DOEACC SOCIETY
KOLKATA CENTRE
(Formerly RCC, KOLKATA)
(A Scientific Body of Dept. of Information Technology, Ministry of Communication & Information Technology, Govt. of India)
JADAVPUR UNIVERSITY CAMPUS, KOLKATA-700 032
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Tender No.DSK/ELECTRICAL/11-12/25 **Date: 12/01/2012**
DUE DATE: 07/02/2012

Tender Document For

Renovation and Restructuring of Existing Electrical Installation at DOEACC SOCIETY, Kolkata Centre

DOEACC Society, Kolkata Centre
Now
National Institute of Electronics & Information Technology (NIELIT)
An Autonomous body under Department of Information Technology,
Ministry of Communications & Information Technology (MCIT),
Government of India
Jadavpur University Campus
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Website : www.doeacckolkata.in

Tender No: DSK/ELECTRIACL/11-12/25 **Date:** 12/01/2012
Tender Cost: Rs. 1000/- **Due Date- 07/02/2012**

NOTICE INVITING TENDER

Sealed Quotations in 2 bid (Technical & Financial) system in prescribed form / format are invited by the Director, DOEACC Society, Kolkata Centre, Jadavpur University Campus, Kolkata-700032 for the work "Renovation & Restructuring of existing electrical installation for (A) Power supply system, power panels & mains (B) Internal electrical installation at Gr. & 1st floor and (c) Internal electrical installation at 3rd floor" from Class-I and Class-II enlisted Electrical Contractors of PWD, CPWD, MES, Railways and capable & experienced contractors of Universities having Electrical supervisor in their employment possessing Supervisor's Certificate of competency in parts 1,2,3,4,5,6(a)(b), 7(a)(b), 10 & 11 & 12 or National Supervisor's Certificate of Competency I & II issued by Govt. of West Bengal and also having valid & adequate up to date credentials (the single job value completed in last 3 years must be at least at par of the job value for which tender is to be submitted) of past experience in execution of similar type of work and valid ST / IT & PT, VAT clearance certificate etc.

Name of work and due date of opening of the tender should be superscribed on the sealed cover of the tender. Estimated value, earnest money for the work, mode of deposit of earnest money, schedule of date & time of purchase of tender document and submission & opening of tender and other terms & conditions are as per enclosed Annexure-I.

Rate should be quoted in figures as well as in words at percentage above / below or at par with the rates shown in the priced schedule of work. No tender with price variation clause will be entertained. Acceptance of lowest or any other tender is not obligatory and the accepting authority reserves the rights to reject any or all tenders without assigning any reason. No conditional tender will be accepted.

Dy. Director (F&A)

Annexure-I

RELEVANT INFORMATION

1.	NAME OF WORK	: Renovation & Restructuring of existing electrical installation for (A) Power supply system, power panels & mains (B) Internal electrical installation at Gr.& 1st floor and (C) Internal electrical Installation at 3rd floor
2.	ESTIMATED WORK VALUE	: Rs. 16,20,773/-
3.	STIPULATED PERIOD OF COMPLETION OF WORK	: Sixteen(16) weeks from the date of issue of work order
4.	EARNEST MONEY	: Rs.35,000/-
5.	MODE OF DEPOSIT OF EARNEST MONEY	: DD / Pay Order along with credentials in Technical Bid
6.	TENDER FEES (not refundable) (PRICE OF TENDER DOCUMENT)	: Rs. 1,000/-(DD / Pay Order along with credentials in Technical Bid)
7.	LAST DATE & TIME OF SUBMISSION OF TENDER	: 07/02/2012 upto 3.00PM
8.	DATE & TIME OF OPENING OF TECHNICAL BID	: 07/02/2012 at 3.30PM
11.	DATE & TIME OF PRICE BID OPENING FOR TECHNICALLY QUALIFIED BIDDERS	: To be informed over phone/e-mail

NB: Representative(s) (maximum 2 from a bidder) need to submit authorization letter for participating tender (technical and financial) opening process.

Part-A
Technical Bid

CONDITIONS OF CONTRACT
(FOR ELECTRICAL WORKS)

1.1. **General**

1.1.1 These conditions of Contract supplement the preamble and General Instructions, General Conditions of Contract, Bill of Quantities, basic rates (if any) and technical specifications and drawings enclosed thereto, and shall be considered as part of the tender paper/ documents.

1.1.2 The several documents forming the tender are to be taken as mutually complementary to one another.

1.1.3 If there are varying or conflicting provisions in the documents forming part of the Contract, the Engineer In-charge deputed / authorized by the authority of DOEACC shall be deciding authority with regard to the intentions of the provisions and his decision shall be final & binding on the contractor.

1.1.4 The employer reserves the right to exclude any of the schedule items on reasons of subsequent change of design or else.

1.1.5 The contractor may be required to carry out any additional or alteration work other than specified in the schedule of work / bill of quantities as & when requires by the Employer within the completion period of the project as per latest PWD schedule of rates / and in the absence of such rates as per analysis of rates in the manner prescribed by PWD.

1.2 Scope of work

The works to be governed by this contract shall cover designing, fabricating and transportation up to destination, safe custody at site, insurance, erection testing & commissioning of the following-

i) H.T. Switch- Gear panel, connecting cables of both incoming & outgoing feeders including terminations etc.
ii) Transformer, connecting cables of both HT & L.T sides including terminations etc.
iii) Main L.T Switch gear panel, connecting cables of both incoming & outgoing feeders.
iv) L.T. underground cables from sub-station /switch rooms to different floors of the centre / to the power panels & sub-power panels at respective floors of the centre including their laying & terminations etc.
v) Electrification of new /old rooms & areas including renovation, re-organization & restructuring.
vi) Electrification of computer centre with provision of both D.G. & U.P.S. power supply systems.

1.2.2 The works to be undertaken by the contractor will inter-alia include the following-

i) Preparation of detailed drawings both single line & layout of Electrical Installation relating to sub-station equipments & accessories, cable laying, erection / fixing of various power panels, distribution wiring with mains & sub-mains, fittings & fixtures, D.G. Sets & change over panels.
ii) Insurance for all materials & complete work.
iii) Commissioning tests as per relevant standards & code of practices of Bureau of Indian Standard, Acts & Rules.
iv) Cable trenches and road crossing as required at site.
v) Earthing installation as pr relevant B.I.S. Codes.
vi) All other earth work and masonary work required to be done in connection with the Electrical Work.
vii) Warranty obligation.

1.3 Drawings

1.3.1 The drawings given with the tender only indicate the general scheme of the requirement. Contractor shall prepare all the detailed design and working drawings and submit them to the Employer for approval within a week from the date of award of contract.

1.3.2 The working drawing shall be furnished in triplicate furnishing all relevant details including physical dimension of all equipments, constructional details, disposition of busbars, terminal connections etc.

1.3.3 The electrical layout-diagram clearly indicating the dimensions of rooms, equipments and electrical clearances, cable trenches cable run with schematic diagram shall be furnished in triplicate for approval.

1.4 **Execution of work**

1.4.1 All the works i.e. layout & installation of H.T. Gear, transformer, power panels, distribution boards, equipments, fittings & fixtures, conduit laying, electrical wiring, cable laying earthing etc. have to be done as per approved drawing strictly following the relevant B.I.S. codes and also as per directions given at site by the Engineer In-charge deputed by the employer.

1.4.2 **Water and power**

The contractor has to arrange water and power for execution of work at his own cost. If the employer at his own discretion provides either of above, subject to availability, required charges as decided by the Employer. However, contractor would provide electrical Energy meter etc at his own cost, and the same will be recovered from running bills / final bill as the case may be.

1.5 **Quality of Materials and works**

1.5.1 All materials used in execution of the contract shall be of the best quality and of the class most suited for the purpose specified. Components, assemblies and equipments to be obtained from sub-contractors should be from Manufacturers of repute / proven / sources.

1.5.2 All erection / installation work shall be of the best quality and to the entire satisfaction of the Employer. The contractor shall ensure that the equipment & services under the scope of this contract whether manufactured in manufacturer's premises or performed within the

contractor's premises or at his sub-ordinates premises or at the work site oratany other place are strictly in accordance with the provisions of this contract and shall also conform to the following Acts, Rules and standards:

i) Indian Factories Act
ii) Indian Electricity Rules
iii) National building Code
iv) Relevant BIS codes

For this purpose the contractor shall adopt necessary quality assurance programme to control such activities at all stages.

1.6 Electrical License

1.6.1 The work shall be carried out only by a contractor holding a valid license issued by the State Govt for carrying out the installation work of voltage classes involved under the direct supervision of the supervisor holding valid certificate of competency issued by the State Govt. The tenderer shall furnish with his tender the particulars of the license with validity period held by him. The successful tenderer shall furnish the names and particulars of certificate of competency of the Electrical Supervisors and workman permit of workmen to be engaged for carrying out this work. One competent supervisor must be present at site during execution of the job to interact with the DOEACC's Authority day to day.

1.7 Inspection

1.7.1 The inspection officer(s) for this contract shall be nominated by the employer and notified to the Contractor.

1.7.2 The cost of the inspection will be on employer's account subject to any other provisions contained hereunder or elsewhere in the contract. One week's must be given by the contractor to the inspecting officer to take up the inspection

1.7.3 The contractor shall provide without any extra cost of the employer all materials, equipments tools, labour and maintenance of every kind which the employer's inspecting officer may consider necessary for any test & examination to be made at Contractor's or the sub-contractor's premises and at site.

1.7.4 All the equipments & materials shall be tested / inspected by the Employer or its authorized inspecting Engineer Officer and approved before they are installed / used in the execution of works covered in the contract. If the contractor uses any equipment / material without the prior approval of Employer those are liable to be rejected.

1.7.5 The exact positions of all equipments, panels DBS, switchboards and all runs of mains, sub-mains and distribution wiring to individual points including exact positions of all fittings & fixtures & switch boards shall be first worked out on drawings & then on actual locations of buildings & areas and the same shall have to be approved by the Engineer-in charge before actual commencement of work.

1.7.6 The inspecting Engineer or his authorized representative shall have at all time access to the Contractor's premises and shall have the power to:

i) Inspect and examine the materials and workmanship of the work at any time during manufacture, fabrication at the manufacturer's / fabricator's premises or in the premises of sub-contractors or at the site of erection.
ii) Reject any or whole of the work carried out by the Contractor as not being in accordance with the contract.

iii) Mark the rejected equipment with a rejection mark so that the same may be easily identified.

iv) Re-inspect at the time of erection at site any equipment previously inspected & approved by the inspecting Engineer at the Contractor or Sub-contractor's premises. Notwithstanding any approval given earlier, the contractor shall make good such rejections made based on such re-inspection at site to the satisfaction of the Engineer.

v) The decision of the Inspecting Engineer as regards to the acceptance or rejection of equipment / work shall be final and binding to the contractor.

1.7.7 **Consequence of rejection**

On the equipments / assemblies of the work being rejected by the Inspecting Officer, the Contractor shall replace such rejected equipment / assemblies of the work forthwith but in any event not later than a period of 2 (two) weeks in the case of minor equipment and 4 (four) weeks in the case of major equipment from the date of rejection. The contractor shall bear all the costs of replacement including freight etc. but without being entitled to any extra time on this account. The decision as to whether the equipment is to be classified as minor or major for the purpose of this clause shall be that of the Inspecting Engineer and it is not questionable.

1.8 **Installation**

1.8.1 All works connected with inclusive of installation & erection under this contract shall be done in accordance with the standard & established method of installation & erection of electrical equipment & accessories and shall comply with relevant Indian Electricity Rules, National Electrical Code, BIS. Code of practices & BIS specification. The work shall also be strictly in accordance with the instructions / recommendations of the manufacturer of equipments. The equipment shall be leveled carefully before being fixed finally in position. All fragile & sensitive accessories shall be protected adequately & handled carefully during installation & erection.

1.9 **Commissioning tests**

1.9.1 As soon as the installations are ready for commissioning, the contractor shall arrange for all the tests / inspections as required in terms of relevant BIS code/specification, I.E. Rules & Regulations of other statutory bodies and advise the Employer & other concerned. For installation, relating to sub-station & HT equipments the required tests are to be carried out by the authorized Agencies of Directorate of Electricity, Govt. of WB & such agencies are to be deputed by the contractor. Employer shall depute the inspecting officer for witnessing the tests and to carry out inspection independently & also jointly with other statutory bodies wherever necessary. Only after the installations passes the required tests & inspection and wherever necessary only after obtaining report of approval of Competent Authority / statutory body on submission of satisfactory test report, the installations shall be commissioned / energized.

1.9.2 The contractor shall take full responsibility for these tests. For site tests the Employer wherever possible, may permit the contractor for the purpose testing, the use of Electric Power as are available at Employer's premises, however the Employer at their discretion may ask the Contractor to pay the cost of energy consumed for carrying the tests & the contractor shall pay the cost. The contractor shall provide all apparatus, instruments, power, Engineer,

technicians, tools & tackles as well be required for carrying out required tests in a manner approved by Employer / Statutory body. If, by reasons of the Contractor failing to comply with any o the provisions of this clause, any of the said tests are to be repeated the contractor shall pay all fees and expenses in connection therewith.

1.9.3 The installation shall be found to be satisfactory on visual inspection and such visual inspection shall include checks for satisfactory workmanship, painting, plastering, cleanliness and compliance with Indian Electricity Rules.

1.9.4 (i) The ammeters, volt meters & energy meters shall be checked for their calibration, scale, accuracy etc and all these should be complied with specific requirement.

ii) For relays manufacturer's test certificate shall be furnished as evidence that the type tests have been carried out in accordance with I.S. 3231. Certificate to compliance of Routine tests shall also be furnished and if required Routine tests are to be carried out in presence of Engineer Incharge of the Employer and test certificates are to be furnished.

iii) All cables shall be tested at Manufacturer's works in compliance to relevant BIS specification and Manufacturer's test certificate shall be furnished. All cables & connections after laying & terminations shall be tested for required:

(a) Pressure test

(b) Insulation test and test report shall be recorded & furnished.

iv) Earth resistance shall be measured separately for each earth electrode and compositely when they are connected together & equipment bodies are connected to. Test results are to be recorded and shall be furnished.

1.10 Period of completion

1.10.1 Normally no extension of time will be granted, however on account of delay in the construction of Building or else thereby hampering the working facilities toward execution suitable extension will be considered. A penalty of 0.5% of the total value of work for each week or part thereof will be imposed for delay over the normal completion period.

1.10.2 No price variation shall be admissible on the contract rate for any item during the entire period of contract including the extended period. The contractor shall not have any claim whatsoever in this regard except statutory variation of duties & taxes imposed by Govt. of India.

1.11 Warranty

1.11.1 The contractor shall guarantee that all equipments & works executed under the contract shall be free from all defects & faults in materials, design workmanship & manufacture and shall be of acceptable standards for the contracted work and in full conformity to the technical specifications, drawings & other contract stipulations.

1.11.2 The contractor's liability in respect of any complaint, defect and / or claim shall be limited to the execution, installation & erection of replacement parts free of charge or repair to the defective parts only to the extent that such replacements or repairs are attributable to or arise from faulty workmanship or design or material in the manufacture of the equipment and or negligency in any manner and also in the event of failure of the equipment to perform as intended.

1.11.3 The contractor shall, if required, replace. Repaid, execute and / or install the goods or such portion thereof, as is rejected by the Employer free of cost at site.

1.11.4 If any defect is not rectified satisfactorily within a reasonable period, which in no case exceed 1 (one) month, the employer may proceed to do the work at Contractor's risk & cost and also without prejudice to any other rights of the contractor under this contract.

1.11.5 If the contractor so desires, the replaced parts can be taken over by him or his representative for disposal, as he deems fit, within a period of one month from the date of replacement of goods / parts At the expire of this period no claim whatsoever shall lie on the Employer.

1.11.6 The Employer may at their discretion recover the ground rent for the goods / parts which have been rejected during the warranty period for the specified period of one month, if the rejected materials are not taken over within that period of one month.

1.11.7 The warranty herein contained shall not apply to any material which have been repaired or altered by the Employer or on their behalf by any without the consent of the contractor.

1.11.8 After completion, testing & commissioning of the entire Electrical Installation, the Contractor shall hand over the installation to the Employer along with a completion certificate complete with relevant test certificates and completion. Drawings and guarantee for twelve months for successful operation of entire installation and shall replace / repair free of cost all defective materials / works as stipulated in preceding paras during above mentioned defect liability period.

1.12 **Indemnity Bond**

The contractor shall be solely responsible for any damage, prosecution, other legal suits & claims arising out of any mishaps occurring at worksite due to negligence, wrong practice, bad workmanship, faulty work, violation of safety & other statutory Rules & Regulations etc. If the Employer so desires, the contractor shall have to sign an Indemnity Bond before starting the work in this regard & the Indemnity Bond shall be executed in the form prescribed by the Employer.

1.13 **Taxes, Duties etc**

Applicable taxes (like TDS) will be deducted from the bills and related TDS certificate will be issued. The contractor shall submit PAN No.

1.14 **Payment to Contractor**

Payment will be made after completion of work and within 45 days of submitting valid bills.

1.15 **Price adjustment**

1.15.1 No price escalation will be accepted i.e. quoted price as applicable, will remain fixed upto the completion of the project / work including extended period, if any.

T E C H N I C A L S P E C I F I C A T I O N
(E L E C T R I C A L W O R K)

1.0 Power cables-
HT & LT

1.1 HT Cables-
Only HT XLPE insulated PVC outer sheath armoured stranded Aluminium conductor cable of 11 KV grade conforming to I.S. 7098 (Part II)-1989 shall be used.

1.2 LT cables-
XLPE insulated PVC sheathed armoured stranded aluminium conductor cable of 1100V grade conforming to IS 7098 (Part I) shall be used.

1.3 Control cable-
PVC insulated & sheathed unarmoured copper conductor cable of 1100V grade conforming to IS 1554 (Part I) 1988 shall be used.

1.4 Cables are to be laid both inside and outside the building. Laying of cable shall be in accordance with IS 1255, meeting the requirement of IE Rules and other Regulations in force. It is also necessary to consult the local authorities including Engineer of Jadavpur University. Inside the sub-station Building cable shall be laid in masonary trench with chequered plate MS covering, outside the building the cable shall be laid in ground at a minimum depth of 1 metre from the ground level along the approved route with necessary brick protection & also with GI Pipe protection for vertical riser / road crossing etc. as per direction of Engineer Incharge.

1.4.1 Laying of cables includes excavation of earth ie. Making the required trench very carefully protecting existing other cables etc, providing necessary sand cushioning below & above the cables and brick protection at top and also at sides for HT Cables. Identification tags shall be provided on the cables at regular intervals where more than one cable is laid. After laying of cables & approval of Engineer Incharge the trenches shall be filled with shifted earth and well rammed to bring the surface in level with surroundings. Sand shall be of good quality river sand and the brick of class B burnt cable identification markers made of galvanized steel plates incorporating the information such as line voltage, size of cable, cable identification No shall be provided at intervals of 10 meters` along the entire cable length in an approved manner & arrangement.

1.4.2 Wherever the cables are crossing the roads, drains, water / sewerage pipes or entering / leaving the building, the cables shall be laid in class-B GI pipes of suitable size as per direction of Engineer In-charge.

1.5 Straight through joints are not normally permitted. In case of unusually long distances of cable laying work straight through joints would be considered for permission only if the jointing kits of specified make are used. No extra payment will be permitted for such joints.

2 Transformer

2.1 Only dry type power distribution transformer conforming to IS 11171-1985 read with IS.2026 & having CPRI certification shall be used.

2.2 Essential & relevant datas viz rating (continuous output), phase & frequency, normal no load pressure ratio, indoor /outdoor type, primary /secondary connection, vector group, type of cooling, neutral lead, temperature rise, taps & range of taps, terminal arrangement & standard fillings inducting temperature scanner etc are as per enclosed schedule of work & specification.

2.3 Other technical particulars viz no load loss & current at rated voltage & frequency, load loss at rated current at 70 degree centigrade & full load current, maximum temperature rise in winding, percentage impedance at 75 degree centigrade at unity power factor at full load / 75% of full load /50% of full load, regulation, overall weight, overall dimension including dimension of HT & LT terminal boxes shall be furnished by the tenderer under certification of manufacturer for consideration.

2.4 The transformer shall be CPRI certified as far as type tests are concerned and the routine tests in accordance with IS 2026 shall be carried out at manufacturer's works before delivery and those include:-

(i) measurement of winding resistance
(ii) Ratio, polarity & phase relationship
(iii) Impedance voltage and load loss
(iv) No load loss & current
(v) Insulation resistance
(vi) Dielectric test (separate source voltage withstand test, induced over-voltage withstand test.

If required, arrangement shall be made by the tenderer for carrying out tests in respect of temperature rise. CPRI certification in respect of type tests and manufacturer's certification along with test results in respect of routine tests shall have to be furnished by the tenderer.

2.5 Installation work shall be carried out in accordance with provisions of IE Rules, relevant Regulation of statutory bodies & BIS code of practices. Works in respect of earthing of Neutral point of secondary of transformer & earthing of transformer enclosures shall be carried out as per above rules, regulations and codes and also as per direction of Engineer In-charge.

4. MAIN POWER DISTRIBUTION BOARDS / LT PANELS:-

4.1 All power panels, distribution / control boards and meter boards shall be manufactured in compliance with the requirements of the following and other relevant standards of latest issue:

i) Indian Electricity Act & Rules

ii) Fire insurance regulations

iii) Rules & Regulations of Electricity Authorities of Central and State Govts

iv) IS- 2147- Degree of protection

4.2 Main power Distribution Boards (MPDB) / L.T. Panels are to be installed in the Sub-station and other building whereas feeder Pillar Boxes (FPB) are to be installed "outdoor" in the open space. All the switch gear items, such as MCCBs, SFUs, Change-over switches, MCBs, CTS, Meters, Neutral Links, Indication Lamps, relays, Capacitors, Bus-bars, internal connections, terminals for externals cable connections etc. shall be housed in suitable cubicles as required. Design, constriction, enclosures, doors interlocking, earthing, marking and testing shall be on the same lines as those of L.T. panels in accordance with IS: 2147. Clearance between phases and between phases and neutral and earth shall not be less than 50 mm.

4.3 There shall be a separate cubicle / compartment for each incoming side and outgoing side MCCB, SFU and change-over switch. The outgoing feeders and controls may be arranged in a multi-tier formation with provision for 2 more compartments for future additions. The height of cubicles shall not be more than 2 M. All or some of the incoming and outgoing cables shall be either at the bottom or top of the cubicles as necessitated by site conditions and this shall be studied and determined before fabrication and assembly of the cubicles. Capacitors and their control switches shall be housed in a separate compartment with suitable ventilation louvers on both front and rear sides of the cubicles.

4.4 The Panels, SPDB and EMPDB shall be of self-standing type with provisions for fixing them to the floor or necessary plinth by means of bolts grouted in foundation. The cubicles shall be fabricated out of MS channels / angles of suitable sizes and CRCA sheet of not less than 2 mm thick. For industrial type, it will be floor & wall mounted.

4.5 All doors shall be hinged-type except bus-bar chamber covers which shall be of both side bolted type.

4.6 Copper bus-bars of both phases and neutral shall be of the same cross-section and capable of carrying the rated current under adverse temperature conditions. Busbar material shall comply with the requirements of grade 911 of IS:5087. Suitable insulator supports and PVC sleeves of R-Y-B and Black colour shall be provided for bus-bars.

4.7 A separate hot deep galvanized iron earth strip of adequate cross section shall be provided throughout the length of the panels with holes drilled at regular spacing for earth – connections of the various equipments.

4.8 All the equipments viz. MCCBs, SFUs, MCBs, CTs, Fuses, Basbars, neutral Links Cable Terminals, Cable inlets and outlets, Earthing points etc. shall be properly arranged within the cubicles / industrial type so as to facilitate easy maintenance and replacements. The measuring instruments, switch operating knobs / handles indicating lamps, relays etc. shall be suitable arranged on the front doors of the cubicles.

4.9 Wiring for metering, indication lamp and control circuits shal be done with 1100 V grade, stranded, tinned annealed copper conductors of PVC insulated, 2.5 Sqmm size wires shall be used. Suitable coloured cables shall be used for identification terminal ferrules at both ends.

4.10 All the cubicles / industrial type panels shall be uniformly finished with enamel paint Opaline Green Colour No. 275 of 13:5 after providing anti-corrosion coats. Inside surface of the cubicles shall also be similarly painted with final finish in broken white. Epoxy paint is to be used in saline/ corrosive areas only.

4.11 **Bus-Bars**

The Bus-Bars shall be suitable for 4 wire, 415 volts 50Hz system and made of high conductivity Electrolytic grade copper strips conforming to IS specifications. Bus-bars including their supports shall be able to withstand thermal and dynamic stresses due to the system short circuits. All the Bus Bars shall be insulated with PVC sleeving heatsink and suitably colour coded. Flush type, pin type hinged construction doors shall be provided for Bus-bar chambers, cable alleys, feeder compartments. All the live-parts shall be properly shrouded with Bakelite barriers. All the equipments shall be accessible from the front. Arrangement and fixing of Bus-bars main connections and wiring shall be in accordance with IS: 375-1963 (latest).

4.12 **Wiring**

All the inter connections between the incoming, bus and outgoing switches / MCB above 125A rating shall be done by insulated copper strips of suitable sizes. Switch fuses and MCCB of 125A & below rating shall be wired with insulated copper conductors. The wiring shall be terminated by using crimping sockets, laid out neatly in bunches and firmly fastened to the steel members of the panels. All the potential circuits shall be protected by fuses. All the control instrumentation and protection wirings shall be provided with printed PVC ferrules at both ends. For terminating control cables on to the equipments in the panels, suitable terminal blocks shall be provided. The terminal shall also be numbered for easy identification and maintenance.

4.13 **Earthing**

The panels shall be provided with a G.I. earth bus running throughout the length of the switch board.

4.14 **Surface treatment**

All sheet-metal accessories and components of switch board panel should be thoroughly degreased, de-rusted and hot dip phosphatised before red-oxide primer is applied. The panel shall be stove enameled to the required final finish. The interior surface of the panel shall be painted a off-white shade.

4.15 **Name Inscription Plate**

The panel as well as the feeders compartment doors shall be provided with name inscription plates giving the switch board / feeder descriptions as indicated on the drawings. A name plate with 25 MM high letters shall be inscribed for identification of panel and 6 mm high letters for incoming and outgoing feeders.

5 Load Break Change Over Switch

5.1 Changeover switches of the current rating indicated in the Schedule of Quantities are required for use in 3 phase and neutral 415 volt. Feeders for changing over from the main power supply system to Diesel generator supply and vice-versa. These switches shall have 4 pole and suitable for on-load operation.

5.2 **Switch Fuse Units (SFUS)**

5.3 SFUs of different current ratings are required for use in 3 phase, 415 V feeders / circuits for 'On load" closing and opening. The switches and HRC fuses shall in all respects conform to IS: 4064 and IS: 2208.

5.4 The complete switch-fuse units shall be suitable for mounting on multi-tier housed panels housed in sheet steel cubicles with operating handle / knob and "ON-OFF" indicator of the switch fixed on the front of the cubicle with door inter-locking arrangement.

5.5 **Air Circuit Breaker (ACB)**

5.5.1 ACBs are required for use in 3 phases and neutral, 415 V, 50 Hz power system for 'On load"closing and opening of feeders. Current rating shall be as indicated in the Schedule of Quantities. ACBs shall be of 4 poles, spring charged, manually operated, draw out type with built in earth fault, over-load and short circuit releases, operating handle, and door interlocks. The related breaking and making capacities shall not be less than 35 KA and 70 KA (AC) respectively. There shall beprovision for both current and time settings for fault protection. All settings shall be from the side. Necessary audio visual trip indications shall also be provided. ACBs shall conform in all respects to the relevant IS and IEC standard specifications. Two Nos. each N.C. and N.O. auxiliary contacts shall be provided.

5.6 (a) **Type and construction**

5.7

Air Circuit Breakers shall be of enclosed pattern, dead front type with 'trip free operating mechanism. Air circuit Breakers shal be drawable type with horizontal draw-out carriage. The ACBs shall be strong and robust in construction with suitable arrangements for anchoring when in fully engaged or fully drawn-out positions. The carriage or cradle on which the breaker is mounted shall be of robust design made of fabricated steel, supported on rollers. Cradle shall also comprise of main and secondary separable contacts and all draw out mechanism in a completely figwelded assembly. There shall be no dependence upon the panel board frame for any critical alignment. The withdrawal arrangement shall be such as to allow smooth and easy movements.

All the current carrying parts of the circuit breakers shall be silver-plated. Suitable arcing contacts shall be provided to protect the main contacts. The sequence of operation of the contacts shall be such that arcing contacts make before and break after the main contacts. Arcing contacts shall be provided with efficient are chutes on each pole and these shall be suitable for being lifted out for inspection of main as well as arcing contacts. The contact tips and arc chutes shall be suitable for really replacement. Self-aligned isolating contacts with automatic shutters to screen the live parts shall be provided. The design of the breaker shall be such that all the components are easily accessible to inspection and replacement.

(b) **Operating Mechanism**

Air Circuit Breaker shall be provided with a quick make and break, trip-free operating mechanism. The operating handle shall be in front of the panel. The design shall be such that the circuit breaker compartment door need not be opened while moving the breaker from completely connected through tests into the disconnected positions. All the ACBs should be provided with service-test isolated position with mechanical indication at the front. A flush mounted manual trip-breaker shall also be provided with a hand re-set automatic trip indicator.

5.8 Normally inspection is carried out at works but in case it is not possible, the routine Test Certificates in triplicate shall be supplied with the equipment.

5.9 Miniature Circuit Breakers (MCBs) and Isolators

5.9.1 MCBs are required for both 3 phase and single phase in TPN & SPN grouping for "On Load" switching operating and also for protection of distribution circuits of 415V / 230V against over load and short circuit faults. Actual requirements viz. combination, current rating, number of sets etc are given in the "schedule". The MCBs shall conform in all respects to IS: 8828 and have short circuit rating of 10 "KA".

5.9.2 Over Current and Earth Fault Relays (OC & EF)

OC & EF shall conform to IS: 3231 and be suitable for the specified CT ratings. The relays shall have inverse type characteristics for over currents and operate instantaneous on earth faults. The operating time shall be less than 20 milli seconds at a time the setting the relays shall be provided with plug bridge type settings in 5 steps from 60 to 300 percent for over currents and 15 to 90 percent for earth faults. There shall be a minimum of 2 N.O./ contacts of 3 Amp. Continuous rating with the relays. The relays shall also be provided with plug indication and reset arrangement.

5.9.3 Earth Leakage Circuit Breaker / Residual Current Operated Circuit Breakers (ELCB / RCCB)

5.9.3.1 These shall be of modular construction and provide complete protection against earth leakage faults, overloads and short circuits. ELCB / RCCBs shall meet the requirements of IS: 12640 and having sensitivity of 100 mA.

5.9.4 Current Transformers (CT)

5.9.4.1 CTs are required for current and energy measurements and also for OC & EF relays. CTs shall be suitable for use in 415 Volt 3 phase circuits and have suitable ratio for measurement with 10VA / 15VA rated burden on the secondary. The CTs shall conform in all respects to IS: 2205. the tenderer shall correctly quote the relevant CT- Burden as per requirement.

5.9.5 Meters (All are Analog)

5.9.5.1 Ammeters are required for measurement of current in conjunction with CTs of incoming 415 V feeders. These shall be of industrial grade, square dial of size 96 * 96 mm for incoming feeder and 72 * 72 mm for outgoing feeder and suitably graduated. The ammeters shall be flush-mounting type, suitable for fixing on front of cubicles and conform to IS : 2419 and IS: 1248 in all respects.

5.9.5.2 Voltmeters are required for direct measurement of voltages 3 phase, 415V circuits. These shall be of industrial grade, square dial of size 96 * 96 mm and suitably graduated for 0.600V range and conform to IS:2419 & 1248 in all respects. These shall be flush mounting type and suitable for fixing on front of the L.T. cubicles.

5.9.5.3 KWH meters of both 3 ph and 1 Ph are required for measurement of energy in LT circuits of 415V and 230V, 50Hz supply. Three-phase meters shall be suitable for recording 3 phase, 4 wire loads, with CTs having a secondary full-load current of 5A. single phase meters shall be of standard ratings or the next higher ratings available. All the meters shall be of induction type class 1 accuracy having digital read out suitable for panel mounting and conforming to IS: 722 in all respects. Contractor shall get these meters tested in approved laboratories before installation and submit test certificates.

5.9.5.4 3-Phase4- wire Power- factor meters shall be panel flush mounted type with not less than 96*96 mm suitable graduated with leading and lagging power factor for unbalanced load. The range shall of 0.4 to 1.00 with commercial class accuracy and conform to relevant IS / BS specification.

6 SPECIFICATION OF SUB-MAIN AND POINT WIRING:

6.1 A power circuit shall always be originated from a distribution fuse boards and the same shall run in a separate PVC conduit / cable as considered in general scheme.

6.2 Insulated or covered earthing conductors where used, shall have green insulation braiding or covering as appropriate. Under as circumstance shall the colour green be used for other than

earthing conductor. In addition, where it is required that cables of different colours be used for identification purposes, the following system shall be employed. Red, Yellow and Blue colour for phases and black for neutral only.

6.3 The electric load of all lights, power outlets etc shall be balanced across the three phases.

6.4 Unless otherwise mentioned in the schedule of quantities, single way porcelain / Bakelite terminal connector with mickle plated brass in and screws to suit the conductor size shall be used for intermediate wiring joints in switch boards.

6.5 Distribution wiring in PVC conduit casing capping to light, fan socket outlets, exhaust fan points etc shall be done in looping in system. In this system except at terminating points such as at terminal of switches, ceiling roses etc and in case of socket outlets at the socket terminals. Inter-mediate wiring joints in junction boxes will not be permitted.

6.6 The maximum number of wires drawn in one PVC conduit shall not be greated than the recommended number given in the table of IS:732-1963, contractor must consult the specification given above.

6.7 Sub-mains are considered for the wiring from PDB to power outlets LDBs. These may be by 2 core armoured PVCA cable / PVC insulated sheathed copper conductor wires as considered in bill of quantities.

7 POINT WIRING IN BUILDINGS

7.1 Wiring in the buildings shall be concealed / surface drawn. PVC conduits, conduit accessories / PVC casing, capping cables, ceiling roses, switches etc used in the wiring shall be of approved makes. All wiring to be done by stranded single core copper P.V.C. conductor of sizes 1.5 Sqmm for phase & neutral and 1.5 Sqmm copper PVC cables for earth wire (green colour). In case of rewiring partially the similar cables are to be used as existing.

7.2 Laying of conduits, conduit accessories and wiring in concealed an surface systems shall met the requirements of IS: 732, National Electrical Code and also National Building Code.

7.3 The PVC and M.S. conduits shall conform to IS:9537(part 1 and 3) and IS:1653 respectively. Metal junction boxes / PVC junction boxes shall be used with PVC /M.S. conduits as the case may be. Conduit accessories such as junction boxes / pull boxes, bends sleeves etc. shall conform to IS: 5133. Necessary G.I. pull wire of 14 SWG shall be provided in the conduits from one end to the other as required for drawing electrical wires

7.4 PVC conduits / Alkathen pipes shall be laid as far as possible in straight runs tied to the reinforcement bars to prevent the getting dislocated during concreting. Where conduits are required to be embedded in the walls. The walls shall be chased to the required depth and conduits fixed in position by means or suitable pipe hoods at every 300 mm distance in an approved manner. The walls chased for conduit embedding shall be covered suitably by the Electrical Contractor.

7.5 Terminal / outlet / switch boxes shall be of MS sheet of not less than 1.5 mm thick and provided with 4 6 8 threaded holes depending upon the size of box. The depth of the boxes shall not be less than 75 mm and the centre cross sectional area in between from 100 to 750 Sqcms. The boxes shall be provided with 2 coats of anti-corrosive paint and the inside surface finished with suitable white paint. The front cover should be of 3 mm thick coloured or white Hylum sheet and over size by 1 cm all round shall be provided with suitable brass screws and cup- washer for M.S. Board only.

7.6 Sheet Metal Connector Box (14 SWG) of the following sizes with 3 mm thick white Hylum sheet cover is to be used.

a) 6" x 4" x 2.1/2"
b) 7" x 4" x 2.1/2"
c) 8" x 6" x 2.1/2"
d) 4" x 4' x 2.1/2"

7.5.2 In case of surface wiring by casing capping, the double T.W. Switch Board and Junction Box of the following sizes (With 3 mm thick white Hylum sheet cover fixing by 4 Nos brass wooden screw with cup-washer) are permitted:

i) Double T.W. Switch Board:
7" x 4" x 2" / 8" x 6" x2" / 8" x 10" x 2" / 8" x 12" x 2"

ii) Junction Box:
7" x 4" x 2" / 4" x 4" x 2"

7.5.3 <u>T.W. Round Block (75 mm dia)</u>

There shall be 3 mm wide and 3 mm deep-groove cut al round the surface against which the bottom of cover will rest and approved plastic compound shall be filled before fixing it finally.

7.5.4 <u>Installation of Switch Board</u>

These shall be installed at a height of 1.3 meters (4'-3") above the floor level.

7.5.5 Various sizes of wires viz 1, 1.5, 2.5, 4 and 6 sqmm which are required to be used in the wiring of buildings shall be of stranded flat twin / singled core copper conductors, PVC insulated & sheathed 1100 volt grade conforming to relevant IS- Specification.

The number of cables / wires drawn in various sizes of conduits shall not exceed the following limit.

Cable sizes	**Conduit diameters**		
	20 mm	**25 mm**	**40 mm**

1.5 sqmm	**6**	**10**	**-----**
2.5 sqmm	**4**	**18**	**------**
4.0 sqm	**3**	**6**	**------**
6.0 sqm	**2**	**4**	**8**

8 TELEPHONE WIRING

PVC conduit junction boxes, drawing boxes outlet boxes and covers for telephones system with suitable sections of PVC pipes for of 2 pair 5 pairs and 10 pairs PVC insulated telephone cables duly terminated with multi-pair PVC insulated terminal injunction boxes to connect up the telephone points outlets. The telephone lines must be kept 150 mm apart from power & lighting system conductor must submit a line diagram and obtain prior approval from Authority.

8.1 EQUIPMENTS AND FITTINGS

The type, rating, the required features, location of fixing etc are indicated in the schedules. The schedule includes all other required accessories, fasteners, small wiring etc, fixing aligning, connecting, testing and commissioning. The materials shall be of good quality acceptable to Engineer-in- Charge and to be fixed in position as directed by him.

8.2 Box / Rail Type Fluorescent Light Fittings

Both single and twin tube assemblies shall be of standard fittings made out of cold-drawn sheet steel, stove enameled, the box finished ingray colour andits cover plates in white colour, complete with copper chokes, starters, starter holder, tube holders, lamps and earth terminal etc.

8.3 Decorative Type Fluorescent Light Fittings

Similar to 16.2 with opal acrylic diffuser.

8.4 Mirror Optics Type Fluorescent Light Fittings

Both single and twin tube assemblies shall be of standard fittings made out of cold-drawn sheet steel, stove enameled, the box finished in gray colour and it cover plates in white colour, complete with copper chokes, starters, starter holder, tube holders, lamps and earth terminal etc. with mirror reflector.

8.5 Corrosive Resistant Type Fittings

Similar to 16.2 with FRP body complete with copper chokes, starters, starter holder, condensers earth terminal suitable lamp holders, lamp etc assembled and wired neatly.

8.6 Compact Fluorescent Type Light Fittings

Compact fluorescent fitting with 2 x 11 watt lamps, holders, stainless steel reflector with housing and OPEC acrylic diffuses etc of "SIGMA" search light make.

8.7 **Bulk Head Fittings**

The fittings shall be made of pressed Aluminium body, outside finished in gray stove enamel and inside white, provided with prismatic glass, covers, rubber gaskets, BC lamp holders, earthing terminal wire net and lamps.

8.8 **Street Light (TFL) Fittings**

The fittings shall be SON / 70W / 150W or weather proof type fluorescent street light fittings. The fittings shall be made of Aluminium sheet and finished outside in hammertone gray colour, stove enameled and white inside, complete with copper wire chokes, starters, condensers, suitable lamp holder, lamps, assembled and wired neatly and provided with clear acrylic moulded cover held by spring loaded hooks against sponge rubber gaskets to make the whole unit dust, vermin and waterproof.

8.9 **Post-Top Luminaries**

The Post-Top Luminaries is to be provided at Gate Pillars and in garden. The Post-top luminaries shall be similar to Philips Cat No. SPC / 11 and supplied with Son 70W lamp and e Post-Top Luminaries is to be provided at Gate Pillars and in garden. The Post-top luminaries shall be similar to Philips Cat No. SPC / 11 and supplied with Son 70W lamp and G.I. wire guard . Necessary pipe shall also be supplied.

8.10 **Ceiling Fans**

The fans have to be suspended normally from the ceiling. These shall be single phase AC 230V, double ball bearing 50Hz and of sizes indicated in the Schedule. However, if adequate vertical clearance is not available due to low ceiling, wall-bracket fans will have to be provided. Fans shall be include choke type / electronic type regulator switch hard rubber bushes, condensers suspension couplings, terminal blocks, suitable top and bottom canopy (covers) etc. Ceiling fans shall be of double ball-bearings type, conforming to IIS: 374 in all respects. Fans should be supplied of approved make.

8.11 **Exhaust Fans**

Heavy / light duty fans are required for exhaust ventilation in buildings, the fans shall be suitable for AC, single phase, 50 Hz, 230V supply. These must be of robust construction having very low noise level. All exhaust fans shall be impeller type with ring mounting arrangements for fixing on walls. The exhaust fans shall conform to IS: 3588 in all respects.

Capacity and size of fans will specified in schedules. The exhaust fans are also to be included with auto timer for it's running at regular internals.

8.12 **Metal Clad Switch Socket Unit**

All the switch-socket units shall be made of non-corroding pressure-case Aluminium alloy and these must be dust, vermin, water and rust proof. Switch-socket units shall be provided with interlocking arrangement for switch and plug HRC fuses, Neon-indicator lamps, terminal blocks and pin-top. The units shall be suitable for both flush and surface mounting. Switch socket units shall comply with IS: 4160.

8.13 **Installation of ceiling fan**

Unless otherwise specified, all ceiling fans shall be hung not less than 2.75 M (9 ft) above floor. The suspension rod and clamps shall be painted with approved paint without involving extra cost.

8.14 **Installation of Fluorescent light fitting**

In case of suspension from ceiling by two rods, each fixing to the ceiling shall be capable of sustaining at least 1.1 kg of dead weight. The down rods and accessories shall be painted with approved paint without involving extra cost. Unless otherwise specified, these should be suspended 2.60 M (8'- 6")

8.15 An angle iron frame D.Bs shall generally be installed at a height of 2.13 Mts (7 Ft) from floor level.

8.16 All fan clamps will have to be provided from R.C. ceiling as per approved design of PWD (ELECTRIC)Schedule of works.

8.17 Control switches for lights, fns call bells, exhaust fans etc shall be of rating 6 Amps, 230 Volt, Piano-type flush mounted, cream colour conforming to relevant Indian Standards. Ceiling roses also shall be of 6 Amps. rating 230V cream colour deluxe conforming to the relevant IS- Specification. Switches of 16 Amp capacity and associated 16A socket would also be required to provide facility of connection of power load upto 1 KW. Alternatively, Industrial type plug-socket board may be used in specific cases. Cable used for power load should be of suitable capacity.

8.18 After successful completion of the work, the final drawing / Blue Print Plan showing the details circuit diagrams and fittings, fixtures are to be submitted along with the final bill.

9. **EARTHING**

All non-current carrying metal parts of the electrical installations such as switch gears. LT panel distribution boards, power plugs, exhaust fans, air conditioners, cable glands, MS conduits, switch

boxes etc shall be bounded together suitably and connected to earth-stations in accordance with the requirements of Indian Electricity Rules and IS: 3043.

All earth stations shall be of the same type similar to one illustrated in IS: 3043, using pipe electrode of galvanized steel Class B having 65mm / 50mm dia and a length of 3.04 meter buried vertically in the ground and providing layers of charcoal / coke and salt as necessary. The top end of the pipe electrode shall have suitable arrangements for making connections of earth wire / flats in the manner approved by the Engineer-in-Charge. The earth stations shall be located at least 2 M away from the buildings and not less than 6 M apart. Nearby earth stations (at least 2) shall be interconnected with suitable size GI flat.

The earth inspection pit should be provided with brick and cement work of 254 mm (10") thick with 1st Class bricks in cement mortar (6:1) both inside and outside plastered 19 mm (3/4") thick and including neat cement finish 1.6 mm in thickness both inside and top outside & C.I. manhole 0.46 Mt. dia. Complete with C.I. cover (weight being 32 Kg) fixed flush with ground surface. The inside dimension when finished should be 0.60m x 0.60m (2' x 2') and 0.40m (1'- 3") in depth.

Earth connections shall be as follows:-

i) In case of system earthing, sub-stations, LT Panels and MDBs, GI Flat of not less than 25 mm x 6 mm size.
ii) For building wiring the earth lead will be drawn from earth electrode to earth bus-bar by 19/10 GI stranded wire and from earth bus-bar to PDB 8 SWG GI wire & from PDB to SDB & LDB etc by No- 10 SWG G.I. wire. For power plug and 6 Amp plug, either by 1 Sqmm stranded copper / 16 SWG GI wire as the case may be which will be mentioned in B.O.Q/ Schedule of Works
iii) Double connections shall be made for medium voltage supply. (251 to 650 V)
iv) All earth wires and flats from one end to the other shall be continuous and without any joints an so laid to protect them against mechanical damage.

If the required earth resistivity is not obtained with the earth-pits, additional pits shall be made for improving the system resistivity. The rates payable for additional pits shall be same as the rates quoted in the tender.

Earthing schedule includes supply of all required materials, digging pits, providing charcoal / coke and salt, filling up the pits, (providing cement concrete chamber with cover for sub-station earthing) only laying of earth wires / flats, making connection with proper fasteners, finishing masonry works that have been disturbed for electrical works, testing etc.

10. **Erection of Poles:**

Erection of single street tubular pole of length, as given below with or without sole plate & cap etc in cement concrete foundation (proportion and dimension indicated below) as to G.S. having 600 x 600 x 150 mm thick cement concrete (4:2:1) base block below sole plate/ Pole with hard jhama metal including CC (6:3:1) muffing of 0.3 mt (1'Ft) above ground level including 3 mm (1.8") thick neat cemented finish and providing GI earth bolt after making drilled holes etc on polce & carriage of polce upto 1.6 km from store depot

to work site including filling up the excavated earth pit with shifted soil and ramming properly.

Dimension of poles	Proportion	Dimension
a) Upto 9 mts	6:3:1	0.6 x 0.6 x 1.70 mt
b) Above 9 mts	6:3:1	0.6 x 0.6 x 1.91 mt

10.1 Painting of steel Tubular Pole of lengths and no of coats of paint as given below with ready mixed paint primer of approved make brand including preparation of surface by sand paper / emery paper, cleaning etc for receiving fresh coat of paint.

10.2 Painting block letters or digits within a circle / square as required with " Black Japan" paint of approved make & brand the size of letters and digits.

10.3 Painting of any steel /iron surface with no of coats of paint as given below with ready mixed paint / primer of approved make and brand including preparation of surface by sand paper, cleaning, etc for receiving fresh coat of paint.

10.4 Supply and Erection of stays sets as described in Bill of Quantities.

10.5 Erection of Galvanized cross arms / 'D' iron clamps as described in Bill of Quantities.

10.6 Erection of insulators as described in Bill of Quantities.

10.7 Supply and erection of conductor (ACC or ACSR with necessary binding wires) as described in Bill of Quantities.

10.8 Erection of Earth Wire, Safety Devices, Cradle guard, lightning Arrestors, Fuses etc as described in Bill of Quantities.

10.9 Supply and erection of conductor joint & tapping accessories as described in bill of quantities.

10.10 Street light as described in bill of quantities.

10.11 Service connection with 'L' type / vertical type G.I. pipe bracket as described in bill of quantities.

10.12 The Schedule item of street light poles include manufacture of stepped poles, excavation of pits, making concrete foundations, erection of poles, filling up of pits satisfactorily, fixing of light fittings on poles, connection with suitable weather proof insulated wires, earthing, testing and commissioning at the locations decided by the Engineer –in- Charge. The pole shall be as per the sketch enclosed.

10.13 The poles shall be manufactured out of steel tubes conforming to IS:2713 as shown in the drawing. There shall be a base plate of MS of size 220 x 200 x 6 mm welded to the bottom

of the pole and one MS rod of 19/20 mm dia and 300 m long inserted across the pole and welded at a height of 600 mm from the base plate and both of them coated with black bituminous paint..

10.14 The cable terminal arrangement shall be built in within the MS loop box as per in the sketch. Water light 2 mm thick MS box shall have locking arrangement to house two sets of terminal for incoming and looping connections and one re-wireable fuse fitting with 6 Amps fuse fixed on 6mm thick Hylum base and properly insulated to withstand weather conditions.

10.15 The poles shall be erected properly with cement concrete foundations as per PWD (Elec) specification. Necessary curing of the concrete shall be done as per relevant procedures. Two P.V.C. pipe of not less than 30 mm dia with gland and bends shall be provided in the foundation for cables entry into terminal box. Electrical connection between the terminal box and the light fitting shall be made by means of 2.5 mm single core. PVC insulated copper cable of 1100 grade.

11 Diesel Generator Set

11.1 Silent type D.G.Set as per B.S 5514 / I.S.O. 3046 meeting the required Emission & noise norms specified by CPCB / MOEF Govt of India and complete with-

1. Diesel Engine
2. Silencer unit in the exhaust circuit
3. Fuel tank & fuel piping
4. Governor
5. Alternator
6. Control Panel
7. Concomitant accessories

7.1 Acoustic enclosure

7.2 Sensing unit & time relay & provision for auto starting / stopping with A.T.S.

8 Anti-vibration Mounting pads

11.2 Diesel Engine shall complete with:-
Heavy duty air fitter, radiator with fan, lube oil & fuel oil filter, fuel injection equipment, electronic governor, engine speed control unit, turbo charger, lube oil pump, fly wheel with safety guard exhaust silencer, lube oil cooler & water pump, self start unit with dynamo & battery, engine control panel with oil pressure gauge, water temperature button start with key switch, silencer having maximum noise level of 75 db, stack height of the exhaust pipe as per CPCB, fuel tank with level gauge of 12 hour capacity, electronic Governor and shall conform to class A-1 or G-3 as per BS 5514 / ISO 8528.

11.3 Alternator as per I.S. 4722 with +- 2.5% voltage regulation under all load condition shall be of self exciting, self regulating type in SPDP enclosure and suitable for 415V 3 phase 4 wire 50 Hz AC system. The neutral point shall be brought out.

11.3.1 Control Panel as per IE Rules & relevant I.S. shall comprise of Ammeter & voltmeter with selector switches, push button for Engine starting / stopping, 4 pole ACB, Bus-bar, KW meter, KWH meter, P.F. meter, set of indicator lamps, battery charge indicator.

11.4 Essential & relevant datas viz Power Rating, voltage rating, frequency & phases and other duty conditions for which the generator is required are as per enclosed schedule of works / specification.

11.5 Other technical particulars to be furnished by the Tenderer under certification of Manufacturer are:

Diesel Engine:
Maker's name & type, cylinder number, RPM, normal rated prime output, guaranteed rated output (continuous BHP 24 hour running), guaranteed consumption of fuel at 100%, 75%, 50% of rated output ltre / BHP, mechanical efficiency, type of coupling, net weight of engine including fly wheel etc.

Alternator:
Maker's name & type complete with concomitant technical & physical data viz KW rating, regulation, efficiency, overall weight with mounting channels etc.

11.6 Installation work to be carried out following provisions of IE Rules, B.I.S. code of practice, P.C.B. WB / CPCB and Manufacturer's installation manual under direct supervision of licensed supervisor & to be tested & commissioned after obtaining clearance from local statutory body.

LIST OF APPROVED MAKES / BRANDS

All materials to be supplied and installed by the contractor shall be of approved makes and conform to the relevant Indian Standard / CPRI Certified / Indian Electricity regulation. Whenever the make and model of an item is specifically mentioned in the schedule of works / bill of quantity the same shall be considered and quoted for, in the tender. However, for the guidance of the contractor some of the approved makes of materials are listed below which can be used when not specifically mentioned in the schedule of works / B.O.Q. In case the make and model of any item required to be installed is not available in the following list, the same shall be got approved by DOEACC prior to being brought to site and installed. However, catalogues / leaflets containing specifications etc. and a sample of all materials whether covered in the list or not shall be submitted to DOEACC for approval and only on approval preceded by factory inspection / testing, if needed of the same further orders shall be placed by the contractor. Any material brought to site without the above procedure is liable to be rejected outright.

SL. NO.	ITEM	APPROVED MAKES
1.0	H.T. SWITCH GEAR	BIECCO LAWRIE / CROMPTON / ABB / KIRLOSKER / SCHNEIDER
2.0	DRY TYPE TRANSFORMER	UNIVERSAL MAGNETIC / CROMPTON / EMCO / UNIVERSAL POWER TRANSFORMER B'LORE / KIRLOSKAR / TRANSFORMER RECTIFIER
3.0	L.T. SWITCH GEAR	
3.1	AIR CIRCUIT BREAKER	L&T / SIEMENS / GE / SCHNEIDER / ABB / LEGRAND
3.2	MCCB	LEGRAND / L&T / ABB / SCHNEIDER / SIEMENS
3.3	AMMETER, VOLTMETER, C.T.	AE
4.0	CABLES / ACCESSORIES	
4.1	CABLES	GLOSTER / NICCO
4.2	CABLE LUGS/ GLANDS	DOWELL / JAINSON
4.3	HEAT SHRINK JOINTING KIT	RPG / M-SEAL
5.0	MCB DB & MCBS	LEGRAND / HAGER
6.0	CONTACTORS	L&T / SIEMENS
7.0	TIMERS	LEGRAND / L&T
8.0	WIRES	FINOLEX (FRLS)
9.0	PVC CONDUITS	PRECISION / ACTION
10.0	SWITCHES / SOCKETS	ANCHOR
11.0	EXHAUST FAN	GEC / EPC / CROMPTON
12.0	LIGHT FITTINGS	PHILIPS / CROMPTON

GENERAL SPECIFICATION FOR ELECTRICAL WORK

1.0 SCOPE:

Scope of these specifications relate to the supply, installation, testing & commissioning of equipments & accessories associated with the work of Re-organization & restructuring of existing 300KVA (2 X 150), 6KV / 415V distribution sub-station having single incoming H.T. Power Supply feder at 6KV from adjacent sub-station of J.U. and even outgoing L.T. power supply feeders at 415 volt to adjacent premises of DOEACC, as described & detailed in the tender.

2.0 **RULES, REGULATIONS AND STANDARDS:**

All equipments & Accessories to be supplied & used shall conform to applicable standards as laid down in relevant specification of bureau of Indian Standard (with upto date amendment) and in its absence the International Electro-technical Commission and all works shall be carried out in conformity with Rules, Regulations and various standard practices, as set out in relevant B.I.S/ codes, some of which are depicted hereunder:-

1. Indian Electricity Act 1910
2. Indian Electricity Act 1956
3. National Electrical Code
4. I.S. 11171-1985 read with I.S.2026, Dry Type Transformer
5. I.S. 13118-1991/CPRI CERTIFIED, Vaccum Circuit Breaker
6. I.S. 2516-1985 IEC 157- Air Circuit Breaker
7. I.S. 3043, Earthing
8. I.S. 1554/7098 read with I.S. 1255/10810, cables

In addition, all installation shall conform to the requirement of local authorities & statutory Regulating authorities like Directorate of Electricity, Licensing Authority etc.

3.0 **DRAWINGS:**

The Drawings given with the tender only indicate the general scheme of requirements and the same is only conceptual. Contractor shall prepare all detailed design & working. Drawings for obtaining approval of competent authority such Drawings VIZ schematic Diagram, Layout diagram, shall clearly indicate the physical dimensions of all rooms of existing sub-station and also of all equipments & accessories including electrical clearances provided for respective equipments. Relevant particulars like cable trenches / layout, Earth Electrodes & Earth Busbars of Earth System / Layout shall also be incorporated in the Drawing.

4.0 **TESTING AND COMMISSIONING:**

On completion of all works entire installation is to be tested as stipulated in relevant BIS codes and such tests are to be carried out by enlisted agencies of Directorate of Electricity. Test reports to be submitted in triplicate for obtaining approval of Competent Authority and on receipt of such approval & necessary clearance for appropriate authority the installaktion is to be energized & commissioned.

Part-B
Financial / Price Bid

1 Background

- DOEACC Society Kolkata Centre is a Scientific Society under Department of Information Technology, Ministry of Communications and Information Technology, Govt. of India. The Centre is located in Jadavpur University Campus, Kolkata – 32.
- The DOEACC Society, Kolkata Centre has planned to replace its existing old Transformers (2 X 150 KVA) Transformers by a new 400KVA Dry type Transformers Completed with associated HT & LT Gears.
- The New 400 KVA Transformer would be purchased while the Existing Transformers (2X150 KVA) would be sold on as-is-where-is basis. It will be done in a phase manner. One Transformer would be disposed immediately while the other would be disposed after installation and transfer of the full load (i.e one month smooth running of the 400 KVA Transformer). A Complete details of the 2X150 KVA is attached here as Annexure – I
- The price of the two 150 KVA Transformer should be shown as a separate item in the price bid and should not be clubbed with the price of 400 KVA Transformer. The buy back price should be shown as a negative price for adjustment.
- Renovation and Restructuring of existing electrical installation which includes (i) Power supply system, Power Panels, Mains. (ii) Internal Electrical Installation of Gr. & 1st floor (iii) Internal Electrical Installation of 3rd floor

2 Bill of Material –

SHEDULE OF WORK

NAME OF WORK: RENOVATION AND RESTRUCTURING OF EXISTING ELECTRICAL INSTALLATION AT DOEACC SOCIETY, KOLKATA CENTRE PHASE – I

PART: A
(POWER SUPPLY SYSTEM, POWER PANELS & MAINS)

SRL	DESCRIPTION OF ITEM OF WORK	QTY.	UNIT RATE	AMOUNT

NO.			(Rs)	(Rs)
1.	**SUB-POWER PANELS & MAIN COMPOSITE POWER PANELS:** Supply & installation of Distribution Panel Board 415 / 240V 3-Phase & Neutral 50 HZ AC dust & vermin proof sheet steel (2 mm CRCA) enclosed, self standing, floor mounted / floor cum wall mounted, cubicle type having separate compartments for respective components & accessories like MCCBS / Busbars / Switch fuse units etc including spare one for prospective accommodation complete with all associated accessories like indicating lamps, instrument fuse units, earthing terminals, lifting lugs, danger boards, inter connection wiring, identification letterings / inscriptions etc. The panel board shall comprise of following components & equipments and complete with floor mounting / floor-cum-wall mounting pedestal / bracket made of 75mm / 50mm M.S. channel suitable for installation on masonary pedestal on floor / over the cable trench etc with all necessary civil work & grouting nuts, bolts etc. A) 1) Sub-Power Panel – 2 (SPP2 at 3rd floor corridor) : Floor-cum-wall mounted with floor-cum-wall mounted bracket & Base frame made of 50 x 50 x 50 x 6 mm channel. a) Panel part 1 : (i) Incoming 1 : 1 No. 160A 4P MCCB with 0/L, S/C & E/F protection (ii) 2 nos Castell Locks (2 Lock & 1 Key operation type) (iii) Incoming 2 : 1 No. 160A 4P MCCB with 0/L., S/C & E/F			

	protection (iv) 1 Set of TPN Busbar Complete with 40 mm x 6 mm of full length of Bus-alley Copper bars of electrolytic grade for phase & neutral with adequate nos of drilled holes on proeclain/moulded Fibreglass insulators of adequate electrical & mechanical strength to withstand stress in the event of system fault. (v) 2 nos. 0-500V voltmeter with HRC fuses & selector switch. (vi) 1 No. 0-200A Ammeter with a set of 3 nos CTS & Selector Switch. (vii) 1x40 mm x 6 mm G.I. earth Busbar of full length of the Panel. (viii) Connection & Inter-connection through brought-out terminals & dropping bars of adequate size of respective I/C & O/G switches/Busbar. (Suitable for top & bottom entry of I/C & O/G cables) (Refer DRG. No. 01/RROFEE1/DOEACC/OCT2008) b) <u>Panel Part – 2</u> : (i) incoming – 1 : 1 No. 250A 4P MCCB with 0/L, S/C E/F protection. (ii) Incoming – 2 : 1 No. 160A 4P MCCB with 0/L, S/C & E/F protection (iii) 2 Sets of Castell Locks (2 Lock & 1 Key operation type). (iv) 1 Set of TPN Busbars complete with 40 mm x 6 mm of full length of Busalley copper Bars of electrolytic grade for phase & neutral with adequate nos. of drilled holes on porcelain moulded fiberglass			

	insulators of adequate electrical & mechanical strength to /withstand stress in the event of system fault. (v) 1 x 40 mm x 6 mm G.I. earth bar of full length of width of the panel. (vi) Connection & inter connection through brought out terminals & dropping bars of electrolytic copper strips of adequate size (for outgoing connections as shown in the DRG No. 01/RR of EE1/DOEACC/OCT2008 complete with porcelain/bakelite hylam/moulded fiberglass insulators to be provided) [The Switch disconnector fuse units will be of FN type of L&T/Equivalent Semens/GE. The MCCBS will be of minimum 36KA breaking Capacity & of make Legrand/L&T and shall be provided with spreader links, rotary handles with extension rod & door inter lock mechanism] B) MAIN COMPOSITE POWER PANEL-2 (at 1st floor room no.205). (a) MPP2 of MCPP2 (Main Power Panel-2 of Main Composite Power Panel-2) i) Incoming 1: 1 No. 250A 4P MCCB with O/L, S/C & E/F protection. ii) Incoming 2: 1 No. 250A 4P MCCB with O/L, S/C & E/F protection (iii) Outgoing : 4 Nos. 125A 4P MCCB with S/C, O/L & E/F protection. (iv) 2 nos. of Castell Locks (2 Lock & 1 key operation type) (v) 1 set of TPN Busbar complete with 40 mm x 6 mm size and of full length of Bus-alley electrolytic copper Busbars both for 3 phases & neutral with adequate NOS. of drilled holes on porcetain/moulded fiberglass insulators of adequate Electrical & Mechanical strength to with stand	1 Set	91,000.00	91,000.00

	stress developed in the event of system fault. (vi) 2 nos 0-500V Voltmeter with HRC fuses & selector switch. (vii) 1 set of 40 mm x 6 mm G.I. Earth Busbar of full length of width of MPP2 having projected Earth stud. (viii) Connection & inter connection of 1/C & 0/G switches & Busbars through brought-out terminals & dropping bars of electrolytic copper bars of adequate size. b) UPP-2 OF MCPP2 (UPS power-panel-2 of Main composite Power Panel-2) (i) Incoming : 1 No. 125A 4P MCCB with O/L, S/C & E/F protection (from OUTPUT-PLUG/SOCKET OF PROPOSED UPS2) (ii) Outgoing : 3 nos. 125A 4P MCCB with O/L, S/C & E/F protection (To BB3, BB5 & C.0.2/2) (iii) INCOMING & OUTGOING CHANGE-OVER MECHANISM (To TIE-UP EXIST. UPS1 & PROPOSED UPS2) : 2 NOS. 125A 4P ONLOAD change-over Switches & 1 No. 125A 4P MCCB WITH O/L, S/C & E/F protection. (iv) 1 Set of TPN Busbar complete with 25 mm x 6 mm size of full length of Bus-alley Copper Busbars both for 3 phases & neutral with adequate nos. of drilled holes on porcelain/moulded fiberglass insulators of adequate strength to with stand stress developed in the event of system fault. (v) 2 nos. 0-500V Vatmeter with HRC fuses & selector switchs. (vi) Connection & inter Connection of 1/C & 0/G switches & busbars through brought-out terminals & dropping bars of electrolytic Copper strips of adequate Capacity. (The MCCBS will be of minimum 36	1 Set	1,78,000.00	1,78,000.00

	KA breaking Capacity & of make L&T / Legrand and shall be provided with spreader links, rotary handles with extension rod & door inter locking mechanism.)			
2.	SERVICING, REPAIRING & REORGANISING THE EXISTING MAIN COMPOSITE POWER PANEL (MCPP-1) : (A) Seperately located INCOMING PANEL with metering (to be rebuilt):- Supply & Installation on angle iron frame on wall the following equipments & accessories in sheet steel enclosure complete with hinged door (2 mm CRCA sheet) and complete with painting and earthing studs etc: (i) 1 No 4P 400 Amp MCCB with O/L, S/C & E/F PROTECTION (Minimum 36KA breaking Capacity) including supplying & fixing spreader links, rotary handle with extension rod assembly & door interlock mechanism (L&T/Legrand). (ii) 1 No. 0-500V Voltmeter with fuses & selector Switch (iii) 1 No. 0-300A Ammeter with Set of 3 CTS & Selector Switch. (iv) Indicating Lamp sets & fuses. (v) Determination & re-termination of existing I/C & O/G 3.5 Core 240 / 300 sq. mm. PVC/A Cable with new crimping sockets & gland. (B) MAIN COMPOSITE CUBICLE PANEL-1 (MCCP1) : Servicing the existing Switch fuse units as under for their proper functioning both electrically & mechanically including replacing worn-out defective Electrical &	1 Set	35,000.00	35,000.00

	Mechanical parts operating mechanism, as are necessary and S+F new HRC fuses, handle assembly, door gaskets including derusting & spray painting the complete cubicle panel complete with lettering of identification of I/C & O/G feeders & inscribing the connection & interconnection diagram in legible & sustainable manner : (i) 400A Switch fuse units (Siemens KL 3 Nos.) (ii) 250A Switch fuse units (Siemens KL 2 Nos.) (iii) 125A Switch fuse units (Siemens KL 6 Nos.) (iv) 60A Switch fuse units (Siemens KL 1 Nos.) Including dismantling the Castell Locks (3 Nos) of 2 x 400A SFU (S2 & S3 of MPP1) & 1 No. 250 SFU (S1 of UPPI) also including disconnect & dismantle the By-pass ie the interconnection between 400A SFU (S3) of MPP1 & Busbar of UPP1 and also disconnect the 400A SFU (S3 of MPP1) from Bus of MPP1 complete with connection & inter-connection as per DRG No: 01/RR OF EEI/DOEACC/OCT2008 and as detailed hereunder:- determination of existing incoming & outgoing feeders of both MPPI & UPP1 and re-terminate those as per DRG including refinishing the ends by supplying & fixing new dowel's solder less sockets & glands as per DRG. (3.5 x 240 sq. mm. -1 set, 3.5 x 95 sq. mm. -2 sets, 3.5 x 70 sq. mm. -1 set, $3^1/_2$ x 25 sq. mm – 3 sets.) (C) INCOMING & OUTGOING CHANGE-OVER MECHANISM TO TIE-UP UPS1 & UPS2: Supply & Installation (on separate	1 Item	30,000.00	30,000.00

	location beside (MCCPI) on angle iron frame on wall the following equipments in sheet steel enclosure having hinged door with door lock including fabrication of the enclosure by 2 mm CRCA sheet complete with painting, lettering & earthing studs: i) 2 Nos. 125A 4P ON LOAD CHANGE-OVER switch for open execution (HAVELL'S UROLOAD/ Equivalent L&T) designated as C.O.I/1 (To be lettered as: open the door after switch-off S2 & S3 of MPP-1) & C.O.I/2 *To be lettered as open the door only after switching-off S5 of UPP1 & S4 of MPP1) (D) INCOMMING & OUTGOING CHANGE-OVER MECHANISM TO TIE-UP SUPPLY OF SUB-STN & OF RISING MAIN AT 1st Floor (AT VERNDAH) Supply & Installation on angle iron frame on wall the following equipments & accessories in sheet steel enclosure with four compartments (each having hinged door with door lock system) and a Bus-alley including fabrication of the enclosure by 2 mm CRCA sheet complete with painting, lettering & earthing studs: i) 2 Nos. 125A 4P on-load change-over switch of open execution type (HAVELL'S UROLOAD/ equivalent L&T) designated as CO-1 & CO-2 (to be lettered as: open the door only after switching-off S/S & S/R1 and S/S & S/R2 respectively) ii) 1 No 160A 4P MCCB of minimum 36KA Breaking Capacity Complete with spreader link & rotary handle	1 Item	16,700.00	16,700.00

	designated as S/S iii)1 Set TPN Busbar Complete with 25 mm x 6 mm size of full length of Bus-alley electrolytic Copper Busbars for phase & neutral with adequate numbers of drilled holes on porcelain/molded fiberglass insulators of adequate strength. iv) INO 100A 4P, MCCB of minimum 36KA breaking capacity complete with spreader link & rotary handle & designated as G.S. (v) Connection & inter Connection of MCCB, C/O switches & Busbars by brought-out terminals & dropping bars of adequate size.	1 Set	33,450.00	33,450.00
3.	RECECPTION OF POWER FROM RISINGMAIN AT 1^{ST} & 3^{RD} FLOOR (To be reorganished). (A) Dismantling the existing 200A TPN SFUS Complete with Busbar-Chamber & refixing the same respectively at toilet of 1^{st} floor and at 3^{rd} floor and to be designated respectively as S/R1 & S/R3 on angle iron frame on wall after dismantling existing equipments & accessories meant for reception of power from Rising main at 1^{st} floor Complete with determination & reterminations as are necessary including supplying & fixing meter-loops in $3^{1}/_{2}$ core 70 sq mm PVC/A Cable with glands & socket.	2 item	2,700.00	5,400.00
	(B) Supplying & fixing 125A TPN switch fuse unit complete with HRC fuses on angle iron frame on wall including supplying & Fixing meter loop in $3^{1}/_{2}$ Core 50 sq mm PVC/A Cable with glands & sockets at Toilet of 1^{st} floor.	1 Item	6,200.00	6,200.00

4.	MAINS (A) Supply & delivery of PVC insulated, armored Aluminum Conductor Cables. (GLOSTER / NICCO / HAVELLS)			
	(i) 1.1KV grade 150 sq mm x 3.5 Core	30 Mtr	1,008.00	30,240.00
	(ii) 1.1 KV grade 70 sq mm x 3.5 Core	115 Mtr	496.00	57,040.00
	(iii) 1.1 KV grade 50 sq mm x 3.5 Core	20 Mtr	379.00	7,580.00
	(B) Laying of Cables (i) Laying of Cable $3^1/_2$ Core upto 50 sq mm on wall surface including S&F M.S, saddles with earthing attachment in 2x6 SWG G.I. (HOT DIP) wire, making holes as necessary, mending good damages and painting (At 1st Floor from Rising Main to change-over panel – 2x10 mtr)	20 Mtr	40.00	800.00
	(ii) Laying of Cable $3^1/_2$ Core 70 sq mm on wall/surface including S&F M.S clamps with earthing attachment in 2x6 SWG S.I. (HOT DIP) wire, making holes etc. as necessary, mending-good damages & painting (At 3rd floor from Rising Main to SPP2 – 15 MTR; At 1st floor from MCPP1 to MCPP2 – 50 MTR & from MCPP2 to MCPP1 – 50 MTR)	115 Mtr	46.00	5,290.00
	(iii) Laying of Cable $3^1/_2$ Core 150 sq mm on wall surface including S&F M.S. clamps with earthing attachment in 2x6 SWG G.I. (HOT DIP) wire, making holes etc. as necessary, mending-good damages & painting (from Ground floor to 1st floor ie from SPP1 to MCPP2 30 MTR)	30 Mtr	53.00	1,590.00
	(C) Compression Glands supplying & fixing compression type glands complete, with brass gland, brass ring & rubber ring for dust & moisture proof entry of PVC/A			

	Cables as below: (i) $3^1/_2$ Core 50 sq mm (1^{st} floor – at BBC near rising main -1+ at 125A SFU near rising main -1+ at changeover panel – 2).	4 Nos	137.00	548.00
	(ii) $3^1/_2$ Core 70 sq mm (At 3^{rd} Floor: at BBC/MCCB near rising main -1+ at SPP2 -1=2; At 1^{st} Floor:- MCPP1 -2+MCPP2-2=4)	6 Sets	137.00	822.00
	(iii) $3^1/_2$ Core 150 sq mm. (At Ground Floor:- SPP1-1 + MCPP2-1=2)	2 Sets	214.00	428.00
	(C) Finishing Cable ends.			
	Finishing off the Cable ends of PVC insulated armoured Cables by crimping method including supplying & fixing solderless sockets (Dowell's make), tapes, anti corrosive paste & jointing materials			
	(i) $3^1/_2$ Core 50 sq mm Cables	4 Sets	142.00	568.00
	(ii) $3^1/_2$ Core 70 sq mm Cables	6 Sets	190.00	1,140.00
	(iii) $3^1/_2$ Core 150 sq mm Cables	2 Sets	214.00	428.00
5.	<u>FEEDERS, MAINS & SUBMAINS:</u> Supplying of PVC insulated, armoured aluminium conductor cables (Gloster / NICCO / Havells)			
	(a) 1.1 KV grade 185sq.mm.x3.5 core (260+60+30) MTR.	350 Mtr.	1,165.00	4,07,750.00
	(b) Laying of Cables (i) Laying of two cables upto 185sq.mm. in an underground trench in single tier formation (horizontal) the trench size 680mmx760mm average depth with brick protection on the top of each cable 8 (eight) nos. bricks per metre and 4 (four) nos. per metre as separator between the bricks & cables and also trench to be filled up with shifted soil, leveling up and restoring surface duly rammed			

	(from LT Panel to SPP1 at Gr. Fl. + from LT Panel to SPP2 at 3rd floor upto Gr. Fl. Duct entry 130+130=260Mtr. i.e. 260/2 =130 Mtr.).	130 Mtr.	188.00	24,440.00
	(ii) Laying of one no. cable upto 185 sq. mm. of underground trench 460mm. wide x 760mm. average depth with brick protection on the top of the cable with 8 (eight) nos. of bricks per metre including filling the space between the bricks & cable and also the trench with sifted soil, leveling up & restoring the surface duly rammed. (from Duct of Rising main to SPP1).	60 Mtr.	96.00	5,760.00
	(iii) Laying of cable above 95 sqmm on wall / surface including S&F M.S. clamps with earthing attachment in 2 x 6 SWG. G.I. (HOT DIP) wire, making holes etc as necessary, mending good the damages & painting (185 sqmm from Ground floor through duct to SPP2)	30 Mtr	53.00	1590.00
	(c) <u>COMPRESSSION GLANDS:</u> Supplying & fixing compression type glands complete with brass gland, brass ring & rubber spring for dust & moisture proof entry of PVC/XLPE armoured cables as below:-			
	3½ Core 185 sq. mm./240sq.mm. (At Gr. Fl. At LT Panel - 4 + At SPP1-2 + At SPP2-1 at MCPP1-3).	10 Nos.	214.00	2,140.00
	(d) <u>FINISHING CABLE ENDS:-</u>			

	Finishing off the XLPE/PVC insulated armoured cables by crimping method including supplying & fixing solderless sockets (Dowell's make) tapes, anticorressive paste & jointing materials: 3½ Core 185 sq. mm. Cables. (Gr. Fl.: at L.T. Panel - 4 + at SPP1-2) (3rd Fl.: SPP2-1 at MCPP1-3).	10 Sets	310.00	3,100.00
Total				9,47,004.00

SCHEDULE OF WORK

NAME OF WORK: RENOVATION AND RESTRUCTURING OF EXISTING ELECTRICAL INSTALIATION AT DOEACC SOCIETY, KOLKATA CENTRE PHASE – I

PART: B
(INTERNAL ELECTRICAL INSTALLATION AT.GR & 1st FLOOR)

SRL NO.	DESCRIPTION OF ITEM OF WORK	QTY.	UNIT RATE (Rs)	AMOUNT (Rs)
1.	Supply & installation of TPN/SPN (IP43) double door MCCB Incoming & TP/SP outgoing type distribution board in Manufacturer's sheet steel enclosure complete with double metal door, fork type copper Busbar of 250A/100A Capacity, neutral link-bar, earth-bar, Din-rail assembly, 4P Spreader link both for interconnection between incoming MCCB & Busbar Assembly and also for incoming Cable termination at MCCB including supplying & fixing the following incoming & outgoing MCCB & MCBS on angle iron frame on wall/recessed mounting including Cutting necessary chases on wall and mending good the damages to original			

	finish, inter connection, painting, earthing (MCCB shall be minimum 16KA Breaking Capacity and MCB shall be of minimum 10KA Breaking Capacity & of C-Curve type. Make: Legrand / Hager / Equivalent) (a) 4 way VTPN comprising of: INCOMING: 1 No. 100A 4P MCCB OUTGOING: 9 Nos 6-32A SPMCB 1 No. 32A TPMCB [Complete with lettering of identification as V(G)/1/C: 3.5 x 50 from C/o Panel at 1st floor]	1 set	15,100.00	15,100.00
	(b) 12 way SPN Comprising of: INCOMING: 1NO. 32A DP MCB OUTGOING : 8NOS. 6-32A SPMCB [Complete with lettering of identification as : (L1/G)/ 1/C : 2C6 from ETPN/VTPN (Ground Floor Mains), U8/BB1/1/C: 2C6 from BBI (Gr.Fl UPS)	2 Sets	3,200.00	6,400.00
2.	Supply & Installation of the following items & accessories in double door sheet steel 12 way D.B. Box including Supplying & fixing Manufacturer's sheet steel enclosure complete with double metal door neutral link bar earth bar, Din rail assembly but without Busbar Assembly or in Metal one way 12 module enclosure (Legrand) complete with metal door, neutral link bar earth bar, Din rail assembly on angle iron legs on wall/recessed mounting including cutting chases on wall and mending good the damages to original finish, painting, earthing, connecting & inter connecting by suitable Copper (FRLS insulated) wires : Incoming: 1NO. 32A FP MCB Outgoing: 3 NOS 32A DP MCB (MCBS shall be of 10 KA breaking Capacity & of C-Curve and of make			

	Legrand / Siemens) [Complete with lettering of identification as : (P1/VP1)/ 1/C: 4C4 SQMM from VP1/1 (1st Floor Mains); (P2/VP1)/ 1/C: 4C4 SQMM from VP1/1 (1st Floor Mains); (P3/VP1)/ 1/C: 4C4 SQMM from VP1/1 (1st Floor Mains); (P4/VP1)/ 1/C: 4C4 SQMM from VP1/1 (1st Floor Mains); (P5/VP1)/ 1/C: 4C4 SQMM from VP1/1 (1st Floor Mains); (P6/VP1)/ 1/C: 4C4 SQMM from VP1/1 (1st Floor Mains); (For Air conditioners of Ground & 1st Floor)	6 Sets	2,730.00	16,380.00
3.	**<u>SUBMAINS</u>** (a) <u>From VTPN to SPNDB/DB BOX</u> Supplying & Laying of 1.1 KV grade PVC insulated, armored, aluminium Conductor Cable on wall / surface including S & F MS saddles with earthing attachment in 1x8 SWG G.I. (HOT DIP) wire, making holes etc. as necessary, mending good damages and painting.			
	i) 2 core 6 sq. mm. [From $^{V}/_{G}$ to $^{L1}/_{G}$ at Ground Floor	10 Mtr.	157.00	1,570.00
	ii) 4 Core 4 Sq. Mm. [From VP1/1 to P1, P2, P3, P4, P5, P6/VP1/1]	60 Mtr.	169.00	10,140.00
	(b) <u>From BLUE BOX(BB) to SPNDB & From DB BOX to socket/starter outlets</u> i) wiring in 1.1 KV grade FRLS PVC insulated single Core stranded & unsheathed 2x6 sq mm+1x2.5 Sq. mm (as ECC) Copper wire (FINOLEX / approved equivalent) in 20 mm (3/4") dia rigid PVC Conduit "FR" (Precision make / approved			

	equivalent) including S+F all necessary materials, saddles, screws, etc. complete [For Gr.Floor UPS Supply - from BBI (U8/BB)]	20 Mtr.	190.00	3,800.00
	ii) Wiring in 1.1 KV grade 'FRLS' PVC insulated single Core stranded & unsheathed 2x4 Sq.mm.+1x2.5 sq.mm (as ECC) Copper wire (from SPN DB to 1st board of looped flug board system for UPS power and also from DB box of Mains power to socket / starter board for A/C for 1st floor and Ground floor)	200 Mtr	140.00	28,000.00
	iii) Wiring in 1.1 KV grade 'FRLS' PVC insulated single Core stranded & unsheathed 2x2.5 sq mm + 1x1.5 sq mm (as ECC) Copper wire (from 1st board plug board system for UPS power and also from VTPN/SPN DB to power plug for Mains power both for 1st floor and Ground floor)	75 Mtr	109.00	8,175.00
	iv) Wiring in 1.1 KV grade 'FRLS' PVC insulated single Core stranded & unsheathed 2x1.5 sq mm + 1x1.5 sq mm (as ECC) Copper wire (from 2nd / 3rd to 3rd / 4th board of looped plug board system of both 1st floor & ground floor	75 Mtr	91.00	6,825.00
	(* Wiring / looping-in / looping-out connecting / inter connecting to be carried strictly following the single line diagram as per direction of Engineer-Incharge)			
4.	<u>POINT WIRING</u> From SPN DB to light/fan/etc. points.			
	i) Distribution wiring in 1.1 KV grade (2 x 1.5) 2x22/0.3 (1.5 sq mm) single			

	Core stranded "FRLS" PVC insulated & unsheathed single Core stranded Copper wire (FINOLEX / approved equivalent make) in 20 mm size PVC rigid conduit 'FR' (precision make / approved equivalent) with 1x22/0.3 (1.5 sq mm) single Core stranded Copper wire as ECC to light/fan/ bell points with piano key type switch fiexed on MS (CRC sheet 16 SWG) switch board on wall Complete with 2 nos. suitable size "Ph & N" Copper bar with holes fixed on bakelite / hard rubber insulators over the MS welded chairs including bakelite / Perspex (wall matching Colour) top cover 3 mm thickness including 175 mm x 100 mm x 62.5 mm inspection box making earthing attachment painting the MS. Box and mending good the damages (this include circuit wiring with 2 x 1.5 sqm + 1 x 1.5 sqm FRLS (Finolex or equivalent CU wire as ECC) in separate conduit from separate ways of SPN DB to switch board via inspection box & also wiring to respective point via inspection box) (LIGHT PT. :- 1ST Floor – 66; Ground Floor-13; TOTAL - 79 PTS FAN POINT 1ST FLOOR-6; GROUND FLOOR-1; TOTAL – 7 PTS. EX.FAN PT :- 1st Floor-2-Total 2 PTS Cabin Fan PT :- 1st Floor-1; Ground Floor-4- TOTAL 5 PTS CALL BELL PTS :- Ground Floor-1; TOTAL – 1 PTS Grand Total- 94 PTS) ii) Distribution wiring in 1.1 KV grade 2x22/0.3 (1.5 sq mm) single Core stranded "FRLS" PVC insulated & unsheathed single Core stranded Copper wire (FINOLEX / approved equivalent make) in 20 mm size PVC rigid conduct 'FR' (precision make / approved equivalent) with 1x22/0.3	94 PTS	712.00	66,982.00

	(1.5 sq mm) single Core stranded Copper wire as ECC to plug point including supplying & fixing 5A 5 pin flush type socket & 5A piano key type switch fiexed on MS (CRC sheet 16 SWG) switch board on wall Complete with 2 nos. suitable size "Ph & N" Copper bar with holes fixed on bakelite / hard rubber insulators over the MS welded chairs including bakelite / Perspex (wall matching Colour) top cover 3 mm thickness including 175 mm x 100 mm x 62.5 mm inspection box making earthing attachment painting the MS. Box and mending good the damages to original finish (on Board)	10 Pts	128.00	1,280.00
5.	<u>SOCKET – OUTLETS</u> I) Supplying & fixing 250V 3 Nos. 6 pin type 10/20A plug socket 3 Nos. 20A piano-key type switch, fuse & indicating lamp on suitable M.S. box (CRCA sheet 16 SWG) with bakelite hylam cover (3 mm thick) complete with connection & inter-connection with suitable FRLS wire on wall including all necessary materials & earthing attachment.	2 Sets	668.00	1,336.00
	ii) Supplying & fixing 250V 1 No. 6 pin type 10/20A plug socket 3 Nos. 5 pin type 10A plug socket 1 No. 20A piano key type switch 3 Nos. 10A piano key type switch fuse, indicating lamp on suitable M.S. box (CRCA sheet 16 SWG) with bakelite hylam cover (3 mm thick) complete with connection & inter connection with suitable FRLS wire on wall including all necessary materials & earthing attachment.	10 Sets	565.00	5,650.00
	iii) Supplying & fixing 250V 1 No. 6 pin type 10/20A plug socket 4 Nos. 5 pin type 10A plug socket, 1 No. 20A			

	piano key type switch, 4 Nos. 10A piano key type switch, fuse, indicating lamp on suitable M.S. box (CRCA sheet 16 SWG) with bakelite hylam cover (3 mm thick) complete with connection & inter connection with suitable FRLS wire on wall including all necessary materials & earthing attachment.	5 Sets	615.00	3,075.00
6.	SUPPLYING AND FIXING <u>LUMINARIES/FITTINGS/FIXTURE</u> a) Supply & installation surface mounting/wall mounting CFL Luminaries complete with lamp energy saving copper ballast, powder coated strip with end cap complete with/without down rod.			
	i) Philips Cat No : FMS 600/136 1x PL-L 36 watt complete with down rod etc. (For emergency lighting from Central UPS power for 1st Floor & Gr. Floor)	2 Sets	780.00	1,560.00
	(b) Supplying & fixing 250V AC BUZZER (Anchor-8217) on HW board including S+F H.W. board (1st Floor-1, Ground Floor-1, Ground Annexe 1)	1 Set	87.00	87.00
	(c) Dismantling the existing Single / twin 4ft-40 watt TL fittings, servicing the same for their proper functioning including replacing holders ballasts, starters as will be found defective and refurbishing the Luminaries by spray painting and refixing the same suspended 25 Cm below the ceiling with 2 nos. 20 mm dia E.I. Conduct (14 SWG) supports fixed with 'L' type M.S. clamp whose one side with ceiling-re-inforcement & other	4 Sets	237.00	948.00

	side connected with switable size bolt & nut including S+F E.I. Conduit L type (125 mm x 125 mm) 6 mm thick & 25 mm width M.S. flat including connection & mending good damages. (1 STFL +, Ground Floor – 4)			
7.	Supply & installation of Step type Mini Electronic fan regulator (Anchor)	3 Nos.	150.00	450.00
8.	SUB MAINS from Power Panels to <u>VTPN DBS</u>			
	(a) Supply & delivery of PVC insulated armoured aluminium conductor cables of 1.1 KV grade 3.5 Core 50 sq mm (16+16+18) Mtr	50 Mtrs	379.00	18,950.00
	(b) Laying of cable 3.5 Core 50 sq mm on wall / surface including S+F M.S. Saddles with earthing attachment in 2x10 SWG. G.I. (HOT DIP) wire, making holes as necessary, mending good damages & painting (from c/o panel to VL1/1 & (VP1)/1) at 1st floor : = (2x8) =16 Mtr + from MC PP2 to VP2/1 & VL2/1 at 1st floor =(2x8)=16 Mtr + from BBC to V/G at Ground floor = 18 Mtr)	50 Mtr	40.00	2,000.00
	(c) Supplying & fixing compression type glands complete with brass gland brass ring & rubber spring for dust & moisture proof entry of PVC armoured cable			
	i) 4 Core 4 sq mm.	10 Set	69.00	690.00
	ii) 3.5 Core 50 sq mm.	10 Set	137.00	1,370.00
	iii) 2 Core 6 sq mm.	9 Set	69.00	621.00
	(d) Finishing off the PVC insulated armoured Cables by crimping method including supplying & fixing solder-less sockets (Dowell's make) tapes,			

	anticorrosive paste & jointing materials.			
	i) 3.5 Core 50 sq mm.	10 Set	142.00	1,420.00
	ii) 2 Core 6 sq mm.	9 Set	22.00	198.00
	iii) 4 Core 4 sq mm.	10 Set	40.00	400.00
9.	Earthing with 50 mm dia G.I. pipe 3.64 mm thick x 3.04 Mtr long and 1 x 25mm x 6mm G.I. strip (as required from earth electrode to earth bus),(HOT DIP) 13 mm dia x 80 mm long G.I. bolts, double nuts, double washers driven to an average depth of 3.65 Mtr below the ground level & restoring the surface duly rammed (for soft soil) by ISI Medium G.I. pipe (2 Set for 1st Floor MCPP2 + 2 Set for 1st Floor MCPP1)	4 Set	1,384.00	5,536.00
10.	(a) Supplying & fixing Earth Busbar of galvanized (HOT DIP) M.S. Flat 50 mm x 6 mm on wall having clearance of 6 mm from wall including providing drilled holes on the busbar complete with G.I. bolts, nuts, washers, spacing insulators etc. as required.	1 Mtr	194.00	194.00
	(b) Supplying & fixing Earth Busbar of galvanized (HOT DIP) M.S. Flat 25 mm x 6 mm on wall having clearance of 6 mm from wall including providing drilled holes on the busbar complete with G.I. bolts, nuts, washers, spacing insulators etc. as required.	2 Mtr	144.00	288.00
	(c) Connecting the equipments to earth Busbar including S+F G.I. (HOT DIP) wire of size as below on wall/floor with saddles buried inside wall/floor as required and making connection to equipments with bolt, nut, washer, cable lug etc. as required & mending good damages.			
	i) No. 4 SWG (for Earth Electrode	50 Mtr	19.00	950.00

	extension) ii) No. 6 SWG (from Ground Floor earth Bus to 1st floor Earth Bus) iii) No. 8 SWG (from main Bus to Sub bus & sub bus to equipment body) iv) No. 10 SWG	 50 Mtr 50 Mtr 50 Mtr	 14.00 9.00 6.00	 700.00 450.00 300.00
11.	(a) Supply of 4' twin fluorescent light fitting complete with Mounting rail with special integral lamp holder, bracket, Copper ballasts, starters & 2 x TLD 36 watt (Philips Cat No : TMS 021/236 LPF) (For Ground Floor + 1st Floor)	6 Sets	900.00	5,400.00
	(b) Fixing only fluorescent light fitting suspended 25 Cm below the cutting with 2 nos. 20 mm dia E.I. conduit (14 SWG) supports fixed with L type MS. Clamp whose one side with ceiling re-inforcement an other side connected with conduit by suitable size of bolts & nuts including S+F E.I. Conduit L type (125 mm x 125mm) 6 mm thick & 25 mm width M.S. flat including connection & mending good damages.	6 Nos	137.00	822.00
	(c) Extra for suspension exceeding 25 Cm with S&F additional 2x20 mm dia E.I. conduit (14 SWG) supports & painting.	3 Mtr	162.00	486.00
12.	Supplying & fixing 56" sweep (1400 mm) A.C ceiling fan complete with fork, canopy, down rod etc. (Crompton deluxe) (Ground Floor Annexe)	4 Nos	2,000.00	8,000.00
Total:				2,26,533.00
			Total of Part A + Part B	**11,73,537.00**

SCHEDULE OF WORKS

NAME OF WORK : RENOVATION AND RESTRUCTURING OF EXISTING ELECTRICAL INSTALLATION AT DOEACC SOCIETY KOLKATA CENTRE

PHASE – I

PART : C

(INTERNAL ELECTRICAL INSTALLATION AT 3RD FLOOR)

SRL NO	DESCRIPTION OF ITEM OF WORK	QTY.	UNIT RATE (Rs)	AMOUNT (Rs)
1.	Supply & installation of TPN/SPN (IP43) double door MCCB incoming & TP/SP Outgoing type distribution board in Manufacture's sheet steel enclosure complete with double metal door, fork type copper Busbar of 250/100A capacity, neutral link-bar, earth-bar, Din-rail assembly, 4P spreader-link both for inter-connection between incoming MCCB & Busbar Assembly & also for incoming Cable termination at MCCB including			

	supplying & fixing following MCCB & MCBS on angle iron frame on wall / recessed mounting including cutting necessary chases on wall and mending good damages to original finish, inter connection, painting & earthing. (MCCB shall be of minimum 16 KA Breaking Capacity and MCB shall be of minimum 10 KA breaking capacity of C-Curve type Make: Legrand / Hager / equivalents). (a) 4 way VTPN Comprising of: INCOMING: 1 NO. 100A 4P MCCB OUTGOING : 9 NOS. 32A SP MCB 1 NO. 32A TP MCB [Complete with lettering of identification as : VL/3 /1/C : 3.5 X 50 from SPP2 (3rd Floor)] (b) 8 way VTPN Comprising of: INCOMING: 1 NO. 125A 4P MCCB OUTGOING : 5 NOS. 32A TP MCB 9 NOS. 32A SP MCB [Complete with lettering of identification as : V(P)/3 /1/C: 3.5x50 from SPP2 (3rd Floor)] (c) 12 way SPN Comprising of : INCOMING : 1 NO 32A DP MCB OUTGOING : 8 NOS. 6-32A SPMCB [Complete with lettering of identification as : L1/3 /1/C 2C 6 sq mm from VL/3 (3rd floor Mains); L2/3 /1/C : 2C 6 sq mm from VL/3 (3rd floor Mains); L3/3 /1/C : 2C 6 sq mm from VL/3 (3rd floor Mains); L4/3 /1/C : 2C 6 sq mm from VL/3 (3rd floor Mains); L5/3 /1/C : 2C 6 sq mm from VL/3 (3rd floor Mains); L6/3 /1/C : 2C 6 sq mm from VL/3 (3rd floor Mains); L7/3 /1/C : 2C 6 sq mm from VL/3 (3rd floor Mains); ie Total for Mains Supply = 7 Sets	1 Set 1 Set	15,100.00 20,810.00	15,100.00 20,810.00

	U1/BB4 /1/C : 2x6 + 1x2.5 from BB4 (3rd floor UPS) U2/BB4 /1/C : 2x6 + 1x2.5 from BB4 (3rd floor UPS) U3/BB4 /1/C : 2x6 + 1x2.5 from BB4 (3rd floor UPS) U4/BB4 /1/C : 2x6 + 1x2.5 from BB4 (3rd floor UPS) U5/BB4 /1/C : 2x6 + 1x2.5 from BB4 (3rd floor UPS) U6/BB4 /1/C : 2x6 + 1x2.5 from BB4 (3rd floor UPS) U/5KVA /1/C : 2x6 + 1x2.5 from BB4 (3rd floor UPS) [ie Total for UPS supply = 7 Sets Grand Total : (7+7) = 14 Sets]	14 Sets	3,200.00	44,800.00
2.	(a) Supply & installation of following items & accessories in double door sheet steel 12 way DB Box including S+F Manufacturer's sheet steel enclosure complete with double metal door, neutral link-bar, earth-bar din-rail but without Busbar assembly Or in metal one way 12 module enclosure (Legrand) complete with metal door, neutral link-bar, earth-bar, din-rail assembly on angle iron legs on wall / recessed mounting including cutting chases on wall and mending good the damages to original finish, painting, earthing, connecting & inter connecting by suitable copper (FRLS insulated) wires : i) INCOMING : 1 NO 32A FP MCB OUTGOING : 3 NOS. 32A DP MCB (MCBS shall be of 10 KA breaking capacity & of c-curve and of make Legrand / Siemens equivalent) [Complete with lettering of identification as : P1/V(P) /1/C: 4C 4 sq mm from V(P)/3 (3rd Floor Mains);			

	P2/V(P) /1/C: 4C 4 sq mm from V(P)/3 (3rd Floor Mains); P3/V(P) /1/C: 4C 4 sq mm from V(P)/3 (3rd Floor Mains); P4/V(P) /1/C: 4C 4 sq mm from V(P)/3 (3rd Floor Mains); (For air conditioners of 3rd floor)]	4 Sets	2,730.00	10,920.00
	ii) INCOMING: 1 NO. Double pole 2 way lexic change over switch-2 module–20A (Legrand Cat No : 004383) OUTGOING : 2 NOS 16A SP MCB (For room No : 402 to facilitate change-over from Central UPS Supply to Standalone 5 KVA UPS & Vice versa to ensure uninterrupted power to server etc.) Complete with lettering of identification as : (U7/U1)/ 1/C : one from (U1/BB4) & other from U/5KVA in 2x4 + 1x2.5	1 Set	2,950.00	2,950.00
3.	SUB MAINS FROM POWER PANELS TO VTPN DBS.			
	(a) Supply & delivery of PVC insulated armoured Aluminium Conductor Cables of 1.1 KV grade 3.5 Core 50 sq mm.	15 Mtrs	379.00	5,685.00
	(b) Laying of cable 3.5 Core 50 sq mm on wall surface including S+F M.S. saddles with earthing attachment in 2x10 SWG G.I. (HOT DIP) wire, making holes as necessary, mending good damages & painting (From SPP2 to V(L)/3 & V(P)/3 = (5+10) = 15 MTR	15 Mtrs	40.00	600.00
	(c) Supplying & fixing compression type cable glands complete with brass glands brass ring & rubber spring for dust & moisture proof entry of cable of size 3.5 Core 50 sq mm	4 Sets	137.00	548.00

	(d) Finishing off the PVC insulated cable of size 3.5 Core 50 sq mm (armoured) by crimping method including S&F solderless sockets (Dowell's make), tapes anticorrosive paste & jointing materials	4 Sets	142.00	568.00
4.	SUBMAIN FROM VTPN TO SPN <u>DB/DB BOX (MAINS SUPPLY)</u>			
	(a) supplying & laying of 1.1 KV grade PVC insulated, armoured aluminium conductor cable on wall/surface including S+F M.S. saddles with earthing attachment in 1x8 SWG/ 2x8 SWG G.I. (HOT DIP) wire, making holes etc. as necessary, mending good damages (as & where required for 3rd floor)			
	i) 2 Core 6 sq mm	75 Mtrs	157.00	11,775.00
	ii) 4 Core 4 sq mm (from V(P)/3 to P1/P2/P3/P4)	40 Mtrs	169.00	6,760.00
	(b) Dismantling carefully the existing 2 Core 6 sq mm PVC/A cable after determinating from existing TPN DB/SPN DB and as & where required relaying with new saddles etc. after properly dressing including S+F new earth continuity wire in 1x10 SWG G.I. for retermination at new TPN DB/ SPN DB. and painting (For supply to 7 Nos. of SPN DB of 3rd floor)	1 Item	700.00	700.00
	(c) Supplying & fixing compression type cable glands complete with brass gland, brass ring & rubber spring for dust & moisture proof entry of cable of size : i) 2 Core 6 sq mm.	14 Sets	69.00	966.00
	ii) 4 Core 4 sq mm.	14 Sets	69.00	966.00
	(d) Finishing off the PVC insulated armoured cable by crimping method including S&F solderless socket (Dowell's make) tapes, anticorrosive			

	paste & jointing materials. i) 2 Core 6 sq mm. ii) 4 Core 4 sq mm.	 14 Sets 14 Sets	 22.00 40.00	 308.00 560.00
5.	WIRING FROM BB TO SPN DB (UPS SUPPLY) AND FROM SPN DB TO SOCKET OUTLET (UPS) AND ALSO FROM DB BOX (MAINS) TO SOCKET STARTER <u>BOARD (MAINS A/C)</u> (a) Wiring in 1.1 KV grade "FRLS" PVC insulated single core stranded & un-sheathed 2x6 sq mm + 1x2.5 sq mm (as ECC) copper wire (FINOLEX/ approved equivalent) in 20 mm (3/4") dia rigid PVC conduit (FR) (precision) make / approved equivalent) including S+F all necessary materials, saddles, screws etc. complete. (For 3rd floor UPS supply from BB4 to (U1/BB4) / (U2/BB4) / (U3/BB4) / (U4/BB4) / (U5/BB4) / (U6/BB4) / (U/5KVA)	65 Mtrs	190.00	12,350.00
	(b) Wiring in 1.1 KV grade "FRLS" PVC insulated single core stranded & un-sheathed 2x4 sq mm + 1x2.5 sq mm (as ECC) copper wire (FINOLEX approved equivalent) in 20 mm (3/4") dia rigid PVC conduit (FR) (precision) make / approved equivalent) including S+F all necessary materials, saddles, screws etc. complete. (From SPN DB (UPS) to 1st board of looped plug board system for UPS power & from DB Box (MAINS) to socket / starter board for A/C	200 Mtr	140.00	28,000.00
	(c) Wiring in 1.1 KV grade "FRLS" PVC insulated single core stranded & un-sheathed 2x2.5 sq mm + 1x1.5 sq mm (as ECC) copper wire (FINOLEX approved equivalent) in 20 mm (3/4") dia rigid PVC conduit (FR) (precision) make / approved equivalent) including			

	S+F all necessary materials, saddles, screws etc. complete. (From 1st board to 2nd/3rd board system for UPS power & from 3PN/TPN DB to power plug for Mains Power)	125 Mtr	109.00	13,625.00
	(d) Wiring in 1.1 KV grade "FRLS" PVC insulated single core stranded & un-sheathed 2x1.5 sq mm + 1x1.5 sq mm (as ECC) copper wire (FINOLEX approved equivalent) in 20 mm (3/4") dia rigid PVC conduit (FR) (precision) make / approved equivalent) including S+F all necessary materials, saddles, screws etc. complete. (From 2nd/3rd to 3rd/4th board of looped plug board system of UPS supply)	125 Mtr	91.00	11,375.00
	(* Wiring / Looping-in / Looping-out/ connecting / inter connecting to be carried out following single line diagram as per direction of Engineer Incharge)			
6.	<u>POINT WIRING</u> FROM SPN D DB TO LIGHT / FAN/ <u>ETC POINTS</u>			
	i) Distribution wiring in 1.1 KV grade 2x22/0.3 (1.5 sq mm) single core stranded "FRLS" PVC insulated & unsheathed single core stranded copper wire (FINOLEX / approved equivalent make) in 20 mm size PVC rigid conduit "FR" (precision make / approved equivalent) with 1x22/0.3(1.5 sq mm) single core stranded copper wire as E.C.C. to light/fan/bell points with piano key type switch fixed on MS (CRC) sheet 16 SWG) switch board on wall complete with 2 nos. suitable size "Ph & N" copper bar with holes fixed on bakelite / hard rubber insulators over the M.S. welded chairs including bakelite / Perspex (wall matching colour) top cover 3 mm thickness			

	including 175 mm x 100 mm x 62.5 mm inspection box, making earthing attachment, painting the MS box and mending good the damages to original finish (this include circuit wiring with 2 x 1.5 sqmm + 1 x 1.5 sqmm FRLS (Finolex or equivalent CU wire as ECC) in separate conduit from separate ways of SPN DBS to switch board via inspection box and also wiring to respective point via inspection box from the switch board)	173 Pts	712.00	1,23,176.00
	ii) Distribution wiring in 1.1 KV grade 2x22/0.3 (1.5 sq mm) single core stranded "FRLS" PVC insulated & unsheathed single core stranded copper wire (FINOLEX / approved equivalent make) in 20 mm size PVC rigid conduct "FR" (precision make / approved equivalent) with 1x22/0.3 (1.5 sq mm) single core stranded copper wire as E.C.C. to plug point including S&F 4A 4 pin flush type socket & 5A piano-key type switch (Anchor penta) fixed on MS (CRC) sheet 16 SWG) switch board on wall complete with 2 nos. suitable size "PH & N" copper bar with holes fixed on bakelite / hard rubber insulators over the M.S. welded chairs including bakelite / Perspex (wall matching colour) top cover 3 mm thickness including 175 mm x 100 mm x 62.5 mm inspection box, making earthing attachment, painting the MS box and mending good the damages to original finish (on board)	15 Pts	128.00	1,920.00
7.	<u>SOCKET OUTLETS</u> i) Supplying & fixing 250 V 3 Nos 6 pin type 10/20A plug socket 3 Nos 20A piano-key type switch (Anchor penta), fuse & indicating lamp on suitable M.S box (CRCA sheet 16 SWG) with bakelite hylam cover (3			

	mm thick) complete with connection and inter-connection with suitable FRLS wire on wall including all necessary materials & earthing attachment. ii) Supplying & fixing 250 V 1 No. 6 pin type 10/20A plug socket, 3 Nos. 5 pin type 10A plug socket, 1 No. 20A piano key type switch, 3 Nos. 10A piano key type switch, fuse indicating lamp on suitable M.S box (CRCA sheet 16 SWG) with bakelite hylam cover (3 mm thick) complete with connection and inter connection with suitable FRLS wire on wall including all necessary materials & earthing attachment. iii) Supplying & fixing 250 V 1 No. 6 pin type 10/20A plug socket, 1 No. 20A piano key type switch, 4 Nos. 10A piano key type switch, fuse, indicating lamp on suitable M.S box (CRCA sheet 16 SWG) with bakelite hylam cover (3 mm thick) complete with connection and inter connection with suitable FRLS wire on wall including all necessary materials & earthing attachment. iv) Supply & installation of 415V 32A 3P+E panel mounting P17 Tecmpra Industrial plug & socket (matching) complete with 32A DP MCB 'C series in manufacturer's sheet steel enclosure wall with all necessary materials & earthing complete (Legrand Cat No : 607871, 057618, 058138); (For 5 KVA_UPS 1/C & 0/G plugs at Room No : 402)	11 Sets 25 Sets 10 Sets 2 Sets	668.00 565.00 615.00 3,000.00	7,348.00 14,125.00 6,150.00 6,000.00
8.	SUPPLYING AND FIXING <u>LUMINAIRES/FITTING/FIXTURES</u> (a) Supply & installation surface mounting/wall/mounting CFL/TL			

	Luminaires complete with lamp, energy saving ballast, power coated strip with end Cap complete with / without down rod etc. i) Philips Cat No: FMS 600/136 1xPL-L 36 watt complete with down rod etc./without downrod on wall (For emergency lighting from UPS power for 3rd floor)	14 Sets	780.00	10,920.00
	ii) Philips Cat No: TMS 021/236LPF with 2 x 36W TLD	6 Sets	1037.00	6222.00
	(b) Supplying & fixing 250V AC Buzzer (Anchor 8207) on H.W. board including S&F HCO. Board.	1 Set	87.00	87.00
	(c) Dismantling the existing single / twin 4'-40 watt T.L. fitting, servicing the same for their proper functioning, including replacing holders, ballasts, starters as will be found defective and refurbishing the luminaries by spray painting and re-fixing the same suspended 25 cm below the ceiling with 2 Nos. 20 mm dia E.P. conduit (14 SWG) support fixed with L type M.S. clamps whose one side with ceiling re-inforcement and other side connected with suitable size nuts, bolts including S&F E1. conduit L type (125 mm x 12.5 mm) 6 mm thick & 25 mm width M.S. flat including connection and mending good damages.	56 Sets.	237.00	13,272.00
9.	Earthing with 50 mm dia G.I. pipe 3.64 mm thick x 3.04 Mtr long and 25 x 6mm (HOT DIP) GI Strip (as required from earth electrode to earth bus) 13mm dia x 80 mm long G.I. bolts, double nuts, double washers driven to an av, depth of 3.65 Mtr below the ground level & restoring surface duly rammed for soft soil by ISI medium G.I. pipe.	2 Sets	1,384.00	2,768.00
10.	(a) Supplying & fixing earth Busbar of	1 Mtr	194.00	194.00

	galvanized (HOT DIP) M.S. flat 50 mm x 6 mm on wall having clearance of 6 mm from wall including providing drilled holes on the Busbar complete with G.I. bolts, nuts, washers spacing insulator etc. as required (For Main Earth Bus).			
	(b) Supplying & fixing earth Busbar of galvanized (HOT DIP) M.S. flat 25 mm x 6 mm on wall having clearance of 6 mm from wall including providing drilled holes on the Busbar complete with G.I. bolts, nuts, washers spacing insulator etc. as required (For Sub-Main Earth Bus).	2 Mtr	144.00	288.00
	(c) Connecting the equipment to earth Busbar including S&F G.I (HOT DIP) wire of size as below on wall / floor with staples buried inside wall / floor as required and making connection to equipments with bolts, nuts, washers, cable lugs etc. as required and mending good damages.			
	i) No 4 SWG (for extension to Earth – electrode connection).	50 Mtr	19.00	950.00
	ii) No. 6 SWG. (from Main Bus to sub-Bus).	50 Mtr	14.00	700.00
	iii) No. 8 SWG. (from Sub-bus to equipment Bus & from Sub-bus to equipment body).	50 Mtr	9.00	450.00
	iv) No. 10 SWG.	50 Mtr	6.00	300.00
11.	Supply & installation Automatic single phase starter complete with undervoltage and over current release of 21 Amps/ 20 Amps Capacity (Make: Electron deviced – type : OLP-3/Getron Powertronics-MS2) (For 1.5 TR/2TR A/C Machines) including supplying & fixing 32A DPMCB- 1 No, complete with supplying & fixing sheet steel enclosure duly painted	30 Sets	2,100.00	63,000.00

Total:	4,47,236.00
Total of Part A+B+C	16,20,773.00

We do agree to do the job …….% above / below / at par the rate of schedule of work and also do agree to accept all terms & conditions as contained in Tender Documents.

3 **Evaluation Criteria** – The Evaluation would be done in two stages.

- Step – I (Technical Evaluation)– Tender cost, EMD and Credentials would be verified. Credentials include Annual Turn Over, Client List, & Licensed Supervisor in Employment of Vendor / Contractor having Supervisor's Certificate of Competency in Part 1,2,3,4,5, 6(a), (b), 7 (a), (b), 10, 11, 12 or National I & II

- Step – II (Financial Evaluation) – Financial Bid will be opened for technically qualified bidders

- Tender has to be submitted following the two bid System. EMD has to be placed in a single envelop and has to be marked as " EMD". Credential has to be placed in a separate envelop. Both the envelops are to be placed in a sealed envelop and to be marked as "Technical Bid". The other sealed envelop would contain the "Price bid".

- Any bid failed to qualify Step – I would be returned back to the respective bidder directly. The bidder would be informed through Mail / Fax / Phone with a definite period of time within which the bidder needs to collect the EMD from our Accounts Department.

- The total work would be executed as a turnkey work and hence lowest price would be decided based on the value of the total work. In case the bid is incomplete, excluding some of the items of the work or for other reason then the bid would be rejected. Although the bid may of very high quality and the price may be most competitive. The decision of DOEACC would be final in this regard and no further justification / submission would be entertained, if not otherwise decided by DOEACC Society.

4 **Inspection and Installation** – All Inspection and Installation has to be done at DOEACC Society, Kolkata under the supervision of DOEACC Engineer / Officer to its level of satisfaction. The Decision of DOEACC would be final and would be binding for the Vendor.

5 **Warranty Service** – The Entire Setup (including all spares, parts, Services etc. and excluding nothing) has to be warranted for a period of one year from the date of successful Installation accepted by DOEACC Personnel. Any problem reported to the Vendor has to be attended within the day and to be solved within 24 hours. Downtime more than 24 hours is not acceptable. In case a spare requires more than 30 days to repair, then the same spare has to be

replaced. No repairing would be accepted in this case. Two Mobile no. and e-mail address of the contact person of Vendor has to be provided where fault reporting would be made. The time would be calculated 4 hours after the time of reporting.

6 **Safety of the Worker –** The safety of the worker would be the responsibility of the Selected Vendor and adequate steps and measures would be taken by the Vendor to protect its staff during Installation and maintenance of the work. In case of any accident happened during execution of the Project, DOEACC society will not be responsible for any compensation in any sort to the Vendor or its worker. Risk to the loss of life and property may be adequately taken care off by the Vendor while bidding for the Project.

7 **Completion of Work –** The Work has to be completed within the specified time. In case of any deviation is observed from the deadline as mentioned in the contract without taking permission from DOEACC Society, then DOEACC society has the full power and authority to execute the work at the cost and risk of the Vendor. The Vendor has to accept this cost as indicated by DOEACC society and no further arbitration can be made on this at any court of law. However an appeal can be made to DOEACC Society which may be considered solely at the discretion of DOEACC.

8 **Quality of Products** – The quality of the product quoted in this Tender should be of highest quality so that high availability of the infrastructure could be made. DOEACCC discourage the use of low quality material for its Project and the Vendor should keep this objective in mind while bidding.

9 **Cost of Delivery** – The cost should include every thing like the material cost, the cost of Shipment to site , Taxes , Octroi etc excluding the changes in Govt. Taxes, if any. This would be calculated as per applicable Taxes at the time of Delivery. DOEACC will not take any responsibility other that intermediate and final inspection of the Project.. All cost breakups are to be shown separately and distinctly in the bill. ***Break up of all cost should be mentioned explicitly.***

10 **Important Dates-**

10.1 Tender Publication Date –

10.2 Last date of Tender Submission –

10.3 Technical Bid opening date-

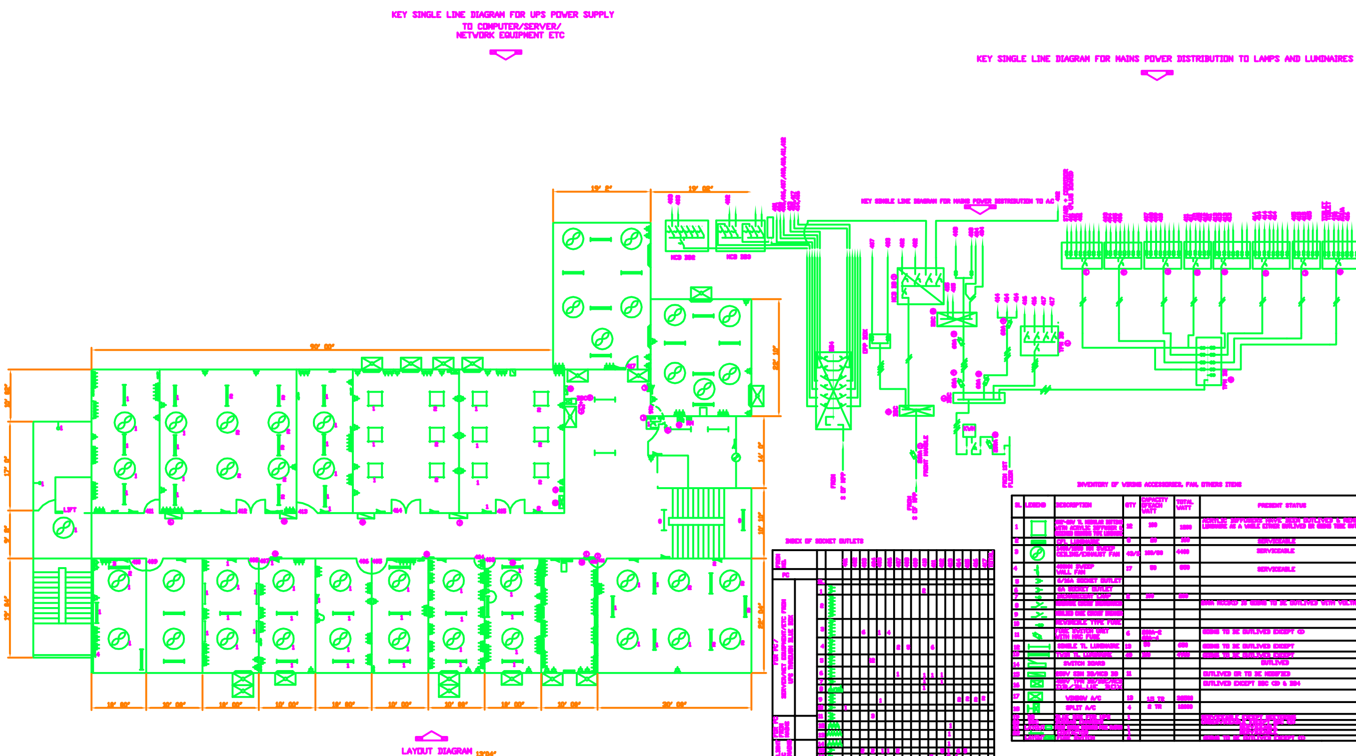
10.4 Price Bid Opening date will be communicated through our website.

10.5 Placement of Order – To be decided later

In case the above mentioned date is a holiday, the activity would be done on next day, if not notified otherwise.

11 Checklist before submission of Bid

Sr.no.	Item to be checked	Contained in	Remarks
1	EMD & Credentials constituting the Technical bid	• Separate envelop clearly marking "Tender Cost", "EMD" & "Credentials" must be contained in a separate sealed envelop clearly marking " Technical Bid" • Bill of Material as per format given by DOEACC • Product Brochure • Acceptance of all Technical Clauses as has been mentioned by DOEACC • Bidders must submit Tender Documents (from Page 1 to Page 27) duly signed and stamped in each page as acceptance of all the clauses in Tender Document, otherwise quotations will be summarily rejected.	Two bids contained in separate sealed envelops should be placed in single envelop and should be in sealed condition. The Sealed envelop should be addressed to the " Director, DOEACC Society, Kolkata Centre, Jadavpur University Campus, Kolkata – 32" "**Name of work & due date of opening of the tender should be superscribed on the sealed cover of the tender"**
2	Price Bid	The Price bid must be in a separate envelop clearly marking " Price Bid"with Tender Documents (from page 28 to page 63) duly signed and stamped in each page	



3RD FLOOR PLAN
SCALE : 1: 100

INDEX OF SOCKET OUTLETS

[illegible]

INVENTORY OF WIRING ACCESSORIES, FAN, OTHERS ITEMS

SL	LEGEND	DESCRIPTION	QTY	CAPACITY OF EACH WATT	TOTAL WATT	PRESENT STATUS
1		[illegible] TL MODULAR FITTING WITH ACRYLIC DIFFUSER & [illegible]	12	100	1200	ACRYLIC DIFFUSERS HAVE BEEN OUTLIVED & REMOVED. LUMINAIRE AS A WHOLE EITHER OUTLIVED OR GOING TO BE OUTLIVED
2		CFL LUMINAIRE	5	20	100	SERVICEABLE
3		1400/1200 MM SWEEP CEILING/EXHAUST FAN	43/2	100/50	4400	SERVICEABLE
4		400MM SWEEP WALL FAN	17	50	850	SERVICEABLE
5		6/16A SOCKET OUTLET				
6		6A SOCKET OUTLET				
7		INCANDESCENT LAMP	2	100	200	
8		[illegible] CIRCUIT BREAKER				[illegible] MCCB(D) IS GOING TO BE OUTLIVED WITH VOLTMETER
9		MOULDED CASE CIRCUIT BREAKER				
10		REWIREABLE TYPE FUSE				
11		FUSE SWITCH UNIT WITH HRC FUSE	6	200A-2 63A-4		GOING TO BE OUTLIVED EXCEPT (D)
12		SINGLE TL LUMINAIRE	13	50	650	GOING TO BE OUTLIVED EXCEPT
13		TWIN TL LUMINAIRE	49	100	4900	GOING TO BE OUTLIVED EXCEPT
14		SWITCH BOARD				OUTLIVED
15		230V SPN DB/MCB DB	11			OUTLIVED OR TO BE MODIFIED
16		400V TPN DB/SDC/MCB DB/BLUE BOX				OUTLIVED EXCEPT SDC (D) & DB4
17		WINDOW A/C	13	1.5 TR	30500	
18		SPLIT A/C	4	2 TR	10000	
19		BLUE BOX FOR UPS	1			SERVICEABLE EXCEPT [illegible]
20		[illegible]				[illegible]
21	LAYOUT	[illegible]	1			SERVICEABLE
22		CONTACTOR	1			SERVICEABLE
	LAYOUT	FUSE SWITCH	6			GOING TO BE OUTLIVED EXCEPT (D)

TITLE	STATUS OF ELECTRICCAL INSTALATION AS EXISITING AT DOEACC SOCIETY, KOLKATA CENTRE JADAVPUR UNIVERSITY CAMPUS, KOLKATA 700 032
CONTENTS	LAYOUT DIAGRAM,KEY SINGLE LINE DIAGRAM,INVENTORY OF VIRING ACCESERIES, INDEX OF SOCKET OUTLETS, INCLUDING REPORT OF THEIR PRESENT STATUS
SUB TITLE	THIRD FLOOR
	DRG.NO: 02/EL.STAT./DOEACC/OCT.2008
	DOEACC SOCIETY, KOLKATA CENTRE, JU CAMPUS KOLKATA 700 032
SIGN	CONSULTANT SIGNATURE

SINGLE LINE DIAGRAM FOR UPSTREAM ELECTRICAL INSTALATION
RISING MAIN

DDEACC SOCIETY KOLKATA CENTRE

SINGLE LINE DIAGRAM FOR L.T. DISTRIBUTION

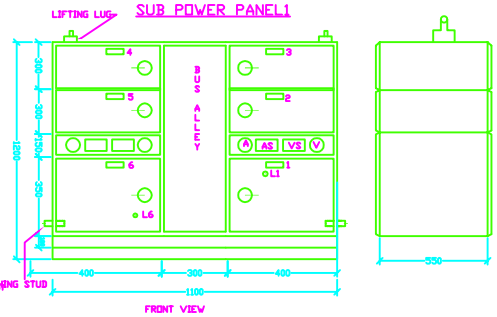
UPS POWER MAIN POWER

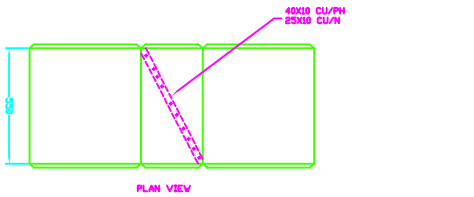
WITH CHANGE – OVER MECHANISM

SPP1

DESIGNATION OF SWITCHES

3P +N (SWITCHES) SFU	
SL	CAPACITY
1	400A
2	200A
3	200A
4	200A
5	200A
6	400A
SL1 SL6	SWITCHES UNDER SIZES TO BE PROVIDED WITH CASTELL LOCK SYSTEM WITH TWO LOCK HAS ONE KEY





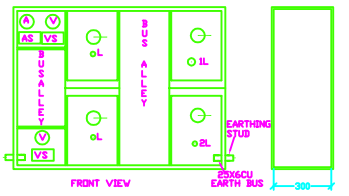
GENERAL ARRANGEMENT

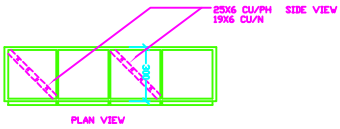
SUB PANEL 2

SPP2

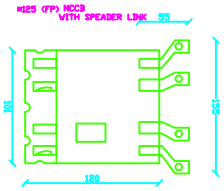
DESIGNATION OF SWITCHES

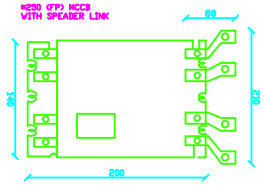
4P MCCB	
SL	CAPACITY
1	160A
2	250A
3	160A
4	160A
SL1 SL6	MCCB UNDER SLIAR TO BE PROVIDED WITH CASTELL LOCK SYSTEM WITH TWO LOCK AND ONE KEY

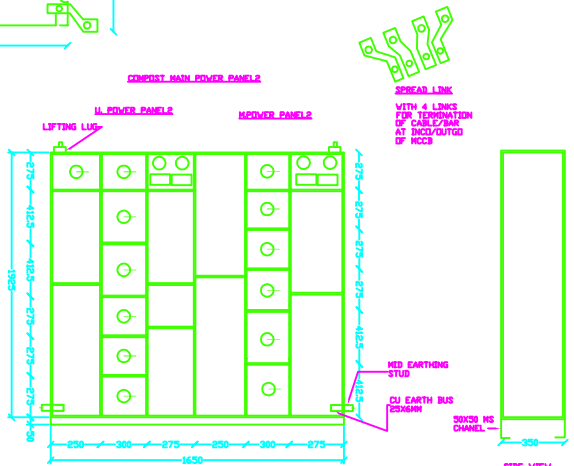




GENERAL ARRANGEMENT



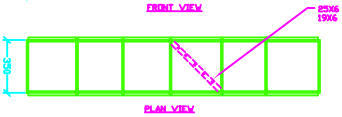


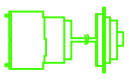


CMPP2

DESIGNATION OF SWITCHES

4P MCCB		
SL	CAPACITY	
1	400A	
2	250A	
3	125A	
4	125A	
5	125A	
6	125A	
7	125A	
8		125A
9		125A
10	125A	
11	125A	
12	125A	
S1 S2	MCCB UNDER SLIAR TO BE PROVIDED WITH CASTELL LOCK SYSTEM WITH TWO LOCK AND ONE KEY	





MMCCB WITH VARY DEAPTH ROTARY HANDLE COMPLETE WITH CONNECTING ROD AND DOOR LOCK MECHANISM

GENERAL ARRANGEMENT

RENOVATION AND RESTRUCTURING	
TITLE	S.R. OF EXISTING ELECTRICAL INSTALCATION AT DOEACC SOCIETY KOLKATA CENTRE
CONTENT	GENERAL ARRANGEMENT DRAWINGS OF DIFFERENT SWITCH/MCCB CONTROLED POWER PANEL
CLIENT	DRG. NO. 04/DOEACC/10.2008 DOEACC SOCIETY KOLKATA CENTRE JU CAMPUS. KOLKATA - 700 032
CONSULTANT	