TENDER DOCUMENT

FOR

High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida.

TENDER NO. : IWAI/PR/Bldg./42/2011 (Vol. - III)

INLAND WATERWAYS AUTHORITY OF INDIA
(MINISTRY OF SHIPPING, GOVT. OF INDIA)
A - 13, SECTOR - 1
NOIDA - 201301 (U.P.)

Phone : 0120-2521664, 2521704, Fax : 0120-2521664, 2543973,
Website : www.iwai.nic.in ; E-mail : iwainoi@nic.in

INLAND WATERWAYS AUTHORITY OF INDIA
(Ministry of Shipping, Government of India)
A-13, SECTOR-1
NOIDA – 201 301 (U.P)

Phone : 0120-2521664, 2521704, Fax : 0120-2544041, 2543973,
Website: www.iwai.nic.in ; E mail : iwainoi@hub.nic.in

Tender No : IWAI/PR/Bldg./42/2011 (Vol. - III)

Issued to : M/s. Date :

Sub: High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida.

Ref : Your letter no. Dated :

Sir,

With reference to your letter cited on the above mentioned subject, please find enclosed herewith one set of tender document for the subject work. You are requested to go through the terms and conditions carefully and also visit / inspect the site to familiarize and submit your tender as per procedure explained in the tender document.

The last date for receipt of tender is 26.12.2012 upto 3:00 PM at IWAI, Noida and tender (Part-1 only) will be opened on 26.12.2012 at 3:30 PM at IWAI, Noida.

Issuance of tender document will not construe that such bidders are automatically considered qualified.

Dy. Director
IWAI, Noida

High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida.

PART – I

TECHNICAL BID

INDEX

INLAND WATERWAYS AUTHORITY OF INDIA
(Ministry of Shipping, Govt. of India)
A-13, SECTOR-1
NOIDA – 201301 (U.P)

NOTICE INVITING TENDER

Tender no. IWAI/PR/Bldg./42/2011 (Vol. - III)

IWAI invites sealed tenders in two cover system from the eligible electrical contractor for following work:

Name of work	Estimated cost (Rs.)	EMD (Rs.)	Time for completion	Last Date of sale of Tender Document	Last date and time of receipt & opening of tender.
High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida. (SH.: Supply & installation of substation including HT Panel, HT Cable, LT Panels, LT Cables and Earthing etc.)	99.81 lakhs	2.00 lakhs	3 Months	24.12.2012	26.12.2012 3:00 PM 26.12.2012 3:30 PM

ELIGIBILITY CRITERIA:-

(i) The firm shall have valid electrical license and registration in appropriate class with CPWD, MES, Railways or any Central / State Govt. Organization.

(ii) Satisfactory completion of at least three similar works each of value not less than Rs. 40.00 lakhs or two similar works each of value not less than Rs. 50.00 lakhs or one work of value not less than Rs. 80.00 lakhs in last 7 years (year ending March, 2012).

(iii) Similar work shall mean works of Supply & installation of substation including HT Panel, HT Cable, LT Panels, LT Cables and Earthing etc.

(iv) The firm should have average annual financial turnover of Rs. 35.00 lakhs of Supply & installation of substation including HT Panel, HT Cable, LT Panels, LT Cables and Earthing etc.

(v) The firm should not have incurred loss for more than 2 years during preceding five years ending 31st March, 2012.

(vi) The firm shall be working in the field of Supply & installation of substation including HT Panel, HT Cable, LT Panels, LT Cables and Earthing etc. works for the past 3 years consistently.

(vii) The firm should have valid registration for service tax VAT and should have Permanent Account Number (PAN).

Parties fulfilling the above indicative eligibility criteria can purchase tender document from office of the Dy. Director IWAI, A - 13, Sector - 1, Noida - 201301 by paying Rs. 500/- (Rupees five hundred only) in the form of non-refundable demand draft in favour of 'IWAI Fund' payable at Noida/New Delhi at any nationalized/scheduled bank on any working day from Monday to Friday during office hours between 9:30 to 18:00 hours up to the last date of issue of tender as indicated above. The tender document can also be downloaded from the IWAI's website "www.iwai.nic.in". Site can be inspected on all the working days during office hours. IWAI reserves the right to reject any or all the tender without assigning any reason thereof.

Sd/-
Dy. Director

INLAND WATERWAYS AUTHORITY OF INDIA
(Ministry of Shipping, Govt. of India)
A-13, SECTOR-1 NOIDA – 201301 (U.P)

No. IWAI/PR/Bldg./42/2011

NOTICE INVITING TENDER

IWAI invites sealed tenders in two cover system from the electrical contractor having valid electrical license and registration in appropriate Class with CPWD, MES, Railways or any Central / State Govt. Organization for the following work:-

Name of work	Estimated cost (Rs.)	EMD (Rs.)	Time for completion	Last Date of sale of Tender Document	Last date and time of receipt & opening of tender.
High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida. (SH.: Supply and installation of substation including HT Panel, HT Cable, LT Panels, LT Cables and Earthing etc.)	99.81 lakhs	2.00 lakhs	3 Months	24.12.2012	26.12.2012 3:00 PM 26.12.2012 3:30 PM

Detailed NIT eligibility criteria and tender document alongwith Instruction to the Bidders can be seen at IWAI's website i.e. www.iwai.nic.in

Dy. Director

FORM OF TENDER

To,

The Dy. Director,
Inland Waterways Authority of India,
A-13, Sector-1,
Noida – 201301 (U.P.)

Name of Work: High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida.

Sir,

1. Having visited the site and examined the General, Special and other Conditions of contracts, General specifications and Detailed specifications, Schedules and Bill of Quantities alongwith all appendix and annexure for the above work, I/We offer to execute the above said work in conformity with the said Conditions of Contract, Specifications, Schedule of quantities for the sum as stated in Bill of quantities of this tender Document or such other sum as may be ascertained in accordance with the said conditions of contract.

2. I/We undertake to complete and deliver the whole of the work comprised in the tender within the time as stated in the tender and also in accordance with the specifications, conditions and instructions as mentioned in the tender documents.

3. I/We have independently considered the amount of Liquidated Damages shown in the tender hereto and agree that it represents a fair estimate of the loss likely to be suffered by IWAI in the event of works not being completed in time.

4. I/We agree to abide by this tender. I/We agree to keep the tender open for a period of 90 days from the date of opening of price bids or extension thereto as required by the IWAI and not to make any modifications in its terms and conditions.

5. A sum or Rs……(Rupees ……..……) is hereby forwarded in the form of Demand Draft no…… dated …….. issued by …….. (name & branch of bank) payable at ……. as earnest Money. I/We agree, if I/We fail to keep the validity of the tender open as aforesaid or I/we make the modifications in the terms and conditions of my/our tender or I/we fail to commence the execution of the works as above than I/We shall become liable for forfeiture of my/our Earnest money, as aforesaid and IWAI shall without any prejudice to another right or remedy, be at the liberty to forfeit the said Earnest Money absolutely otherwise the said earnest money shall be retained by IWAI towards part of security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be ordered. Should this tender be accepted, I/We agree to abide by and fulfill all the terms and conditions and provisions of this tender. No interest is payable on earnest money deposit and/or security deposit.

6. If this tender is accepted, I/We undertake to enter into, at my/our cost when called upon by the employer to do so, a contract agreement in the prescribed form. Unless and until a formal agreement is prepared and extended this tender together with your acceptance thereto shall constitute a binding contract.

7. I/We agree that if my/our tender is accepted, I/We am/are to be jointly and severely responsible for the due performance of the contract.

8. I/We understand that you are not bound to accept the lowest or any tender you may receive and may reject all or any tender without assigning any reason.

9. I/We are enclosing herewith "Time Activity Schedule" so as to complete the work within stipulated time.

10. I/We confirm that all statements documents, information submitted/given with this tender or in support of tender is/are true, genuine, authentic, legitimate and valid. I agree that at any time before award of work or after award to selected/successful bidder in case any of these statement document, information is/are found incorrect, false, willful misrepresentation or omission of facts or submission of false/forged documents, the EMD/Security deposit submitted by me/us shall be forfeited by IWAI.

11. I/We certify that the tender submitted by me/us is strictly in accordance with the terms, conditions, specifications etc. as contained in the tender document, and it is further certified that it does not contain any deviation to the aforesaid documents.

Date …….

Signature ……..

Name …….....

Designation ……..

duly authorized to sign & submit tender for an on behalf of

(Name and address of firm)

M/s ……..

……..

…….....

Telephone Nos. ……..

FAX No. ……

Witness:

Signature: ……

Name : …….....

Occupation: …….

Address: ……

……

Telephone nos.: …….

INSTRUCTION FOR SUBMISSION OF BID

1. All covering letters and information to be included in the bid shall be submitted along with the bid itself.

2. Tender should be submitted in two covers viz. separate sealed Envelope-1 (containing technical bid) and Envelope-2 (containing price bid) and both of these covers should be placed in an envelope duly super scribing clearly the name of the work "**BID FOR HIGH SIDE ELECTRICAL WORK FOR VERTICAL EXPANSION (2nd TO 6th FLOORS) OF IWAI OFFICE CUM R & D COMPLEX AT A -13, SECTOR-1, NOIDA."** and "**TO BE OPENED BY THE ADDRESSEE ONLY**" written prominently. The full name, postal address and Telex/telegraphic address of the Bidder shall be written on the bottom left hand corner of the sealed envelope. Further envelope containing each part shall be superscripted as under:

3. The first cover/envelope containing Part-1 shall be submitted along with the following documents and the cover should be super scribed with "**ENVELOPE-1 : TECHNICAL BID** FOR HIGH SIDE ELECTRICAL WORK FOR VERTICAL EXPANSION (2nd TO 6th FLOORS) OF IWAI OFFICE CUM R & D COMPLEX AT A -13, SECTOR-1, NOIDA.

   a) Original bid document duly filled in and completed in all respects except prices, signed with rubber seal on each page as a proof of acceptance.
   b) Earnest Money Deposit (Demand Draft)
   c) Memorandum of Association & Article of Association/Partnership deeds, as applicable.
   d) Copy of document in proof of registration as an electrical contractor in appropriate Class with CPWD, MES, Railways or any Central / State Govt. Organization. Description of the bidders works experience of similar nature during last seven years along with documentary proof (ending March, 2012).
   e) Copy of document in proof of electrical license.
   f) Balance Sheet and the Profit & Loss Account together with Tax Audit Report duly certified by a firm of Chartered Accountant for the last 3 financial years.
   g) Bidder shall furnish list of the supervisory persons and other technical persons he wish to deploy in this job along with their experience details.
   h) Letter of Authority for signing and negotiation of bid.
   i) Document in the respect of PAN, service tax, VAT number/registration.
   j) Solvency certificate from any nationalized /scheduled bank.
   k) Receipted copy of the return of Income filed with Income Tax Authority for last 3 years.
   l) Receipted copy of Return of Employees Provident Fund (EPF) for last three years.
   m) Any additional relevant information to be furnished by the bidder.

   The Second cover containing Part-2 shall be submitted along with the following documents and the cover should be super scribed with "**ENVELOPE-2 : PRICE BID** FOR HIGH SIDE ELECTRICAL WORK FOR VERTICAL EXPANSION (2nd TO 6th FLOORS) OF IWAI OFFICE CUM R & D COMPLEX AT A -13, SECTOR-1, NOIDA.

   a) Schedule of prices duly filled in.

It may please be noted that:-

(a) The price bid part shall not contain any terms and conditions whatsoever. These, if any, must be brought out in Part- I only. Any condition given in the price bid will not be taken into account and it will be sufficient cause for rejection of bid.

(b) Price bids of only those bidders whose technical and commercial proposals are complete and found acceptable, shall be opened in the presence of bidders or their authorized representatives who may like to be present, on a suitable date to be intimated to such tenderers separately.

4. Bidders are advised to submit their offers strictly based upon the detail terms and conditions contained in "INSTRUCTION TO BIDDERS" being a part of this tender document and not to stipulate any deviations. Should it, however, become unavoidable, deviations should be stipulated in part – I of the tender. IWAI reserves the right to evaluate bids containing such deviations and accept or reject any part or whole of the same without showing any reason whatsoever.

5. IWAI reserves the right to reject any or all bids without assigning any reasons.

6. Bids received late at IWAI's office after the stipulated last date and time for receipt of bids due to any reason whatsoever, will not be considered. Bids shall be adjudged as non-responsive due to any of the following reasons:

   (a) Bids submitted after the due date and time.
   (b) Bids submitted without Earnest money,
   (c) Bids submitted without certificate(s) in respect of the financial and technical qualification criteria.
   (d) Bids submitted without documents to establish the eligibility criteria.
   (e) Bids submitted without photocopies of the receipted copies of VAT, IT and PF Returns from the respective Competent Authority.
   (f) Qualified Price Bid.
   (g) Any other reason as applicable.

7. The bid can only be submitted in the name of the bidder in whose name the bid documents are issued by IWAI.

8. Any annotation or accompanying documentation in the bid shall be in Hindi or English language only and in metric system. Bid filled in any other language will be summarily rejected.

9. The firms interested in the work must have a good track record and must not have been black-listed by any Government Organization/ PSUs / Statutory Body / Major Ports in course of last 5 years. Bids of such black listed firms will not be considered by the Authority. The intending tenderers must have positive net worth as on 31.03.2012. This fact should be certified by a Chartered Accountant. The tenderer must also submit banker's certificate along with the offer regarding the financial credibility/solvency of the firm.

10. Bidder shall sign their proposal with the exact name of the firm to whom the bid document has been issued. The bid shall be duly signed and sealed by an authorized person of the bidders' organization as following:

(a) If the Tender is submitted by an individual, it shall be signed by the proprietor above his full name and full name of his firm with its current business address.

(b) If the Tender is submitted by the proprietary firm, it shall be signed by the proprietor above his full name and full name of his firm with its name and current business address.

(c) If the Tender is submitted by a firm in partnership, it shall be signed by all the partners of the firm above, their full names and current business address, or by a partner holding the power of attorney for the firm for signing the Tender in which cases a certified copy of the power of attorney shall accompany the Tender. A certified copy of the partnership deed and current business address of all the partners of the firm shall also accompany the Tender.

(d) If the Tender is submitted by a limited company, or a limited Corporation, it shall be signed by a duly authorized person holding the power of attorney for signing the tender in which case a certified copy of the power of attorney shall accompany the Tender. Such limited company or corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded. 'Satisfactory evidence' means the certificate of incorporation of the limited company or corporation under Indian Companies Act, 1956.

(e) Two or more firms interested in work may also submit joint bid. In such case, all the firms have to submit a memorandum of understanding alongwith the joint bid. In that case, the lead partner will sign all tender documents. The sponsoring firm/lead partner shall submit complete information pertaining to each firm in the group and state along with the bid as to which of the firm shall have the responsibility for tendering and for completion of the contract document and furnish evidence admissible in law in respect of the authority assigned to such firm on behalf of the group of firms for tendering and for completion of the contract document. The full information and satisfactory evidence pertaining to the participation of each member of the group of firm in the firm in the Tender shall be furnished alongwith the Tender.

11. Bidders shall clearly indicate their legal constitution and the person signing the bid shall state his capacity and also the source of his ability to bind the bidder. The power of attorney or authorization or any other document constituting adequate proof of the ability of the signatory to bind the bidder shall be annexed to the bid. The owner may reject outright any bid unsupported by inadequate proof of the signatory's authority.

12. The bid document shall be completed in all respects and shall be submitted together with the requisite information and appendices. They shall be completed and free from ambiguity, change or inter-lineation.

13. If the space in the bid form or in the Appendices thereto is insufficient, additional pages shall be separately added. These pages shall be page numbered & signed by the Bidder.

14. Bidder shall set their quotation in firm figures and without qualification. Each figure stated should also be repeated in words and in the event of any discrepancy between the amounts stated in figures and words, the amount quoted in words shall be deemed the correct amount. Bid containing qualifying expressions such as "subject to minimum acceptance" of "subject to availability of material / equipment" etc. is liable to be rejected.

15. IWAI shall have a unqualified option under the said bid bond to forfeit the EMD in the event of Bidder failing to keep the bid valid upto the date specified or refusing to accept work or carry it out in accordance with the bid if the IWAI decides to award the work to the Bidder.

16. The EMD shall be retained with the IWAI until finalization of tenders. If any statements documents/information submitted by tenderer is found false/incorrect, willful misrepresented or omission of facts or fake/forged documents, the EMD shall be forfeited.

17. IWAI shall, however, release the EMD in respect of unsuccessful bidders within 30 (thirty) days of placement of order to successful bidder. EMD of successful bidder will be converted into security refundable deposit. In case of any breach of contract, EMD will be forfeited.

18. The EMD shall be retained with the IWAI until finalization of tenders. Further, security deposit as per the clause of Security shall be payable by the successful bidder. If the tenderer fails to furnish the security deposit or performance guarantee in accordance with tender conditions, EMD shall be forfeited. In the event of the Bidder becoming the successful Contractor. The amount of EMD would be adjusted against the Security deposit.

19. IWAI shall, however, arrange to release the EMD in respect of unsuccessful bidders within 30 (thirty) days of placement of order to successful bidder. No interest shall be payable on EMD by IWAI.

***

DEFINITIONS

1. The contract means the documents forming the tender and acceptance thereof and the format agreement executed between the Competent Authority on behalf of the Chairman, Inland Waterways Authority of India and the contractor, together within the documents referred to therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Engineer-in-charge and all these documents taken together shall be deemed to form one contract and shall be complementary to one another.

2. In the contract, the following expressions shall, unless the context otherwise requires, have the meetings, hereby respectively assigned to them;

   (i) The expression work or work shall unless there be something either in the subject or context repugnant to such constructions be construed and taken to mean the works by or by virtue of the contract to be executed whether temporary or permanent, and whether original offered substituted or additional.

   (ii) The 'Contractor' shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.

   (iii) The 'Employer' means the Chairman, Inland Waterways Authority of India and his successors.

   (iv) The 'Engineer/ Engineer-in-charge' means the Engineer officer who shall supervise and be in charge of the work and who shall sign the contract on behalf of the Employer.

   (v) 'Engineer-in-charge representative' shall mean any officer of the Authority nominated by the Engineer to work on his behalf for supervision, checking, taking measurement, checking bills ensuring quality control, inspecting works, issue instructions and other related works for completion of the project.

   (vi) 'IWAI/Authority/Department/Owner' shall mean the Inland Waterways Authority of India, which invites tenders on behalf of the Chairman, IWAI.

   (vii) The 'Site' shall mean premises no. A-13, Sector – 1, Noida of owner on which the works are to be executed under this contract.

   (viii) The term 'Day' shall mean a calendar day beginning and ending at midnight.

   (ix) The term 'Week' shall mean seven consecutive calendar days.

   (x) The term 'Month' shall mean the English calendar month.

(xi) Excepted Risk are risks due to riots (other than those on account of contractors employees) war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection, military or usurped power, any act of Govt. damages, acts of God, such as earthquake, lightening and unprecedented flood, and other causes over with the contractor has no control and accepted as such by the Accepting Authority or causes solely due to use or occupation by Govt. of the part the works in respect of which a certificate of completion has been issued or a cause solely due to Govt., faulty design of works.

(xii) Market rate shall be as decided by the Engineer-in-charge on the basis of the cost of materials and labour at the site where the work is to be executed plus and percentage mentioned in tender to cover all overheads and profits.

(xiii) Schedules referred to in these conditions shall mean the relevant schedules annexed to the tender papers or the standard schedule of rates of the Govt. mentioned with the amendments thereto issued up to the date of receipt of the tender.

(xiv) District specifications mean specifications followed by the State Government in the area where the work is to be executed.

(xv) Tendered value means the value of the entire work as stipulated in the letter of award.

Interpretation Clause

- The 'Chairman' means the Chairman of Inland Waterways Authority of India.
- Word Importing the singular number only includes the plural number and vice versa.

Integrity Pact

To,

M/s ……..
…….
……....
…..……..
……..……..
…….

Sub:- NIT No. IWAI/PR/Bldg./42/2011 (Vol.-III) for the work of High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A -13, Sector-1, Noida.

Dear Sir,

It is hereby declare that IWAI is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the IWAI.

Yours faithfully

Dy. Director

To,

The Dy. Director,
Inland Waterways Authority of India,
A-13, Sector-1,
Noida – 201301 (U.P.)

Sub: Submission of Tender for the Work for High side electrical work for vertical expansion (2^{nd} to 6^{th} floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida.

Dear Sir,

I/We acknowledge that IWAI is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process.

I/We acknowledge that the making of the bid shall be regarded as an unconditional and absolute acceptance of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by IWAI. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/bid, IWAI shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid is accordance with terms and conditions of the tender/bid.

Yours faithfully

(Duly authorized signatory of the Bidder(s)

To be signed by the bidders' and same signatory competent/authorised to sign the relevant contract on behalf of IWAI.

INTEGRITY AGREEMENT

This Integrity Agreement is made at ..... on this ..... Day of..... 20.....

BETWEEN

Chairman, Inland Waterways Authority of India represented through Chief Engineer, Inland Waterways Authority of India, A - 13, Sec. – 1, Noida.

IWAI, (Hereinafter referred as the 'Principal/ Owner', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

.....
(Name and Address of the Individual/Firm/Company)
through .....(Hereinafter referred to as the
(Details of duly authorized signatory)
"Bidder/Contractor" and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

Preamble

WHEREAS the Principal / Owner has floated the Tender [NIT No. IWAI/PR/Bldg./42/2011 (Vol. – III)] (hereinafter referred to as "Tender/Bid") and intends to award, under laid down organizational procedure, contract for "High side electrical work for vertical expansion (2^{nd} to 6^{th} floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida".

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as "Integrity Pact" or "Pact"), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

Article 1: Commitment of the Principal/Owner

1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:

(a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

(b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.

(c) The Principal/Owner shall endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.

2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article 2: Commitment of the Bidder(s)/Contractor(s)

1. It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the IWAI all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.

2. The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:

   a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the tender process or execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the contract.

   b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.

   c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contract(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participate in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.

e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

3. The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

4. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.

5. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/ her reputation or property to influence their participation in the tendering process).

Article 3: Consequences of Breach

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the bidder/contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right:

1. If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days' notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.

2. Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Principal/Owner has disqualified the Bidder(s) from the tender process prior to the award of the contract or terminated/determined the contract or has accrued the right to terminate/determine the contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.

3. Criminal Liability: If the Principal/Owner obtains knowledge of conduct of a bidder or Contractor, or of an employee or a representative or an associate of a bidder or Contractor which constitutes corruption within the meaning of IPC Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.

2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/ Owner.

3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors

1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Subcontractors/ sub-vendors.

2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.

3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article 6- Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 12 months after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, IWAI.

Article 7- Other Provisions

1) This Pact is subject to Indian Law, place of performance and jurisdiction is the Headquarters of the Division of the Principal/Owner, who has floated the Tender.
2) Changes and supplements need to be made in writing. Side agreements have not been made.

3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.

4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intensions.

5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with this Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.

Article 8- LEGAL AND PRIOR RIGHTS

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....
(For and on behalf of Principal/Owner)

.....
(For and on behalf of Bidder/Contractor)

WITNESSES:

1. .....
(Signature, name and address)

2. .....
(Signature, name and address)

Place:
Date:

GENERAL CONDITIONS

1. All supplies proposed to be obtained on contract are as notified in Notice Inviting Tender published in newspapers.

   This form will state the supplies to be made as well as the date for submitting and opening tenders and the time allowed for carrying out the work, also the amount of the earnest money to be deposited with the tender and the amount of the security deposit to be deposited by the successful tender and the percentages, to be deducted from bills, copies of the specifications and any other documents required in connection with the work, signed for the purpose of identification by the Engineer-in-charge. These documents shall also be open for inspection by the contractor at the office of the Inland Waterways Authority of India during office hours.

2. In the event of the tender being submitted by a firm, it must be signed separately be each member thereof, in the event of the absence of any partner, it must be signed on his behalf by a person holding a valid power of attorney authorizing him to do so, such power of attorney shall be produced with the tender and it must disclose that the firm is duly registered under the Indian Partnership Act. .

3. Receipts for payment made to a firm must also be signed by the several partners except where the contactors are described in their tender is a firm, in which case the receipt must be signed in the name of firm by one of the partners, or by some other person having authority to give effectual receipts for the firm.

4. Any person who submits a tender shall fill up the supplied form stating at what rate he is willing to undertake each item of the work. Tenderers who purpose alteration in the work specified in the said form of invitation to tender or in the time allowed for carrying out the work or which contain any other conditions of any sort will be liable for rejection. No single tender shall include more than one work, but contractors wish to tender for two or more works shall submit a separate tender for each. Tenders shall have the name and number of the work to which they refer written outside the envelope.

5. The Engineer-in-charge or his duly authorized representative will open tenders in the presence of any intending bidders who may be present at the time, and will enter the amounts of the several tenders in a Comparative Statement in a suitable form. In the event of a tender being accepted a receipt for the earnest money forwarded therewith shall thereupon be given to the contractor who shall thereupon for the purpose of identification sign, copies of the specification and other documents mentioned in rule 1. In the event of a tender being rejected the earnest money forwarded with such unaccepted tender shall thereupon be returned to the respective bidder.

6. The officer inviting tenders shall have the right of rejecting any or all of the tenders without assigning any reason and will not be bound to accept the lowest tender.

7. The receipt of the Finance Department for any money paid by the contractor will be considered as payment to the Engineer-in-charge and the contractor shall be responsible for seeing that he produces a receipt signed by the Engineer-in-charge or the authorized signatory of Finance Department of Inland Waterways Authority of India (IWAI), Noida.

8. The person/persons, whose tender(s) may be accepted (herein after called the contractor) shall permit IWAI/Govt. at the time of making any payment to him for work done under the contract to deduct such sum as long with the sum already deposited as earnest money will amount to 5% of the total cost of the work. Such deduction to be held by Govt. by way of security deposit provided always that the Govt. for this purpose should be entitled to recover the amount from each running bill unit the balance of the amount of security deposit is realized. All compensation or other sums of money payable by the contractor under the terms of this contract may be deducted from or paid by the sale of a sufficient part of his security deposit. In case security deposit is reduced by reasons of any deductions or sale as aforesaid the contractor shall within 10 days make good in cash or demand draft in favour of the Inland Waterways Authority of India. The security deposit shall be collected from the running bills of that contractor at the rates mentioned above and the earnest money if deposited at the time of tender will be treated as part of security deposit. No interest shall be payable on security deposit or Earnest Money Deposit.

9. The Security Deposit of Contractor shall not be refunded before the expiry of guarantee period stipulated in the contract.

CLAUSES:

1. The contractor is to complete his work under this contract on or-before the date mentioned in the tender failing which he shall be subject to pay or allow deduction of one percent on the total amount of the contract for every of delay subject to a total deduction of 10% of the tender value/agreement amount or the value of final bill whichever is more as liquidated damages to the IWAI.

2. In every case in which the payment or allowance mentioned in clause 1 shall have incurred for ten consecutive days, the Engineer-in-charge shall have the power to annual the contract and or have the supply completed at the contractors risk and expenses without any further notice to him and the contractor shall have no claim to compensation for any loss that may incur in any case.

3. If the contractor shall be hindered in the supply of the materials so as to necessitate an extension of the time allowed in this tender, he shall apply in writing to the Engineer-in-charge who shall grant it in writing if there are reasonable ground for it, and without such Authority in writing by the Engineer-in-charge, the contractor shall not claim exempted from the fine livable under Clause 2. For the completion of the rest of the works the contractor shall be entitled such extension of time as may be determined by the Engineer-in-charge.

4. The contractor shall inform the Engineer-in-charge of his intention of making delivery of materials and on the materials being approved the Engineer-in-charge or his authorized representative shall grant a receipt to him no material will be considered as delivered until so approved.

5. On the completion of the delivery of material the contractor shall be furnished with a certificate to that effect by the Engineer-in-charge but the delivery will not be considered complete until the contractor shall have removed all rejected materials and shall have the approved materials stocked or placed in such positions as be pointed out to him.

6. If at any time after the commencement of the supplies the Chairman, IWAI/Government shall for any reason whatsoever not require the whole or part thereof as specified in the tender to be supplied, the Engineer-in-charge shall in addition to his power to annual the contract in case of default on the part of the contractor, have power to terminate all liability of the IWAI/Govt. there under at any time after giving due notice in writing to the contractor of his desire to do so. In the event of such a notice being given:

   (a) The Engineer-in-charge shall be entitled to direct the contractor to complete the supply of the material which are ready for delivery up to the expiry of the notice and thereafter to cease their supply, all the articles or supplies received and accepted up to that date shall be paid for at the tender rate, and.

   (b) The contractor shall have no claim to any payment or compensation what-so-ever on account of any profit or advantage which he might have derived in consequence of het full execution of the contract but which he did not obtain owing to its premature termination or for any loss which he might have sustained on this account.

7. No payment should be made for a work estimated to cost rupees five thousand or less till the whole of the work shall have been completed and certificate of completion given. But in the case of work estimated to cost more than rupees five thousand and contractor shall on submitting the bill be entitled to receive a monthly payment proportionate to the part thereof then executed to the satisfaction of the Engineer-in-charge, whose certificate of the sum of payable shall be final and conclusive against the contractor.

8. Payment due to the contractor may, if so desired by him, be made to his bank instead direct to him, provided that the contractor furnishes to the Engineer-in-charge (1) an authorization in the form of a legally valid documents such as a power of attorney containing authority on the bank to receive payment and (2) his own acceptance of the correctness of the account made out as being due to him by Government or his signature on the bill or other claim preferred against Govt. before settlement by the Engineer-in-charge of the account of claim by payment to the bank while the receipt by such bank shall constitute a full and sufficient discharge for the payment, the contractor should, wherever possible present his bills duly receipted and discharge through his bankers.

9. Nothing herein contained shall separate to create in favour of the bank any rights or equite vis-à-vis the IWAI.

10. The materials shall be of the best description and in strict accordance with the specification and the contractor shall receive payment for such materials only as are approved and passed by the Engineer-in-charge.

11. In the event of the material being considered by the Engineer-in-charge to be inferior to that described in the specifications, the contractor shall on demand in writing forthwith remove the same at his own charge and cost and in the event of his neglecting to do so within such period as may be name by the Engineer-in-charge that office may have such rejected materials removed at the contractors risk and the expenses incurred being liable to deducted from any sums due or which may become due to the contractor:

    (a) Contractor/supplier hereby declares that the goods, stores, articles sold or to be sold to the IWAI/ Govt. under this contractor shall be of the best quality and workmanship and shall be strictly in accordance with the specifications and particulars contained in the tender document and the contractor/seller hereby guarantees that the said goods/stores articles shall continue to confirm to the description and quality aforesaid for a period of 12 months from the date of delivery of the said goods/stores/article to the Engineer-in-charge and that notwithstanding the fact that the Engineer-in-charge may have inspected and on approved the said good articles be discovered not be conforming to the description and quality/aforesaid or to have deteriorated (and the decision of the Engineer-in-charge will be entitled to reject the said good/stores/articles or such portion there of as may be discovered not to confirm to the said description and quality). On such rejection the goods/articles stores will be at the contractors risk and the provisions contained in the tender document shall mutates mutinies apply to the removal of the goods/stores/articles rejected under this clause. The contractor/seller shall if called upon to replace the said goods/stores/articles or such portion thereof as has been rejected by the Engineer-in-charge or otherwise the contractor/seller shall pay to the IWAI such damages as may arise by reason of the breach of the condition herein contained. Nothing herein contained shall prejudice any other right of the IWAI/Govt. in that behalf under this contract or otherwise.

12. if the contractor or his work people or servants shall break, deface injure or destroy buildings, road, fence, enclosure, water pipes, cabbies, drains, electric or telephones posts or wires, trees, grass or grass land or any other property belonging to IWAI or any other contractor working in the same premises where the materials are being supplied, he shall make good the same at his own expenses and in the event or his refusing of failing to do so the damage shall be made good as required at his expenses by the Engineer-in-charge, who shall deduct the cost from any sums due, or which may become due, to the contractor.

13. The contractor shall supply at his own expenses all tools, plant and equipment's required for the due fulfillment of this contract and the material shall remain at his risk till the date of final delivery, unless it shall have been in the meantime remove for use by the Engineer-in-charge.

14. No material shall be brought to site or delivery given on Sundays or holidays without the written permission of the Engineer-in-charge. Normally all material shall be delivered during office house and with prior information to the Engineer-in-charge.

15. This contract shall not be sublet without the written permission of the Engineer-in-charge. In the event of the contractor subletting his contract without such permission he shall be considered to have thereby committed a breach of contract, and shall forfeit his security deposit and shall have no claim for any compensation for any loss.

(a) The Engineer-in-charge shall have power to make any alteration, omissions, additions or substitutions in the original specifications, drawings, designs, and instruction that may appear to him be necessary or advisable during the course of supply of the materials and the contractor shall be bound to supply the materials in accordance with any such instruction which may be given to him in writing signed by the Engineer-in-charge and such alterations, omissions, additions or substitution shall not invalidate the contractor, and altered, additional or substituted materials which the contractor may be directed to supply in the manner above specified as part of the work shall be supplied by the contractor on the same conditions in all respect for which he agreed to do the main work, and at the same rates, as specified in the tender for the main work. The time for the completion of the supply shall be extended in the proportion that the altered, additional or substituted quantity of materials bears to het original quantities and the certificate of Engineer-in-charge shall be conclusive as to such proportion. And it the altered, additional or substituted materials include any class of materials, for which the rate is specified on this contract than such class of materials shall be supplied at the rates entered in the schedule of rates of the main contract direct on which the estimated cost shown in the tender is passed and in such class of materials are not entered in the schedule of rates of the main contract direct on which the estimated cost shown in the tender is passed and in such class of materials are not entered in the said schedule of rates than the contractor shall which seven days of the date or his receipt of the order to supply the materials inform the Engineer-in-charge of the rate which he intends to charge for such class of materials and if the Engineer-in-charge of does not agree to his rate he shall give notice in writing and be at liberty to cancel this supply, such class of materials and arrange the supply thereof in such manner as he may consider advisable provided always that if the contractor shall commence supply or incur any expenditure in regard thereof the rates shall have been determined as lastly herein before mentioned time and in such case he shall only be entitled be paid in respect of the supply made or expenditure incurred by any him prior to the date of the determination of the rate as aforesaid according to such rate or rates shall be fixed by the Engineer-in-charge. In the event of any disputes the decision of the Chairman, IWAI shall be final and building to all.

16. In respect of all labour directly or indirectly employed in the work for performance of the contractor's parts of this agreement the contractor shall at his own expense arrange for the safety provision as per CPWD safety code framed from time to time and shall at his own expense provide for all facilities in connection therewith. In case the contractor fails for making arrangement and provide necessary facilities as aforesaid he shall be liable to pay a penalty of Rs. 50/- for each default and in addition the Engineer-in-charge shall be at liberty to make arrangement and provide facilities as aforesaid and recover the cost incurred in that behalf from the contractor.

17. Except otherwise provided in the contract all questions and disputes relating to the meaning of the specification designs drawing and instructions herein mentioned as to the quality of workmanship or materials used on the work or as to any other question claim right matter or thing whatsoever in any way arising out of or relating to the contract, design drawings, specifications, estimates, instructions orders or these conditions or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the completion, abandonment thereof shall be referred to the sole arbitrator or the person appointed by the Chief Engineer, IWAI in charge of work. At the time of such appointment, it will be no objection to any such appointment that the arbitrator so appointed is a IWAI/Government servant that he had deal with the matter to which the contract relates and that in the course of his duties as Govt. servant he had expressed views on all or any of the matters in disputes or difference. The arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reasons, such C.E. or administrative head as aforesaid at the time of such transfer vacation of officer or inability to act shall appoint another person to act as arbitration in accordance with the terms of the contract that one person other than a person appointed by such Chief Engineer or administrative head of the IWAI as aforesaid should act as arbitrator and if for any reason, that is not possible, the matter is not to be referred to arbitration at all.

18. Subject to as aforesaid the provisions of the Arbitration Act, 1940 or any statutory modification or re-effacement thereof and the rules made there under and for time being in force shall apply to the arbitration proceeding under this clause.

19. It is term of the contract that the party invoking arbitration shall specify the disputes or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of such dispute.

    The arbitrator(s) may from time to time with consent of the parties enlarge the time, for making and publishing the award.

19(a) The arbitrator/s shall make such inquiries and shall call upon such evidences as he may deem fit.

19(b) The arbitrator/s may call upon the parties for their personal appearance before him on the date fixed by him at the specified time and place.

19(c) That in case of non-appearance of either of the parties the arbitrator/s shall proceed ex-parte.

19(d) The decision of the arbitrator/s shall be binding on the parties, their legal representatives, successor and heirs.

19(e) The cost of the reference shall be on the sole discretion of the arbitrator/s.

20. On the breach of any terms or conditions of this contract by the contractor, the said owner/ IWAI shall be entitled to forfeit the security deposit or the balance thereof that may at that time be remaining and to release and retain the same as damages and compensation for the said breach but without prejudice to right of the said owner/IWAI to recover any further sums as damage from any sums due or which may become due to the contractor by Government or otherwise howsoever.

21. Without prejudice to any of the right or remedies under this contract. If the contractor dies the Engineer-in-charge on behalf of Chairman, IWAI shall have the option of terminating the contract without compensation of the contractor.

22.(1) Whenever any claim against the contractor for the payment of a sum or money arises out or under the contract, IWAI shall be entitled to recover such sum by appropriating in part or whole security deposit of the contractor and to sell any of his equipment etc. In event of the security being insufficient or if no security has been taken form the contractor then the balance or the total sum recoverable as the case may be, shall be deducted from any sum hence due or which at any time thereafter may become due from the contractor under this or any other contract with the Government. Should this sum be not sufficient to cover the full amount recoverable, the contractor shall pay to IWAI/Government on demand the balance remaining due.

22.(2) IWAI/Government shall have the right to cause an audit the technical examination of the works and the final bill of the contractor including all supporting vouchers abstract etc. to be made after payment of final bill and if as a result of such audit and technical examination any sum is found to have been overpaid in respect of any work done by the contractor under the contract or any work claimed by him to have been done by him under contract and found not to have been executed the contractor shall be liable to refund the amount of the overpayment and it shall be lawful for Government to recover the same from him in the manner described in sum clause (1) of this clause or in any other manner legally permissible and if as a result of audit and technical examination, it is found that contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by IWAI to the contractor.

22.(3) Provide that IWAI/Government shall not be entitled to recover any sum overpaid, not the contractor shall be entitled to payment of any sum paid short where such payment has been agreed upon between the Engineer-in-charge on the one hand and the contractor on the other under any term of the contract permitting payment for work after assessment by the Competent Authority.

SPECIAL CONDITION

1.0 Rates:

1.1 The rates quoted by the tenderer, shall be firm and inclusive of all taxes (including works contract taxes), duties and levies, octroi and all charges for packing forwarding, insurance, freight and delivery, installation, testing, commissioning etc. at site i/c temporary constructional storage, risks, overhead charges general liabilities/obligations and clearance form local authorities. However, the fee for inspections shall be borne by the department.

1.2 The contractor has to carry out routine & preventive maintenance for 12 months from the date of handing over. Nothing extra shall be paid.

2.0 Care of the Building:

Care shall be taken by the contractor while handling and installing the various equipment's and components of the work to avoid damage to the building. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of the installation from the site of work.

3.0 Period of Completion

The completion period of 3 Months indicated in the tender documents is for the entire work of planning, designing, supplying, installation, testing, commissioning and handing over of the entire system to the satisfaction of the Engineer-in-charge.

4.0 Performance Guarantee:

4.1 The tenderer shall guarantee among other things, the following

(a) Quality, strength and performance of the materials used.

(b) Safe mechanical and electrical stress on all parts under all specified conditions of operation.

(c) Satisfactory operation during the maintenance period.

4.2 The successful tenderer shall submit an irrevocable performance guarantee of 5% of the tendered amount in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement within 15 days of issue of letter of intent. This guarantee shall be in the form of government securities of fixed deposit receipts or guarantee bonds of any scheduled bank or the State Bank of India in the specified format. The performance guarantee shall be initially valid up to the stipulated date of completion plus 60 days beyond. This bank guarantee shall be kept valid till the recording of completion certificate for the work by the Competent Authority.

5.0 Guarantee

5.1 All equipments shall be guaranteed for a period of 12 months form the date of taking over the installation by the department against unsatisfactory performance and /or break down due to defective design, workmanship of material. The equipment's of components, or any part thereof, so found defective during guarantee period shall be forth with repaired or

replaced free of cost, to the satisfaction of the Engineer-in-charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. The decision of the Engineer-in-charge in this regard shall be final.

6.0 Power Supply

Electric service connection of 415 V, 3 Phase, 4 Wire, 50 Hz, AC supply shall be provided by the Deptt. for installation purpose free of charge.

7.0 Water Supply

Water supply shall be made available by the department at one point.

8.0 After Award of work

(i) The successful tenderer would be required to submit the following drawings/documents within 15 days of award of work for approval before commencement of installation.

(a) All general arrangement drawings.
(b) Details of foundations for the equipment, load, location etc. of various assembled equipment as may be needed generally by other agencies for purpose of their work. lift well etc.
(c) Complete layout dimensions for every unit/group of units with dimensions required for erection purposes.
(d) Any other drawing/information not specifically mentioned above but deemed to be necessary for the job by the contractor.

9.0 The successful tenderer should furnish well in advance three copies each of detailed instructions and manuals of manufactures for all items of equipments regarding installation, adjustments operation and maintenance i/c preventive maintenance & trouble shooting together with all the relevant data sheets, spare parts catalogue and workshop procedure for repairs, assembly and adjustment etc. all in triplicate.

10.0 Extent of work

10.1 The work shall comprise of entire labour including supervision and all materials necessary to make a complete installation and such tests and adjustments and commissioning as may be required by the department. The terms complete installation shall not only mean major items of the plant and equipment's covered by specifications but all incidental sundry components necessary for complete execution and satisfactory performance of installation with all layout charges whether or not those have been mentioned in details in the tender document in connection with this contract.

10.2 Minor building works necessary for installing of equipment, foundation, making of opening in walls or in floors and restoring to their original condition, finish and necessary grouting etc. as required.

10.3 Maintenance (Routine & Preventive) for one year from date of completion and handing over.

10.4 The work is a turnkey project. Any item required for completion of the project but left inadvertently shall be executed with in the quoted rates.

11.0 Inspection and testing:

11.1 Copies of all documents of routine and type test certificates of the equipment, carried out at the manufacturers premises shall be furnished to the Engineer-in-charge and consignee.

11.2 After completion of the work in all respect the contractor shall offer the installation for testing and operation.

12.0 Validity

Tenders shall be valid for acceptance for a period of 90 days from the date of opening of price bid.

13.0 Compliance with regulations and Indian standards

13.1 All works shall be carried out in accordance with relevant regulation, both statutory and those specified by the Indian Standards related to the works covered by this specification. In particular, the equipment and installation will comply with the following:

(i) Factories Act.
(ii) Indian Electricity Rules.
(iii) IS & BS Standards as applicable.
(iv) Workmen's compensation Act.
(v) Statutory norms prescribed by local bodies like NOIDA etc.

13.2 Nothing in this specification shall be construed to relieve the successful tenderer of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with currently applicable statutory regulations and safety codes.

13.3 Successful tenderer shall arrange for compliance with statutory provisions of safety regulations and departmental requirements of safety codes in respect of labour employed on the work by the tenderer. Failure to provide such safety requirement would make the tenderer liable for penalty of Rs. 50/- for each default. In addition, the department will be at liberty to make arrangement for the safety requirements at the cost of tenderer and recover the cost thereof from him.

14.0 Indemnity

The successful tenderer shall at all times indemnify the department, consequent on this works contract. The successful tenderer shall be liable, in accordance with the Indian Law and Regulations for any accident occurring due to any cause and the department shall not be responsible for any accident or damage incurred or claims arising therefrom during the period of erection, construction and putting into operation the equipments and ancillary equipment under the supervision of the successful tenderer in so far as the latter is responsible. The successful tenderer shall also provide all insurance including third party insurance as may be necessary to cover the risk. No extra payment would be made to the successful tenderer due to the above.

15.0 Erection Tools

No tools and tackles either for unloading or for shifting the equipment's for erections purposes would be made available by the department. The successful tenderer shall make his own arrangement for all these facilities.

16.0 Cooperation with other agencies

The successful tenderer shall co-ordinate with other contractors and agencies engaged in the construction of building, if any, exchange freely all technical information so as to make the execution of this works contract smooth. No remuneration should be claimed from the department for such technical cooperation. If any unreasonable hindrance is caused to other agencies and any completed portion of the work has to be dismantled and re-done for want of cooperation and coordination by the successful tenderer during the course of work, such expenditure incurred will be recovered from the successful tenderer if the restoration work to the original condition or specification of the dismantled portion of the work was not undertaken by the successful tenderer himself.

17.0 Mobilization Advance

No mobilization advance shall be paid for this work.

18.0 Insurance and Storage

All consignments are to be duly insured the cost of the supplier. The insurance covers shall be valid till the equipment is handed over duly installed, tested and commissioned.

19.0 Verification of correctness of Equipment at Destination

The contractor shall have to produce all the relevant records to certify that the genuine equipment from the manufactures has been supplied and erected.

20.0 Training

The scope of works includes on job technical training of two persons at site. Nothing extra shall be payable on this account.

21.0 Maintenance

21.1 Sufficient trained and experienced staff shall be made available to meet any exigency of work during the guarantee period of one year from the handing over of the installation.

21.2 The maintenance, routine as well as preventive for one year from the date of taking over the installation as per manufacturer's recommendation shall be carried out and the record of the same shall have to be maintained.

22.0 Interpreting Specifications

In interpreting the specifications, the following order of decreasing importance shall be followed in case of contradictions:
(a) Schedule of quantities
(b) Technical specifications
(c) Drawing (if any)
(d) General Specifications
(e) Relevant IS or other international code in case IS code is not available.

TECHNICAL SPECIFICATION

1.0 GENERAL SPECIFICATION FOR ELECTRICAL WORK

2.0 1000 KVA UNITISED SUB- STATION

3.0 DISTRIBUTION TRANFORMERS

4.0 LT. PANELS (POWER CONTROL CENTERS & SWITCH BOARD PANELS)

5.0 MOULDED CASE CIRCUIT BERAKER

6.0 METERING, INSTRUMENTATION AND PROTECTION

7.0 MEDIUM VOLTAGE CABLES

8.0 EARTHING FOR ELECTRICAL WORK

1.0 GENERAL SPECIFICATION FOR ELECTRICAL WORK:

1.1 SCOPE

In general, the contractor shall supply, store, erect, test and commission all the equipment required for Electrical Installation. The contractor shall furnish all the materials, labour, tools and equipments for the electrical work, as shown in the accompanying drawings and in the bill of quantities and specifications hereinafter described.

1.2 CONTRACTOR

The Contractor shall be a licenced electrical contractor, possessing a valid electrical contractor's license in the state, employing licensed supervisors and skilled workers having valid permits as per the Regulation of Indian Electricity Rules and Local Electrical Inspector's requirements. (In case the contractor does not have licence of that state then it should be clearly stated through which local electrical contractor they shall submit the test report & a copy of the valid licence of the contractor be enclosed along with the copy of their own licence of the state of their registration).

1.3 DEFINITIONS

The following abbreviations used in the bill of quantities specifications and drawings represents :

ISS	-	Indian Standard specification.
IER	-	Indian Electricity Rules, 1956.
BS	-	British Standard (where specifically called for)
BSCP	-	British Standard Code of Practice (if called for).
HRC	-	High Rupturing Capacity
GI	-	Galvanised Iron
MS	-	Mild Steel
CI	-	Cast Iron
APLSTS	-	Aluminium conductor, paper insulated lead sheathed, Double steel tape armoured and serving.
PVC	-	Polyvinyl Chloride.
XLPE	-	Cross Linked Polyethylene.
HT	-	High Tension.
LT	-	Low Tension.
A-Amp	-	Ampere.
KV	-	Kilo Volts.
PT	-	Potential Transformers.
CT	-	Current Transformers.
OCB	-	Oil circuit Breakers
VCB	-	Vacuum Circuit Breaker
ACB	-	Air Circuit Breakers
SFU	-	Switch fuse Unit
COS	-	Change Over Switch
CFS	-	Combination Fuse Switch
MCCB	-	Moulded Case Circuit Breaker.
MCB	-	Miniature Circuit Breaker
IC	-	Iron Clad
ICTPN	-	Iron Clad Triple Pole and Neutral

ICDP	-	Iron Clad Double Pole
DB	-	Distribution Board
KVA	-	Kilo Volts Ampere.
KVAR	-	Kilo Volts Ampere - Reactive.
NC	-	Normally Close
NO	-	Normally open
SWG	-	Standard Wire Gauge.

1.4 REGULATION & STANDARDS

The installation shall conform in all respects to Indian standard Code of Practice for Electrical Wiring Installation I.S. - 732 and 'National Electrical Code'. It shall be in conformity with the current I.E 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 a higher standard of materials and/or workmanship then those required by any of the above regulations, this specifications shall take precedence over the said regulations and standards.

In general, the materials, equipments and workmanship not covered by the above, shall conform to the following Indian Standards (Latest Edition) unless otherwise called for:

1 SWITCHGEAR

a.	Requirements of A.C. Circuit Breakers.	:	IS 2516 (Part I) Sec.1,2 & 3 (Part-II)
b.	Switches and Switch Isolators above 1000V But Not Exceeding 1.1 KV	:	IS 4710
c.	Markings & arrangements for switchgear bus-bars, main connection & auxilliary wiring	:	IS 375
d.	Specification for normal duty air break switches & composites unit for air break switches and fuses for voltage not exceeding 1000 Volts.	:	IS 4064
e.	Heavy duty air-break switches and composite units of air-break switches and fuses for voltages not exceeding 1000 Volts.	:	IS 4047
f.	Specification for miniature circuit breakers.	:	IS 8828
g.	Specification for enclosed distribution, fuse boards and cut-outs for voltage not exceeding 1000 Volts	:	IS 2675
h.	Installation and maintenance of switchgear.	:	IS 3072 (Part I)
i.	HRC cartridge fuse links 650 Volts.	:	IS 2208

2 CABLE

a.	Specification for paper insulated and lead sheathed cables	:	IS 692

b.	Code of Practice for installation and maintenance of paper insulated power cables (upto and including 33 KV)	:	IS 1255
c.	Specification for PVC insulated (Heavy Duty) electric cables Part-I for Voltage upto 1100 Volts.	:	IS 1554
d.	Specification for PVC insulated cables (for voltage upto 1100 V) (Part-II) with Aluminium conductors.	:	IS 694 (Part-II)
3.	Specification for rigid steel conduit for electrical wiring.	:	IS 9537
4.	Specifications for rigid non-metallic conduits for electrical installations.	:	IS 9537
5.	Specifications for accessories for rigid steel conduits for Electrical wiring.	:	IS 3837
6.	Box for the enclosure of electrical accessories steel and C.I. Boxes.	:	IS 5133 (Part I)
7.	3Pin plugs and sockets outlets	:	IS 1293
8.	Ceiling Roses	:	IS 371
9.	Adhesive insulating tapes for Electrical purposes (Part- I & II)	:	IS 2448
10.	General and safety requirements for Electrical lighting fittings.	:	IS 1913
11.	Watertight electric light fittings.	:	IS 3553
12.	Flood Lights.	:	IS 1947
13.	Ceiling fans and regulators.	:	IS 374
14.	Propeller type AG Ventilating fans	:	IS 2312
15.	Code of Practices for earthing.	:	IS 3043
16.	Glossary of terms for electrical cable and conductors.	:	IS 1885
17.	Code of Practice for buildings (General) Electrical installation	:	IS 1646
18.	Protection of buildings and allied structures against lighting.	:	IS 2309
19.	Current Transformers	:	IS 2705 (Part-I to III)
20.	Voltage Transformer	:	IS 3156 (Part-I to III)
21.	Power Transformer	:	IS 2026-1977 (Part-I to IV)
22.	Installation Transformer	:	IS 10029
23.	Shunt capacitors for Power system	:	IS 2834

24.	Direct acting electrical indicating instruments	:	IS 1246
25.	Factory assembled switchgear	:	IS 8623
26.	Rating for Cable	:	IS 3961 (Part -II)
27.	Earthing	:	IS 3843

1.5 INSPECTION & APPROVAL OF THE WORK BY LOCAL AUTHORITY

On completion of this work, the contractor shall obtain and deliver to the owners the certificates of inspection and approval by electrical inspectorate of local Local Administration. The fees paid for inspection will be reimbursed on production of challan/receipt. The contractor shall include in his rates all charges necessary for getting electrical installation approved which includes Sub-station, LT distribution, etc. by the Chief Electrical Inspector to the state government or/ and from any other authority required for this job.

INSPECTION OF MATERIALS

The Architect/ owners shall have access to the manufacturer's premises for inspection of any items of the tender for which contractor has made arrangement with manufacturer/ suppliers. All such inspection shall not need any prior intimation by the owners or architects.

1.6 DRAWINGS

The drawings, specifications and bills of quantities shall be considered as a part of this contract and any work or materials shown on the drawings and not called for in the specifications or vice-versa, shall be executed as if specifically called for in both. The contract drawings indicate the extent and general arrangement of various equipment and wiring, etc. and are essentially diagrammatic. The drawings indicate the point of termination of conduit runs and broadly suggest the routes to be followed. The work shall be executed as per approved working drgs, subject to any minor changes, if found essential to co-ordinate installation of this work with other trades. All such changes shall be without any additional major cost to the owners. The data given in the documents and drawings are approximate & their complete accuracy is not guaranteed. The drawings and data furnished are meant for guidance & assistance to the contractor. The exact dimension, location, distance and levels, etc., will be governed by the space conditions. The contractor shall examine all Architectural, structural, plumbing and sanitary and air-conditioning drawing before starting the work and report to the architect/owners any discrepancy which in his opinion appear on them, and get the same clarified. He shall not be entitled to any extras for omissions or defects in electrical drawings or when they conflict with other work.

1.7 WORKING DRAWINGS & SHOP DRAWINGS

The contractor shall prepare and submit to the Architects/ owners for approval detailed working drawings & shop drawings of all switch boards, L.T. Panel, H.T Panels, transformers, equipment, layout, cable layout, earthing, submission plans for electrical inspectorate, etc. within 60 days of award of work.

1.8 AS BUILT DRAWINGS

At the completion of the work and before issuance of certificate of virtual completion, the contractor shall submit to the Architect/ employers layout drawings drawn on tracing film and approved scale indicating the complete wiring as installed.

1.9 ENGINEER/ SUPERVISOR

The contractor shall employ a competent, licence, qualified full time electrical engineer / supervisor to direct the work of electrical installations in accordance with the drawings and specifications. The engineer / supervisor shall be available at all times at times at the site to receive instructions from the Architect/employers in any day to day activities throughout the duration of the contract. The engineer & supervisor shall correlate the progress of the work in conjunction with all the relevant requirements of the supply authority. The skilled workers employed for the work should have requisite qualifications and should possess competency certificate from the Electrical Inspectorate of Local Administration.

1.10 APPLICATION FOR ELECTRIC SUPPLY/ LIASON

The Contractor shall be responsible for filing and follow up application for electric supply to the project. The contractor shall carry out all the liason work required for obtaining electric supply at site commencing from filing of application. This liason shall be deemed to be a part of the contract.

2.0 DETAILED SPECIFICATIONS FOR 1000 KVA UNITIZED SUB STATION

Package Sub- Station

2.1 The complete package sub-station shall be factory assembled with separate access to transformer, HT breaker and LT panel board as per specification / BOQ and each component housed in separate compartment. It should be possible to install the package sub-station in congested areas with blocked walls on two sides.

2.2 The sub-station enclosure shall be of modular design made from G.I sheet of 2.0 mm thickness (minimum) with polyurethane paint finish as per color shade approved by client. The enclosure should not require any artificial cooling through exhaust fans, etc. It should be naturally air-cooled.

2.3 There should be proper provision of internal lighting of each MV and LV compartments

2.4 Sufficient space should be available inside the package sub-station for performing any maintenance activity.

2.5 Fault passage indicator with core balance current transformer shall be provide inside the package sub-station.

2.6 Package sub-station shall be placed on RCC plinth to avoid ingress/collection of water during rainy season and also to facilitate sufficient cable bending radius for incoming HT and outgoing LT cables. The plinth height shall be 300 mm (minimum) above NGL. This shall also facilitate ease of operation and maintenance.

2.7 The package sub-station shall be delivered as a complete unit ready for direct installation on the plinth and no other assembly work is required/to be made at site other than termination of both types of cables.

The Package sub-station will have the following provisions: -

11 KV CIRCUIT BREAKER / RING MAIN UNIT (RMU)

The 11KV RMU of Package Sub Station shall be non-extendable metal clad single compartment and comprising of 1 no SF6 circuit breaker , 2Nos 11KV Load break switches as supply source for distribution transformer. The 11KV breaker shall be rated for 630A at 11KV level, with SF6 as arc quenching medium and suitable for manual closing aided by spring mechanism charged with handle. 11 KV SF6 with integral earth switch with interlocking facility and of suitable making capacity, live capacitive cable indicator for monitoring SF6 gas pressure and pad locking facility. 11KV (HT) breaker shall have the provision of ammeter, voltmeter to monitor various parameters. The breaker shall be provided with self powerd microprocessor-based set of 2 nos. Over current and 1 nos. Earth Fault relay.

Transformer:-

The distribution transformer of corrugated design shall be of three phase 50 Hz 1000 KVA rating with Dyn 11 vector group and percentage impedance as per IS 2026. It should be Oil immersed(Oil type) Natural Air cooled with no load ratio of 11000/415 volts having both low and high voltage winding of high purity electrolyte copper. The transformer shall be complete with rating and diagram plate, 2 Nos. earthing terminals, and winding temperature indicator with Trip facility and with all standard accessories The distribution transformer shall be provided with off load tap changer + 5% to – 10% in steps of 2.5% each on HT side . The loss figures of the transformer shall be indicated by the bidder/manufacture.
However, current density should be restricted to 2.4 Amp./sq.mm. The bidder should attach GTP of the Transformer to be supplied by him.

L.T Panel Compartment

Incomer:

1 No. 4 pole 1250 Amp manually operated draw out type ACB with static release for over current short circuit and Earth Fault protection releases.

- 4 pole bus bar of suitable current rating having current density not less than 0.7 AMP./ SQ. MM .
- 3Nos R-Y-B indicating lamps (LED TYPE)
- 3 Nos. ON-OFF-Trip Indicating Lights (LED- Type)

2.0 GENERAL SPECIFICATION FOR: DISTRIBUTION TRANSFORMERS (11 KV)

3.1 GENERAL:

The power transformers shall be supplied & installed as per the requirements furnished in the equipment Schedule & bill of Quantities.

3.2 CODES & STANDARDS:

The transformers shall conform to the following codes & standards:

A. IS : 2026 (Part I to IV)
B. IS : 10028 (Part II)
C. IEC : 76

SYSTEM PARAMETERS:

The transformers shall be suitable for continuous operation at rated KVA under the following system parameters:

a. Nominal Voltage- Primary : 11,000 Volts
b. Maximum Voltage- Primary : 12,000 Volts
c. Frequency : 50 Hz
d. Frequency Variation : +/ - 5%
e. Voltage variation : As/ standards
f. Secondary Voltage : 415 Volts.
g. Transformer shall be able to withstand short- circuit current as per relevant standards between phases & between phase to ground with full voltage maintained at the other side without any injury to the transformer. The duration of the short circuit shall be as called for in the relevant standard (Refer IS: 2026 Part- I clause 8 & 9).

SALIENT FEATURES:

The transformer shall have the following salient features:
Transformer shall be oil immersed, natural cooled & double wound.
Windings shall be made of electrolytic copper conductor.
Tank shall be made of good quality low carbon steel of adequate thickness & electrically welded.
All welded joints shall be stress relived.
All access holes, manholes etc., shall be so designed as to prevent any ingress of moisture into the tank.
All gaskets shall be non- deteriorating, hot oil resistant, weather- proof & resilient type.
Tank shall not be deformed & joints shall not yield due to the system short- circuit allowable as per
IS: 2026.

Transformer cores shall be of low loss, non- aging, high quality, cold reduced grain oriented silico steel laminations.

The core fabrication shall be done in such a manner as to avoid hum & vibration and should be of boltless construction type. The core lamination insulation shall be resistant to oil & high temperature encountered.

Insulation of the winding shall be of very high quality & shall be resistant to the action of hot oil & high temperature encountered.

ACCESSORIES & FITTINGS :

The transformer shall be fitted with accessories & fittings as listed in "Equipment Schedule".

COOLING :

Transformers shall be of "ONAN" type unless otherwise called for in the equipment schedule & BOQ. Transformer shall be provided with radiators mounted directly on the tank. The oil used for insulation & cooling shall conform IS: 355 in all respects.

TAPPINGS :

Tappings shall be provided on HV winding as specified. The transformer shall be capable of operation at the rated KVA at any tap position provided the voltage variation is limited to +/ - % of the voltage corresponding to the tap. The variation in impedance shall be limited a minimum over the entire range of taps.

TAP CHANGIN GEAR :

Off load tap changing shall be effected by a 3-phase gang operated tap switch. The operating shaft shall be brought out of the tank & a hand wheel at a convenient height. A visual indicator to indicate the position of the tapping in use shall be provided. It shall be possible to padlock the handle in each tap position. A suitable interlock shall be provided so that padlocking is not possible unless the tapping contacts are engaged. On- load tap changing gear may be provided, if specifically called for in "Equipment Schedule" & BOQ.

CONSERVATOR :

A detachable conservator of liberal capacity & equipped with oil level indicator, drain valve, detachable cover at one end shall be provided. The conservator shall be connected to the tank with necessary piping & valves.

The following oil valves of high quality gun metal shall be provided :

Drain valve & oil sampling valve for the tank.
Conservator drain valve.
Flanged valve between buchholz relay & conservator.

TERMINAL ARRANGEMENT :

HIGH VOLT CABLE CONNECTION:

(i) High volt terminals of the transformer shall be brought out through side wall bushings to a cable end- box suitable for terminating 3- core 11 KV H. T. cable.

(ii) Cable end box shall be self-supporting weather- proof type complete with detachable cover, suitable no. of cable entries, etc, as required.

L. T. CABLE CONNECTION:

(i) 415 Volts terminals shall be brought out through side-wall mounted bushings to a cable end box with self-supporting disconnection chamber or terminal box suitable for 1100 volts, aluminum conductor, armored PVC cable < as per drawing>.

TEST :

Routine test shall be conducted on all transformers at manufacturer's works as per IS: 2026. In addition, transformer tanks shall be subjected to leak tests & vacuum tests. Original test certificate shall be furnished along with transformers.

HANDLING, STORING, INSTALLATION & COMMISSIONING :

Transformers shall be installed as per IS 10028 part- II & regulation of local authorities.

HANDLING:

Transformer & its accessories shall be handled carefully in its upright position as indicated on the packing case or as per the direction of the manufacturer. Lifting lugs & jacking pads shall be used for lifting of the transformer. Jacking pads shall be used with utmost care. Traction eyes with steel wire ropes shall be used for pulling or dragging of the transformer on sleepers or rollers.

STORAGE:

Transformer shall be stored in covered place which is free from moisture. No explosive/ immflamable materials shall be stored near the transformer. Transformer shall be covered with heavy polythene cover or any other water proof material. All gaskets shall be tightened to avoid any leakage into the transformer.

CABLING & EARTHING:

Cables shall be terminated at H. T. & L. T. sides only after IR values are measured & found to be in order. Cable terminations shall be carried out with utmost care using correct termination materials as specified in BOQ. H. T. cable termination shall be carried out in dry weather conditions. Transformer neutral shall be provided with double run of copper earth tapes & connected to 2 Nos. copper plate earth stations. Body of the transformer shall be also be provided with effective earthing by means of double run of GI earth tapes to GI plate earth station.

PRE- COMMISSIONING TESTS:

The following pre-commissioning tests shall be carried out before the transformer is commissioned:

Position & inclination of the transformer shall be checked with respect to buchholz relay.
General inspection of bolts, nuts, gaskets & accessories shall be carried out.
Dielectric strength of oil shall be got tested from three samples taken from the bottom of transformer tank.
IR Values on HV and LV windings shall be tested with 1000 V DC megger.

Voltage ratio on each step of tap changer to be checked.

MOUNTING & ERECTION:

The transformer shall be lifted by lugs or shackles or any other suitable means (such as dragging on rollers) and mounted on the concrete plinth prepared for the purpose. Care shall be taken to see that transformer is not titled during lifting and erection of transformer. The rollers shall be checked to prevent movement of the transformer after being positioned on the plinth. Adequate & necessary clearance from walls, other equipments, etc. shall be provided as indicated on the drawing.

All accessories and parts such as conservator tank, buchholz relay, breather, explosion vent, thermometer, etc. shall be mounted on the transformer. All bolts shall be tightened & all leakages shall be checked.

Oil level shall be checked & topped up, if necessary, with new oil. Di- electric strength of oil shall be tested as per IS specifications.

Insulation resistance of winding shall be measured with a 1000 volts magger & results shall tally with relevant IS specifications.

If di-electric strength of oil is found to be lower than the required level as per ISS, the oil shall be dried by filtration through a streamline filter plant.

Phasing out test with 415 volts applied to HV windings & voltage across LV windings shall be checked.

Measurement of neutral & body earth resistance shall be checked & the value shall not exceed 0.5 ohm.

Functioning of buchholz relay, thermometer, oil level indicator, Max. Temperature alarm & trip shall be checked & adjusted, if required. The transformer shall not be charged unless all above tests are successful & approval of local electrical inspectorate.

4.0. L.T. PANELS (POWER CONTROL CENTERS & SWITCH BOARD PANELS)

4.1 GENERAL:

Medium voltage power control centres (generally termed as switch board panels) shall be in sheet steel clad cubicle pattern, free floor standing type, totally enclosed, compartmentalized design. This specification shall cover the following types of panels:

a) Air circuit breaker panels - Drawout type with single or double tier arrangement as per design shown on the drawings.

Panels with one or more Air circuit breakers with Draw-out arrangement and switch-fuse units of non-drawout design.

Panels with switch- fuses of non- drawout type. However, the switch-fuse units can have drawout fuse-carriage if a particular make of switch-fuse is used.

The panels shall generally be of extensible type with provision for bus extension on or both sides as desired at the time of approved of shop drawings.

4.2 CODE/STANDARDS :

The panels shall generally conform to the requirements of following codes/ specifications:

a) IS-8623
b) IS-4237
c) IS-2147
d) IS-3072
e) IS-375
f) IS-1248 & 2419
g) IS-2705
h) IS-722
i) IS-4064
j) IS-2208
k) IS-6875
l) IS-6005
m) IS-5082

The equipment shall conform to Indian Electricity Rules as amended upto-date.

The supplier shall examine the provision of these codes and confirm or indicate his comments.

4.3 CONSTRUCTION:

Power control centres/ switch board panels shall of free standing type, with sheet steel enclosure having following features :

a) The panel shall be constructed of sheet steel of minimum 2.0 mm thickness. The internal frames shall be made of structural steel angles or made up sections (as per standard design of the manufacturer) specifications of which, shall be submitted along with offers.

b) The panel shall be compartmentalised to accommodate one feeder n each compartment. The main bus bar chamber shall be provided at the top of panel or bottom of the panel as required. The compartments shall be arranged in section with metallic/ phenolic barrier in between.

A vertical cable alley of at least 200mm width shall be provided to serve one/ two vertical section of feeders. Cable alley shall have hinged door/ doors with rubber gaskets. Suitable cable clamping arrangement with slotted steel members shall be provided in the cable alley. Similarly, vertical bus bar shall be housed in-between two feeder compartments in a separate bus chambers. The opening between bus chamber and feeder compartments shall be properly covered with Bakelite/ Hylam sheets of 3mm minimum thickness. The vertical bus chamber shall be provided with removable bolted covers on the front and back side. All the interconnecting links to the feeders shall be shrouded so as to avoid accidental contact, by means of phenolic barriers.

c) Each compartment shall have its own hinged door with concealed hinges. The doors shall have heavy duty rubber gasket fixed on the inner side of the door. The door shall have interlocking facility with the feeder unit.

d) The Panel shall have punched openings for mounting meters, lamps, push buttons, relays, etc.

e) The dimensions of feeder compartments, bus chambers and cable alleys shall be as shown on the relevant drawings. However, the following minimum dimensions shall be strictly adhered to :

i. ACB compartment : Drawout -600mm wide x 1000mm deep x 900mm high.

ii SWITCH FUSE UNITS/MOULDED CASE CIRCUIT BRACKER (NON-DRAWOUT TYPE) :

Up to 63A/ 100A	:	300mm wide x 225mm high x 400mm deep
250A	:	400mm wide x 400mm high x 400mm deep
400A to 630A	:	400mm wide x 500mm high x 400mm wide. (or vice- versa).

iii. BUS CHAMBER :

Main bus (Horizontal)	:	400mm high x 300mm deep
Vertical bus (Feeder bus)	:	300mm wide x 400mm deep

iv. Cable alley : Min. 200mm wide.

These dimensions are furnished as a guide and the clearances required in between each live bus/ link and between bus/ links to the earth (panel wall/ sheet) shall be as per relevant Indian Standard Code of practice. However, minimum clearance between neutral bus and earth shall not be less than 25mm. The panel supplier shall furnish detailed sectional drawings and also arrange to get the panel inspection done at intermediate stages of fabrication to avoid fault defective febrication of the panels (however, the compliance of these specifications shall entirely be the suppliers' responsibility).

BUS BARS :

The bus bars shall be suitable for 3 phase, 4 wire, 415 volts 50 Hz AC supply. The bus bars shall be made of high conductivity aluminium. The bus bars shall have uniform cross-section throughout the length. The bus bars shall be designed for carrying rated-current continuosly. The bus bars and links shall be designed for a maximum temperature of 75^{O}C. The max. current density of bus bars shall be as follows:

i. Copper : 1.86 Ampere/ Sq.mm. of cross section area.
ii. Aluminium : 1.28 Ampere/ Sq.mm. of cross section area.

It may be noted that these ratings are the upper limit to which the bus could be stressed. Suitable derating factors shall be applied to arrive at the correct cross section of bus bars.

b. Bus bars shall be supported on suitable non hygroscopic, non-combustible, material such as DMC/ SMC at sufficiently close intervals to prevent bus bar sag. All bus bar joints shall be provided with high tensile steel bolts (electro plated with suitable metal such as Nickel/ Cadmium), spring washer and nuts so as to ensure good contact. Alternatively, electroplated/ tinned brass bolts shall be used. The joints shall be formed with fish-plates on either side of bus bar to provide adequate contact area. Bus supports shall be provided on either side of joints (max. unsupported distance from the joint 400mm)

c. Power shall be distributed to feeders in dual section by a set of vertical bus bars (Phases+neutral). Individual module shall be connected to the vertical bus bars through sleeved connections.

d. Bus bars shall be insulated with PVC sleeves (heat shrink type) with colour coding (Red/ Blue/ Yellow/ Black).

e. The bus bars and their supports shall be able to withstand thermal and dynamic stresses due to the system short-circuits. The supplier shall furnish calculations alongwith his drawing establishing the adequacy of bus bars both for continuous duty and short -circuit rating. Short circuit withstand capacity shall be for one second. Calculations for spacing of supporting of supports shall also be furnished.

4.5 EARTHING :

The panels shall be provided with a copper earth bus running throughout the width of the switchboard. Suitable earthing eyes/bolts shall be provided on the main earthing bus to connect the same to the earth grid at the site. Sufficient number of star washers shall be provided at the joints to achieve earth continuity between the panels and the sheet metal parts.

4.6 MOUNTINGS :

Panels incorporating switchfuse units shall have suitable compartments of standard width. Each compartment shall incorporate a heavy duty load break switchfuse and HRC fuses. Suitable cable termination arrangement shall be provided for switch fuse/ fuse-switch unit feeders. Equipment shall be provided with proper fastening arrangements to ensure vibration free operation. Proper designation as given on the respective drawings shall be provided for every equipment.

Circuit breakers shall be mounted such that they are accessible from the front of the panel. More than two circuit breakers shall not be incorporated in a vertical section. The breakers compartment shall be divided into two parts, one for the breaker and the other for incorporating associated control gear. The necessary instrumentation shall be provided on the door of the compartment.

4.7 INTERLOCKING

The panels shall be provided with the following interlocking arrangements:

a. The door of the feeder compartments is so interlocked with the switch drive or handle that the door can be opened only if the switch is in "OFF" position. De-interlocking arrangement shall also be provided for inspection.

b. It shall not be possible for the breakers to be withdrawn when in "ON" position.

c. It shall not be possible for the breakers to be switched "ON" unless it is either in fully inserted position or for testing purposes it in fully isolated position.

d. The breaker shall be capable of being racked into "testing", "isolated" and maintenance position and kept in any of these positions.

e. A safety catch to ensure that the movement of the breaker as it is withdrawn, is checked before it is completely out of the cubicle shall be provided.

4.8 PROTECTION AND INSTRUMENTATION:

Protection and instrumentation shall be as per standard specification.

4.9 WIRING

All the interconnections between the incoming, bus and the outgoings of 100A and above rating shall be done by insulated links/ strips of suitable sizes. Switch fuses and equipments below 100A rating shall be wired with PVC insulated copper conductors. The wiring for instrumentation protection and control equipment shall be carried out with PVC insulated flexible copper conductors.

The Power interconnections shall be carried out by means of bolted connections with washers. The wiring shall be terminated by using crimping sockets. Wring shall be laid out neatly in bunches which are fastened to the steel members of the panel. All the potential circuits shall be protected by fuses mounted near the tap-off point from the main connections.

4.10 TERMINALS:

All the control, instrumentation and protection wiring shall be provided with printed PVC ferrules at both ends. For terminating control cables on to the equipment in the panels, suitable terminals blocks shall be provided. The terminal shall also be numbered for easy identification and maintenance.

4.11 SURFACE TREATMENT

All sheet metal accessories and components of power, control centres and switchboard panels shall be thoroughly cleaned, degreased, derusted and phosphatised before redoxide primer is applied. The panel shall be stove enameled to the required final finish. The interior surfaces of the panel shall also be painted to required shade. The supplier shall indicate in his offer, if there is any deviation from the treatment specified above.

4.12 ENCLOSURES

The panel enclosure shall be dust and vermin proof and shall be suitable for indoor installation. Enclosure design shall be in accordance with the requirements of IP 54 as per IS-2147-1962. The supplier shall confirm whether this requirement is met and a type test certificate furnished. If type test certificate for IP-54 is not available, the same shall be brought out clearly in his offer.

4.13 NAME PLATE

The panel as well as the feeders compartment doors shall be provided with name plates giving the switchboard/ feeder descriptions as indicated on the drawings.

4.14 TESTING

The power control centres shall be tested at factory after assembling of all components and completion of all interconnections and wiring. Tests shall be conducted in accordance with the requirements relevant IS Codes/ specifications.

a. INSULATION TEST

i. Insulation of the main circuit, that is, the insulation resistance of each pole to the earth and that between the poles shall be measured.

ii. Insulation resistance to earth of all secondary wiring should be tested with 1000V megger. Insulation test shall be carried out both before and after high voltage test.

b. HIGH VOLTAGE TEST :

A high voltage test with 2.5KV one minute shall be applied between the poles and earth. Test shall be carried out on each pole in turn with the remaining poles earthed. All units racked in position and the breakers closed. Original test certificate shall be submitted along with panel.

4.15 STORING, ERECTION AND COMMISSIONING

a. STORING

The panels shall be stored in a well-ventilated, dry places. Suitable polythene covers shall be provided for necessary protection against moisture.

b. ERECTION

Switchboards shall be installed on suitable foundation. Foundation shall be as per the dimensions supplied by the panel manufacturer. The foundation shall be flat and level. Suitable grouting holes shall be provided in the foundation. The switch boards shall be properly aligned and bolt000ed to the foundation by atleast four bolts. Cable shall terminated on the bottom plate or top plate as the case may be, by using brass compression glands. The individual cables shall then be lead through the panel to the required feeder compartments for necessary terminations. The cables shall be clamped to the supporting arrangement. The switch board earth bus shall be connected to the local earth grid.

c. PRECOMMISSIONING TESTS :

Panels shall be commissioned only after the successful completion of the following tests. The tests shall be carried in the presence of engineer-in-charge.

i. All main and auxiliary bus bar connections shall be checked and tightened
ii. All wiring terminations and bus bar joints shall be checked and tightened.
iii. Wiring shall be checked to ensure that it is according to the drawing.
iv. All wiring shall be tested for insulation resistance by a 1000V megger.
v. Phase sequence/ rotation shall be estimated.
vi. Suitable injection tests shall be applied to all the measuring insuring instruments to establish the correctness and accuracy of calibration and working order.
vii. All relays and protective devices shall be tested for correctness of settings and operation by introducing a current generator and an ammeter in the circuit.

5.0 GENERAL SPCIFICATION FOR: MOULDED CASE CIRCUIT BREAKERS

5.1 GENERAL:

Moulded case circuit breakers or fuse free breaker shall be incorporated in the switch board wherever specified. MCCBS shall conform to BS : 3871 Part II or JIS-C-8370 in all respects. MCCBS shall be suitable either for single phase 230V or three phase 415volts.

5.2 CONSTRUCTION:

The MCCB and case shall be made of high strength heat resistant and flame retardant thermo-setting insulating material. Operating handle shall be quick make/quick break, trip-free type. The operating handle shall have suitable "ON", "OFF" and "TRIPPED" indicators. Three phase MCCBS shall have a common operating handle for simultaneous operation and tripping of all the three phase. Suitable arc extinguishing device shall be provided for each contact. Tripping unit shall be of thermal-megnetic type provided on each pole and connected by a common trip bar such that tripping of any one pole actuates three poles to open simultaneously. Thermal magnetic/tripping device shall have IDMT characteristics for sustained over loads and short circuits. Contact tips shall be made of suitable are resistant, sintered alloy for long electrical life. Terminals shall be of liberal design with adequate clearances.

5.3 ACCESSORIES:

MCCBS shall be provided with the following accessories, if specified in schedule of quantities:

i. Under voltage release
ii. Shunt release
iii. Alarm Trip alarm
iv. Auxiliary contacts.

5.4 INTERLOCKING:

Moulded case circuit breakers shall be provided with the following interlocking devices for interlocking the door of switch board:

a. Handle interlock to prevent unnecessary manipulation of the breaker.
b. Door interlock to prevent the door being opened when the breaker is in "ON" position.
c. De-interlocking device to open the door even, if the breaker is in "ON" position.

5.5 RUPTURING CAPACITY:

The moulded case circuit breaker shall have a returning capacity of not less that 10KA Rms at 415 volts. Wherever required, higher rupturing capacity breakers to meet the system short circuit fault shall be used. All such ratings shall be as per equipment schedule/B.O.Q.

5.6 TESTING:

a. Original certificate of the MCCBS as per BS:3871 or JS-C-8370 shall be furnished.
b. Pre-commissioning tests on the switch boards panel incorporating the MCCB shall be done as per specifications.

6.0 METERING, INSTRUMENTATION AND PROTECTION

6.1 GENERAL

The Specifications hereinafter laid down shall cover all the meters, instrumentation and protective devices required for the electrical work. The ratings, type and quantity of meters, instruments and protective devices shall be as per the schedule of quantities and drawings.

6.2 INSTRUMENT TRANSFORMERS

a. Current Transformers :

Current transformers shall be in a conformity with IS:2705 (Part I, II and III) in all respects. All current transformers used for medium voltage applications shall be rated for 1 KV. Current transformers shall have rated primary current, rated burden and class of accuracy as specified in the schedule. However, the rated secondary current shall be 5A unless otherwise specified. The acceptable minimum class of various applications shall be as given below.

Measuring	:	Class 0.5 to 1
Protection	:	Class 5P10

Current transformers shall be capable of withstanding without damage, magnetic and thermal stresses due to short circuit fault of 35 MVA on medium voltage system. Terminals of the current transformers shall be paired permanently for easy identification of poles. Current transformers shall be provided with earthing terminals for earthing chassis frame work and fixed part of the metal casing (if any). Each C.T shall be provided with rating plate indicating the following:

i. Name and Make.
ii. Serial Number
iii. Transformation ratio
iv. Rated burden
v. Rated Voltage
vi. Accuracy class

Current transformers shall be mounted such that they are easily accessible for inspection, maintenance and replacement. The wiring for CTS shall be copper conductor, PVC insulated wires with proper termination lugs and wiring shall be bunched with cable straps and fixed to the panel structure in a neat manner.

b. Potential Transformers :

Potential Transformers shall be provided if specifically called for. Potential transformers shall comply with the requirements of IS: 3156 (Part I, II and III) in all respects.

6.3 MEASURING INSTRUMENTS :

a. General

Direct reading electrical instruments shall be in conformity with IS:1248. The accuracy of direct reading shall be 1/.5 for Voltmeters and 1/.5 for ammeters. Other type of instrument shall have accuracy of 1/.5. The errors due to variations in temperature shall be limited to a minimum. The meters shall be Suitable for continuous operation between $0^{O}C$ and $60^{O}C$. All meters shall be of flush mounting type with 144x144/96x96 sq. mm. The meter shall be enclosed in a dust tight housing. The housing shall be of ABS Body. The design and manufacture of the meters shall ensure the preventing of fogging of instrument glass.

Instrument meters shall be sealed in such a way that access to the measuring element and to the accessories within the case shall not be possible. Meters shall be provided with 12.5 mm height LED display. Suitable selector switches shall be provided for all ammeters and voltmeters intended to be used on three phase supply.

b. Ammeters :

Ammeters shall be of digital LED display type. The ammeters shall be manufactured and calbrated as per the latest editionof IS : 1248. Ammeters shall be instrument transformer operated and shall be suitable for 5A secondary of instrument transformer. The ammeter shall have sensitivity of 5% minimum.

The scale shall be calibrated to indicate primary current, unless otherwise, specified. The ammeter shall be capable of carrying substantial overloads upto 120% of ratio current during fault condtion without damage or loss of accuracy.

c. Voltmeters :

Voltmeters shall be of moving iron type. The range of 400 Volts, 3 Phase Voltmeter shall be 0 to 500 Volts. Suitable selector switch shall be provided for each voltmeter to read voltage between any two lines of the system. The voltmeter shall be provided with protection fuse of suitable capacity.

d. Wattmeter, Frequency Meters, Power Factor Meters :

Watt meters shall be of three phase, electronic type suitable for use with current & potential transformers associated with the particular panel. As per IS: 13779 Accuracy class 1/.5 IEC 61036/CB 1P-88.

i. Power Factor Meters:
Polyphase power factor meters shall be of electronic type with current and potential coils suitable for operation with current transformers and potential transformers associated with the particular panel. The scale shall be calibrated for 50% lag-100%-50% lead readings. Phase angle accuracy shall be + 2 degrees/1 degrees.

ii. Energy meters and reactive power meters :
Trivector meters shall be two element, integrating type kilowatt hour, KVA kilovolt-ampere-hour reactive meters. The meters shall conform to IEC-61036/ CB 1P- 88 in all respects. Energy meters, KVA and KVARH meters shall be provided with integrating registers. The registers shall be able torecord energy consumption of 500 hours corresponding tomaximum current at the rated voltage and unity power factor. These meters shall be suitable for operation with current and potential transromers associated with the particular panel and can also be integrated with PC with RS4 B5 port for energy management system.

6.4 RELAYS :

a. General

Protection relays shall be provided wherever required to trip and isolate the particular section under fault. All the relays shall be provided with flag type indicators to indicate the cause of tripping. The flag indicators shall remain in position unit they are resent by hand reset.

Relay shall be designed to make or break the normal circuit current with which they are associated. The relay contacts shall be of silver or platenium alloy. The contacts shall be designed to withstand repeated operation without damage. The relays shall be of draw-out to facilitate testing maintenance Draw-out case shall be dust tight with a finish suitable for tropical country. The relays shall be capable of disconnecting the faulty section of the network or fault equipment without causing interruption or disturbance to the remaining sections. The analysis of setting shall be made considering relay errors, pick-up and overshoot errors and shall be submitted to the Engineer/Architect for approval.

b. Over current Relay :

Over current relay shall be induction type with inverse definite minimum time lag charactoristics. The over circuit relays shall be provided with adjustable current and time settings. The setting for current shall be 50 to 200% in step of 25%. The IDMT over current relays shall have time lag (delay) of 0 to 3 seconds. The time setting multiplier shall be adjustable from 0.1 to unity. Over current relays shall be fitted with suitable tripping device with trip coil being suitable for operation on 5Amp.

c. Earth Fault Relay :

Earth fault relay shall have current setting of 10% to 40% in steps of 10% otherwise, the earth fault relay shall conform to specification laid down for over current relays.

d. Under Voltage Relays :

Under Voltage Relays shall be induction type and shall have inverse limit operation characteristics, with pick up voltage range of 50-90% of the rated voltage.

6.5 TESTING

6.5.1 Instrument transformers shall be tested at factory as per IS: 2705 and IS : 3156. The test shall incorporate the following :

Routing Tests :

Original test certificates in triplicate shall be provided.

6.5.2 Meters shall be tested as per IS : 1248. The tests shall include routine tests. Original test certificate in triplicate shall be furnished.

6.5.3 Suitable injection tests shall be applied to the secondary.

a. Circuit of every instrument to establish the correctness of calibration and working order All relays and protective devices shall be tested to establish the correctness of setting and operation by introducing a current generator and an ammeter in the circuit.

POWER FACTOR IMPROVEMENT SYSTEM:

GENERAL:

The Power factor improvement system shall comprise of capacitors and associated switchgear and control gear as per the requirements.

CAPACITORS:

Power factor correction capacitors shall conform in all respects to IS: 2834- 1964. Capacitors shall have approval of fire insurance association of India. The capacitors shall be suitable for 3 phase 415 V, at 50 Hz frequency and shall be available in single phase and three phase units of 5, 10, 15, 20, 25 and 50 KVAR sizes. The capacitors shall be suitable for indoor use upto ambient temperature of 500 C. The permissible overloads shall be as given below:-

Voltage overload shall be 10% for continuous operation and 15% for 6 hours in a 24 hour cycle.

Current overload shall be 15% for continuous operation and 50% for 6 hours in a 24 hour cycle.

Overload of 30% continuously and 45% for 6 hours in a 24 hour cycle. Capacitors shall be hermetically sealed in sturdy corrosion proof, sheet steel containers and impregnated with non-inflammable synthetic liquid. Every element of each capacitor unit shall be provided with its own built in silvered fuse. The capacitors shall have suitable discharge device to reduce the residual voltage from crest value of the rated voltage to 50 V or less within one minute after capacitor is disconnected from the source of supply. The loss factor of capacitor shall not exceed 0.005 for capacitors with synthetic impregnants. The capacitors shall withstand voltage of 2500 V ac (power frequency test voltage) for one minute. The insulation resistance between capacitors, terminals and containers when test voltage of 500V DC is applied shall not be less than 50 megohms.

CAPACITOR CONTROL PANEL:

The capacitor control panel shall generally comprise of following:

a) Power factor correction relay
b) Step controller with reversing motor.
c) Time delay and no-volt relays.
d) Contactor and fuses for individual capacitor banks.
e) Auto- manual selector switch for either manual or automatic operation.
f) Current Transformers (On main LT Panel)
g) ON/OFF indicating lamps with fuses for each bank
h) ON/OFF Push Buttons for each bank.

CONTROL PANEL:

The capacitor control panel shall be fabricated out of 2.0 mm sheet steel suitably rust inhibited and stove enamelled. The panel shall have adequate space for mounting the capacitors. The panel shall be of dust and vermin proof construction with suitable ventilation arrangement for capacitors. Panels shall be dead front pattern and floor munting type, complete with cabling arrangement, bus bars and earthing, etc. as per specification No. ELEC- 110/90.

7.0 GENERAL SPCIFICATION FOR: MEDIUM VOLTAGE CABLES

7.1 TYPE :

Medium voltage cables shall be aluminium conductor, PVC insulated, PVC sheathed and steel wire armoured or steel tape armoured construction. Aluminium conductors up to 10sq.mm. may be solid, circular in cross section, and sizes above 10sq.mm. shall be stranded. Sector shaped stranded conductors shall be used for sizes above 25sq.mm. The cable shall conform to IS 1554 (Part I).

7.2 RATING

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

7.3 CONSTRUCTION

The conductors for power cables shall be made of electrical purity aluminium & that for control cable from annealed high conductivity copper. The conductors shall be insulated with high quality PVC base compound. A command covering (bedding) shall be applied over the laid up cores by extrusion or wrapping of a filling material containing unvulcanized rubber or thermoplastic material, armouring shall be applied over the inner shath of bedding, over the armouring a tough outer sheath of PVC sheathing shall be

extruded. The outer sheath shall bear the manufacturers name and trade mark at every 30 meter interval.

7.4 CORE IDENTIFICATION :

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

i.	Core	:	Red/Black/Yellow/Blue
ii.	Core	:	Red and Black
iii.	Core	:	Red, Yellow, and Blue
iv.	3.5/4 core	:	Red, Yellow, Blue and black.

7.5 CURRENT RATINGS :

The current rating shall be based on the following conditions.

i.	Maximum conductor temperature	:	$70^{O}C$
ii.	Ambient air temperature	:	$40^{O}C/50^{O}C$
iii.	Ground temperature	:	$70^{O}C$
iv.	Depth of laying	:	75cm

7.6 SHORT CIRCUIT RATING:

Short circuit ratings for the cables shall be as specified in IS : 1554 Part -I.

7.7 SELECTION OF CABLES:

Cables have been selected considering the conditions of the maximum connected load, ambient temperature, grouping of cables & the allowable voltage drop. However, the contractor shall recheck the sizes before the cables are fixed and connected to the service.

a. Storing

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

b. Laying

Cables shall be laid as per the specifications given below. The system adopted for this job shall be as per BOQ :

i. Duct system

Wherever specified cables shall be laid in underground ducts. The duct system shall consist of a required number of reinforced "HUME" pipes with simplex joints. Wherever asbestos cement pipes are used, the pipes shall be enclosed in concrete of 75mm thick, the ducts shall be properly anchored to prevent any movement. The top surface of the cable ducts shall be laid with a gradient of atleast 1:300. The ducts shall be provided with inspection manholes and all direction changes and at required regular intervals for drawing the cable. The manholes shall be of reinforced concrete either cast-in-situ or precast. The manhole cover and frame shall be of cast iron and machine finished to ensure a perfect joint. The manhole cover shall be installed flush with ground or paved surfaces. The duct entry to the man holes shall be made leakproof with lead-wool joints. The ducts shall be properly plugged at the ends to prevent entry of water rodents, etc. Suitable duct markers shall be placed along the run of the cable square embedded in concrete, indicating the voltages, no of ducts and the direction of run of the cable duct. Suitable cable supports made of

angle iron shall be provided in the manholes for supporting the cables. Proper identification tags shall be provided for each cable in the manholes.

ii. Cables in outdoor trenches:

Cables shall be laid in outdoor trenches wherever called for. The depth of the trenches shall not less than 75cm from the final ground level. The width of the trench shall not be less than 45cm. However, where more than one cable is laid, an axial distance of not less than 15cm shall be allowed between the cables. The trenches shall be cut square with vertical side walls and with uniform depth. Suitable shoring and propping may be done to avoid caving in of trench walls. The floor of the trench shall be rammed and levelled. The cables shall be laid in trenches over the rollers placed inside the trench. The cable drum shall be rolled in the direction of the arrow for rolling. Wherever cables are bent, the minimum bending radius shall not be less than 12times the diameter of the cable. After the cable is laid and straightened, it shall be covered with 8cm thick layer of sand. Cable shall then be lifted and placed over this sand. Cable shall then be lifted and placed over this sand cushion. The cable shall then be covered with a 8 cm. Thick sand cushion. Over this, a course of cable protection tiles or burnt brick shall be provided to cover the cables 50mm on either side. Trench shall be backfilled with earth and consolidated. Cables shall be laid in Hume pipes/ stone-ware pipes at all road crossings and in CI pipes at the wall entries. Approved cable markers made of aluminium or CI indicating the voltages, no. of cables and the direction of rep. Of the cables shall be installed at a regular interval of 30 meters.

iii. Cables in indoor treanches:

Cables shall be laid in indoor treanches where specified. The trenches shall be made of brick masonry with smooth cement mortar finish. The dimensions of the trenches shall be determined depending upon the maximum number of cables that is expected to be accommodated. Cables shall be arranged in tier formation inside the trenches. Suitable clamps hooks and saddles shall be used for securing the cables in position. Spacing between the cables shall not be less than 15cm centre to centre. Wherever specified, trenches shall be filled with fine sand and covered with RCC precast slabs or steel chequered covers. Unless otherwise called for specifically in BOQ, the making of indoor trenches is outside the scope of this work.

iv. Cable on Tray/ Racks:

Cables shall be laid on cable trays/ racks wherever specified. Cable racks/trays shall be of ladder, trough or channel design suitable for the purposes. The nominal depth of the trays/ racks shall be 150mm. The width of the trays shall be as per the design shown on drawing. The cable trays shall be made of steel or aluminium. The trays/ racks shall be completed with end plates, tees, elbows, risers, and all necessary hardware. Steel trays/ Rack shall be painted with two coats of enamel paint of approved shade over a coat of red oxide primer. Cable trays shall be erected properly to present a neat and clean appearance. Suitable cleats or saddles made of aluminium strips with PVC covering shall be used for securing the cables to the cable trays. The cable trays shall comply with following requirements:

1. The trays shall have suitable strength and rigidity to provide adequate supports for all contained cables.

2. It shall not present sharp edged, burrs or projections injurious to the insulation of the wiring/ cables.
3. If made of metal, it shall be adequately protected against corrosion or shall be made of corrosion resistant material.
4. It shall have side rails or equivalent structural members.
5. It shall include fittings or other suitable means for changes in direction and elevation of runs.

7.8 INSTALLATION

1. Cable trays shall be installed as a complete system. Trays shall be supported properly from the building structure. The entire cable tray system shall be rigid.
2. Each run of the cable tray shall be completed before the installation of cables.
3. In portion where additional protection is required, non-combustible covers/ enclosures shall be used.
4. Cable tray shall be exposed and accessible.

8.0 GENERAL SPECIFICAITON FOR: EARTHING FOR ELECTRICAL WORK

8.1 General

All non-current carrying metal parts of the electrical installation shall be earthed as per IS: 3043. All metal conduits, trunkings, cable armour, switchgear, distribution boards, meter, light fixtures, fans and all other metal parts forming part of the work shall be bonded together and connected by two separate and distinct conductors to earth electrodes. Earthing shall also be in conformity with the provisions of Rules 32, 61, 62, 67 & 68 of IER 1956. These specifications apply to both copper and GI earthing system. The material to be used shall be as per that give in BOQ.

8.2 Earthing Conductors

8.2.1 All earthing conductors shall be of high conductivity copper or GI and shall be protected against mechanical damage and corrosion. The size of earth conductors shall not be less than half that of the largest current carrying conductor. The connection of earth continuity conductors to earth bus and earth electrodes shall be strong and sound and shall be easily accessible. The earth tapes shall be joined together using double rivets. The earthing conductor shall be laid in cable trenches, cable trays or conduits or on cable by using suitable clamps made of non-ferrous metals compatible with the earthing conductor. The following earthing conductors and required to be used for various sections of the installations.

a. All fixtures - lighting, fan and switch enclosures, lighting conduits shall be earthed with 16 SWG bare copper wire or 1.5sq.mm. Copper conductor, PVC insulated wires or 16 SWG GI wire. (As per BOQ)
b. 3rd pin of power socket outlets upto 20A shall be earthed with 1.5 sq.mm. copper conductor PVC insulated wire (As per BOQ)
c. All single phase switches and DBs above 20A and upto 30A rating shall be earthed with one run of 10SWG bare copper wire or GI wire.
d. All single phase switches and DBs above 30A and upto 63A rating shall be earthed with one run of 8SWG bare copper wire or GI wire.

e. All three phase switches/ DBs upto 30A rating shall be earthed with 2 runs of 10SWG copper wire/ GI wire.
f. All three phase switches/ DBs above 30A and upto 63A shall be earthed with 2 runs of 8 SWG copper wires/ GI wires.
g. All three phase switches/DBs above 63A and upto 100A shall be earthed with 2 runs of 25x3mm Copper Strip/GI Strip.
h. All three phase switches/DBs of 200A rating and above shall be earthed with 2 runs of 25x6mm copper Strip / GI Strip.
i. All motor frames shall be earthed by two earthing conductors of specified cross section.

Earth conductors shall be properly terminated with bolts to the frames of panels/eqpts. And provided with crimped sockets in case of wires.

8.2.2 Main earth bus shall be taken from the main medium voltage panel to the earth electrodes. The number of electrodes required shall be arrived at taking into consideration the anticipated fault on the medium voltage net-work and soil resistivity.

8.2.3 All the sub mains and sub circuits shall be provided with earth continuity conductors as specified and connected to the main earth bus. Earthing conductors for equipment shall be run from the exposed metal surface of the equipment and connected to a suitable point on the sub main or main earthing bus. All switches shall be connected through double earthing conductor to the earth bus. Earthing conductors shall be terminated at the equipment using suitable lugs, bolts, washers and nuts.

8.2.4 All conduits, cable armouring, raceway, rising mains, etc. shall be connected to the earth all along their run by earthing conductors of suitable cross sectional area, sprinkler, pipes, LPG pipes, water pipes, steel structural elements, cable trays/ racks lighting conductors shall not used as a means of earthing an installation. The electrical resistance of earthing conductors shall be low enough to permit the passage of fault current necessary to operate a fuse/ protective device a circuit breaker and shall not exceed 2 ohms. As rough guide the following sizes of earth continuity conductors shall be used for circuit wiring.

Size of circuit wires/ cables	Size of copper or GI earth wires
a. 2.5 sq.mm.	16 SWG or 1.5sq.mm. Cu. PVC insulated
b. 4 sq.mm.	14 SWG or 2.5sq.mm. Cu. PVC insulated
c. 6 sq.mm.	12 SWG or 2.5sq.mm. Cu. PVC insulated
d. 10 sq.mm./ 16 sq.mm.	8 SWG or 4.0sq.mm. Cu. PVC insulated
e. 25 sq.mm. / 35 sq.mm.	6 SWG or 6.0sq.mm. Cu. PVC insulated

All Single phase wiring have one run of earth wire and three phase wiring shall be provided with two runs of earth wires.

8.3 EARTHING ELECTRODES: (REFER IS : 3043)

8.3.1 Earthing electrodes shall be designed as per the requirements of clause 17.2 of IS : 3043. The number and size of earth electrodes shall be calculated so that under fault conditions no electrode is loaded above its maximum permissible current density. The resistance of earth electrode shall be as low as possible, the maximum allowable value being one ohm. Earthing electrodes of either plate of pipe electrode shall be decided according to the anticipated fault level of the net-work and local soil conditions. Generally, plate electrodes shall be used for sub-stations. Generally, plate electrodes shall be used for sub-

stations and large & medium voltage net work and pipe electrodes for small & medium voltage net-work and installations.

8.3.2 Plate Electrode (REFER IS : 3043)

Plate electrode shall be made of copper plate of 3.15mm thick and 60x60 cm. Size or as per B.O.Q. The plate shall be burried vertically in ground at a depth of not less than 2 meters to the top of the plate, the plate being encased in charcoal to a thickness of 15cm all round. It is preferable to bury the electrode to a depth where sub soil water is present. Earth leads to the electrode shall be laid in a GI pipe and connected to the plate electrode with brass bolts, nuts and washer. GI pipe of not less than 19mm dia shall be placed vertically over the plate and terminated in a funnel at 5cm above the ground. The funnel shall be provided with a wire mesh. The funnel shall enclosed in masonry chamber of 30cm x 30cm x 30cm dimensions. The chamber shall be provided with CI frame and CI cover. The earth station shall also be provided with a permanent identification label/ tag.

8.3.3 Pipe Electrode (REFER IS : 3043)

Pipe electrode shall comprise of a 4.5 meter long 75mm dia GI pipe or as per B.O.Q. with holes drilled as per IS: 3043 and burried vertically in a pit of 35cm x 35cm size and filled with alternate layers of charcoal, salt and river sand and connected at the top to a GI pipe of 19mm, 1 metre long with a funnel at the other end, 5cm above ground. The earth lead shall be properly clamped to the pipe electrode with brass bolts, nuts and washers. The funnel and earth lead connection shall be enclosed in a masonry chamber of 30cm x 30 cm x 30cm dimensions. The chamber shall be provided with a CI frame and CI cover. Proper permanent identifications tag/ lebel shall be provided for each electrode.

8.4 PRECAUTIONS:

8.4.1 Earthing system shall be mechanically robust and the joints shall be capable of retaining low resistance even after passages of fault currents.

8.4.2 Joints shall be soldered, tinned and double rivertted in case of copper and joints shall be filed and doubled rivertted in case of GI. All the joints shall be mechanically, electrically, continuous and effective.

8.5 TESTING:

8.5.1 On the completion of the entire installation, the following tests shall be conducted.

a. Earth resistance of electrodes.
b. Earth loop impedance as per IS L 3043/NEC.

8.5.2 All meters, instruments and labour required for the tests shall be provided by the contractor. The results shall be submitted in triplicate to the engineer-in-charge for approval.

8.6 SUB-STATION AND GENERATOR EARTHING

H.T panels and transformer body shall be provided with double earthing with copper/ GI tape of suitable size depending upon the anticipated fault level. The contractor shall furnish detailed calculations in respect of the size of earth conductors and number of earth stations.

SPECIFICATIONS FOR MAINTENANCE FREE EARTHING

Grounding System – Elecrolytic Maintenance Free Earthing

The effective earthing connection surface should be smooth and free form paints and oxide coatings

A. General

1 Self – contained ground electrode (s) using electrolytically enhanced grounding where specifically indicated on the drawings.
2 The electrode shall operate by hygroscopic ally extracting moisture form the atmosphere to activate the electrolytic process.
3 Electrode shall be UL ® Listed
4 Electrode shall be 100 % self – activating, sealed and maintenance free. No additions of chemical or water solutions required.

B. Technical Specifications

Type and Technical Specifications (Long Life Maintenance Free Earthing Solution)

Type	Soil	Warranty (Years)	Current Capacity	Electrode Details			Back Fill Qty (Bags	Test Well Cover
		GI / Copper		Length (feet)	Outer (inch)	Thickness (mm)		
Electrolytic Earthing	**Rocky**	**20/30**	**1 kA/9Se**	**10**	**2**	**2**	**3**	**Polyplastic**

Note : Each Bags Contain 22.6 Kg materials.

1 The specifications with performance warranty and technical spec details shown in the tables.
2 The ground rod shall be filled from the factory with non – hazardous metallic salts to form the electrolytic process and enhance the grounding performance.
3 Ground rod shall be a minimum of ten feet long.
4 2Nos 40x5 mm GI Strip at the top of the electrode for the connections and inspection purpose.

C. Protective Test Well

1. Polyplastic well for non – traffic applications . Includes bolt down flush cover with "breather ports"

D. Environment Friendly Backfill Material

1. Non – corrosive , electrically conductive and ground enhancing backfill. Backfill will lower the contact resistance to earth by up 63% when in conjunction with copper grounding equipment .
2. No mixing or tamping shall be required for backfill application.

E. Excavation

1 Bore a hole in to the earth (minimum diameter6") Hole should be bored to allow installed unit to be as close to vertical as possible.
2. A 14" Hole must be provided for the cover box.
3. Depth of hole must be 6" deeper than the vertical length of the system.
4. Top vent ports must be left open to the atmosphere for continuous air circulations by using the protective test well provided.

F Installation

1. Remove sealing tapes from bottom of unit only. Tapes must be saved and made available to the electrical inspector to verify removal and proper installation . Do NOT remove the green and white "Bury to Here" marker from the top of the unit.
2. Position the unit in the hole. Use green and white " Bury to Here marker as a guide to depth in which unit shall be buried in terraFill® . Three bags of TerraFill® are included with each 10' electrode.
3 Pour BackFill® (Each bag contain 22.6Kg Materials) around electrode in augured hole . Do not mound backfill past green and white marker.
4. Place box with cover over the top of the electrode so that the cover is at grade level. Use backfill to stabilizer box around the electrode .This keeps the breather holes free of obstructions and debris. Top of box should not contact the top of the electrode.
5. Remove top sealing tape ONLY after backfill is complete . This prevents soil from blocking the vent ports.

G. **Connection**

1. Connect grounding conductor to ground rod pigtail exothermally/ Stainless steel nut and bolts.
2. Burry grounding conductor 30inch below grade.

LIST OF ACCEPTABLE MAKE OF MATERIALS:

Sl. no.	Description		Approved Makes
1.	**UNITISED SUB STATION**	:	ABB / SUDHIR- INTRA/ C&S / UNIVERSAL
2.	**11KV HT RMU PANEL**	:	GROUP SCHNEIDER / ABB / SUDHIR- INTRA
3.	**CABLES**		
(i)	11KV H.T. Cable	:	GLOSTER /HAVELLS / SKYTONE / KEI
(ii)	L.T. Cable	:	GLOSTER /HAVELLS / SKYTONE/ KEI
4.	**M.V. SWITCHGEAR**		
(i)	ACB	:	SCHNEIDER (MASTER PACT –MVS) / L &T (C– POWER) / SIEMENS (3WT)
(ii)	MCCB (upto 250A-Adjustable Thermo magnetic & above 250A- Microprocessor based)	:	SCHNEIDER (COMPACT CVS) / L & T (100A -DH/ ABOVE 100A -D SINE SERIES) / SIEMENS (3VL)
(iii)	On Load Changeover Switch	:	L & T/ HPL- SOCOMEC
(iv)	MCB's	:	LEGRAND / SCHNEIDER / HAGAR (L &T)
(v)	Power Contactor	:	SCHNEIDER (TELEMECHANIQUE) / SIEMENS
(vi)	Heavy Duty Capacitor Banks (EQUAL TO MPP –H)	:	L & T/ EPCOS/ DUCATI
(vii)	Harmonic Block Reactors (7%)	:	L & T/ EPCOS/ DUCATI
5.	**METERS / INDICATORS / PUSH BUTTONS**		
(i)	Ammeter/ Volt Meter (Digital type)	:	SCHNEIDER / SECURE
(ii)	Indicating Lamps (LED type)	:	SIEMENS/ L & T (ESSBEE)/ SCHNEIDER ELECTRIC
(iii)	Push Buttons	:	SIEMENS/ L & T (ESSBEE)/ SCHNEIDER ELECTRIC
6.	**RELAYS/ CONTROLLERS**		
(i)	Multi Function Mete	:	SCHNEIDER / L & T
(ii)	Under Voltage Relays	:	L & T/ CONTROL & SWITCHGEAR
(iii)	Over Voltage Relays	:	L & T/ CONTROL & SWITCHGEAR
(iv)	Restricted Earth Fault Relays	:	L & T/ CONTROL & SWITCHGEAR
(v)	Over current, short circuit & Earth fault Relay for HT Panels	:	L & T/ ABB
(vi)	Aux. Relay for HT Panels	:	L & T/ ABB
(vii)	APFC Relay	:	L & T/ DUCATI / EPCOS
(viii)	Electronic KWH Meter	:	L & T/ CONZERV / SECURE
7.	**INSTRUMENT TRANSFORMERS**		
(i)	L.T. Current Transformers (CAST RESIN)	:	AEP/ KAPPA / MATRIX /PRECISE
(ii)	Potential Transformers (CAST RESIN)	:	AEP/ KAPPA / MATRIX /PRECISE
8.	**Micro PLC Processor & accessories**	:	ALLEN BRADLEY / SIEMENS

9. MISCELLANEOUS

(i)	Glands	:	COMMET / GRIPWELL
(ii)	Lugs	:	DOWELS / ACTION
(iii)	Selector Switch	:	SALZER / KAYCEE
(iv)	Plug & Sockets 3Phase /1 Phase)	:	LEGRAND / BALS / HENSEL/ SCHNEIDER
(v)	11KV Termination kits	:	RAYCHEM / MEC / 3M / INCAB
10.	**CABLE TRAY (GI SHEET)**	:	VENUS / MEM / SKABER /GLOBAL-9
11.	**LT PANELS MANUFACTURERS**	:	**M/S NEPTUNE SYSTEMS** (NOIDA) **M/S MADHU ELECTRICALS** (GURGAON) **M/S SHIVAM CONTROLS PVT LTD** (GURGAON) **M/S. JAKSON ENGINEERS LTD** (NOIDA) **M/S. AMBIT SWITCHGEAR** (NOIDA)

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

In case any of makes for any of the materials is missed out in the above list, then the contractor shall inform the consultants about the same obtain the approval. Therefore, he can proceed with the supply of the equipment's.

(Signature of the Tenderer)

Annexure – I

PROFOMETREA FOR EXPERIENCE

DETAILS OF SIMILAR WORKS CARRIED OUT BY THE FIrm

(SEPARATE SHEETS TO BE ATTACHED)

S. No	NAME OF ORGANISTON	NAME OF WORK	CONTRACT VALUE	SCHEDULED DATE and ACTUAL DATE OF COMPLECTON (EXTN. OF TIME, IF ANY)	ACTUAL REASON FOR DELAY IN COMPLEETION, IF ANY

Annexure - II

FOMETREAT OF BANK GUARANTEE FOR PERFOMETREANCE SECURITY

To,

The Chairman,
Inland Waterways Authority of India,
A-13, Sector-I,
NOIDA – 201301.

WHEREAS…… (name and address of contractor) thereinafter called "the contractor" has undertaken, in pursuance of Contract No. …… Dated ……to execute……. (Name of Contract and brief description of Works) (hereinafter called "the contract").

AND WHEREAS it has been stipulated by you in the said contract that the Contractor shall furnish you with a Bank Guarantee by a Nationalised/Scheduled bank of India for the sum specified therein as performance guarantee for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREOF we hereby affirm that we are the guarantor and responsible to you on behalf of the Contractor, up to a total of Rs…… (amount of guarantee) (Rupees……. (in words), such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of …….. (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract or of the works to be performed there under or of any of the contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 28 days from the date of issue of the Defects Liability Certificate.

Signature and seal of the Guarantor……

Name of the Bank ……

Address……

Date……
In the presence of ……
1……
(Name of Occupation)

An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.

Annexure – III

PROFORMA FOR AGREEMENT

(TO BE SUBMITTED ON Rs.100/- NON JUDICIAL STAMP PAPER)

CONTRACT AGREEMENT FOR THE WORK OF ……...
Made this …… Day of…….
Between…….. M/s ……..

Hereinafter called the "Contractor" (which terms shall unless excluded by or repugnant to the context include its successors and permitted assigns) of the one part; and Inland Waterways Authority of India, A- 13, Sector- 1 Noida- 201301 (U.P.) hereinafter called the "OWNER" (which terms shall unless excluded by or repugnant to the context include its successors and permitted assigns) of the other part.

WHEREAS

a) OWNER being desirous of getting executed the WORK mentioned, enumerated or referred to in the Bid Document including Notice Inviting Tender, Instruction to Bidders, General Condition of Contract, Special Conditions of Contract, Specifications, Time Schedule, Letter of Acceptance of Bid and other documents has invited Bids.
b) CONTRACTOR has inspected SITE and surroundings of WORK specified in the Bid Documents and satisfied himself by careful examination before submitting his Bid as to the nature of the quantities, nature and magnitude of WORK, availability of equipment etc. necessary for the execution of WORK, the means of access to SITE, the position of supply of power and water thereto and the accommodation he may require and has made local and independent enquiries and obtained complete information as to the matters and things referred to, or implied in the Bid Document or having any connection therewith, and has considered the nature and extent of all probable and possible situation, delays, hindrances or interferences to or with the execution and completion of WORK, to be carried out under this CONTRACT, and has examined and considered all other matters condition and things and probably and possibly contingencies, and generally all matters incidental thereto and ancillary thereof effecting the execution and completion of WORK and which might have influenced him in making his Bid.
c) The Invitation to Bid, instructions to Bidders, General Conditions of Contract, Description of Works and specifications, Plans, Time Schedule, Letter of Acceptance of Bid any and any other documents and enclosures, copies of which are hereto annexed are included in the expression "CONTRACT" :

AND WHEREAS

OWNER accepted the Bid of CONTRACTOR for the provision and the execution of WORK at the CONTRACT PRICE as indicated in the letter of award of work upon the terms and subject to the conditions of Contract.

Now this CONTRACT AGREEMENT witnesseth and it is hereby agreed and declared as follows:

1. In consideration of the payment to be made to CONTRACTOR for WORK to be executed by him, CONTRACTOR hereby covenants with OWNER that CONTRACTOR shall and will duly provide, execute and complete the work and things in CONTRACT, mentioned or described or which are to be implied therefrom or may be reasonably necessary for completion or stipulations mentioned in CONTRACT.

2. In consideration of the due provision, execution and completion of WORK by the CONTRACTOR in accordance with the terms of the CONTRACT, the Owner does hereby agree with CONTRACTOR that OWNER will pay to Contactor the respective amount for the work actually done by him and approved by Owner as per Payment Terms accepted in CONTRACT and payable to CONTRACTOR under provision of Contract; such payment to be made at such time and such manner as provided for in the CONTRACT.

AND

3. In consideration of the due provision, execution and completion of WORK, CONTRACTOR does hereby agree to pay such sums as may be due to OWNER for the services rendered by Owner to Contractor as set forth in CONTRACT and such other sums as may become payable to Owner towards loss, damage to the OWNER's equipment, materials etc. and such payments to be made at such time and in such manner as in provided in the CONTRACT.

   IN WITNESS WHEREOF Parties executed these presents on the day and the year above written.

Signed and Delivered for and on behalf of CONTRACTOR	Signed and Delivered for and on behalf of OWNER (IWAI)
…… ……	…… ……
Date: …… Place: ……	Date: …… Place: ……

In presence of Witness (Signature with Name & Address)

1. ……	1. …… .....
2. …… ……	2. ....

High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida

PART – II

PRICE BID

BILL OF QUANTITIES

Name of work : - **High side electrical work for vertical expansion (2nd to 6th floors) of IWAI office cum R & D complex at A - 13, Sector - 1, Noida**

SUMMARY OF PRICES

SECTIONS	DESCRIPTION	AMOUNT (RS.)
SECTION- A	**SUB- STATION**	
PART - I	SUPPLY	
PART - II	INSTALLATION	
SECTION- B	**L. T. PANELS**	
PART - I	SUPPLY	
PART - II	INSTALLATION	
SECTION- C	**L.T. CABLES**	
PART - I	SUPPLY	
PART - II	INSTALLATION	
SECTION- E	**EARTHING & MISCELLANEOUS ITEMS**	
	TOTAL	
SECTION- F	**REBATE ITEMS(BUY BACK) FOR TRANSFOMETREER AND HT PANEL WITH ASSOCIATES ITEMS**	
	GRAND TOTAL	

SECTION -A: SUB STATION
PART I: (SUPPLY)

S.No.	Description	Unit	Qty.	Rate	Amount
1.0	**Unitized Substation (Package Substation)**				
1.1	Design, Manufacture, Supply of pre-fabricated factory built compartmentalized type outdoor duty package substation made of 2mm thick GI sheet enclosure with a base of 4mm thick GI hot dip galvanized sheet, accessible from all around for all the equipments housed inside, all the doors must be locking provision and the partitions between the different compartments must be atleast of 2mm thick GI sheet and having a provision of sufficient ventilation avoiding heating of the material kept inside the enclosure. The enclosure exterior shall be painted with the polyurethane paint of specified The package includes 1way HT switchgear (SF6) insulated ring main unit), 1000KVA,11KV / 415V oil immersed transformer, 1600A 4P ,MDO ACB. the system should have indicators for all kind of faults, the work involves all the internal connections, terminations including supply of inter connected cable terminations and all other accessories require to furnish the job. The Package substation comply with IEC 1330 recommendation and supply exactly complete in all manners as per equipment schedule (Annexure -A)	Set	1		
2.0	**HT 11 KV METREU PANEL (11KV METER ROOM)**				
2.1	Supply of 11KV HT Panel type Ring Main Unit METREU Complete with Transformer Protection feeder with 1No.SF6 circuit Breaker Incoming / Outgoing (D function) having following Specifications:-	Set	1		
a)	Rated Voltage - 12KV				
b)	Short time with stand current - 21KA (rms)				
c)	Duration of Short time current -1.0Second				
d)	Type of Feeder - Transformer				
e)	Type of Circuit Breaker - SF6				
f)	Rating of Circuit Breaker - 200A				
g)	Operation - Manual				
h)	Protection relay for Circuit - VIP -35 Breaker transformer protection				
i)	Type - Non Extensible, Indoor type				
j)	Designation - METREU NE-D				
k)	Cable Entry - Bottom through trench				

l)	Cable Size - 11KV 3 Core 150 sq. mm Alu. conductor, XLPE insulated, Armround cable				
3.0	**H.T. CABLES :**				
3.1	Supply of 3 core 11 KV, HT XLPE cable as per specifications.				
i)	3 core 150sq.mm. Cable	rm	40		
	TOTAL OF SECTION- A (PART- I)	**RS.**			

SECTION - A : SUB-STATION
PART- II :(INSTALLATION)

S.No.	Description	Unit	Qty.	Rate	Amount
1.0	**Unitized Substation (Package Substation)**				
1.1	Installation, testing and commissioning of pre-fabricated factory built compartmentalized type outdoor duty package substation made of 2mm thick GI sheet enclosure with a base of 4mm thick GI hot dip galvanized sheet, accessible from all around for all the equipments housed inside, all the doors must be locking provision and the partitions between the different compartments must be atleast of 2mm thick GI sheet and having a provision of sufficient ventilation avoiding heating of the material kept inside the enclosure. The enclosure exterior shall be painted with the polyurethane paint of specified The package includes 1way HT switchgear (SF6) insulated ring main unit), 1000KVA,11KV / 415V oil immersed transformer, 1600A, 4P MDO ACB. The system should have all kind of faults, the work involves all the internal connections, terminations including supply of inter connected cable terminations and all other accessories require to furnish the job. The Package substation comply with IEC 1330 recommendation and supply exactly complete in all manners as per equipment schedule (Annexure -A)	Set	1		
1.0	**HT 11 KV METREU PANEL (11KV METER ROOM)**				
1.1	Receiving, unloading, handling, hoisting, double handling, storing, transporting to the exact location, installing, testing & commissioning of 11KV HT Panel type Ring Main Unit METREU Complete with Transformer Protection feeder with 1No.SF6 circuit Breaker Incoming / Outgoing (D function) having following Specifications:-	Set	1		
a)	Rated Voltage - 12KV				

b)	Short time with stand current - 21KA (rms)				
c)	Duration of Short time current -1.0Second				
d)	Type of Feeder - Transformer				
e)	Type of Circuit Breaker - SF6				
f)	Rating of Circuit Breaker -200A				
g)	Opeartion -Manual				
h)	Protection relay for Circuit -VIP -35 Breaker transformer protection				
i)	Type - Non Extensible, Indoor type				
j)	Designation -METREU NE-D				
k)	Cable Entry -Bottom through trench				
l)	Cable Size - 11KV 3 Core 150 sq. mm Alu. conductor, XLPE insulated, Armround cable				
3.0	**H.T. CABLE :**				
3.1	Receiving, storing in dry place, handling/double handling, laying, testing and commissioning of 3 core HT 11KV XLPE cable on IS angle, supports/ existing hume pipe, including clamps, saddles, screws etc, for fixing cables in indoor trenches.				
i)	3 core 150sq.mm. Cable	m.	20		
3.2	Ditto as above but H.T. Cable being laid in earth at 900mm depth below ground with sand cushion and burnt brick protection including excavation and back filing of earth cable route marker etc as required				
i)	3 core 150sq.mm. Cable	m.	20		
4.0	**END TEMETREINATION :**				
4.1	Supply & fix end termination for 3 core H.T., 11 KV, XLPE Cable using RAYCHEM'/'MEC'/ INCAB'/ '3M kits and inclusive of sockets, lugs, glands etc. as required				
i)	3 core 150 sq.mm. cable (Indoor type)	Nos.	5		
ii)	3 core 150 sq.mm. cable (Outdoor type)	Nos.	1		
	TOTAL OF SECTION- A	**RS.**			

SECTION - B : L.T. PANELS
PART - I : SUPPLY

S.No.	Description	Unit	Qty.	Rate	Amount
1.0	**L.T. PANELS :**				
1.1	Supply of the following cubical type panels made of 14 guage CRCA structure, base channel, complete with, moulded case circuit breakers, meters, indicating lamps, current transformer etc. Complete in all respects, insulated bus bars with heat shrinkable PVC sleeve in suitable bus chambers, interconnection, small wiring, name plate, danger plat, earth bus etc. & comprising of compartments with hinged door for each feeder & its accesories, cable alley with hinged doors, bus chamber with bolted door etc. The panel being of dust & vermin proof construction with rubber gasket attractively powder coating etc. The panel shall be free standing type/ wall mounted type as per relavant drawing and comprising with the following.				
Note:-					
1)	All MCCBS shall be with Extended type Front door operating handle, Phase Spreaders & Phase Barriers.				
2)	Metering CTs burden shall be 15VA & accuracy class 1.0.				
3)	CTs shall be "CAST RESIN" type .				
4)	MCCB's upto 250A shall be with Adjustable thermal-magnetic and above 250A Microprocessor based release.				
5)	All indication lights shall be LED type.				
6)	All meter shall be "DIGITAL" type.				
7)	Rated Short time withstand current of all ACB's are Icw for one second.				
8)	Breaking Capacity of all MCCB's are Ics Service Breaking Capacity				
9)	Degree of Protection for panels shall be IP:52				
10)	Panel Manufacturer should have Type Test Certificates for Short Time withstand current test of 50KA for 1.0 Sec from CPRI. Bhopal / Bangalore.				
11)	Capacitor Banks shall be Heavy Duty type equal to MPP - H.				
12)	Control SP MCB's of 2A Rating shall be provided for each metering circuit.				

A)	**<u>MAIN L. T. PANEL (MLTP)</u>**	Set	1		
a)	**INCOMING :**				
i)	1 No.1600A 4P EDO ACB (50kA) with built in Microprocessor based releases equal to SR 18G for Over load, Short Circuit & Earth Fault Protection (For Transformer near MLTP).				
ii)	1 Nos.800A 4P EDO ACB (50kA) with built in Microprocessor based releases for Over load, Short Circuit & Earth Fault Protection (For 500KVA DG Set).				
iii)	1 Nos.630A 4P EDO ACB (50kA) with built in Microprocessor based releases for Over load, Short Circuit & Earth Fault Protection (For 380KVA DG Set).				
iv)	1 No.800A 4P on Load changeover switch				
b)	**BUS COUPLER:**				
i)	1No.630A 4P EDO ACB without built in Microprocessor based Releases.				
c)	**BUS BAR :**				
i)	One set of 1600A & One Set of 630A TPN Alu. Bus Bar with PVC Sleeve in sealed M.S. Painted bus chamber.				
d)	**METERING , INDICATIONS AND RELAYS :**				
i)	3 sets. of R/ Y/ B phase indicating lamp with control MCB's.				
ii)	1 No. (0 - 1600A) Digital Ammeter with built-in selector switch and CT's.				
iii)	1 No. (0 - 800A) Digital Ammeter with built-in selector switch and CT's.				
iv)	1 No. (0 - 630A) Digital Ammeter with built-in selector switch and CT's.				
v)	3 Nos. (0 - 500 V) Digital Voltmeter with built-in Selector switch & control MCB's.				
vi)	3 Sets ON/ OFF/ TRIP Indicatiing lamps for Incomers.				
vii)	1Set ON/ OFF Indicatiing lamps for Bus Coupler ACB.				
viii)	3 Nos. Multifunction Meter with RS 485 Port for Transformer & DG incomer.				
ix)	1 No. Reverse power Relay type MRP-11/ Equal (For 380KVA DG Set)				
x)	1No. Microprocessor based numerical type Generator Protection Relay (GPR) having RS 485 (For 500KVA DG Set) Communication port with following protections :-				
a	Voltage Restrained O/C & S/C (50V & 51V)				
b	Under & Over voltage (27 & 59)				
c	Under & Over Frequency (81U & 81O)				
d	Loss of Field (40)				
e	Active Reverse power (32)				

f	Stator Earth Fault (64 S)				
g	Negative sequence (46)				
h	Over Excitation (24)				
i	Under Impedance (21)				
j	Breaker Failure protection (51 BF)				
xi)	3 Nos.Res. Earth fault relay				
xii)	10 Nos. Electronic Dual source KWH meter				
xiii)	16 Nos.Digital Ammeter with built-in selector switch and CT's for outgoing MCCB feeders .				
xiv)	17 Sets "ON" LED indicating lamp for outgoing MCCB's feeders.				
e)	**OUT GOINGS :**				
i)	2 Nos. 630A, TP MCCB (35 kA)				
ii)	1Nos. 400A, TP MOTORIZED MCCB (35 kA)				
iii)	1 No. 320A, TP MCCB (35 kA)				
iv)	10 Nos. 250A, TP MCCB (35 kA)				
v)	2 Nos. 200A, TP MCCB (35 kA)				
vi)	1 No.160A TP MCCB (35 kA)				
f)	**INTERLOCKING FOR 1NO.TRANSFOMETREER & 2 NOS DG'S** Electrical interlocking between 3 Nos. incoming ACB's & 1No Bus Coupler ACB's + 1No. out going 400A Motorized MCCB. Only 2 Nos ACB's can be "CLOSED" at a time.Transformer incoming ACB & DG set- 2 incoming ACB which are on same bus bar should not be closed at a time (Micro PLC System shall be used for Electrical interlocking)				
g)	Panel space heaters with control MCB & Thermostat for each Panel.				
h)	50 x 10 mm. GI. Earth Bus across the width of the panel.				
B)	**SYNCHRONIZATION PANEL** PLC Panel for Auto Start / Auto Stop / Auto Synchronizing / Auto Load Sharing / Auto Load Management for 2 Nos. DG Sets.(1No 500KVA +1No.320KVA/ 250KVA DG Sets)	Set	1		
i)	**HARDWARE**				
*	1Set PLC Micro Processor suitable for Monitor & control of 2Nos. DG Sets. (1No. 500KVA +1No.320KVA/ 250KVA DG Sets)				
*	1 Set 16 Slot I/O Rack.				
*	1 Set Rack power Supply.				
*	2 Nos. Line Synchronizing Module/Power Monitor.				
*	2 Nos. 16 CH 10 - 30V DC I/P Module.				
*	2 Nos. 16 CH Digital O/P Module.				
*	1 Set Power Supply cable.				
*	1 Set EPROM.				

ii)	**OPERATOR INTERFACE- SCADA SOFTWARE (1SET)**				
*	1 Set PC to PLC Comm. Cable.				
*	1 Set PC to PLC Comm. Card.				
*	1 Set Window based Graphics Software package.				
*	1 Set Run time for 1500 tags.				
iii)	**PC PACKAGE (1SET)**				
*	1 Set Pentium IV Microprocessor-2.6 GHz				
*	1 Set 512MB RAM, 40GB HDD.				
*	1 Set 50 x CD ROM.				
*	1 Set 17" Colour Monitor with windows NT.				
*	1 Set Keyboard.				
iv)	**MISC. EQUIPMENT**				
*	1 Set 10A 24V DC Power Supply with Battery.				
*	1 Set UPS 2 KVA for Black Stat.				
*	1 Set Printer with 80 Column.				
*	Lot- Interposing relays (Approx. 30 Nos.)				
v)	**MANUAL SYNCHRONISATION**				
*	1 Set Double frequency Meter				
*	1 Set Double Voltmeter				
*	1 Set Synchronoscope				
*	2 Set 415/110V, 50 VA PT for synchronoscope				
*	2 Set Dark Lamps				
*	1 No. check synchronising relay SCM-21/SY-SP				
*	1 No. SYN ON/OFF Selector Switch.				
*	1 No. DG Selector switch				
*	2 Nos. Digital Ammeter with built-in selector switch.				
*	2 Nos. Digital Voltmeter with built-in selector switch.				
*	2 Nos. Digital Frequency Meter				
*	2 Nos. Digital Power Factor meter				
*	2 Nos. Digital KW Meter				
*	1 No. PLC/Manual selector switch				
*	2 Nos. Voltage Raise/Lower Joystick.				
*	2 Nos. Speed Raise/Lower Joystick.				
*	2 Set Engine start/stop push button				
*	2 Nos. Emergency Stop push button (Mushroom Type)				
*	2 Nos. Breaker control Switches. (T/N/C)				
*	2 Nos. Motorized potentiometer for Voltage correction				
*	3 Sets Bicolour LED Indicating lamps (2 for DG incoming ACB's & 1 for Bus Coupler ACB)				
*	1 No. DC supply healthy indicating light				
*	1 Set DC Failure indicating light with alarm				
*	1 Set Aux contactors (Coil voltage 24 V DC)				
vi)	**ANNUNCIATOR & STATUS INDICATION**				
*	2 Set 8 window Annunciator for audio visual fault indication.				
*	1 Set Test/ Accept/ Reset Push Buttons				
*	1 No. Electronic Hooter.				

vii)	**PANEL GENERAL ACCESSORIES**				
*	1 Sets 18W Panel Light with door switch				
*	1 Sets Space heater with thermostat				
*	1 Sets 10 A SP MCB				
*	2 Sets 150 mm exhaust fan with air filter				
viii)	**TEMETREINAL ARRANGEMENT**				
	Bottom & Top Gland Plates for control cables entry (thickness of gland plate 2.5 MM)				
ix)	1 No. 50 x 6mm. GI. Earth Bus across the width of the panel.				
Note	Synchronising Panel should be complete in all respect like control wiring between Synchronising Panel & MLTP, interposing relays for control & Monitoring of two Nos.D.G Set.				
C)	**CAPACITOR CONTROL PANEL-1 (325KVAR)**	Set	1		
a)	**INCOMING :**				
i)	1 No.630A TP MCCB (50kA)				
b)	**BUS BAR :**				
i)	One set of 630A TPN Alu. Bus Bar with PVC Sleeve in sealed M.S. Painted Bus Chamber.				
c)	**INDICATION AND RELAYS :**				
i)	1No.(0 - 500 V) Digital Voltmeter with built-in Selector switch & control MCB's.				
ii)	1 No. (APFCR) automatic power factor correction relay with Power Factor Meter.				
iii)	1 No. Digital Power Factor Meter.				
iv)	One set of R/Y/B phase indication lamp with control MCB's.				
d)	**OUTGOING :**				
i)	1 Sets of 2X50KVAR Capacitor bank, 525V with 7% Harmonic Block Reactor 2X115A TP Contactor,250A TP MCCB (35kA) Capacitor rating to be designed for required output KVA at 415V				
ii)	1Set of 50KVAR Capacitor bank, 525V with 7% Harmonic Block Reactor 115A TP Contactor,125A TP MCCB (25kA) Capacitor rating to be designed for required output KVA at 415V				
iii)	4Sets of 25 KVAR Capacitor bank, 525V with 7% Harmonic Block Reactor 63A TP Contactor,63A TP MCCB (25kA) Capacitor rating to be designed for required output KVA at 415V				
iv)	2 Set of 15 KVAR Capacitor bank, 525V with 7% Harmonic Block Reactor, 40A TP contactor and 40A TP MCCB (25kA) .Capacitor rating to be designed for required output KVA at 415V				
v)	2Set of 10 KVAR Capacitor bank, 525V with 7% Harmonic Block Reactor, 25A TP contactor and 25A TP MCCB (25kA) .Capacitor rating to be designed for required output KVA at 415V				

vi)	1Set of 5 KVAR Capacitor bank, 525V with 7% Harmonic Block Reactor, 16A TP contactor and 16A TP MCCB (25kA) .Capacitor rating to be designed for required output KVA at 415V				
vii)	1 Set of 20 KVAR Capacitor banks with 63A, TP MCCB (35kA) (Fixed bank)				
Note	Each outgoing feeder shall have 'ON/OFF' lamps, start / stop push buttons, Digital Ammeter with built in sel. Switch and 3CT's.				
e)	1 No. 50 x 6 mm. G.I. Earth Bus across the width of the panel.				
D)	**NEW UTILITY PANEL**	Set	1		
a)	**INCOMING :**				
i)	1 No. 160A,TP MCCB (35 KA)				
ii)	1 No.160A,4P On load changeover switch				
b)	**BUS BAR :**				
i)	One set of 200 A TPN Alu. Bus Bar with PVC Sleeve in sealed M.S. Painted Bus Chamber.				
c)	**METERING & INDICATIONS**				
i)	1 set of R/Y/B phase indication lamp.				
ii)	1 No. (0 - 160 A) Digital Ammeter with built-in selector switch and CT's.				
iii)	1 No. (0 - 500 V) Digital Voltmeter with built-in Selector switch & control MCB's.				
d)	**OUTGOING :**				
i)	3 Nos. 100A, TP MCCB (25kA)				
ii)	1No.63A, 4P MCB (10kA)				
e)	1No. 25 x 6 mm. G.I. Earth Bus across the width of the panel.				
E)	**AC PANEL-1**	Set	1		
a)	**INCOMING :**				
i)	1 No. 400A,4P MCCB (35 KA)				
ii)	1 No.400A,4P On load changeover switch				
b)	**BUS BAR :**				
i)	One set of 400 A TPN Alu. Bus Bar with PVC Sleeve in sealed M.S. Painted Bus Chamber.				
c)	**METERING & INDICATIONS**				
i)	1 set of R/Y/B phase indication lamp.				
ii)	2 No. (0 - 400 A) Digital Ammeter with built-in selector switch and CT's.				
iii)	1 No. (0 - 500 V) Digital Voltmeter with built-in Selector switch & control MCB's.				
iv)	1 No. Electronic Dual source KWH meter				
v)	2 Set "ON" LED indicating lamp for outgoing MCCB's feeders.				
d)	**OUTGOING :**				
i)	1No. 400A, TP MCCB (35kA)				
ii)	1No. 160A, TP MCCB (35kA)				

e)	1No. 40 x 5 mm. G.I. Earth Bus across the width of the panel.				
F)	**AC PANEL-2**	Set	1		
a)	**INCOMING :**				
i)	1 No. 250A,4P MCCB (35 KA)				
b)	**BUS BAR :**				
i)	One set of 250 A TPN Alu. Bus Bar with PVC Sleeve in sealed M.S. Painted Bus Chamber.				
c)	**METERING & INDICATIONS**				
i)	1 set of R/Y/B phase indication lamp.				
ii)	1 No. (0 - 250 A) Digital Ammeter with built-in selector switch and CT's.				
iii)	1 No. (0 - 500 V) Digital Voltmeter with built-in Selector switch & control MCB's.				
d)	**OUTGOING :**				
i)	6Nos. 63A, 4P MCB (10kA)				
e)	1No. 25 x 6 mm. G.I. Earth Bus across the width of the panel.				
G)	**OUT DOOR TYPE LT PANEL IN THEMETREOPLASTIC ENCLOSURE** Supplying, receiving, storing, handling erecting, testing and commissioning of Modular panels made of thermoplastic Polycarbonate, complete with incomer Moulded case circuit breaker and outgoings through MCBs, voltmeter, Ameter, indicating lamps, CTs etc. Complete in all respects, insulated bus chambers, interconnection, small wiring, name plate, dsanger plate, earth bus etc & comparising of compartments with removal Polycarbonate opeque/transparent lid with Polyurethane injection moulded Gasket for IP65 degree of protection for each feeder. The panel shall be Floor/Wall mounted. The panel should be insulated and shock proof with protection class-II. Type tested according IEC 60 439-1 and glow wire tested at 960 degree celcius, Flame resistant and self-extinguishing & can with stand temperature up to+120 degree celcius. The panel should be UV resistant & weather proof, Acid resistant, Halogen and Silica free and recyclable environment friendly.Impact resistant.				
Note:					
1)	All notes are similar to notes mention in point no.1 L.T Panel exept point no.10 i.e (Panel Manufacturer should have Type Test Certificates for Short Time withstand current test of 36kA for 1.0 Sec from CPRI. Bhopal / Bangalore.)				
i)	**MDB - 1 & MDB-2 (MECHANICAL CAR PARKING)**	Set	2		
a)	**INCOMING :**				
i)	1 No.200A 4P MCCB (35kA)				

c)	**BUS BAR :**				
i)	One set of 200A TPN Alu. Bus Bar with PVC Sleeve in sealed M.S. Painted bus chamber.				
d)	**METERING , INDICATIONS AND RELAYS :**				
i)	3 sets. of R/ Y/ B phase indicating lamp with control MCB's.				
ii)	1 No. (0 - 200A) Digital Ammeter with built-in selector switch and CT's.				
iii)	1 Nos. (0 - 500 V) Digital Voltmeter with built-in Selector switch & control MCB's.				
	OUT GOINGS :				
i)	40 Nos. 20A, TP MPCB (10kA)				
e)	40 x 6 mm. GI. Earth Bus across the width of the panel.				
	TOTAL OF SECTION : PART 1 (SUPPLY)-				

SECTION - B : L.T. PANELS
PART - II : INSTALLATION

S.No.	Description	Unit	Qty.	Rate	Amount
1.0	**L.T PANELS:**				
1.1	Receiving, storing,loading , unloading, handling, hoisting, erecting, including checking of all interconnections, small wiring, testing & commissioning of panels as per item 1 of Part- I and as per Standard Specifications.				
A)	**MAIN L. T. PANEL (MLTP)**	Set	1		
B	**SYNCHRONIZATION PANEL**	Set	1		
C)	**CAPACITOR CONTROL PANEL-1 (325KVAR)**	Set	1		
D)	**NEW UTILITY PANEL**	Set	1		
E)	**AC PANEL-1**	Set	1		
F)	**AC PANEL-2**	Set	1		
	TOTAL OF SECTION- 'B (PART- II)				

SECTION - C : L.T. CABLES
PART - I : SUPPLY

S.No.	Description	Unit	Qty.	Rate	Amount
1.0	**L.T. CABLES**				
1.1	Supply of the following 1100 Volts Alu/ Cu. Conductor, PVC insulated PVC sheathed, steel armoured/ unarmoured or XLPE cables as per IS-1554/ 7098 Part- I and as per stanard specification				
A)	**ALUMINIUM CABLE (AMETREOURED)**				
a)	3.5 core 400sq.mm XLPE	m.	640		
b)	3.5 core 240sq.mm XLPE	m.	210		
c)	3.5 core 185sq.mm XLPE	m.	105		
d)	3.5 core 150 sq.mm XLPE	m.	60		
e)	3.5 core 95sq.mm XLPE	m.	200		
f)	4 core 50sq.mm XLPE	m.	90		
g)	4 core 35 sq.mm XLPE	m.	15		
B)	**COPPER CABLE (AMETREOURED)**				
a)	4 core 6sq.mm PVC	m.	50		
b)	4 core 2.5sq.mm PVC	m.	3200		
C)	**COPPER CONTROL CABLE FOR DG SETS**				
a)	16 core 2.5 sq.mm PVC	m.	160		
b)	12 core 2.5 sq.mm PVC	m.	160		
c)	6 core 2.5 sq.mm PVC	m.	160		
	TOTAL OF SECTION- C' (PART-I)	**Rs.**			

SECTION - C : L.T. CABLES
PART - II : INSTALLATION

S.No.	Description	Unit	Qty.	Rate	Amount
1.0	**INSTALLATION OF CABLES**				
1.1	Receiving, storing, handling, laying, testing & commissioning of the 1100 Volts PVC insulated PVC sheathed/ XLPE cable in indoor trenches/ Indoor & outdoor cables tray/ cable rack/ supports/existing pipes etc. as per specifications, inclusive of all clamps/ saddles/ screws/ cables indentification tages (made of GSS sheets) etc. as required, but exclusive of supply & fixing of cable trays.				
A)	**ALUMINIUM CABLE (AMETREOURED)**				
a)	3.5 core 400sq.mm XLPE	m.	400		
b)	3.5 core 240sq.mm XLPE	m.	140		
c)	3.5 core 185sq.mm XLPE	m.	75		

d)	3.5 core 150 sq.mm XLPE	m.	60		
e)	3.5 core 95sq.mm XLPE	m.	200		
f)	4 core 50sq.mm XLPE	m.	90		
g)	4 core 35 sq.mm XLPE	m.	15		
B)	**COPPER CABLE (AMETREOURED)**				
a)	4 core 6sq.mm PVC	m.	50		
b)	4 core 2.5sq.mm PVC	m.	3200		
C)	**COPPER CONTROL CABLE FOR DG SETS**				
a)	16 core 2.5 sq.mm PVC	m.	160		
b)	12 core 2.5 sq.mm PVC	m.	160		
c)	6 core 2.5 sq.mm PVC	m.	160		
1.2	Ditto as above but L.T.Cable being laid in earth at 800 mm depth below ground with sand cushion and burnt brick protection including excavation and back filling of earth, cable route marker etc. as required.				
A)	**ALUMINIUM CABLE (AMETREOURED)**				
a)	3.5 core 400sq.mm XLPE	m.	240		
b)	3.5 core 240sq.mm XLPE	m.	70		
c)	3.5 core 185sq.mm XLPE	m.	30		
2.0	**CABLE END TEMETREINATIONS;**				
2.1	Supply & provide cable end terminations for following Aluminium/Copper conductor cables using crimping sockets, brass compression glands, etc, as required.				
A)	**ALUMINIUM CABLE (AMETREOURED)**				
a)	3.5 core 400sq.mm XLPE	Nos	12		
b)	3.5 core 240sq.mm XLPE	Nos	12		
c)	3.5 core 185sq.mm XLPE	Nos	4		
d)	3.5 core 150 sq.mm XLPE	Nos	4		
e)	3.5 core 95sq.mm XLPE	Nos	6		
f)	4 core 50sq.mm XLPE	Nos	2		
g)	4 core 35 sq.mm XLPE	Nos	2		
B)	**COPPER CABLE (AMETREOURED)**				
a)	4 core 6sq.mm PVC	Nos.	2		
b)	4 core 2.5sq.mm PVC	Nos.	136		
C)	**COPPER CONTROL CABLE FOR DG SETS**				
a)	16 core 2.5 sq.mm PVC	Nos	2		
b)	12 core 2.5 sq.mm PVC	Nos	2		
c)	6 core 2.5 sq.mm PVC	Nos	2		
	TOTAL OF SECTION- C' (PART-II)	**Rs.**			

SECTION - E : EARTHING & MISCELLANEOUS ITEMS

S.No.	Description	Unit	Qty.	Rate	Amount
1.0	**TAPES/WIRES** Supplying, receiving, laying, fixing, jointing, and terminating of the following tapes/wires in masonry treches/on walls/on cable tray/ along the cable with suitable G.I./Copper Clamps, screws etc. The wire shall be terminated with proper sockets, washers, bolts & nuts. All joints shall be rigid using double rivites :				
a)	50 x 6 mm CU Tape with PVC Sleeve	m.	50		
b)	40 x 5 mm CU Tape with PVC Sleeve	m.	25		
c)	25 x 6 mm CU Tape with PVC Sleeve	m.	25		
d)	50 x 6 mm GI Tape	m.	240		
e)	40 x 5 mm GI Tape	m.	60		
f)	25 x 6 mm GI Tape	m.	125		
g)	8 SWG GI Earth Wire.	m.	100		
2.0	**EARTH STATIONS:**				
2.1	Providing and fixing following earth station as per IS 3043-1987, with watering pipe, GI funnels masonry chamber with CI cover(heavy duty), Including excavation and refilling of pit, supplying and fixing of charcoal salt & sand, identification of pit as Note :-earth station chamber size 450 x450 mm & 32 mm dia GI pipe shall be used for watering				
a)	600 x 600 x 6.3 mm Copper Plate Earth station (for Transformer neutral)	Nos.	2		
b)	600 x 600 x 3.15mm Copper Plate Earth station (for UPS & DG neutral)	Nos.	6		
c)	600 x 600 x 6.30 mm GI Plate Earth Station (for Transformer & DG body)	Nos.	8		
d)	80 mm dia & 6.0 M long G.I. Pipe Earth Station (for H.T & LT. Panels)	Nos.	6		
3.0	**DANGER BOARD/SHOCK RESTORATION CHART ETC.**				
3.1	Supplying and fixing of standard shock restoration chart (both in Hindi & English) in heavy wooden frame with 3 mm thick plane glass.	Sets	1		
3.2	Supplying & fixing of 9 litres capacity 6 Nos sand Buckets with MS Stand	Sets	1		
3.3	Supplying and fixing of 440V Danger Board	Nos	2		
3.4	Supplying and fixing of 11 KV Danger Board	Nos	2		

3.5	Supplying & laying of ISI approved Rubber mate (1.0 m wide)				
i)	Suitable for 11 KV	m.	2		
ii)	Suitable for 1.1 KV	m.	15		
3.6	Supplying of First aid Box	Set	1		
3.7	Supplying and fixing of Rubber Hand gloves suitable for 11KV System	Pair	1		
4.0	**CABLE RACK**				
4.1	Supplying, fabricating and fixing cable rack with MS channels, angles, plates, etc. as per design including anchor bolts/dash fasterners/bolts/nuts etc. as required complete with painting with one coat of primer and two coats of synthetic enamel paint as per app	Ton	1.0		
5.0	**CABLE TRAY**				
5.1	Supply and fix Ladder type/perforated hot dip GI cable Tray made of 2.00mm thick sheet steel with all fixing arrangements etc. as required including all fixing/ grouting & hanging arrangement with supply.				
a)	100 x 600 mm Wide Cable Tray (Ladder type)	m.	30		
b)	50 x 1000 x 50 mm Wide Cable Tray(Perforated type)	m.	60		
c)	50 x 600 x 50 mm Wide Cable Tray(Perforated type)	m.	60		
d)	50 x 450 x 50 mm Cable Tray (Perforated type)	m.	10		
e)	40 x 300 x 40 mm Cable Tray (Perforated type)	m.	10		
f)	25 x 150 x 25 mm Cable Tray (Perforated type)	m.	50		
g)	25 x 100 x 25 mm Cable Tray (Perforated type)	m.	50		
6.0	Supplying, and fixing RCC/PVC pipes for road crossing/ PCC floor for cables depth of pipe laying 1000 mm / 800 mm, including excavation of trenches, back filling and consolidating trenches and providing & fixing cable marker as per standard specification.				
a)	200 mm dia Hume (RCC) pipe at 1000 mm depth (For HT Cables)	m.	20		
b)	200mm dia Hume (RCC) pipe at 800 mm depth (For LT Cables road crossing etc)	m.	90		
c)	150mm dia Hume (RCC) pipe at 800 mm depth (For LT Cables road crossing etc)	m.	20		
d)	50 mm dia PVC pipe at 600 mm depth (for communication cables)	m.	50		

7.0	Supplying & fixing of following fire extinguishers complete with high pressure control value, rubber braided discharge hose. Body of fire extinguishers should be CCE approved with IS: 2878 marking. The valve shall confirm to IS: 3224.				
a)	9 KG CO2 Fire Extinguisher.	Nos.	4		
b)	10 KG DCP Fire Extinguisher	Nos.	1		
c)	50 KG with Trolly foam type Fire Extinguisher	set	1		
8.0	**POWER SOCKET OUT DOOR TYPE (for car parking motors)**				
8.1	Supplying, installation, testing and commissioning of 20/16A TP, 5 Pin Moulded Socket **(IP67)** with MCB in thermoplastic box .	Nos.	70		
	TOTAL OF SECTION - 'E'	**RS.**			

SECTION -F: REBATE ITEMS(BUY BACK) FOR TRANSFOMETREER AND HT PANEL WITH ASSOCIATES ITEMS

S.No.	Description	Unit	Qty.	Rate	Amount
1.0	**REBATE ITEMS (–)**				
1.1	Dismantling & taking away the existing operational 200KVA Transformer of-------make with all accessories.	SET	1		
1.2	Dismantling & taking away the existing operational 11KV Oil circuit breaker.	SET	1		
	TOTAL OF SECTION - 'F'	**Rs.**			

Dy. Director