<tr>
<td>11</td>
<td>IEC - 60044.2</td>
<td>PT</td>
</tr>
<tr>
<td>12</td>
<td>IEC - 60255</td>
<td>Electrical Relays</td>
</tr>
<tr>
<td>13</td>
<td>IEC - 60529</td>
<td>Classification of degrees of protection provided by enclosures.</td>
</tr>
</tbody>
</table>

### EQUIPMENT TO BE FURNISHED (SINGLE PANEL BOARD)

One complete 11 KV metal clad, cubicle type 1 module Panel board, outdoor switchgear consisting of the following circuits:

-One (1) No. 11 KV, 630A VCB, 350 MVA, Draw out type.

The breaker shall be suitable for termination of 3C x 185 Sq.mm. H.T XLPE cable on incoming and 3C x 185 Sq.mm. H.T XLPE cable on outgoing side.

Controls and interlocks as required for the safe operation of the switchgear.

All supporting structures and installation materials including steel foundation frame, anchor bolts, holding down bolts, etc.
Tenderer shall be required to supply all his distribution equipment for the control power supply as required. Special tools and tackle required for erection, operation and maintenance of equipment.

Drawings, technical details, installation and maintenance manual for the switchgear and auxiliary equipment.

GENERAL DESIGN FEATURES

The equipment shall be installed indoor/outdoor. The maximum temperature rise in any part of the equipment at specified rating shall not exceed the permissible limits as stipulated in relevant standards.

The rated peak short circuit current or the rated short time current carried by the equipment shall not cause:

a) Mechanical damage to any part of the switchgear.

b) Separation of contacts

c) Insulation damage of "Current Carrying Part". All controls shall be suitable for 24V DC.

CONSTRUCTION FEATURES

GENERAL

The switchgear shall be indoor, metal-clad (cubicle type), floor mounted, draw-out truck/cassette type design. Each panel shall comprise essentially of two portions.

a) The fixed portion housing bus bars, current transformers, voltage transformers, relays and instruments, cable pot heads and other accessories.

b) The moving portion comprising of circuit breaker.

The switchgear shall have structural steel framework, enclosed on all sides and top by CRCA sheet of minimum 2mm thickness.

The Switchgear panel shall be dust and vermin proof complying with degree of protection of not less than IP-4X as per IS-3427 (1997). The outdoor breaker panel shall be suitable for IP- 55 degree of protection.

The Circuit Breakers should be rated for 25 KA for 1 Sec & bus-bars for 25 KA for 1 sec. The bus-bars shall be extensible on both sides.

The moving portion of the switchgear shall consist of circuit breaker mounted on a carriage. The operating mechanism of the circuit breaker shall be located at the front of the carriage.

The moving carriage shall be complete with self-aligning primary and secondary disconnecting devices. The moving carriage shall have three positions -

a) Service
b) Test

c) Isolated

The switchgear shall be required to operate in the following manner.

a) In "service" position all the power contacts and control contacts shall be maintained and the circuit breaker can be closed and tripped in the normal way.

b) In "test" position, the power contacts shall be disconnected and control contacts shall be maintained. In this position, the circuit breaker can only be closed and tripped from local panel only.

c) In "Isolated" position, both the power and control contacts shall be disconnected and the carriage shall be ready for removal.

The switchgear shall be designed in such a way that power contacts of the fixed portion shall be covered by a shutter when the moving carriage is withdrawn from the switchgear.

Each switchgear assembly consisting of all the units shall be mounted and bolted to a common channel. The channel in turn shall be bolted to the foundation at site. All equipment foundation, anchor bolts, etc. shall be furnished.

The standard phase arrangement when facing the switchgear shall be R-Y-B from left to right, from top to bottom and front to back. All relays, instruments, other devices, buses and equipment involving three-phase circuit shall be arranged and connected in accordance with the standard phase arrangement.

All the High Voltage compartments i.e. Circuit Breaker, Bus Bar, and Cable Compartments shall be separated from each other by metallic partitions in line with IEC-600298. These compartments must have pressure relief flaps for exit of gas due to internal arc to ensure operators safety. All the HV design must ensure conformity to IEC-600298 and must be Type tested for Internal Arc Test. The supplier shall submit Type Test report from CPRI or other independent agency to prove the above.

BUS BARS

The switchgear buses shall be rated for continuous current of magnitude as specified. Maximum temperature rise of bus and connection shall be limited to 40 °C over an ambient of 45°C.

The bus bars, of the switchgear section shall be of hard drawn electrolytic copper liberally sized with high safety factor for required current rating and shall be of the same cross-section. The busbars, connection and their insulated supports shall be mechanically strong, and shall withstand all the stresses which shall be imposed upon them in ordinary working due to fixing, vibration, fluctuation in temperature, short-circuit or other causes.

The bus bars shall have the marking, colour coding and arrangement according to the relevant IS and shall run in a separate bus bar chamber. The bus bars and joints shall be fully insulated and so enclosed as not to leave any exposed live parts.
Provision shall be made for expansion and contraction of the busbars and connections with variation of temperature.

**BUS WAY**

a) Continuous current rating selection

b) Standards to be complied with needs to be clearly indicated-

<table>
<thead>
<tr>
<th>Continuous Current rating of Bus way (Amperes)</th>
<th>Aluminium</th>
<th>Copper</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
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</table>

**CIRCUIT BREAKERS**

The circuit breakers shall be vertically and horizontally draw out type VCB mounted on the moving carriage. The circuit breaker shall be of modular design. The rating of the circuit breaker shall be as specified.

Normal Service Conditions:

- **Ambient temperature**: 45 degree Celsius
- **Elevation**:  
- **System Voltage**: 11 KV, Effectively earthed system
- **Highest system voltage**: 28 KV
- **Frequency**: 50Hz
- **Main circuit terminal**: Circuit breaker should be provided with...
main terminals and 3 load side terminals.

**Closing mechanism & Anti-pumping device**

Motor operated closing mechanism and Mechanical and electrical anti-pumping device shall be provided. Motor operating mechanism shall be complete with universal motor, opening spring, closing spring, and all necessary accessories. Spring charged/discharged indicator shall be provided. The Mechanism shall work on 230 VAC.

**Coil voltage for shunt trip and release coil**

: 24V
The symmetrical breaking capacity in MVA shall remain constant for 11 KV breakers. Breakers shall be capable of making, carrying and breaking starting and full load currents.

- Closed circuit breakers from being moved from service position to test position/isolated position.
- Closing and opening of the circuit breaker in an intermediate position between "Service/Test".
- Circuit breaker can be racked in to service position only with the front door closed.

Breakers shall be complete with the following accessories.

- Mechanical operating device for manual closing and tripping of the breaker. Device for manual charging of the closingspring.

At least four (4) NO and four (4) NC mechanically operated auxiliary contacts of sufficient rating (in addition to those required for breaker operation) shall be wired out to terminal block for external connection. In the case of KV breaker in addition to the circuit breaker auxiliary contacts provided on breaker trolley for circuit breaker operation, a mechanically operated switch shall be provided on a stationary part of switchgear. This switch shall be positively operated by the breaker mechanism when the breaker is in "service" position but not when the breaker is isolated. The switch shall be provided with at least six (6) normally open and at least six (6) normally closed adequately rated auxiliary contacts for each circuit breaker for inter locking.

In case a switch with six (6) NC contacts cannot be offered as required then a switch with six (6) normally closed and two (2) normally open contacts may be offered along with an auxiliary relay having four (4) normally open and two (2) normally closed contacts (out of which any four contacts shall be wired out), shall be provided on each feeder cubicle.

Each circuit breaker, disconnector and bus VT cubicle shall have necessary limit switches for service and test positions, which shall provide the required contacts for breaker operation and Interlocking, position indication and disconnection of remote control circuits.

Each breaker shall have the following protections:-

**Short circuit and overload protection:-**

Short circuit and overload protection shall be provided through inverse definite minimum time (IDMT) type of relay. This relay shall be provided with shunt reinforcement along with the hand reset flag. Relay rated time shall be less than 1.3 seconds. This relay shall be having the non-directional feature. The relay shall be induction disc type with adjustable time current characteristics. Relay shall be of high torque and shall ensure high contact pressure even at currents near pickup values. The relay shall be of three (3) element type. Two elements for overload protection and one element for earth fault protection. Current setting range of the relay shall be 50-200%.

Earth fault protection shall be provided through an instantaneous earth fault relay. The relay shall be of heavily damped induction disc type with an adjustable inverse
time voltage characteristic. This relay shall be provided only on transformer feeders. The relay shall have a setting range of 20-80%.

Master Trip Relay:

The relay shall be fast acting multi contact, attracted armature with high mechanical stability. It shall be suitable for tripping duties requiring simultaneous switching operation. The relay shall be suitable on 24 V DC. The operating time shall not exceed more than ten (10) milli second. The number of hand reset contact NO/NC shall be as per final approved scheme plus 25% spare. The contact used for tripping circuit breakers shall be blow out type.

Each breaker shall be power operated by stored energy, charged spring mechanism for both closing and opening operations. Accidental failure of any spring shall not trip or close a breaker. Spring shall be charged full at all times.

Breaker shall close, upon closing a contact in its closing circuit momentarily. A second closing impulse shall have no effect on the closing mechanism.

Red lights, indicating 'Breaker-closed' shall be wired to supervise shunt trip circuit. Green lamps mounted on remote panels indicating 'Breaker-open' shall be wired to light up only when remote/local switch is on 'Remote' position.

All protective relays shall be provided with flag indicators, and all relays directly tripping the breakers shall be provided with hand reset contacts in addition to the flag indicator.

INSTRUMENT TRANSFORMER

CURRENT TRANSFORMER

The current transformers shall be of epoxy encapsulated/cast resin type, mounted on stationary portion of the switchgear and shall be easily accessible for maintenance and testing purpose.

The current transformers shall be capable of withstanding the short circuit stresses corresponding to a fault level of the system.

The ratio and ratings of the current transformers shall be suitable to meet the requirements of metering and protection of the corresponding feeder.

The current transformers shall conform to the latest edition of IS. Unless specified otherwise, insulation, temperature rise and all other phases of manufacture and testing shall conform to that given in the standards. A type test certificate of a CT of similar design for temperature rise test shall be furnished along with the offer.

Facilities for shorting and grounding the terminals shall be provided at the terminal block.

POTENTIAL TRANSFORMERS

The potential transformers shall be epoxy encapsulated /cast resin design and Star type on L.T. side.
A manually operated disconnecting device shall be mounted on the primary side of potential transformer. This device shall be designed to operate externally without access into the line portion of the switchgear.

The connections from main circuit to potential transformers shall be capable of withstanding short circuit stresses of the system.

The high voltage winding of the potential transformer shall be protected by current limiting fuses. Low voltage fuses, sized to prevent harmful overload, shall be installed.

The manufacture, testing, insulating and temperature rise of the potential transformer shall conform to the latest revision of the relevant IS. The 110V bus in the switchboard shall be sectionalized.

**INSTRUMENTS & METERS**

The instruments shall be the flush type preferably with the square face of digital intelligent panel meter 96W x 96H as specified. They shall be fully tropicalized, dust tight and shall conform to the relevant standards.

Display shall be of backlit LCD with 10mm height digits.

The meter shall be capable of measuring power, current, and voltage simultaneously with accuracy of class 1.0.

The scale range of the AC ammeter shall generally be equal to 1.5 times the rated primary current of the C.T. feeding them. The scale range of the voltmeter shall be about 15% in excess of the normal circuit voltage.

**AUXILIARY AND CONTROL POWER SUPPLY**

**AC POWER SUPPLY FOR SPACE HEATER AND CUBICLE ILLUMINATION LAMPS**

Each carriage control panel including the breaker operating mechanism shall be provided with thermostatically controlled space heater. The thermostat shall have adjustable range. The space heaters shall be rated for 230 volts, 1 phase, 50 Hz. For cubicle illumination, receptacle arrangement at suitable location of each control panel shall be provided so that hand lamp connection may be taken from this receptacle during inspection and maintenance.

Wiring for space heaters shall be suitably grouped so as to form a more or less balanced condition on 230 V, 1 phase, 50 Hz supply. Suitable number of space heaters along with thermostat may be provided.

Each space heater and hand lamp circuit shall be provided with ON/OFF switch and suitable protection.

**CONTROL SUPPLY**

The power for breaker control and indication shall be taken from 24V DC supply.

In addition, each cubicle shall be provided with one double pole, single throw switch for its control circuit power supply.
**FUSE**

All control and power fuses shall be link type "HRC" fuses. Plug fuses (screw-in type) shall not be accepted.

**SECONDARY AND SMALL WIRING**

All wiring for the equipment and devices located on or within the switchgear shall be carried out. The wiring shall be complete in all respects so as to ensure proper functioning of control, indication, measurement, protection and interlocking scheme.

All the wiring shall be marked in accordance with the relevant standards. Numbered ferrules, reading from the terminals onward shall be provided at both ends of all the wiring for easy identification.

The internal wiring shall be of PVC insulated cable of 1100/650 grade of minimum size 2.5 Sq.mm copper.

**ALARM ANNUNCIATION SYSTEM**

The annunciator shall be provided on each panel to indicate the various circuit conditions and shall be placed at suitable height. The various functions shall be as follows:

- Circuit breaker closed
- Circuit breaker open
- Trip circuit healthy
- Alarm & Autotrip
- Transformer non trip (Buchholz, etc.)
- C/B intest

Hooter/Buzzer shall be provided with a manually operated switch so that it can be silenced.

**CABLE TERMINATION**

Power Cable

Cable pot heads for termination of 11 KV XLPE type insulated cables shall be furnished.

All power cable entry shall be from the top and the cable pot heads shall be self-supported, detachable type.

Where more than one cable pot heads are used per phase, the Contractor shall be required to arrange pot heads in such a way that detachment of any pot head is possible without disturbing the other units.

**Control Cable**
All control cables shall enter the switchgear from top/bottom. Removable plates at the top/bottom of the panel shall be furnished with compression type cable glands to make entry dust-tight and no weight is transferred on the terminal. The glands shall be suitable for terminating cable armored.

All connections and accessories required to complete the whole installation shall be supplied by the Sub-contractor.

TERMINAL BLOCKS

Terminal blocks shall be provided as specified and shall be clip-on type. They shall be shrouded preferably by a transparent acrylic sheet. The terminal block of different voltage classes shall be segregated.

ACCESSORIES

Following accessories shall be provided for each switchgear:

Channel base and foundation bolts Lifting lugs

Maintenance closing handles for circuit breaker Draw handle for circuit breaker Hook stick, indoor use, and 1.5 m long Test plug for draw out type relay

NAME PLATE

Nameplates of approved design shall be furnished at the front of each compartment of the cubicles. Rating plates for each circuit breaker and at each instrument, relay and auxiliary switches as mounted on the face or inside the cubicle shall also be furnished.

Instruments and devices mounted on the cubicle door of the switchgear shall be identified on the rear also with the respective numbers on or adjacent to the instrument or device case.

GROUND BUS

A ground bus of 50 mm x 6 mm Copper flat shall be furnished along with the full length of the panel. Each stationary unit shall be connected directly to this ground bus.

Grounding terminals at two end of the ground bus shall be provided for connection to station ground grid.

The frame of each draw-out carriage containing circuit breaker shall be grounded through heavy multiple finger contacts at all times except when the unit primary disconnecting devices are separated by a safedistance.

TESTS
The switchgear unit shall be completely assembled, wired, adjusted and tested for operation under similar conditions to ensure accuracy of wiring, correctness of control schemes and proper functioning of all equipment.

**ROUTINE TEST**

Each of the following equipment shall be subjected to standard routine tests as per applicable clauses of relevant IS specifications:

- Circuit breakers
- Bus bar assembly
- Instrument transformers
- Auxiliary relays
- Control switches and indication lamps

**DESIGN TEST (TYPE TEST)**

Typical type test report of the tests mentioned below conducted on similar equipments in the past shall be furnished along with the tender:

- Short Time Current Test
- Short Circuit Test duties on Circuit Breaker
- Impulse withstand Test
- Power Frequency withstand Test
- Temperature Rise Test
- Internal Arc Test
- Mechanical Endurance test on Circuit Breaker
- Test to prove Degree of Protection of enclosure

**TEST CERTIFICATES**

Test certificate shall be furnished in required number of copies.

The routine and type test certificates shall be furnished to the Engineer-in-charge for approval before dispatch of the equipment from the works. The approval in writing shall be required to effect the dispatch of the equipment.

The routine and type test certificates of the miscellaneous components shall also be furnished to the Engineer-in-charge for approval.

The report shall furnish complete identification of data including serial number of each equipment.

**PERFORMANCE GUARANTEE**

The performance guarantee figures quoted on the schedule of technical data shall be guaranteed within the tolerances permitted by standard and will become a part of successful Tenderer's Contract.
After award of contract, the successful Bidder shall submit the required number of copies of the following drawings for approval of the Engineer-in-charge:

**Confirmed outline dimensional drawing of the various switchgears showing the general arrangement and indicating the following:**

- Space required in the front for breaker withdrawal.
- Control cable entry points and termination arrangement.
- Power cable entry points and termination arrangement.
- Bus bar clearance phase to phase and phase to ground.
- Configuration of busbar.
- Technical detail of supporting insulator and theirs spacing.
- Location of instrument transformers.
- Control panel details with equipment layout.
- Terminal block details.

**Single and three line diagram of all switchgears showing instrument transformers control switches, instruments and indication, etc.**

**Control schematic diagram of each breaker showing all safety and operation interlocks, annunciation, etc.**

**Transport/shipping dimensions with weights.**

**Foundation and anchor bolt details including dead load and impact load. Cross-section with parts list.**

**Cubicle wiring diagram with terminal board disposition.**

**Any other relevant data, drawing and information necessary for review of items whether specifically mentioned or not, shall be furnished by the Contractor along with that information.**

The responsibility of correctness of wiring diagram shall be with Contractor. The Engineer-in-charge will check the final schematic after submission. If any modification, addition or alteration is considered necessary to comply with the approved schematic drawing as stated herein above, the said modification, addition or alteration shall be carried out by the Contractor either in their works if it is before delivery, or at Site after delivery at no cost to the Owner.

Before starting manufacture of the equipment, the Contractor shall have to take approval of these design drawings from the Engineer-in-charge in writing. Any manufacturing done prior to approval of drawings shall be rectified in accordance with the approved drawing by the Contractor at his own cost and the equipment shall be supplied within the stipulated period.
TECHNICAL PARTICULARS OF SINGLE PANEL HT SWITCHGEAR EQUIPMENT

1. Type: Outdoor, cubicle type
2. System rated voltage: 11 KV
3. System maximum voltage: 12 KV
4. Frequency: 50 Hz
5. Insulation Level:
   a) 1.2/50 microsecond Impulse withstand voltage: 170 KV peak
   b) One minute power frequency withstand voltage: 70 KV rms
6. Rated Current:
   a) Continuous
      Incoming VCB circuit breaker (1 no.): 630 A
      - Short time current for 3 seconds: 25 KA
7. VCB Circuit Breaker:
   a) Quantity (Incoming feeder): 1 No
   b) Rated breaking capacity symmetrical: 350 MVA
   c) Total breaking time: 3 cycles (maximum)
   d) Operating sequence:
   e) Auxiliary voltage:
      - Control circuit: 24 V DC
      - Space heater and illumination lamp, etc.: 230 V, 1 Ph, 50 Hz
8. Potential Transformers:
   a) Quantity: One on each bus
   b) Voltage ratio: 11 KV/415 V
   c) Over voltage factor: As per IS-3156
   d) Accuracy class: 1.0
   e) Rated burden: 100 VA

9. Current Transformer (on incomer):
<table>
<thead>
<tr>
<th>Circuit</th>
<th>Ratio</th>
<th>Accuracy Class</th>
<th>Burden</th>
</tr>
</thead>
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<tr>
<td>Incoming For Protection</td>
<td>100/1A</td>
<td>5P10 &amp; Class 1.0</td>
<td>15 VA</td>
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<tr>
<td>&amp; Metering</td>
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<tr>
<td>Outgoing For Protection</td>
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<tr>
<td>&amp; Metering</td>
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</tbody>
</table>
HT SWITCHGEAR 11 KV 4 PANEL BREAKER

11 KV metal clad, cubicle type 4 module Panel board, outdoor switchgear consisting of the following circuits: (Technical particulars for VCB same as above but with)

- One (1) No. 11 KV, 630A VCB, 350 MVA, Draw out type as incomer (Group control protection)
- One (1) No. 11 KV, 630A VCB, 350 MVA, Draw out type as outgoing for 500 KVA Transformer feeder protection
- Two (2) Nos. 11 KV, 630A LBS (Load Break Switch), 350 MVA, as outgoing for existing 400 KVA Transformers feeder protections.

The panel shall be made suitable for termination of 3C x 185 Sq.mm. H.T XLPE cable on incoming and 3C x 95 Sq.mm. H.T XLPE cable on outgoing side.

TECHNICAL PARTICULARS OF SINGLE PANEL HT SWITCHGEAR - ISOLATOR / LBS

The Isolators offered shall conform to IS: 4710/9920 as amended to date. The isolator shall be triple pole, spring assisted, hand operated, non-automatic type with quick break contacts. The operating handle shall have three positions 'ON', 'OFF' and 'EARTH' which shall be clearly marked with suitable arrangement to padlock in any position. A safety arrangement for locking shall be provided by which the isolator operation shall be prevented from 'ON' position to 'EARTH' position or vice versa.

11 kV, 630A, 25kA Air insulated Load break switch outdoor with earth switch,

230V AC shunt trip coil with manual operated spring charging mechanism with 2 NO + 2 NC contacts,

3 nos. HT HRC fuses (fuse ratings 40A or as per the kVA of the transformer), R Y B Phase indication lamps LED based with MCB protection,

Trip circuit with push button, ON/OFF/EARTH position indications, Space heater with ON/OFF switch with thermostat.

Incoming and outgoing cable box for bottom entry and with all other standard accessories & required control wiring to make the installation complete.
TECHNICAL SPECIFICATIONS

OF MAINTENANCE FREE TREATED EARTH PIT

MAINTENANCE FREE TREATED EARTH PIT

The bidder shall have to do the entire work of earth pits required for equipment earthing and for the pits at the corners of earth mat.

STANDARDS
The product and the equipment covered by this specification shall, unless otherwise specified be in line with the requirement of any of the latest applicable standards and will apply in order of priority as listed below:

a) Indian Standards
b) IEEE 80
c) ANSI (American National Standards)
d) BS (British Standards)

EARTH PITS

All the Earth Pit shall be with special Ground electrodes supplied by Reputed Manufacturer. These special electrodes are provided with Ground enhancement material.

A. EARTHING PRODUCT COMPONENTS
   - The Earthing System should be based on use of Copper Bonded Earth Rods / Cu coated Pipe electrode / Cu coated PIP electrode (for corrosion resistance) and Ground Enhancement Material (to reduce Soil Resistivity).
   - It should be capable of providing any ohmic value as specified by the client, by inter-connection of ground rods to form a Grid.
   - The system shall be totally maintenance free and require no periodic or scheduled maintenance for a period of at least 30 years.
   - There shall be no requirement to add water or any other chemical any time after initial installation.
   - The system shall provide constant low ohmic value for entire life cycle without any consideration for moisture or temperature conditions.
   - The manufacturer shall be a company of international repute engaged in the field of Facility Electrical Protection work.

B. ELECTRODE:

   (1) COPPER BONDED EARTHRODS

   - For 66 KV Substations:
The Earth Rods shall have a nominal (actual) dia of 24mm (Min.) and length of 3 M (Min.). It shall be capable of handling 25 KA 1-Sec Short time current.

- **For 132KV, 220KV & 400 KV Substations:**
The Earth Rods shall have a nominal (actual) dia of 38mm (Min.) and length of 3 M (Min.). It shall be capable of handling 40 KA 1-Sec Short time current.

- The Rods shall have a steel core with molecular bonding of 250 micron of copper as per international standards.
- A nickel layer is applied to steel core (and subsequently copper) by an electrolytic process forming a metallurgical bond between the three.
- The copper used shall be type DHP alloy No. 122 CDA and rated at 99.95% copper. The thickness of copper layer shall be uniform 250 micron.
- The Rods should be manufactured by a company of high repute to ensure quality of Copper Bonding.
- Type test report (tested at NABL accredited laboratory) shall be submitted satisfying minimum STC of 25 KA-1Sec for 66 KV S/S and for above class, STC shall be 40 KA-1Sec.
- Test report (tested at NABL accredited laboratory) of cu-coating shall be submitted satisfying our requirement of 250 micron coating.

(2) PIPE or PIP (Pipe-In-Pipe) or Flat-In-Pipe

ELECTRODE For 66 KV Substations:
- The Pipe or Pipe-In-Pipe or Flat-In-Pipe electrode shall have a nominal (actual) outer dia of 50 mm & 2.5 mm thickness (Min.) and length of 3 M (Min.). It shall be capable of handling 25 KA 1-Sec Short time current and shall have a molecular bonding of 250 micron of copper as per international standards.

For 132KV, 220KV & 400 KV Substations:
- The Pipe or Pipe-In-Pipe or Flat-In-Pipe electrode shall have a nominal (actual) outer dia of 75.5 mm & 3 mm thickness (Min.) and length of 3 M (Min.). It shall be capable of handling 40 KA 1-Sec Short time current shall have a molecular bonding of 250 micron of copper as per international standards.

- In case of P-I-P and Flat-In-Pipe, the portion between pipes shall be filled with the conductive material.

- Type test report (tested at NABL accredited laboratory) shall be submitted satisfying minimum STC of 25 KA-1Sec for 66 KV S/S and for above class, STC shall be 40 KA-1Sec.

- Test report (tested at NABL accredited laboratory) of cu-coating shall be submitted satisfying our requirement of 250 micron coating.

C. GROUND ENHANCEMENT MATERIAL / BACK FILL / GROUNDING COMPOUND

- Ground Enhancement Material/ Backfill / Grounding compound shall be permanent and maintenance free. (No re-charging with salts or any other chemicals) and shall maintain its earth resistance with time.

- Ground Enhancement Material/ Backfill / Grounding compound shall confirm IEEE 80-2000 Clause No.14.5 (d). Ground Enhancement Material/ Backfill / Grounding compound in its set form shall have a resistivity of not more than 0.12ohm-m.

- Ground Enhancement Material / Backfill / Grounding compound shall comply there requirements and all applicable tests as per part-7 of IEC.
62561. The same shall be tested at NABL accredited laboratory and reports are to be verified at site.
   -- Resistivity test using soilbox
   -- Leaching test
   -- Sulfur determination
   -- Corrosion test

- It must set up firmly and not dissolve or decompose or otherwise pollute the soil or the local watertable.
- It shall be suitable for use in dry form or slurry form.
- The Ground Enhancement Material/ Backfill / Grounding compound shall not depend on the continuous presence of water to maintain its conductivity.
- The material shall be carbon based conductive concrete and shall not contain bentonite in any form.
- Same shall be applicable for conductive material used for filling in case of P-I-P and Flat-In-Pipe type earthelectrodes.

D. CLAMP

- Each Earth Rod/Pipe/PIP must be provided with a suitable Cu plated clamp OR exothermic welding of Cu plated plate to facilitate inter-connection of rods and connection to Equipment Earth Bar using appropriate copper coated MSstrip.

GUARANTEE

The product shall be guaranteed for trouble free operation for a period of 30 years from date of commission or arrival at site whichever is later. Any defect discovered during this period shall be rectified free of charge.

The pits shall be drawn with the help of a boring machine, an auger or any other means as required by site conditions and nature of ground strata which shall be in the scope of supplier.

VERIFICATIONS & TESTS TO BE CARRIED OUT AT SITE:

Following verifications and tests shall be carried out by respective E.E.(Construction) while execution of work of maintenance free treated earth electrodes.

(I) Electrode:

1. Type test report shall be verified satisfying minimum requirement of STC of 25 KA-1Sec for 66 KV S/S and for above class (i.e. 132 KV, 220KV, & 400 KV Substations), STC shall be 40 KA-1Sec.

2. Test report of cu-coating shall be verified for 250 micron coating.

(II) Ground enhancement material/ Back fill /Grounding material:
(A) Sampling of bag shall be 1 bag per lot of 50 bags received at site.
As per part-7 of IEC 62561, resistivity test using soil box shall be carried out and value of the same shall be below 0.12 Ohm-m.

(B) As per part-7 of IEC 62561, following test certificates shall be verified at site for

--- Leaching test
--- Sulfur determination
--- Corrosion test

Important Notes:

In Earthing Philosophy, terms “CI Pipe Electrode” and “Treated Electrode” shall be read as “Maintenance free Treated Earth pit” wherever indicated. It shall also be applicable for various equipment earthing drawings.
LIST OF I.S.CODES FOR INTERNAL ELECTRIFICATION INSTALLATIONS

1. EXTERNAL ELECTRIFICATION wiring installation (system voltage not exceeding 650V) IS 732 – 1989
2. Graphical symbols used in Electro-technology art-XI-Electrical Installation buildings IS 2032-1969
3. Fire safety of buildings (General) Electrical Installation IS 1646-1961
4. 3 pin plugs and sockets IS 1293
5. Earthing. IS 3043-1966
6. Rigid steel conduits for electrical wiring IS 9537-PII-1989
7. Fittings for electrical wiring IS 2667-1964
8. Flexible steel conduits electrical wiring IS 3430-1966
9. Accessories for rigid steel conduit insulated cables IS 3837-1966
10. General and safety requirements for electric lighting fittings IS 1913-1969
11. Protecting of buildings and allied structures against lightning IS 2309-1967
12. Busbar ratings IS 8084-1976
13. On load change over switches IS 4064-1978
# LIST OF APPROVED MANUFACTURERS / NATURAL SOURCES OF MATERIALS TO BE USED IN THE ELECTRICAL WORKS SUBJECT TO THE APPROVAL OF SAMPLES BY THE CONSULTANT/ ENGINEER

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Item name</th>
<th>Makes</th>
<th>Executed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>HV CIRCUIT BREAKERS /LBS</td>
<td>ABB/ SIEMENS/ SCHNEIDER/ CROMPTON GREAVES</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>HT PANELS</td>
<td>TRICOLITE/ ABB/ SCHNEIDER/ L&amp;T/ SIEMENS/ AMBIT SWITCHGEARS</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>PROTECTION RELAYS</td>
<td>AREVA/ ABB/ WOODWARD/ L&amp;T/ SIEMENS/ SCHNEIDER</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>HV CABLES</td>
<td>UNIVERSAL/ NICCO/ POLYcab/ KEI/ HAVELLS</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>HV CABLE TERMINATION KIT</td>
<td>RAYCHEM / M-SEAL/ 3M</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>MV Panels (PCCs)</td>
<td>Manufacturers with CPRI Test Certificate and having experience in fabricating of VCB panels earlier.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>DBs/ Metal clad sockets</td>
<td>ABB/Siemens/ Legrand / Schneider /L&amp;T/ Havells</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>MCB/MCCB</td>
<td>ABB/Siemens/ Legrand / Schneider /L&amp;T/ Havells</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>SWITCH &amp; SOCKET/ STEP TYPE REGULATOR</td>
<td>Legrand – Mosaic- My link / MK-wrap around/ Anchor -Woods / Schneider Clipsal/ Crabtree (Havell's) / PANASONIC/ PHILIPS</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>CABLES/COPPER CONDUCTOR WIRES</td>
<td>Havells/ Polycab/Universal/KEI/</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>CABLE LUGS</td>
<td>Dowells / Jainsons/3D</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>CABLE GLANDS</td>
<td>HMI /Comet/ Cosmos/Dowells (Biller India)/ Hax Brass</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>PVC conduits, Casing , Capping &amp; Accessories (ISI MEDIUMUM)</td>
<td>Precision / Sudhakar/ Avon plast/ FINOLEX</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Steel Conduit</td>
<td>BEC / AKG / PRECISION / ATUL</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>M.S. Cable Tray</td>
<td>Stelco / Steelways / Slotco / Pilco / Patny</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Capacitor Bank</td>
<td>Epocs /Neptune/ Tibcon</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Light Fixtures (LED)</td>
<td>Philips / Havells/ CG (only commercial models)</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>LED COVE/ROPE Lighting Strip</td>
<td>Philips / GE/ Havells/ CG/ Wipro/ Jaguar</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Ceiling Fans, Wall mounted fans &amp; Exhaust Fans</td>
<td>Havells/Bajaj/ CG/Orient/ USHA/ Almonard</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Selector Switches:</td>
<td>Vaishno / Salzer / Kaycee</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Indication Lamps LED</td>
<td>L &amp;T/ Siemens/Technique/ ESBEE/Schneider / Vaishno / Binay</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Resign cast CTs</td>
<td>KALPA/KAPPA/ Automatic Electric</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>CT SHORT CIRCUITING TERMINALS</td>
<td>ELMEX or equivalent</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Telephone Wires</td>
<td>Lapp / Delton / Polycab/ Finolex/ SKYTONE/ HAVELLS</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>LAN Cables</td>
<td>D LINK, Finolex, Ploycab, Legrand/SKYTONE/ HAVELLS</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>LAN SWITCHES/ I/O PORTS</td>
<td>Kramer/ Extron/ Crestron/ CISCO</td>
<td></td>
</tr>
</tbody>
</table>

Signature of the contractor with seal
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Make/Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.</td>
<td>CAT 6 / LAN cables/ OFC</td>
<td>DLink/DigiLink/Aten</td>
</tr>
<tr>
<td>28.</td>
<td>AV Audio Rack Floor Mounted</td>
<td>VALRACK/NETRACK/EMERSON</td>
</tr>
<tr>
<td>29.</td>
<td>Occupancy sensors</td>
<td>Schneider/ Legrand/ Phiips/ Havells</td>
</tr>
<tr>
<td>30.</td>
<td>GI pipes / MS pipe</td>
<td>Jindal / GST / Tata / Zenith</td>
</tr>
<tr>
<td>31.</td>
<td>CONTACTORS( POWER/ AUX)</td>
<td>SCHNEIDER/L&amp;T/ ABB/SIEMENS</td>
</tr>
<tr>
<td>32.</td>
<td>Protection Relays</td>
<td>L&amp;T/Areva/ABB/Siemens</td>
</tr>
<tr>
<td>33.</td>
<td>Fuse Disconnector Switch/ SFU/Fuse</td>
<td>L&amp;T/Siemens/ABB</td>
</tr>
<tr>
<td>34.</td>
<td>Measuring Instruments (VOLT METER, AMMETER, FREQUENCY METER, PF, LOAD MANAGER,KWH, ETC)</td>
<td>Conzerv/ CMS/ El measure/IME/ L&amp;T/ Nippen/ Schneider Electric/Enercon / AE / IMP/BHEL / SIMCO / India Meter/HPL</td>
</tr>
<tr>
<td>35.</td>
<td>UPS</td>
<td>Schneider/ Numeric/ APC</td>
</tr>
<tr>
<td>36.</td>
<td>BATTERY</td>
<td>EXIDE/ PANASONIC / AMARON QUANTA</td>
</tr>
<tr>
<td>37.</td>
<td>ACB</td>
<td>Siemens/ L&amp;T/Schneider</td>
</tr>
<tr>
<td>38.</td>
<td>Rising Mains</td>
<td>Tricoline / L&amp;T / Zeta / C &amp; S/Legrand India</td>
</tr>
<tr>
<td>39.</td>
<td>Pipes</td>
<td>Jindal Hissar / Tata / BST</td>
</tr>
<tr>
<td>40.</td>
<td>HOOKER</td>
<td>VPRO or equivalent</td>
</tr>
<tr>
<td>41.</td>
<td>GSS sheet</td>
<td>Jindal / Sail / Tata / Equivalent</td>
</tr>
<tr>
<td>42.</td>
<td>Grilles/ Fire dampers/ Diffusers/ VCD</td>
<td>Caryaire/Premier/ Dynacraft / Ravistar/ Equivalent</td>
</tr>
<tr>
<td>43.</td>
<td>Expanded Polystyrene</td>
<td>Thermollloyd/ Beardsell/ Astha polymer/ Equivalent</td>
</tr>
<tr>
<td>44.</td>
<td>GI sheet</td>
<td>Jindal / Sail / Tata / Equivalent</td>
</tr>
<tr>
<td>45.</td>
<td>Valves</td>
<td>Advance/C&amp;R/ Audco/ Leader/ Equivalent</td>
</tr>
<tr>
<td>46.</td>
<td>Strainer</td>
<td>Sant/ DS engineering/ Equivalent</td>
</tr>
<tr>
<td>47.</td>
<td>3/2Way mixing valves</td>
<td>3/2Way mixing valves</td>
</tr>
<tr>
<td>48.</td>
<td>EPABX SYSTEM - PC BASED OPERATOR CONSOLE</td>
<td>SIEMENS / MATRIX / PANASONIC / NEC UNIVERGE</td>
</tr>
<tr>
<td>49.</td>
<td>ANALOG PHONE</td>
<td>SIEMENS/ PANASONIC/ NORTEL / BEETEL</td>
</tr>
<tr>
<td>50.</td>
<td>MDF/IDF, TAG BLOCKS</td>
<td>KRONE or equivalent</td>
</tr>
</tbody>
</table>

Note: All Items Materials Used on site shall be ISI Mark only.

Important: Please Tick (/) the make of materials considered in the Tender. Any other material not specified above should be used after approval of the same by the consultant/SBIIMS.

**NOTE:**

The contractor shall use only above mentioned material or equivalent make to be approved by the Consultant. All other materials shall confirm to the specifications laid down. The tenderer shall take this into account while tendering rates / prices. The Consultant / SBIIMS has got every right to select any of the above Makes for the Project. However, the samples of every material including all fixing accessories shall be got approved by SBIIMS / Consultant before Execution.

**ALL MAKE SHALL BE CONFIRMING TO BIS ONLY.**
<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNITS</th>
<th>UNIT RATE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HT Works</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>11KV, 630A, 3 phase, 25KA, 3 way RMU 2 inputs (LBS) and one output (VCB)- Two inputs should be interlocked</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply, installation, testing and commissioning of 11KV, 3 way outdoor RMU with incomings of LBS-2 no and it should be interlocked and 1 VCB out going, shall be totally enclosed, should be fabricated out of 2MM thick CRCA sheet steel for loading bearing members 3 mm thick with 7 tank treatment, floor mounting, free standing, dust and vermin proof outdoor type (IP54), aluminium bus bar arrangement for outgoing complete confirming to IEC-60298 &amp; IS3427, plant shale should be Dark Grey code 632 of IS-5:</td>
<td></td>
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</tr>
</tbody>
</table>

Input 1 & Input 2 : 2 nos. LBS
11 kV, 630A, 25kA Air insulated Load break switch outdoor with earth switch-2no,
230V AC shunt trip coil with manual operated spring charging mechanism with 2 NO + 2 NC contacts-2no
3 nos. HT HRC fuses (fuse ratings 40A or as per the kVA of the transformer),-2sets
R Y B Phase indication lamps LED based with MCB protection-2sets,
Trip circuit with push button, ON/OFF/EARTH position indications- 2 sets
Space heater with ON/OFF switch with thermostat- 2 sets. Incoming cable box for bottom entry for both the LBS and with all other standard accessories & required control wiring to make the installation complete

Out going: 11 KV, 630A VCB

11 kV, 630A, 3 Phase 50HZ, 250MVA rupturing capacity horizontal draw out/horizontal isolation outdoor VCB fitted with motor operated spring charging mechanism, with 230V AC motor, shunt trip coil of 24V DC, closing coil of 24V DC, Aux. Contact 4NO+4NC, Mechanical ON/OFF indicator and push button, mechanical operation counter, power pack

1 set of 11kV/110V, 150VA Potential Transformers with protection MCB
1 Set of Phase protection MCB indicating lamps with 1 set of indicating lamps to indicate OPEN, CLOSE, TRIP, SPRING CHARGED, TRIP CIRCUIT HEALTHY.

1 set of 100/5-5A Current Transformer for metering and protection 15 VA burden with class 0.5-1.0 accuracy

Digital Voltmeter with inbuilt selector switch

Digital Ammeter with inbuilt selector switch

Load Manager with RS-485 communication port

**1 Set of IDMT Relay with**

1 no. Digital Tri vector meter containing HT voltage, ampere, frequency, Power factor, KW, KVA, KVAR, KVARH, Avgpf, avg voltage, avg frequency, run hours, no. of interruptions, % total harmonics distortion of all 3 phases voltages & current, KVA, instant & maximum demand with day, date & time of maximum demand occurrence, High- low profile records with 4 peaks & 4 lows for V,A,F & PF and all power parameters with day, date & time of occurrence.

Shall be capable to communicate all parameters using SCADA s/w with MODBUS RTU/equivalent protocol using inbuilt RS485 port up to the required destination.

Trip circuit supervision relay, Auxiliary relays with shunt trip coil as per requirement. T-N-C Switch (Breaker Control Switch) - 1 no Trip Circuit Healthy Push Button - 1 no with suitable control wiring

Protection:
Numerical type 3O/C+1E/F Relay having Inbuilt features as follows :-
1) O/C+E/F Relay, 2) Master Trip Relay (Self powered), 3) Anti pumping relay

8 stage annunciator window shall be provided with VCB for all relays

Mechanical operation counter

Electrical release coil of 24V.

**Shunt trip coil of 24V.**

**BUSBARS :**
11kV, 250 MVA, 630 Amps Three Phase busbars of aluminium with Rear cable termination i.e. Provision for terminating 1 X 3C X 240 sq mm XLPE Cable

Space heater with ON/OFF switch cubicle illumination lamp, and MCBs for AC/DC Control & Hooter - 1 set

1 no. H.T Danger Plate

1 no. Battery Charger 24 V DC with battery suitable for VCB operation (Power pack)

All wiring necessary for the above including interconnection to trip coil. The wire should be FRLS type in all panels. The scope of work of includes supply of any additional items if required for smooth function of the RMU

Getting line clearance/ approvals from TSSPDCL is in the scope of successful bidder only and the bidder have to get all required approvals with his cost

2

Supply, installation, testing and commissioing of 11KV, 630A, 25KA LBS shall be totally enclosed, should be fabricated out of 2mm thick CRCA sheet steel, floor mounting, free standing, dust and vermin proof outdoor type (IP54) with 7 tank treatment, aluminium bus bar arrangement for outgoing complete confirming to IEC-60298 & IS3427, plant shale should be Dark Grey code 632 of IS:5:

LBS: 11KV, 630A, 25KA
(a) 11KV, 630A, 25KA Air insulated Load break switch outdoor with earth switch,
(b) 230V AC shunt trip coil with manual operated spring charging mechanism with 2no+ 2NC contacts,
(c) 3 no of HT HRC fuses (fuse ratings 40A or as per the KVA of the transformer),
(d) R Y B phase indication lamps LED based with MCB protection, Trip circuit with push button, ON/OFF/ Earth position indications,
(e) Space heater with On/ off switch with thermostat.
(f) Incoming and outgoing cable box for bottom entry and with all other standard accessories & required control wiring to make the installation and inter locking complete

3

Supply, laying, testing and commissioning only of the following size 11 kV grade (E) XLPE insulated armoured aluminium conductor under ground cable to be laid, in already laid RCC Hume pipe or built up cable trench from 3 way RMU to CTPT to LBS, complete with all necessary supports, accessories as per the drawings as required. The cable shall conform to IS 7098/Part II.

Signature of the contractor with seal
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Rate (rmt)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>a 11 kV, 3 core x 95 sq.mm HT XLPE cable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply, installation, testing &amp; commissioning only of end terminations for</td>
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<tr>
<td></td>
<td>the cables specified above with suitable indoor Raychem Heat Shrinkable</td>
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<tr>
<td></td>
<td>Termination kit, Bi-metallic lugs using crimping tool, insulation tape,</td>
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<td></td>
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<tr>
<td></td>
<td>identification tags, consumables and complete with all necessary supports,</td>
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<td></td>
<td>accessories as per the drawings as required etc. including earthing of</td>
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<tr>
<td></td>
<td>Gland.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>a</td>
<td>11 kV, 3 core x 95 sq.mm HT XLPE cable no 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>CHEMICAL EARTHING</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Supply, Installation, Testing and Commissioning on Maintenance free Chemical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Earth Electrodes complying with the latest version of IS 3043 / IEC / IEEE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specifications. The Earth Electrode shall be with 3 M long, 17 mm. dia high</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>tensile strength, copper bonded Steel Rods coated with minimum 250 micron</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>pure electrolytic Copper. Soil enrichment compound in quantities not less</td>
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<tr>
<td></td>
<td>than 10 Kgs shall be used and the Earth Pit shall be back-filled with good</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>quality soil without any Stones / Granules / Sand etc. The Earth Station</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>shall be provided with suitable requisite Copper / GI terminals, 450 x 450</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm bric</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Body of the RMU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>50 x 6 mm G.I flat to earth the Body of the DG sets.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Removing of existing RMU including terminations and buyback of the existing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 way and 2 way oil HT breakers</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LS</td>
<td></td>
<td></td>
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</tbody>
</table>

|      | Total                                                                       |          |            |        |
|      | Discounts if any                                                           |          |            |        |
|      | Grand Total                                                                 |          |            |        |

Note:

(1) Applicable GST on quoted amount will be paid extra.
(2) Getting line clearance/ approvals from TSSPDCL is in the scope of successful bidder only and the bidder have to get all required approvals with his cost