TENDER DOCUMENTS

FOR

(TECHNICAL SPECIFICATION- PART 1)

FOR INTERNAL & EXTERNAL ELECTRICAL WORK OF CCCR BUILDING TENDER

AT

INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PASHAN, PUNE

INDEX

ISSUED TO.	: ON
CASH RECEIPT NO.	: DT

TENDER NOTICE

1. Sealed item rate quotations are invited from reputed electrical contractor with valid contractor's license who can carry out the work in state of Maharashtra**.**

Name of Owner	:	**INDIAN INSTITUTE OF TROPICAL METEOROLOGY PUNE.**
Name of Work	:	**EXTERNAL & INTERNAL ELECTRICAL WORK FOR CCCR BUILDING AT PASHAN**
Cost of Tender documents	:	**Rs. 1000/- (Non Refundable) Cash or in the form of Demand Draft from Nationalized bank**
Earnest Money Deposits	:	**Rs.200000/-(Two Lakhs only) in form of D.D/B.G from Indian Nationalized Bank drawn in favour of "Director Indian Institute of Tropical Meteorology, Pune".**
Date of completion	:	**Three months from the date of LOI.**

2. The tender forms will be available on payment of Rs.1000/- of tender documents in cash/D.D. from Nationalized Bank at the address given below from **8.11.2011.**

   The Director,
   Indian Institute of Tropical Meteorology
   Dr. Homi Bhabha Road, Pashan, Pune - 411 008
   Tel. No. 020 - 25904200
   Note:-Tender documents also can be download from the Institute website www.tropmet.res.in and D.D of Rs 1000/- as tender fee should be enclosed along with the technical bid.

3. Pre-bid meeting on **15.11.2011 at 1100hrs.**

4. Duly completed tenders shall be submitted in sealed envelops at the office of Director IITM Pune on address given below on 29.11.2011 at 1230hrs.

   Indian Institute of Tropical Meteorology
   Dr. Homi Bhabha Road, Pashan, Pune - 411 008
   Tel. No. 020 - 25904200

   Contact Person : Shri Saxena, Civil Engineer

   Email:- anupam@tropmet.res.in

   Due Date and Time :- 29.11.2011 at 1230hrs. and Technical bid will be open on 29.11.2011, at 1500hrs. The date of commercial bid opening will be intimated to technically qualified venders after evaluation of technical bids.

5. The Director IITM, Pune reserves right to accept or reject any or all the quotations without assigning any reasons.
6. This tender notice shall form part of Contract / Order.

INSTRUCTION TO THE TENDERS

1. The tender is to be filled properly and all relevant information asked for shall be provided for in due format.
2 Technical and commercial bids are to submit in separate envelop. Technical bid is the blank BOQ (without price schedule) along with specifications and highlighted with the makes and material considered; duly signed on each page, super scribing the envelop as technical bid
3 Commercial bid with price schedule only, super scribing the envelope as commercial bid.
4. The schedule of rates shall be returned in two sets.
5. All section wise total amounts shall be written in words also.
6. The tenderers are requested to furnish information about similar works handled, staff and infrastructure etc in technical bid.
7. All drawings and documents issued to the tenderers are confidential and shall be returned back with the tender.
8. EMD shall be in the form of DD/B.G of Nationalized Bank or as mentioned specifically in Tender Notice and shall be enclosed in a separate envelope along with the tender.
9. The duly completed tender shall be submitted at the following address in a sealed envelope before the time indicated.
10. Preliminary drawings, prints shall be available for reference & discussions at our office.
11. Time is essence of contract, hence contractor has to mobilize proper manpower & material in a short mobilizations period to site. No extension will be given for completion period, without proper and genuine reasons.
12. All bidders should visit site prior to giving quotes to get acquainted with site conditions. No demand shall later be entertained due to site conditions.
13. Pre-bid meeting for technical queries will be held on 15.11.2011, at **1100hrs** at I.I.T.M. Bidders are requested to be present in the meeting. All technical queries will be answered by I.I.T.M and consultants.
14. Bidders are requested to give deviations / comments / assumptions clearly in deviation pages based on the site observations.
15. Bidders are requested to highlight the makes of material considered while quoting in the list of approved makes.
16. Bidders are requested to quote value for supply & installation of material but client may provide some or all capital items free of cost. So while quoting labour / installation rates, material handling charges should be considered accordingly.
17. The Director IITM, Pune reserves the right to accept or reject any or all the quotations without assigning any reasons.
18. Soft copy of covering letter and priced BOQ shall be submitted along with tender in the CD provided. Bidders shall not change format of BOQ. VAT & service tax calculation / supporting shall be kept separate.
19. Duly completed tenders shall be submitted on or before 29.11.2011 at 1230 hrs. to addressee to following address :-

Indian Institute of Tropical Meteorology
Dr. Homi Bhabha Road, Pashan, Pune - 411 008
Tel. No. 020 - 25904200

Contact Person : Shri Saxena, Civil Engineer
Tel No. :- 020 - 25904200

ARTICLES OF AGREEMENT

Articles of Agreement ----------
made on the ----------day of ----------2011.
Between:

(hereinafter called "The Owner") of the part and ---------- ----------
----
of (or whose registered office is situated at) ----------

(herein after called "The contractor")of the other part.
Where as the owner is desirous of awarding the External & Internal Work for ----------
----------. Drawing and Bill of Quantities showing and describing the work to be done prepared by under the direction of:

And where as the Contractor has supplied the owner with a Fully priced copy of the said bills of quantities (Which copy herein after referred to as "The Contract Bills"). And where as the said Drawings (herein after referred to as "The Contract Drawings") and the Contract Bills have been signed by or on behalf of the parties hereto and where to and where as the Contractor has deposited the sum of rupees ---------- with the OWNER for the due performance of this Agreement. Now it is hereby agreed as follows:

1. For the consideration herein after mentioned the Contractor will upon and subject to the condition annexed, carry out and complete the work shown upon the contract Drawings and described by or referred to in the Contract Bills and the said Conditions.

   The Owner will pay the Contractor the sum of Rs. ----------
   ----
   (herein after referred to as "Contract sum") or each other sum as shall become payable here under at the time and in the manner specified in the said conditions.

2. The terms "The Consultant" in the said condition shall mean the said or in the event of his death or ceasing to be Consultant for the purpose of this contract, such other persons as the owner shall nominate for that purpose provided always that no person subsequently appointed to be the Consultant under this contract shall be entitled or over rule any certificate or decision or approval or instruction given or expressed by the earlier Consultant.

3. The said condition and Appendix hereto (Sections) Shall be read and construed as forming part of this Agreement, and the parties hereto shall respectively abide by, submit themselves to these Conditions and perform the agreements on their parts respectively in such Conditions contained.
   As Witness the hands of the said parties.

   Signed by the:
   In the presence of:

   Witness :
   Name :
   Address :

SECTION - A

FORM OF TENDER.

To,

The Director,
Indian Institute of Tropical Meteorology
Dr. Homi Bhabha Road, Pashan, Pune - 411 008
Tel. No. 020 - 25893825

Dear Sir,

Having examined the drawings, specifications and schedule of quantities of work specified below and having visited and examined the site of works for acquiring requisite information. I/We hereby offer to execute the works specified below in the specified time period at the rates quoted in the Schedule of Prices attached in accordance with the drawings, designs, specifications, conditions of contract and in all other respects with such conditions as applicable.

a)	Description of Work	:	**EXTERNAL & INTERNAL ELECTRICAL WORK FOR CCCR BUILDING AT PASHAN**
b)	Earnest Money Deposit	:	**Rs.200000/-(Two Lakhs only) in form of D.D/B.G from Indian Nationalized Bank drawn in favour of "Director Indian Institute of Tropical Meteorology, Pune".**
c)	Completion Period	:	**Three Months**

1. Should this tender be accepted, I/We _____for a minimum period of 60 days.
2. I/We hereby deposit a sum of Rs. ----------Drawn on bank …… Dated…..as EMD which is not to bear any interest. Should I/we fail to execute the contract when called up to do so, this sum shall be forfeited by me/us.
3. Our Bankers are
4. Names of Owner/Partner of Firm

   1)

   2)

   3)

Name of Partners/Director of
Firm Authorized to Sign.

Name of Person having Power of
Attorney to Sign the Contract.

PLACE :
DATE :

Signature & Seal of
Contractor.

SIGNATURE, NAME & ADDRESSES OF WITNESSES.

1)

2)

SECTION - B

PROJECT INFORMATION:

OWNER	**:**	**INDIAN INSTITUTE OF TROPICAL METEOROLOGY PUNE.**
PROJECT		**CCCR BUILDING AT PASHAN, PUNE.**
WORK	:	**EXTERNAL & INTERNAL ELECTRICAL WORK IITM, CCCR BUILDING AT PASHAN**
AVG. RAIN FALL	**:**	800 mm.
TEMPERATURES	**:**	42 ^{0} c Max. 8 ^{0} c Min.
INCOMING SUPPLY	**:**	400V 3Ph, 4Wire, 50HZ.
DISTRIBUTION	**:**	230V 1Ph, 3Wire, 50HZ

DETAIL SCOPE OF WORK :

B.1 : SUBSTATION & RELATED WORK:

DELETED

B.2 : INTERNAL ELECTRIFICATION:

1. Supply, Installation of M.V.Panel
2. Supply & Laying of 1100V Gr. Cables.
3. Supply & installation of end termination of 1100 V XLPE/PVC insulated AL/Cu, Cables.
4. Supply & installation of cable trays, supports MS sections fabrication, isolator's MCB outlets etc.
5. Supply & installation of DB's power outlets, point wiring, conduits, junction boxes in etc. Supply & Installation of Lighting fixtures.
6. Supply & installation of Ceiling fans, Exhaust fans.
7. Supply & installation of readymade Earthing system & misc. Items like pipes, Earthing conductor.
8. Supply, installation of Building L.A. Early streamer system.
9. Supply & installation of Light Point wiring in GI & FRPVC Conduit in office areas respectively.

B.3: EXTERNAL LIGHTING:

1. Supply Installation of 1100 V Gr. Cables and End termination of cables.
2. Supply, Installation of External lighting fixtures, Flood Lights, Landscape Light Fixtures.

B.4 CIVIL WORKS:

1. Major Civil works like foundation; readymade (Brick / concrete) trenches, meter room, fencing & Gates, plinths, hume pipes below roads are not included in the scope.
2. However scope of electrical contractor shall include coordination & follow up with civil contractor for getting civil works related to electrical works done correctly and in time.
3. All Civil works like chasing & making good the chases, making pockets for grouting if necessary, grouting of panels DB's etc. is Included in scope.
4. Fabrication and fixing of supports, frames etc. are included in the scope.
5. Excavation & refilling of trenches in soil is included in scope.
6. Preparation of earthing station chambers is included in scope.
7. Installation of vertical & Horizontal Sleeves in Slab wherever required as per drawing.

B.5 GENERAL:

Scope includes testing and commissioning of all items installed by contractor. Necessary support by manufacturer can / shall be provided.

Scope also includes unloading of free issue items at site, & storing of these items. Contractor's person can accompany client's representatives for shop inspection if necessary for above items.

Contractor has to carry out all works as per respective IS standards & I.E.C. All required tools & tackles, testing kits, measuring instruments. Contractor shall provide safety equipment's with skilled manpower required.

B.6 LIST OF FREE ISSUE ITEMS:

Nil

B.7 POST COMPLETION HANDING OVER DOCUMENTS:

Contractor's scope of work also covers post completion handing over documents, which will cover.

a) As Built Drawings.
b) Installation & maintenance manuals of all equipment.
c) Test & warranty certificates of all bought out items.
d) Test certificates for all installations.
e) Statutory documents required for record.
f) Testing & commissioning Documents in standard forms.

SECTION – C
DEFINITION OF TERMS

C.1 '**Owner/Purchaser'** shall mean the client on whose behalf this enquiry is issued and his authorized representative.

C.2 **'Engineers'** shall mean Engineer / Architect / Consultant appointed by Owner for the project.

C.3 '**Bidder'** shall mean party who quotes against this enquiry.

C.4 **'Contractor'** shall mean the successful `BIDDER' whose bid has been accepted by Owner and on whom Purchase/Work Order is placed.

C.5 **'PROJECT'** shall mean the project specified in Section - B.

C.6 '**SITE'** shall mean the actual place of work as detailed in specification / Section B

C.7 **'SPECIFICATIONS'** shall mean collectively all the terms and stipulations contained in those portions of contract as general and special conditions, amendments, deletions, revisions as made in agreement or written agreements made pertaining to method of work.

C.8 **'Month'** shall mean calendar month.

C.9 **'Plant/Equipment'** and 'Works' shall mean respectively the goods to be supplied and services to be provided by contractor.

C.10 **'Contract/Work Order'** shall mean the order specifying works and associated specifications to be executed by "Owner and Contractor".

C.11 **'Contract Period'** shall mean the period during which "Owner" and "Contractor" shall execute the entire contract as agreed.

C.12 **'Guarantee Period'** / "Defect Liability Period" shall mean period during which the plant / equipment and installations shall give same and trouble free performance as guaranteed by contractor.

C.13 **'Engineer's Instructions'** shall mean instruction oral or written, drawings, direction, explanations issued by Consultant / Engineer / Architects on be-half of the owner from time to time during period of contract. (All 'oral' instructions shall be authenticated by written instructions immediately.)

C.14 **'Performance Tests'** shall mean all tests to be carried out by contractor as per specifications prior to installation being taken over by Owner under guarantee

C.15 **'Commissioning'** shall mean integrated activity of carrying out performance tests, initial and trial operations of system.

C.16 **'Drawings'** shall mean all drawings furnished by Engineer / Owner for basis of proposal or for carrying out works, from time to time; all drawing submitted by vendor provided such drawings are acceptable to Engineer/Owner.

C.17 '**UR'** means quote unit rate.

SECTION : D-I

GENERAL CONDITIONS OF CONTRACT

D-I.1 WORK ORDER:

The work order conveys final agreement between owner and contractor on terms and conditions and is exclusive statement of terms of their agreement. In case of discrepancy between general conditions and specifications, drawings furnished by owner, the latter shall take precedence.

D-I.2 MODIFICATION AND VARIATION:

The order may be amended, modified or rescinded only in writing by both the parties and their duly authorized representatives pursuant to terms stated therein.

D-I.3 MATERIALS AND SERVICES:

D-I.3.1 LABOUR & TOOLS TACKLES:

The contractor shall provide at his cost, all necessary material, tools, tackles, skilled manpower for proper execution of works specified in the schedule of the quantities and as per drawings and specifications. Any discrepancy in schedule of quantities and drawings shall be brought to notice of engineer/owner for decision, immediately.

D-I.3.2 ACTIVITY CHART RELATED TO CIVIL WORK:

Contractor shall provide detail Bar chart of activities based on completion period and civil work schedule made on MS project or similar software and get approval prior to starting the work. Mile stones for supply of important material & completion of specific jobs shall be indicated clearly.

D-I.3.3 MAKE OF MATERIAL:

Contractor shall provide all material of specific makes accepted during discussion stage or from approved list of makes.

In case of any problem / difficulties in procurement of such items, alternative makes will be approved by Engineer & owner based on samples and specifications submitted by contractor.

Alternative material shall be procured only after written approval for makes.

Procurement and use of material of makes not in approved list shall be sole responsibility of the contractor. Contractor shall replace all such material at no additional cost within a stipulated period.

D-I.4 AUTHORITIES AND LAWS:

Contractor shall confirm to all provisions of any law pertaining to works and to the regulations and by laws of related authorities and for water/electricity supply. Contractor shall indemnify owner/Engineer from all conflicts arising out of provisions of regulations & laws.

D-I.5 MATERIAL AND WORKMANSHIP:

All the materials to be supplied for execution of works shall be of first quality, new and strictly as per specifications. In case employer procures such items and hands over the same for fixing to the contractor, the contractor will receive the goods, open the crates and report any discrepancies, store it in his custody until required, install and commission it with necessary care and the best workmanship. The contractor shall be responsible for any loss or damages once the materials are supplied to him in good order and condition.

All the installation rates are deemed to include handling, erection, fabrication services & erection hard ware required for all items.

All the works shall be executed with highest quality of workmanship and as directed by owner/engineer. In case of mockups or approved samples, the quality of the same shall be adhered to for all works and any work quality & material below that standard will be rejected.

D-I.6 SUPERVISION:

A competent representative of contractor shall be available at work site for supervision of works and for co-coordinating, receiving instructions from owner/engineer during entire period of contract.

The supervisory staff required shall depend on value & complexity of job. The supervisory infrastructure planned shall be provided in writing along with a bar chart.

For all works up to 30 lakh at least one engineer with 4 to 6 years project execution experience shall be available for coordination.

For all works above 30 lakh one engineer with 6-8 years experience in execution of similar projects will be available on site full time. He will be assisted by adequate supervisory staff.

For all projects of value 100 lakh & above, coordination & site activities shall be handled by a project manager with minimum 10 years project execution & planning experience. Adequate engineers & supervisory staff will assist him.

D-I.7 ACCESS TO WORK:

Owner / Engineer or their authorized representative shall have access to works being carried out at all reasonable times. No person, not authorized by owner/engineer except representatives of public authorities shall be allowed at work site at any time.

D-I.8 SUB-CONTRACT:

The complete work included in the contract shall be executed by the contractor and the contractor shall not sub-contract/sub-let work or part thereof without prior written consent from owner/engineer. However, contractor shall not be relieved from the responsibility of execution of works as per contract under any circumstances.

D-I.9 SCHEDULE OF QUANTITIES AND DRAWINGS:

D-I.9.1 SCHDULE OF WORK:

The schedule of quantities indicates nearest approximate quantities of the items works. There is a possibility of upward or downward variation of quantities due to site modifications. Any variation of quantities of the individual items as per schedule and overall cost variation of 25% shall be accepted by contractor without any financial implication. Contractor shall take exact measurements for items like cables, earth strips prior to bringing and cutting the same. If variation is beyond above stipulated limits, such items shall be carried out after written mutual agreement. However no excess payment claims for additional quantities shall be entertained if variation is established prior to deliveries of stipulated quantities.

D-I.9.2 GENERAL INFORMATION ON DRAWINGS:

Rates quoted for all 'Unit Rate' (UR) items shall be deemed as valid for any quantity as may be required for completion of work. The drawings enclosed indicate extent and
general arrangement of various equipments. These are for guidance of contractor and exact locations, dimensions; clearance will be governed by site conditions, buildings and statutory rules. Contractor is required to go through the drawing and regulations prior to starting of works. Any discrepancy/changes required shall be reported to consultant and owner. Contractor shall prepare all **`working drawings'** and get them approved from consultants prior to starting the work. The working drawing shall be submitted to consultant within a specific time frame from date of order as mutually decided. Drawing for all bought out items / panels shall be submitted for consultant's approval within a specific time frame & prior to starting any work. All drawings shall be submitted in at least 3 sets.

D-I.9.3 PROCURMENT OF MATERIALS:

Contractor shall bring quantities of items like cables, earthing strips, trays etc. after specific measurement. Client will not take over excess quantities of any items unless it is specifically agreed. Contractor shall have to take back all such quantities without any financial burden on client.

D-I.10 SUFFICIENCE OF SCHEDULE:

The contractor shall be deemed to have satisfied himself before tendering as to correctness and sufficiency of his tender for works and prices quoted therein which shall cover all obligations under contract for satisfactory completion of works, and stipulated performance of system/equipment in his preview.

D-I.11 MEASUREMENTS & BILLS:

Measurements and billing shall be done by specific method detailed below.

1. Contractor shall maintain a proper measurement book (Triplicate) on site and take measurement from time to time.
2. Owners representative / Engineer shall check these measurements from time to time. Coordination for checking will be contractor's responsibility.
3. Contractor shall make bills based on checked measurements only.
4. Bills shall be made in standard and cumulative formats only. Non cumulative Bill will not be accepted.
5. Contractor shall submit minimum 3 copies of bill with
   a) Measurement sheets copies duly signed.
   b) Copies of signed challan
   c) Summary sheet.
   d) Site progress photographs.

Measurements will be certified within 7 days. Consultants will certify R.A. Bills within 10 days of submission of correct bills. Contractor will claim extra items vide separate bills only after rate approval of such items.

D-I.12 REMOVAL OF WORKS:

The owner/engineer during the progress of work have power to order in writing removal from the works any material / installations which in their opinion are not as per specifications or instructions, and for carrying out rectification/rework within specified time and contractor shall carry out such removals/rework as per specification at his own cost. The owner/engineer can get such rectifications/rework done from other agencies at the cost of contractor, if the same are not carried out by them in the stipulated and agreed period.

D-I.13 COMPLETION CERTIFICATE:

D-I.13.1 COMMENCEMENT DEFECT LIABILTY PERIOD:

The work shall be deemed to have been completed on written certificate by Engineer that they have been virtually completed. The "Defect Liability Period" shall commence from the date of such certificate.

D-I.13.2 COMPLETION DRAWINGS & DOCUMENTS:

On completion of works, prior to getting completion certificate contractor shall prepare as built drawings in association and to satisfaction of consultant/Engineer giving all particulars.

a) Exact dimensions and clearances.
b) Fuse & switchgear ratings, ratings of equipments.
c) Cable sizes, cable schedule.
d) Earthing details.

Contractor shall submit the as-built drawing in 3 sets of prints and one set of reproducible to the client.

Contractor shall also submit detail drawings, instruction & maintenance manuals & test certificates for all bought out items. Test certificates of all tests carried out at site shall also form part of this.

One set of all handing over documents shall be given to Engineer / Consultant.

D-I.14 DEFECT LIABILITY PERIOD:

Any defects, faults, deterioration in performance of the material and installations which may appear; during the "Defect Liability Period" of twelve months or any period as agreed by both parties from virtual completion of contract shall be amended/made good by the contractor at his own cost within a reasonable time. In case of default, owner may employ and pay other person to make good the defects and deduct the expenses from the dues payable to contractor on certification from engineer. The defect liability period unless otherwise specifically agreed shall be twelve months.

D-I.15 CONTRACTOR'S RESPONSIBILITY:

Contractor shall be responsible for injury to person animal or things, for all damages caused to property from operations or negligence of himself or his employees/sub-contractors. The contractor shall indemnify owner / Engineer and their employees and hold them harmless in respect of any and all expenses arising from such injury or damage and claims arising there of.

The damages to the property, plant and equipment caused due to such negligence shall be made good by the contractor at his own cost to the satisfaction of the owner / engineer within a specific time. The owner in concurrence with engineer shall be entitled to deduct amount of damage, compensation for loss arising from such damages/injuries/accidents in case of default. All laws related to PF, ESI, Medical insurance etc. shall be adhered to by the contractor. No child labour shall be employed by contractor.

D-I.16 INSURANCE & INDEMNITY:

D-I.16.1 LABOUR LAWS:

Contractor shall have valid PF, ESI registration. All laws related to Labour, PF, ESI, Medical insurance etc, shall be adhered to by contractor. No child Labour shall be employed by contractor.

D-I.16.2 GENERAL INSURANCE:

Contractor shall provide necessary insurance cover for all equipment and material in his scope till the system is handed over. Necessary insurance cover shall also be provided for man power employed on site. Contractor shall indemnify Owner/Engineer and their representatives employed and hold them harm less in case of any damages injuries /accidents and any claims arising out of them.

D-I.17 DATE OF COMMENCEMENT:

The date of commencement of work shall be accounted from the date of issue of LOI.

D-I.18 PENALTY CLAUSE:

The contractor shall pay penalty of 1% per week / subject to a maximum of 10% at value of work order in case of delays beyond the accepted completion period for reasons solely attributed to him.

D-I.19 TIME EXTENTION:

If in the opinion of owner/engineer the work is delayed (a) by force majeure, (b) by reasons beyond control of contractor, extension of time for carrying out the works can be sanctioned by owner/engineer on written request from contractor with due reasoning / supporting.

Force majeure shall mean & include compliance with statutory laws & regulation, Government order or change in orders, war & war like conditions, acts of civil & military authorities, fires, floods, earthquakes and other acts of God, sabotage, revolt, Strikes & lockout of more than 2 weeks. How ever contractor & owner in such case should devise means of expediting the progress for performance as per contract.

D-I.20 TERMINATION OF CONTRACT:

Owner shall be entitled to terminate the contract in case contractor fails to fulfill one or more conditions of contract or if the engineer/consultant certify to the owner in writing that the contractor;

a) Has abandoned the work.
b) Has failed to commence the work or has without any lawful excuse under contract conditions suspended work progress for more than one week or,
c) Has failed to proceed with the works and failed to make such due progress for timely completion of works or.
d) Has failed persistently to observe and perform works as per specifications and contract conditions or.
e) Has employed services of sub-contractors/sub-let all or part of works without prior permission of owner/engineer.

Then and in any of the above said cases owner may not withstanding any previous waiver, can terminate the contract after giving seven days notice in writing to the contractor without affecting powers of engineer and obligation and liabilities of the contractor.

If the payment of the amount payable by the owner under certificate of engineer is unpaid for thirty days or if owner interferes or obstructs issue of such certificate or if the works of owner/engineer or by any injunction or other orders by court of law, then and in any of the said cases contractor shall be at liberty to terminate the contract by giving

seven days notice to the owner and shall be entitled to recover payment from owner on account of work executed or any loss sustained. Owner shall also be entitled to recover any losses due to default of contractor, incurred by him for carrying out / completing works as certified by consultant.

D-I.21 CERTIFICATION AND PAYMENTS:

The contractor shall be paid by owner from time to time under interim measurements certified by engineer/consultant on account of work executed in accordance with contract & to satisfaction of Engineer with certain retention till the work is completely executed. On virtual completion of the works, contractor shall be paid final installment retaining certain fixed percentage over a period known as "Defect Liability Period" as security. The final balance shall be payable to the contractor after expiry of "Defect Liability Period" and after such certificate is issued by engineer/consultant. Engineer/Consultant shall have power to withhold payment against work or part thereof not carried out to his satisfaction.

D-I.22 The decisions, opinion, direction, certificates with respect to clauses 9,13,17,18 here of shall be final conclusive and binding on the parties without appeal. All other decisions, opinion, direction certificates etc. shall be subject to right of arbitration.

D-I.23 ARBITRATION:

All the disputes of any kind in connection with contract shall be referred to engineer/consultant and settled in writing by him. If any party is dissatisfied with such decision except for clauses indicated in clause 22 they are entitled to bring such disputes for arbitration.
Both parties shall appoint Arbitrator/s and his/their decision shall be final and binding on both parties.
Consultant/Engineer if necessary will represent the client in case of arbitration.

D-I.24 TECHNICAL SCRUTINY OF FINAL BILL:

The owner shall have right to get works and bills technically scrutinized at the time of payment of final bill. Owner shall be entitled to recover any money found to be over paid or over certified during such scrutiny.

D-I.25 CO-ORDINATION:

Contractor or his authorised representative shall be responsible for co- ordination with all other agencies working at site for smooth functioning and timely completion of works.

The Contractor shall arrange his work program to suit the building progress and priorities given by Owner/Consultancy.

Site meeting: Qualified/responsible representative shall attend necessary site meeting from contractor's side to take site instruction/decision in view of trouble shooting and progress review of works. Consultant/his representative shall attend the meetings as required.

D-I.26 PRICES:

The prices quoted in the schedule of works shall remain firm during the period of contract. Bidder shall be clearly state taxes, statutory duties and levies which he is required to pay. The rates quoted by Bidder for the items in schedule of rates shall inclusive of all taxes, duties etc. No separate amounts shall be payable to contractor on this account. Any upward statutory duty / tax variation shall be payable on production of proof and necessary reduction shall be effected for downward variation.

Escalation shall not in any case be payable for contracts of value Rs. 10 lacs and less or completion period one year and less.

D-I.27 EXTRA ITEMS:

Contractor may be required to carry out extra items due to site requirements or changes. All such items shall be carried out by contractor after written consent from client. Contractor shall submit a rate analysis of these items based on market rates. A margin of 15% shall be allowed over and above the expenses incurred. Escalation shall not be allowed on the extra items.

D-I.28 SECURITY DEPOSIT:

Successful bidder shall have to pay an amount of 5% of the order value at the time of starting the work in terms of bank guarantee of equal amounts in favor of the owner for entire period of contract up to virtual completion period.

D-I.29 PERFORMANCE GUARANTEES:

The contractor shall guarantee performance of plant and equipment and workmanship against fault for a period of 12 (twelve) months called as "Defect Liability Period".

A certain percentage of work value 5% or as per payment terms shall be retained for the entire "Defect Liability Period" as security. Such retention can be released on furnishing a performance bond in form of bank guarantee of equal amounts for 12 month in favour of owner.

D-I.30 PAYMENT TERMS:

1. 60% of supply value against supply of material at site.
2. 15% of supply value & 75% of labour value on installation
3. 20% of supply of installation on value against testing and commissioning
4. Balance 5% Payment can be release on submission of Bank Guarantee from Indian Nationalized Bank of equal amount valid for 12 moths from the date of virtual completion certificate.

SECTION : D-II

SPECIAL CONDITIONS OF CONTRACT

D-II.1 STORAGE AND OFFICE SHED:

The contractor has to prepare his own store and office shed. The owner at site will provide the suitable space. The contractor will be responsible for safety of his materials stored on site. The contractor shall make his own arrangements for housing of his staff. The CONTRACTOR **will not** be given space to put up Labour camp. CONTRACTOR shall make his own arrangement outside the premises without causing any hindrances to the OWNER. The cost of putting up the labour camps will be borne by the CONTRACTOR. After completion of work the office & store shed shall be dismantled / removed by the contractor at his own cost.

D-II.2 ELECTRICITY AND WATER :

Indian Institute of Tropical Meteorology, Pune will provide any of these facilities on chargeable basis at one place. Contractor shall have to make his own arrangements for further use of the facility. Unavailability of power & water cannot be deemed as reasons for delay.

D-II.3 MAINTENANCE OF SITE

Contractor should keep the site, building office clean of debris wood pieces etc. during the period of contract & work will not be considered as complete till last particle of debris is disposed off to the satisfaction of the Engineer / owner.

D-II.4 SECURITY RULES:

The contractor shall strictly follow all security rules of **Indian Institute of Tropical Meteorology, Pune** particularly bearing upon the inward & outward movements of his trucks, people and equipment and shall also execute the work in such a manner so as to cause the minimum disturbance to the working of the owner.

D-II.5 DISPLAY OF DRAWINGS AT SITE:

The drawings maintained on the site shall be carefully mounted on boards of appropriate size. They shall be protected from rain, ants or other insects. The contractor shall provide at his own cost a display board for showing the details of work as directed and instructed by the Engineer.

D-II.6 EXAMINATION OF DRAWINGS:

Contractor shall examine the relevant drawings, specifications of work which shall be available at the architect's / consultant's office. No claims shall be entertained for the assumptions made by tenderer, if any. Contractor shall not write any comments / conditions / figures or change the tender by writing on the same in any manner. The tender drawings are meant for guidance only.

D-II.7 BAR-CHART:

Contractor shall prepare bar chart and finalize the same in consultation with project consultants before mobilization advance is paid to the contractor. This bar chart will also indicate inputs from Project Consultants & Clients, Links with other works. Following items shall be included;

a. Time required for each activity and their relationship.
b. Quantities in each activity.
c. Resource planning such as equipment & tools to be employed and manpower to be employed for each activity.
d. Cost of each activity.
e. Schedule of drawings required by him for completing the project as per chart.

Bar charts shall be done in M.S. Project or equivalent software and shall be available on Compact Disc (CD). The Bar chart shall be reviewed in every site meeting.
CONTRACTOR will be bound to provide the minimum resources shown in the bar chart. In case it is found at any interim stage that the PROGRESS OF WORK is slow and completion time of any activity is likely to extend beyond the target dates the CONTRACTOR will have to increase the planned resources.
Provision of time will be made by the CONTRACTOR for other agencies to carry out their part of the work and such lapse of time will be considered by the CONTRACTOR in the planning schedule. No compensation will be paid for idle labour due to work of other contractors.

D-II.8 REQUIREMENT OF DRAWINGS:

Contractor shall indicate the dates on which drawings are required by him before starting the work. Contractor shall give a notice of 15 days to architect/consultant about the requirement of the drawing / decisions required by him to complete the project as per schedule. It is understood that all the drawings are not required at the beginning of the project for completing the project within time.

D-II.9 WORK- PROGRESS:

Contractor shall submit progress report for every site meeting with updated bar-chart marking upto date. Progress upto previous day compared to planned Bar chart and % comparison (lag/lead) with approved bar chart.
Monthly progress reports shall accompany "**selective photographs"** of works carried out at site and showing the progress (postcard size.)

D-II.10 CIVIL – WORK:

Contractor & his site engineers will be responsible for monitoring correctness civil works required for electrical works being executed by civil contractor. Necessary follow up for such work will also be done in view of expediting the works.

D-II.11 SHOP- DRAWING:

Contactor shall prepare his own shop drawing for substation layout as required by Statutory Agencies for submission & approval. Calculation if required for such application shall also be provided. Soft copies of consultant's drawings can be provided.

D-II.12 PAINT & FLOORING:

Contractor should take care of paint & flooring. In case of damage to paint or floor, Contractor shall reimburse the amount for required rectification need to be done.
Work Sequence should be as per given below.

D-II.13 APPROVAL OF DRAWINGS:

As per scope of work contractor shall submit 3 sets of shop / working drawings for approval with softcopy before commencement of work which includes,

a) Shop drawing for bought out items like transformer, breakers & panels (as per the scope of work),
b) Conduit layout & switch board schedule,
c) Detailed cable tray route layout with support details
d) Cable schedule,
e) Standard installation details

Contractor's senior engineer / representative shall be made available at consultant's office for any discussion on above as required.

D-II.14 TENDER DRAWING:

The tender drawings are meant for guidance only & may not represent exact size & shape of the building. However they will give a fair idea of the work involved. Complete list of tender drawings available for inspection is given elsewhere in the tender.

Contractor shall examine the relevant tender drawings (which shall be issued along with the tender documents) & specification of work. No claim shall be entertained for the assumption made by the CONTRACTOR, IF ANY. CONTRACTOR shall not write any comments / conditions / figures on the tender.
In case price of item is quoted as lump sum in the BOQ the work described in the drawing will be added in the work described in the item of work as if it is included in the scope of work where lump sum price is quoted .No extra payment will be made for the work shown in the tender drawings.

D-II.15 PRECEDENCE ORDER:

1. Articles of agreement of IIA
2. Drawings
3. Bill of Quantities
4. Special conditions of contract
5. General specification
6. General condition of contract

D-II.16 VARIATION IN THE CONTRACT SUM:

Rates of contractor shall be valid for 25% increase or decrease of value of the contract. CONTRACTOR shall not refuse to carry out any work at the rates mentioned in the tender for the reason of change in the quantity of any item.

D-II.17 DRAWINGS & DOCUMENTS:

"The contractor shall, upon receipt of drawings and documents, study and examine them thoroughly and bring to the notice of the Architect / Consultant any discrepancy found therein before starting work. Failure to do so will be at the risk and consequence of the contractor".

D-II.18 INSURANCE:

Contractor shall insure all the equipment and work in his scope including necessary transit insurance.

D-II.19 QUANTITIES:

Contractor shall, based on shop drawings check the quantities and bring in required quantities after establishing the same.
Abnormal increase or decrease of any quantities compared to BOQ shall be brought to notice of consultant for verification and shall be ordered after verification.
Balance material will not be taken over by client unless specifically discussed.

SECTION - E

SAFETY REGULATIONS

E.1 Readily accessible **First Aid Kit** including adequate sterilized cotton and dressing shall be provided on site.

E.2 Any injured person shall be taken to nearest public hospital without delay.

E.3 All workmen working at heights shall be provided with **safety belts**.

E.4 Portable ladders shall be of heights less than 8 meters. In case of ladders above 8 meters additional man shall be provided for holding the ladders.

E.5 Workers engaged in welding and related works shall be provided with protective eye shields and gloves.

E.6 The excavations, trenches etc. shall be provided with necessary **signals, barricades, obstacles** etc.

E.7 All the electrical connections taken for construction purpose shall have earthings wires provided for equipment earthings.

E.8 **Open/temporary jointing of the cables** shall be avoided and all connections shall be taken through proper sockets & plug tops, Insulated joints and switches etc.

E.9 **Live wires** shall not be laid on ground / road or taken on surface without protective cover.

E.10 All water sumps shall be underground or otherwise shall have covers.

E.11 **All workmen and supervisors** shall be provided with **helmets / safety caps**. **All visitors / Engineers** shall also **wear helmets** when moving on sites.

E.12 Safety apparatus like hand gloves of appropriate class shall be used for all testing commissioning activities. Proper care through danger notice boards, personal vigil shall be taken during such operation to avoid Injury and damage.

E.13 **Protective switchgear** shall also be used for **all temporary works**.

SECTION - F

TECHNICAL SPECIFICATIONS

F.1.0 GENERAL:

F.1.1 The entire electrical installation shall be carried out in accordance with latest Indian Electricity Code and relevant IS Standards up to date. The work shall also comply with all statutory regulations of supply agencies, state inspection authorities and fire regulations.

F.1.2 Contractor shall be responsible for obtaining all necessary statutory approvals, clearances, sanctions, drawing approvals and getting actual connections.

F.1.3 Definition of terms pertaining to all technical requirements as per IEC / IS shall apply.

F.1.4 Contractor shall submit all necessary drawings for scrutiny and approval by Engineer / Consultant prior to commencement of work. Contractor shall immediately bring out the difficulties faced in execution of works to the notice of Engineer / owner / consultant.

F.1.5 All material, equipment, fittings used in the installation shall be of approved quality conforming to relevant IS specifications.

F.1.6 On completion of works contractor shall carry out all necessary tests including but not limited to pressure test, insulation resistance test, continuity of conductors and earth resistance and functional tests along with commissioning checks to the satisfaction of Consultant / Engineer. Contractor shall employ services of specialist agency for testing of substation equipment, H. T. Cables & H. T. Joints, relays & for harmonic analysis.

F.1.7 Contractor shall furnish necessary test certificates as required by authorities and consultant.

F.1.8 List of standards relevant to the works is enclosed.

F.1.9 Installation of equipment shall include all necessary works and fixing accessories like hardware, clamps, round blocks supports boxes etc. required for completing installation satisfactorily.

F.1.10 Complete location/room wise technical and functional testing will be done for equipments & installation before handing over and a consolidated acceptance test report shall be prepared by contractor based on standard formats along with test certificates of bought out items, certificates of testing carried out at site. All equipment & installation test will be done jointly with representatives of client, consultant and signed jointly for the acceptance with remarks if any.

F.1.11 MODE OF MEASUREMENT:

F.1.11.1 Excavations, refilling, reinstating, removing excess soil etc. in all types of strata except Hard rock for laying cables, pipes and earthing conductor will not be measured separately and will be included in respective items. Only excavation in hard rock will be measured separately.

F.1.11.2 Civil works like Brick / Concrete pedestals, foundations and coping for poles, earth pits and chambers, chasing for conduits and making good chases up to wall level etc. shall be included in respective items.

F.1.11.3 End termination of YY cables (Cu un-armoured) & flexible cables will not be measured separately.

F.1.11.4 Cost of street light poles includes, cost of pole pit, pole foundation, coping, 2nos of 40mm dia. GI pipes for cables, cable loop box, wiring up to streetlight fittings from looping box with MCB and loop earthing of pole with 8 SWG GI wire painting etc.

F.1.11.5 Cost of control panels or Distribution boards includes, all base frames required for erection, foundation bolts or anchor fasteners, nut bolts, earth points etc. complete. All structural steel supports over trench for panel, wall mounting brackets for DB's sockets, cable trays will be measured separately.

F.1.11.6 No extra charges will be paid towards testing to be done at site after installation as per the IS standards, specifications, manufacturers recommendations, statutory requirements etc.

F.2.0 SUBSTATION AND H.T. INSTALLATION:
DELETED

F.3.0 TECHNICAL SPECIFICATIONS FOR HV METAL ENCLOSED SWITCHGEAR UPTO 33 KV

DELETED

F.4.0 TECHNICAL SPECIFICATIONS OF DISTRIBUTION TRANSFORMERS (ONAN)

DELETED

F. 5.0 EARTHING AND LIGHTNING PROTECTION:

F.5.1 GENERAL:

All non-live metal parts of the electrical system and equipment shall be earthed with suitable size of earth conductors. 2 distinct earthing shall be provided for all 3-phase equipment.
Earthing shall be in confirming with IS 3043 and Lightning protection shall be with IS 2309. Earth resistance of individual earth station shall not exceed 5 Ω and overall resistance shall be less than 1 Ω at all times. Earth resistance shall be taken with earth meggers for all earth points. All earth points shall be located 2.0mtrs away from the building and there will be a minimum distance of 3.0 meters between 2 earth points. All earth stations shall be identified with number and using painted board.

F.5.2 EARTH STATION:

Pipe Electrode Earthing: 50 mm dia. Class B GI Pipe 3.0 mtrs long tapered at bottom and 12mm dia holes at 75mm c/c on all sides for bottom 2.0mtrs with top watering arrangement shall form earth electrode. The electrode has to be buried vertical in ground.

Plate Earthing: 600 x 600 x 6mm GI or 600 x 600 x 3mm Copper Plate with 50 mm dia. GI watering pipe with funnel at top. The construction shall be as per details given in the Latest edition of IS 3043.

Incase of rocky strata, Bore earthing stations with 150mm bore and 100mm class B GI pipe shall be done. Depth of bore earthing shall be 6.0 mtr minimum. Soil resistivity test shall be done for deciding depth if necessary.
Bentonite or earth powder slurry shall be put along with pipe in the bore.

F.5.3 MAINTENANCE FREE EARTHING:

Generally pipe-in-pipe technology shall be used with inner pipe and outer pipe of different sizes and lengths as mentioned below. These pipe electrodes shall be hot dip galvanized to enhance life.
The annular space between these pipes & inner pipe shall be filled with adequate special crystalline compound material which shall resists the corrosion of inner pipe electrode. Area surrounding outer pipe shall be filled with back fill compound mixed with the soil. Depth & size of pit shall suit to the electrode length. Soil resistivity test shall be done if necessary for deciding depth.

	Pipe Electrode Details.			Galvanizing (Micron)min
Category	Inner pipe dia (min)	Outer pipe dia (min)	Length	
T39	40mm dia	80mm dia	3000 mm or as specified	80 – 100
T19	25mm dia	50mm dia	3000 mm or as specified	80 - 100

F.5.4 MASONRY CHAMBER:

Brick masonry chamber of size 450 x 450 x 450mm minimum (internal clear imensions) with cast iron cover and frame with top finished at ground level shall be provided for watering and test link access.

F.5.5 ARTIFICIAL TREATMENT:

In case of rocky soil, hard murum soil resistance is very high. For getting proper earthing alternate layers of charcoal and salt are to be provided, for entire height of earth electrode with 300mm over all cover. Black cotton soil can be used for refilling the earth points in rocky strata.

F.5.6 EARTHING CONDUCTORS:

Earthing conductor size shall depend on the loads and defined fault conditions. The general guide lines are as listed below –

a)	Main H.T. & L.T. earth conductor, Transformer 2000 KVA and above.	:	75 x 10 MM GI strip.
	Up to 1600 KVA.	:	50 x 6 mm GI Strip
b)	D. G. set neutral 1500 KVA and above.	:	75 x 10 mm Cu Strip
	up to 1250 KVA	:	75 x 6 MM Cu. strip.
c)	Grid earth conductors	:	32 x 6 mm GI strip.
d)	Main Switch boards/Power Distribution boards	:	50 x 6 mm GI strip.
e)	Other switch board & Motors including & above 50 HP / 100 Amps up to 400 Amps	:	25 x 6 mm GI strip.
f)	Motors from 20HP to 50 HP		25 x 6 mm GI strip.
	Motors above 10 HP upto 20 HP Local PDB's	:	25 x 3 mm GI strip.
g)	Power Points 63A, LDB'S	:	8 SWG GI Wire / 10 SWG Cu. wire.
h)	Lightning conductors	:	25 x 3 mm GI strip.
i)	Motors below 10 HP & Power points upto 32A		10 SWG GI Wire / 12 SWG Cu Wire.
j)	Metering Kiosk	:	25 x 3 mm Cu strip
k)	UPS earthing	:	Cu. Flexible wire as per rating.

The earthing conductors shall be connected with either riveted or bolted joints with at least 2 rivets/bolts. The joints shall be painted with bitumen paint.

Earthing strips for lightning protection shall be run on parapet walls of outer periphery of building and outer periphery of highest structure for horizontal runs and on unapproachable vertical walls up to disconnecting box fixed at 1.0 mtr height above ground level. Lightning conductor shall be connected to earth station directly and separate 25x6 mm strip from earth station is to be connected to grid earthing. The lightning conductor/s shall be fixed at appropriate highest location on the building / structure. Separate earth pit shall be provided for each lightning conductor.

F 5.7 GENERAL SPECIFICATION FOR EARLY STREAMER (LIGHTNING ARRESTOR):

F.5.7.1 AIR TERMINATION UNIT:

The air-termination unit should be a Controlled Early Streamer Emission (CESE) lightning conductor with a central pick up rod made of tinned copper. A full electrical continuity between the tip and the earth point should be ensured. The unit shall be fully autonomous and collect energy through a lower series of electrodes. It shall be equipped with an electronic device to detect the lightning and trigger a controlled streamer (3KV and 20A minimum) within few micro seconds. Air Termination shall be manufactured as per NFC 17-102. A dedicated tester or remote testing facility should be available for maintenance purpose. Performance of the unit should have been tested in High Voltage Laboratory (CPRI) as well as in real lightning conditions.

F.5.7.2 AIR TERMINATION SUPPORT:

The Air Termination shall be fixed at the top of a GI or FRP elevation pole so as to be at least 2 meters above the top of the structure to be protected. The elevation pole should have a dia of 35mm to 50mm with a thread at the top to fix the unit. Guy wires may be used in order to ensure the stability of the installation.

F.5.7.3 LIGHTNING EVENT COUNTER:

Design and Supply of a lightning event counter electronically controlled shall be done. It shall activate one registration for 1000A to 100kA for a 8/20 micro second peak current. The item should have necessary High Voltage Laboratory (CPRI) test certificate.

F.5.7.4 EARTHING SPECIFICATION FOR EARLY STREAMER:

Each down conductor should be connected to its own Tripod Earthing termination for a lower resistance value. The tripod earthing shall be made of 3 copper bonded earth rods, 2m long minimum, each one connected to a horizontal conductor (25x3 copper strip) with a 2m length minimum. The horizontal conductors shall be connected to the down conductor with an earth clamp housed in a manhole in order to facilitate the inspection. The earth termination should be connected to the electrical earth of the building with a Copper cable (16mm²) or Aluminium cable (25mm²) in order to achieve an equipotential network as per IEC 62305 standard. The earthing station details shall be as mentioned in previous point (F 5.5).

F.6.0 M.V. PANELS & DISTRIBUTION BOARDS

F. 6.1 CONSTRUCTION :

The panels shall be free standing, floor mounting compartmentalized cubicle type panels with framed structure and bottom channel frame of suitable section. The frame structure shall be rolled/folded sheet section of 2.0 mm thick sheet. Partitions shall be 1.6mm thick. Doors and gland plates shall be 2.0 mm thick. The panel shall be dust and vermin proof with neoprene gasketing. All doors shall be provided with concealed hinges, necessary Earthing arrangement and shall be provided with bracings wherever required to avoid deformation. Easily openable door locks with common key shall be provided for all doors including alleys. Bolts should not be provided for fixing doors except for busbar chambers.

Following minimum clearances shall be adhered to while such designs.

1.	Between phases	:	35 mm
2.	Between phase & neutral	:	25 mm
3.	Between phase & earth	:	25 mm
4.	Between neutral & earth	:	25 mm

All installation materials used for supports shall be non-hygroscopic duly treated to withstand high humidity, tropical conditions and stresses due to temperature variations, and fault currents.

The panels shall be so designed to provide sufficient space for cable alleys for incoming and outgoing cables. Removable gland plates shall be provided at bottom or as required & top covers of panel shall accommodate BUSDUCTS. All live parts shall be shrouded with insulating Board covers. Compartment sizes shall be adequate for easy maintenance. All terminations & joints shall be easily accessible. The operating heights of switchgear shall not be less than 400 mm and shall not exceed 1800 mm.

20% spare terminals shall be provided in both power cable and control terminal blocks. The panel design and construction shall be suitable for extension on both sides.

Degree of protection unless otherwise specified shall be IP 52. Floor mounted panels will be provided with 75 mm channel frame with panel finish.

Adequate care shall be taken in panel design for heat dissipation.

F.6.2 CLEANING AND PAINTING :

The fabricated sections shall be thoroughly cleaned by 7-tank process, which include alkaline degreasing, cold water rinsing, acid pickling, water rinsing, phosphate and pacivation. Panels shall then be powder coated unless other wise specified including corrosion resistance treatment. **No alternative treatment or part treatment other than 7-tank process is acceptable.**

In case enamel painting is to be done corrosion resistance treatment shall be done under controlled conditions and then two coats of stoving enamel paint of approved shades shall be given. The paint / powder coating shade shall be RAL 7032 unless otherwise specified.

F.6.3 BUSBARS & INTERCONNECTIONS:

The bus bars unless otherwise specified shall be of high conductivity aluminum alloy of grade E 91 E as per IS 5082. The busbars shall be provided with suitable SMC bus bar support suitable for withstanding required fault levels. The bus bar shall also withstand above fault level without permanent deterioration for all main panels. The connections shall be securely done with adequate size of plated hardware, plane and spring washer sets. The inter connections shall be made with solid busbars as far as possible. Busbars shall be provided with colour coded Heat shrinkable PVC sleeves. Arrangement of Busbars and busbar alley shall be such that busbar can be easily maintained without disturbing the assembly.

In case interconnections are done with wires, all wires shall be 1100V grade & shall be terminated with suitable lugs. Suitable heavy-duty terminals shall be provided for all such

incoming & outgoing connections. Al earthing bus bar shall be generally 25x6 mm strip minimum and shall be provided at appropriate location through out length of panel extending out for external earth connection. All non-live metal parts shall be properly earthed.

Busbar Design Parameter

a) Current Density: Aluminum 1.0 Amp/Sq.mm
Copper 1.5 Amps/ Sq.mm

b) Temperature rise Limit 85^0C

F.6.4 SWITCHGEAR :

The switchgear used in panels shall be pertaining to relevant IS standards and shall be from the approval list. The terminals shall be suitable for accepting Al busbars and Al cables of relevant sizes suiting the switchgear rating. The metal parts other than live contacts shall be treated against corrosion. All switches shall be with door interlocking provision. Breaking capacities (ICS) of switchgear shall be suitable for the fault levels indicated for respective panels (ICS=ICU). All switchgear shall be type tested for sequence 2 & sequence 3.

F.6.4.1 AIR CIRCUIT BREAKERS:

All ACB's unless other wise specified shall be draw out type. All ACB with same ratings / frame sizes shall be interchangeable. All ACB's unless otherwise specified shall be provided with built in microprocessor based EF / OC release with variable settings and fault indications, shunt release, Auxiliary contact block, manual operating handle, Positive position indication on facia. All incomer ACB's on Main panel unless otherwise specified shall be 4 poles EDO type & All Breaker's in Main Panel & PDB incoming should be provided Microprocessor Based EF/OC Release, with LSIG protection. All other panel ACB's should be with microprocessor based protection release. Basic Display and communication provision should be possible to add on and same shall be provided only if specifically asked for. All CB's shall have position micro switches, ready to close contact provision as standard & as per attached chart. Necessary wiring shall be done for all accessories & potential free contacts up to the terminal block. Specific requirement of switchgear for BMS purpose shall be referred.

F.6.4.2 MCCB:

All MCCB's shall be universal mounting line load interchangeable and with door interlock & handle. All MCCB's on Sub Distribution Panels shall be provided with variable setting Thermo magnetic & all MCCBs with microprocessor based release on Main LT Panel & PDB/sub panel incomer only. Door handles will be provided with pad locking arrangement. All MCCB's on Main panel shall be provided with shunt release and Auxiliary contact block. All MCCB's shall be provided with suitable spreader links on both sided for bus bar and cable connections. All MCCB's used, as incomers to PDB's and sub panels, MLDB shall be provided with shunt release & Aux contact Block. MCCB's shall have clear ON, OFF & TRIP positions. Specific requirement of switchgear for BMS purpose shall be referred.

F.6.4.3 SWITCH DISCONNECTOR FUSES:

These will be used only if specified and shall be with Door inter lock, handle with pad locking arrangement. Phase separators shall be provided on both sides. Clear OFF / ON position indicators shall be provide on handle. Fuses used shall be HRC only and shall be with 80 KA breaking capacity. HRC fuses shall have indication for healthy / blown fuse.

F.6.4.4 MCB's:

All MCB's used in panels & DB's shall be din rail mounted, 10 KA Breaking capacity, 'C' characteristic unless others wise specified. Terminals of MCB's shall be suitable for connecting proper size Cu / Al cables with lugs. Multiple MCB's shall be provided with common fixed operating handle.

F.6.4.5 PROTECTION:

Specific External protection relays shall be provided if required by statutory requirements, approvals or functional requirements. Necessary CT's /PT's etc shall also be included in the scope.

F.6.5 MEASURING INSTRUMENTS AND INSTRUMENT TRANSFORMER :

All meters on panels unless other wise specified shall be digital meters either individual or combined with minimum class 1 accuracy and will be calibrated. These will be flush mounting type. Direct reading instruments shall be in confirmation with IS 1248 and of accuracy class 1.0. All analog meters wherever used shall be flushed mounting type with minimum 96 x 96mm size and in dust proof enclosures. The meters shall have white dials with black scales. All meters shall have sealing arrangement and zero adjustment screw from outside. Voltmeters and ammeters shall be moving iron type with suitable selector switches and protective MCB's for potential circuits.

The current transformers shall be single pole wire wound resin cast accuracy class 1.0 for metering and 5p for protection. Separate CT's shall be provided for metering and protection. The polarities shall be prominently marked CT circuits shall be wired with 2.5 sq. mm. multistrand copper wires. CT's shall not be kept open and terminal-shorting arrangement shall be provided.

PT's wherever specified shall be of appropriate voltage class and 100 VA Burden.

All Main & DG incomers shall be provided with Digital LOAD MANAGERS unless otherwise specified instead of regular meters. LOAD MANAGERS shall provide minimum voltages, currents, KW, KVA, KWH, KVA Rh, frequency, Cos Ø % harmonics, Maximum demand KVA reading with scrolling. These will be with RS 485 port for down loading data. LOAD MANAGER should be able to store last 8 days data, which can be downloaded. Necessary software for Load Manager shall be provided.

F.6.6 INDICATION AND CONTROL :

The control switches shall be rotary type with suitable isolation transformer provided for control supply. Control supply bus shall be provided wherever necessary. Indicating lamps shall be LED Type only with translucent lamp covers. Push buttons shall be momentary contact type with suitable colour code and shall be fitted with integral marker plate. The control wiring shall be with 1.5sq.mm. multistrand 1100V gr copper wire except CT Circuit which shall be with 2.5 sq. mm. wires. Identification ferrules and colour coding shall be used for all wire. MCB's for protection shall be provided wherever required. The control wires shall be bunched and dressed properly and shall not be left hanging. Control MCB's shall be provided in all potential circuits.

F.6.7 DISTRIBUTION BOARDS :

The distribution boards shall generally be as per panel specifications above. All DB's shall be MCB type suitable for concealed/surface installation. DB's shall be ready-made vertical type with hinged secured front covers, with double door arrangement top and bottom knockouts, earthing studs & circuit marking provisions. Top & bottom plates shall be removable as far as possible.

F.6.8 INSPECTION AND TESTING :

Inspection and shop testing for all panels as per IS Standard shall be offered to consultant/owner's representatives. The tests to be done shall include:

a) Physical checking.
b) Megger/insulation resistance, (1000V Megger).
c) H.V. test.
d) Functional tests including control and interlock functions, Automatic operation simulation etc.
e) Any such tests required by local authorities, Electricity Boards and for complying statutory requirements.

F.6.9 APFC PANEL & RELAY :

APFC panel shall be so designed to accommodate all components including capacitors. Adequate ventilation provision shall be made in panel design. Forced ventilation shall be considered for capacitor compartment if necessary.

RELAY : Relay forms important component of APFC system. Relay shall be microprocessor based, self-diagnostic with capacity to function properly at low loads up to 10% of the rated loads and should be reliable & fail safe.

Relay shall have digital power factor indicator and facility to set target P.F. Relay should be able to use and select different ratings of capacitors steps connected to achieve target power factor. Relay should be able to identify & isolate faulty capacitor feeder.Relay shall have clear indication on its function for

a) Control Power availability
b) Lag / Lead power factor.
c) No. of ways utilized at any particular moment.

Relay shall also have facility for manual operation and Auto / Manual ,delay function for each way.

F.6.10 CAPACITOR :

Capacitor shall be 3 Phase Delta connected capacitor banks of appropriate ratings either APP or Mix-dielectric type only. Individual capacitor shall have protection and shall have provision for proper connector box & connector for connecting external cable.

Capacitors should be suitable to any kind of loads and load variation & should be able to sustain high harmonic distortion.

Capacitors shall be of low loss design with watt loss less than 0.5 W / KVAR and guarantee capacitance loss of less than 10% over life period. In rush current limiting arrangement shall be provided to limit inrush current to 1.7 (line current) (In).Capacitors when provided with series reactors to provide filters shall be of appropriate higher withstand voltage depending on % reactance. Also the KVAR indicated in the panel SLD shall be effective KVAR at 415 volts.

F. 6.11 SPECIFICATION FOR TVSS:

		Low exposure-branch panel/eqpt.	Medium exposure – Main Panels
1	Fault Current rating	14kA IC	65kAIC
2	Surge kA rating	50kA/60kA Phase	100kA /phase
3	Fuse	Built in the SPD and fuse should be able to take the surge current.	
4	Surge Protection	Protection should be provided in L-L, L-N, L-E, E-N	
5	Response time	**<0.5ns**	
6	Let-through Voltage	**600V-800V**	
7	Status indication	On-line LED	
8	Technology	MOV with fusing Elements	
9	Surge Capacitors	Yes	
10	Failure Testing	Yes Safe Failure	
11	MCOV	320V (max. continuous Operating voltage)	

F. 6.12 SPECIFIC REQUIREMENTS IN PANELS FOR BMS:

Following requirements shall be done in the panels for Building Management system.

1. Incoming switchgears in Main Panels i.e. MLTP, Synchronizing Panels :

a. Switchgear shall be provided with Microprocessor based release with communication RS485 port.
b. Necessary accessories like Auxiliary contact block, position micro switch for providing potential free contacts for ON, OFF & TRIP status for BMS besides the requirement of indications on panel doors.
c. Shunt release for remote trip.

d. Necessary Auxiliary Contactors for providing potential free contacts shall be provided.

2. **Incoming switchgears in Sub-panel/PDBs, MLDB :**
   a. Necessary accessories like Auxiliary contact block, position micro switch for providing potential free contacts for ON, OFF & TRIP status for BMS besides the requirement of indications on panel doors.
   b. Shunt release for remote trip.
   c. Necessary Auxiliary Contactors for providing potential free contacts shall be provided.

3. Outgoing switchgears in Main Panels i.e. MLTP, Synchronizing Panels :

i. MCCBs :

a. Necessary accessories like Auxiliary contact block, position micro switch for providing potential free contacts for ON, OFF & TRIP status for BMS besides the requirement of indications on panel doors.
b. Shunt release for remote trip.
c. Necessary Auxiliary Contactors for providing potential free contacts shall be provided.

ii. ACBs:

a. ACBs with Microprocessor based release without Communication port unless mentioned. But it shall be possible to add release with communication port in this ACB in future.
b. Necessary accessories like Auxiliary contact block, position micro switch for providing potential free contacts for ON, OFF & TRIP status for BMS besides the requirement of indications on panel doors.
c. Shunt release for remote trip.
d. Necessary Auxiliary Contactors for providing potential free contacts shall be provided.

4. **Metering:** All meters unless otherwise specified shall be digital type with RS485 port and necessary software for parameter display at remote PC shall be provided by vendor along with the panels/meters.

Necessary wiring shall be done for all above accessories & potential free contacts mentioned in Sr. no. 1 to 4 above up to the terminal block.
This will be clearly shown in control wiring diagram with identification.

5.

Requirement for Monitoring & Control (Optional) :

In case of Monitoring & Control all above requirements along with additional provisions shall be provided in the panels like Controller, RTU, DDC, Data cable connections provisions etc. This will be decided later if required by client.

However space provision shall be done for incorporating, Monitoring & control requirements in all panels.

F.7.0 <u>SANDWITCH TYPE ALUMINUM VERTICAL BUSRISER</u>

DELETED

F.8.0 CABLES & CABLE LAYING

F.8.1 H.T. CABLES:

DELETED

F.8.2 L. T. CABLES:

All power and distribution cables shall be 1100V grade, PVC / XLPE insulated and sheathed, armoured, multistrand aluminium conductor cables unless otherwise specified. All control cables shall be 1100V grade PVC insulated and sheathed armoured multi-strand copper conductor cables unless otherwise specified. The cables shall confirm to IS 1554-1988 & IS 7098:1988 with up to date amendments. Type test certificates of the cables from manufacturers for the particular drums shall be provided.Shop inspection shall be offered for routine tests if specifically asked for.

F.8.3 LAYING:

1. The cables shall be thoroughly inspected for transit damage and irregularity in sheath etc.
2. Sufficient manpower with necessary equipment like jacks, rollers shall be provided for unwinding and laying the cables and dragging and twisting shall be avoided. Proper unwinding methods shall be used to avoid twists & cable should be meggered before starting laying.
3. Cables shall be laid at a depth of at least 750mm from ground level with 50mm sand bedding, brick box with cushion for protection. Bending radius provision of at least 12 D shall be kept while laying. The trenches shall be filled and reinstated layer by layer leaving a crown on top.
4. H.T. and L.T. cables shall not be laid in same trench. When more than one cable is laid in same trench a gap of at least 150mm shall be kept between the cables.
5. Cables laid on walls; trenches shall be supported at every 600mm for vertical run and every 450mm for horizontal run. Suitable clamps shall be provided for fixing and support. Vertical runs near ground level shall be protected by GI Pipes of suitable size up to the height of at least 1200 mm.
6. The length of the cables in schedule will be approximate and actual site measurements shall be taken by contractor prior to cutting any cable.
7. Cable identification tags shall be provided at appropriate location throughout length of cables and at both ends.

F.8.4 JOINTING:

Jointing or end termination of cables shall be done by skilled person only. Straight through joints shall be avoided as far as possible. Heavy-duty compression type brass glands shall be used for all connections. Crimping type lugs with suitable brass/Chrome Plated hardware shall be provided for connections.

The cables on panel side are connected to bus bars Cu or Al, Care should be taken to avoid heating & corrosion at the joints. All LT cable joints in outdoor and humid atmospheres shall be done with double compression glands only / if done by Single compression Gland should be accommodated by **PVC HOOD** Of Appropriate size.

F.8.5 TESTING:

Cables shall be meggered as soon as they are brought to site. Insulation resistance shall also be tested.

a) After cutting.
b) After laying and preparing the joint.

Following test shall be taken after completing the installation.

a) Cable continuity.
b) Earth continuity.
c) Insulation resistance.

1000V megger shall be used for testing 3 phase 415 Volt systems.
All HT cables shall be pressure tested after making the end joints at site. Insulation resistance tests shall be done by 5000V megger for all H.T. Cables.

F.8.6 CABLE ROUTE MARKER:

Cable route marker shall oval shaped cast iron of minimum 150 mm length. The voltage levels shall be specifically marked on cable route markers. The cable route marker shall have 20 mm GI pipe or 20 x 20 x 3 mm MS angle support of suitable length grouted in 150 x 150 x 150 mm 1:3:6 concrete block buried in ground.

F.9.0 POINT WIRING

F.9.1 CONDUITS; ACCESSORIES & JOINTS:

All conduits unless otherwise specified shall be hot dip galvanized ERW steel conduits 16SWG up to 25mm dia and 14SWG above 25mm dia size. All conduit accessories shall be screwed type and conduits shall be joined by means of threaded couplings only. Check nuts shall be provided at all joints for tightening and sealing. Ends of conduits shall be free from burs sharp edges. All threaded portions shall be cleaned of any oil and shall be coated with plastic adhesive. All M.S conduits and accessories if used shall be painted with 2 coats of Red Oxide before installation and accessible parts of conducting after installation shall be painted with enamel paint to match the wall paint. Capacity of conduits is separately given. In case of rigid FRPVC conduits, the conduits shall be at least 2.0mm thick. The accessories shall be similar quality. The joints shall be made using special adhesives used for pressure pipe joints.

F.9.2 SURFACE CONDUITING:

The surface conduits shall be fixed with help of 20 SWG saddles on spacers at every 600mm for vertical run and every 450 mm for horizontal run. The runs shall be straight with pull boxes and inspection type bends as required. Contractors are required to provide suitable sleeves for structural member crossing at the time of casting. No elbows shall be allowed.

In case of false ceilings the conduits shall run on walls/trusses/slabs above false ceiling level as far as possible. The connections between such runs and fixtures shall be made with flexible conduits.

F.9.3 CONCEALED CONDUITING:

The concealed conduit work shall be carried out along with construction of walls prior to plaster. The work covers chasing walls with wall cutters only if necessary fixing the conduits, boxes, and accessories, redoing the damaged surface using chicken mesh. All horizontal conduit runs shall be straight at wall point light level to necessary junction/pull boxes and then straight vertical drop to switch box if necessary.

The conduits shall be laid such that they are little below the brick level to avoid cracks. Elbow shall not be used and bends shall be avoided as far as possible using offsets. Pull boxes shall be provided at suitable locations. All necessary sleeves shall be provided in beams, columns, and prior to casting. Deep junction boxes only shall be used in slabs.

The pull and junction boxes shall not be clustered at one place and shall be so arranged that they should not be easily seen from heavy movement areas. All cases shall be taken to secure joints and boxes in place. All vertical runs shall be sealed at top, while masonry civil works going on. Conduit with 25mm dia. minimum shall be used be used for all concealed work.

Generally in areas with false ceiling conduits will not be concealed in slab but will be concealed below false ceiling area. Conduits above false ceiling in such cases shall run with proper supports / suspenders. Conduits shall not be rested on false ceiling grid in any case. Flexible conduits shall not be used in concealed work.

F.9.4 SWITCH BOARDS :

The switchboards shall be readymade modular type metal boxes of approved makes makes as per attached list with all sides knockouts except top. Top plate fixing arrangement shall be provided at all corners with tapped holes. At least 1No. earth stud shall be provided. Switchboard shall be at-least 50mm deep. M.S. Switch board shall be painted with 2coats of Red Oxide primer from inside and outside if not plated or galvanized. In case of surface mounted boards switchboards shall be powder coated with necessary treatment. The switch

plate shall be 2mm thick while phenol-bonded sheet unless specified and shall be fixed with chrome-plated screws with cap washers. For modular switch range switch boxes shall be of same make. Metal boxes shall be used for concealed wiring where as ABS plastic/Polyurethane boxes shall be used for surface mounting. Suitable readymade boxes & plates only shall be used.

F.9.5 SWITCHES & SOCKETS:

All 5/15 a switches shall be modular/fancy type 240 V grade of approved colour and of same shade throughout. 5A Sockets shall be 3pin & 15AMP Sockets shall be 5 pin (Universal).
All switches shall be provided on phase wires only. For power points more than 20AMP capacity 20/30AMP flush type DP Switches shall be provided, unless other wise specified.
All workstation sockets shall be universal multifunction.

F.9.6 WIRES & WIRING INSTALLATION:

All wiring shall be carried out with Non PVC / ZHLS 1100V grade multistrand copper conductor wires of specified sizes. The conduits shall be ventilated and drained before drawing the wires. The circuit wires shall be laid in looped formation with suitable termination arrangement in junction boxes. T joints shall be used. No joints shall be allowed in drawn lengths. Crimping type lugs shall be used for switch interconnections. Colour codes shall be followed. Separate earth wire of same class and suitable size shall be drawn along with other wires. Mains and sub-mains shall be drawn in separate conduit of adequate capacities with separate earth wires. All circuit wires shall be meggered for continuity and insulation resistance.

F.9.7 WIRING CLASSIFICATION:

General wiring requirement for points unless otherwise specified in BOQ /Drawing shall be as listed below:

Lighting Sub mains	2 x 2.5 + 1 x 1.5 sq. mm wires
Light / Fan / 5A / ExFan Pts.	2 x 1.5 + 1 x 1.5 sq. mm wires
Call Bell.	
15A Point	2 x 2.5 + 1 x 1.5 sq. mm wires
As above but Looped	2 x 4.0 + 1 x 2.5 sq. mm up to1st Point. 2 x 2.5 + 1 x 1.5 sq. mm for Looped Point.
1.5 Tonne window A/c & 20A Power Point	2 x 4.0 + 1 x 2.5 sq. mm wires
Window A/c 2.0 Tonne, Geyser & 30 AMP Pts.	2 x 6.0 + 1 x 2.5 sq. mm wires

F.9.8 CONDUIT CAPACITIES:

WIRE SIZE	1.5	2.5	4.0	6.0	10.0
CONDUIT SIZE (GI ERW)					
19/20 mm	7	4	3	----	----
25 mm	10	8	6	5	----
32 mm	18	14	12	8	4
40 mm	---	---	---	10	8

No. of wires in respective size of conduits shall not exceed capacities given.

Capacities as given for conduit runs with pull boxes at not more than 4.25 mtrs. and deflection not more than 15^0. 20% reduction shall be applied for conduit runs with deflection more than 15^0. 20% additional wires shall be allowed in the same size FRPVC conduits.

F.9.9 MOUNTING HEIGHTS (ABOVE FFL):

The general recommended heights for Points as given below:

a) Light Points on Walls	2250 mm. (Center)
b) Switch boards DB's	1200 mm. (Bottom)
c) Socket outlets	1200 mm / 300 mm. (Bottom) / 800 mm at Work Station
d) Telephone Sockets	300 mm. (Bottom) / 800 mm (bottom) at work stations
e) Geyser outlets	1800 mm. (Bottom) / Switch on Nearest switch Board.
f) Exhaust fan outlet	Switch at 1200 mm Socket near Ex fan,
g) A/c Point	window seal/Near A/c Equipment.

Contractor shall refer specific point schedules and architects drawings for exact lights of points.

F.9.10 POINT DEFINITIONS:

1. All points shall include necessary circuit mains from distribution boards up to switch boards as specified, point wiring up to points locations from switchboard, switch, switch sockets & boxes with switch plates as specified, Connector, ceiling rose or brass light holder as required at point location.
2. The circuit mains will not be separately measured in any case.
3. The points will not be distinguished as primary / secondary or short / long points. Generally 2 ceiling light points will be controlled by one switch in open areas and one light point will be controlled by individual switch in small rooms, cabins, toilets unless otherwise specified. Individual switches will control all wall light points.
4. Points controlled directly from the MCB DB by MCB shall be identified separately.
5. Call bell points shall include call bell either dual tone or musical.
6. A/C points unless otherwise specified shall be with 20A Industrial sockets & SPMCB in A readymade box near the A/C location on left side.
7. Fan point unless otherwise specified shall include electronic step control regulator with RF filter and fan box / fan fixing arrangement.
8. Any socket outlet separated by minimum 1.0 mtrs. From the nearest switchboard shall be considered independent socket outlet.
9. All power / A/C, Geyser points shall include wiring from the MCB DB's and no separate mains shall be measured for these points.
10. In case of multiple sockets on an independent socket board one socket point will be considered as independent points and other sockets as points on switchboard.

F.10.0 SPECIFICATIONS FOR TELEPHONE & COMMUNICATION PROVISIONS :

F.10.1 GENERAL:

These specifications cover general provisions to be made for communication excluding equipment. Equipment requirements will be specified separately if included in scope.

F.10.2 TELEPHONE CABLES & WIRES:

All Telephone cables unless otherwise specified shall be PVC sheathed, armoured, jelly filled, twisted pair 0.51 mm tinned Cu conductor cables.

Telephone cables shall be preferably laid in PVC pipes at a minimum depth of 600 mm from finished ground level.

Telephone wires shall be twisted pair PVC sheathed 0.51 mm tinned Cu conductor. Telephone wires shall be laid in Gray FRPVC conduits unless otherwise specified. All end terminations shall be done using proper tools. Identification ferules shall be provided on both ends of wires.

F.10.3 TTB:

All Telephone Terminal Boxes shall be Krone type only suitable for indicated pairs. Boxes shall be fabricated as per panel specifications with concealed hinges, powder coating and shall be with key locks. TTB's shall be of sufficient size to allow proper connections and some extra lengths of pairs and for maintenance. Minimum 20% spear pair connection provision should be provided on the krone.

F.10.4 TELEPHONE OUTLETS:

Telephone outlets unless otherwise specified shall be shuttered RJ 11 type modular plates with suitable surface / concealed boxes.

F.10.5 MEASUREMENTS:

Telephone cables and krone boxes shall be measured on item basis.

Telephone wiring if considered on point basis shall include telephone wires in suitable 2 mm FRPVC conduits from krone, RJ 11 telephone outlets with box, end connections, ferrules, testing of wires complete.

F.11.0 LIGHTING FIXTURES

All lighting fixtures shall be specified in items with specific cat., ref., number. Same or exact equivalent fixtures of other makes shall only be considered. Samples and catalogue references Nos. will have to be approved for alternate make. All fixtures shall be with high power factor, low harmonic, and warm start electronic ballast of approved makes. Push on lamp holders VS or equivalent shall be provided for Flu. Lamps. Fluorescent lamps unless otherwise specified shall be triphospher colour 86 (cool day light). CFL lamps shall be “Bright white” unless other wise specified. Light colour shall be got approved when lamps are being used in office areas. MID / High bay fixtures and streetlights shall be integral and floodlights shall be non-integral unless other wise specified. All housings shall be cast aluminums only. Sheet metal housing are not acceptable for outdoors luminaries. Fixtures construction shall be suitable for maintenance from bottom unless otherwise specified and shall be screw less press fit as far as possible. Lamp replacement shall be possible without removing fixtures. Tie arrangement shall be provided for covers, louvers etc. which need to be removed for lamp / ballast replacement. Provision shall be given for mounting the fixtures from ceiling (suspended)

Installation of fixtures shall be suitable type suspension arrangement using Ball & socket joints / conduits or chrome plated chains with adjustable I bolts at the bottom. The weight of fixtures shall not be transferred on false ceiling members unless special frame for fixing fixtures are provided in ceiling.

SECTION G

APPROVED LIST OF MATERIAL

NOTE: CLIENT RESERVES RIGHT TO ASK FOR ANY OF THE FOLLOWING APPROVED MAKES TO BE USED DURING DISCUSSIONS.
CONTRACTOR SHALL INDICATE WHICH MAKE HAS BEEN CONSIDERED WHILE QUOTING THE RATES.

A. OUTDOOR HT WORK		
DELETED		
B. SUBSTATION		
DELETED		
C. EARTHING & LA		
MAINTENANCE FREE EARTHING.	:	ASHLOK / GALEXI / JMV.
EARLY STREAMER LIGHTNING ARRESTOR	:	INDELEC / PHONIX / LPI
D. PANELS		
FABRICATED READYMADE PANELS	:	ACCUSONIC / ASIAN POWER / PCE / ANTIA / VEGA CONTROLS / COTMAC / PRATIK / VIDYUT CONTROLS
APFC STANDARD	:	ACCUSONIC / ASIAN POWER / PCE / ANTIA / VEGA CONTROLS/ COTMAC / PRATIK / VIDYUT CONTROLS
CAPACITORS	:	SIEMENS / L&T / SUBODHAN / VISA / SHREEM
ACB	:	SCHNEIDER / ABB / SIEMENS / L&T
MCCB	:	SCHNEIDER / ABB / SIEMENS / L&T
RCCB	:	LEGRAND / SCHNEIDER / L&T HAGER / SIEMENS / INDO ASIAN
MCB	:	LEGRAND / SCHNEIDER / L&T HAGER / SIEMENS / INDO ASIAN
MCB DB	:	LEGRAND / SCHNEIDER / L&T HAGER / SIEMENS / INDO ASIAN
LOAD MANGER / DIGITAL METER	:	CONSERVE / HPL / SECURE / ELECTREX/SIEMENS
APFC RELAY	:	BELUK / L&T / SYCON / ELECTRONICOM
CONTACTOR	:	MG – TELE / SCHNEIDER / L&T / SIEMENS

FUSES	:	MG / SCHNEIDER / L&T / SIEMENS
PUSH BUTTONS	:	L&T / RASS / TEKNIK
PILOT LAMPS (INDICATIONS) LED	:	ALTOS / TEKNIK / RASS
PLC	:	ALLEN BRADLY / MESSUNG
ANNUNCIATOR	:	MINILEC / EQUIV
TERMINALS	:	WAGO / ELMEX / CONNECTWELL
RELAYS (PROTECTIONS)	:	ALSTHOM / AVKS SEGC / L&T / ABB.
AUXILIARY RELAY	:	OEN / EQUIV
INDUSTRIAL SOCKETS	:	BCH / HANSEL / MENNEKES / ELCON
MOTORS	:	KIRLOSKAR / CROMPTON / ABB
MOTOR STARTER	:	L&T / SIEMENS / SCHNEIDER
TVSS	:	OBO BETTERMAN / PHOENIX / EMERSON
RTPFC WITH / WITHOUT REACTOR	:	L&T / CLARITAS / VISA / POWER MATRIX
METER (ANALOG)	:	RISHAB / L&T / AE / SECURE
SANDWICH BUSDUCT / BUSBAR	:	SCHNEIDER / L & T / C & S / SIEMENS.
UPS	:	DB POWER / MG-APC / ETON / SOCOMEC
CTS' / PT	:	AE / KAPPA / C & S / NEWTEK
E. CABLES		
AL. / CU. CONDUCTOR CABLES XLPE / PVC	:	FINOLEX / PRIMCAB / GLOSTER / RPG / POLYCAB /HAVELLS/RALISON
AL. / CU. CONDUCTOR UNARMOURED CABLES	:	FINOLEX / RR / LAPP
HEAVY DUTY BRASS CABLE GLAND	:	HMI / BRACO / JAINSON
TELEPHONE CABLE / WIRE	:	FINOLEX / RR
TV CABLE	:	FINOLEX / POLYCAB
DATA CABLES	:	SYSTEMAX / FINOLEX/AVAYA / LEGRAND
CU. LUGS	:	DOWELL'S / ATLAS
AL. LUGS	:	DOWELL'S / ATLAS
CABLE TRAYS & ACCESSORIES	:	ELECON/VISHWACHAYA OR EQUIVALENT LOCAL/ CCR INDUSTRIES
F. POINT WIRING & LIGHTING		

FR PVC CONDUIT	:	PRECISION / ASIAN / DIAMOND
GI CONDUIT	:	BEC / VEMCO
CASING CAPING	:	MODI / PRECISION / PRESTO PLAST
TRUNKING PVC	:	MK / LEGRAND
CU. WIRE (ZHLS)	:	RR / LAPP / L&T/ ECOTEK
SWITCH / SOCKET / DIMMER	:	MOSAIC / CLIPSAL / NORTHWEST / ANCHOR VIOLA / CRAB TREE
FAN REGULATOR	:	MOSAIC / CLIPSAL / NORTHWEST / ANCHOR VIOLIA / CRAB TREE
CEILING ROSE, HOLDERS	:	MK / ANCHOR
CEILING FAN	:	CROMPTON / ORIENT
EX. FAN	:	ALMONARD / NUTECH / CIRACO / CROMPTON
LIGHTING FIXTURE (INTERNAL)	:	WIPRO / PHILIPS / TULIP / ERCO / PIERLITE
EMERGENCY LIGHT	:	PRESTO LIGHT / BPL OR EQUIVALENT.
FLAMEPROOF LIGHTING FIXTURE	:	FCG / STAHL / SUDHIR
AVIATION OBSTRUCTION LIGHT	:	ALTOS / EQU
GENERAL INSECTOCUTER	:	VARUN / FLY-O-CATCH
MOTION SENSOR	:	WIPRO / PHILIPS / AQUILA
LUX SENSOR	:	WIPRO / PHILIPS
SCENE SELECT SYSTEM	:	WIPRO / LUTRON / DYNALITE
G. TELE / DATA / SAFETY		
TELEPHONE TAG BLOCKS	:	ITI / KRONE
TELEPHONE / TV SOCKET	:	MOSAIC / CLIPSAL / NORTHWEST / ANCHOR VIOLA / CRAB TREE
TV SPLITTERS	:	DIAMOND / TOSHIBA
DATA SOCKETS	:	AMPS / SYSTEMAX
H. EXTERNAL LIGHTING		
HIGH MAST	:	PHILIPS / BAJAJ / WIPRO / SURYA
POLES	:	S P POLES / BOMBAY TUBES OR REPUTED LIGHTING COMPANY
STREET LIGHT FIXTURES	:	WIPRO / CROMPTON / CASELEC / PHILIPS
FLOOD LIGHT	:	WIPRO / CROMPTON / CASELEC / DELTA / PHILIPS
DECORATIVE / LANDSCAPE LIGHTING FIXTURE	:	K-LITE / THORN / GEMINI

SECTION - H

LIST OF IS STANDARD

Sr. No.	IS No. / Year	Description
		A – H. T.
1	IS :3427-1997	AC metal enclosed switchgear and controlee for rated voltages above 1 kV upto and including 52kV.
2	IS : 14659-1999	AC metal enclosed switchgear and controgear for rated voltages above 1 kV upto and including 38kV.
3	IS : 10601-1983	Dimensions of terminals of high voltage switchgear and controlgear.
4	IS : 5613-1985	Code of practice for design, installation and maintenance of O.H. power lines.
5	IS : 2705-1992	Current transformer
6	IS : 3156-1992	Voltage transformers
7	IS :5819-1970	Recommended short circuit ratings of high voltage PVC cable
8	IS :13118-1991	General requirements for circuit breakers for voltages above 1000V
9	IS :9920-1982	Switches and switch isolators for voltages above 1000V
10	IS:7098-1988	Cross linked polyethylene insulated PVC sheathed cables
11	IS : 3231-1986	Electrical relays for power system protection.
12	IS : 3961 - 1967	Recommended current ratings for cables.
		B – TRANSFORMER
13	IS : 3347 - 1979	Dimensions for porcelain transformer bushings for use in normal and lightly polluted atmosphere
14	IS : 1271 – 1985	Thermal evaluation and classification of electrical insulation.
15	IS : 10028 – 1985	Code of practice for selection, installation and maintenance of transformers.
16	IS : 2026 - 1994	Power transformer.
17	IS : 1180 - 1989	Outdoor type three phase distribution transformers upto and including 100 kVA 11KV.
18	IS : 10561-1983	Application guide for power transformers.
19	IS : 11171 -1985	Dry type power transformers.
20	IS : 8468-1977	On load tap changers.
21	IS : 3637 – 1966	Specification for gas operated relays (Buchholz's).

22	IS : 335 – 1993	Specification for new insulating oils.
		C – EARTHING & LIGHTNING PROTECTION
23	IS : 3043 – 1987	Code of practice for earthing.
24	IS : 2309 – 1989	Code of practice for Protection of buildings and allied structures against lightning.
		D – LOW VOLTAGE SWITCHGEAR & PANELS
25	IS : 8623 – 1993	Specification for low voltage switchgear and control gear assemblies
26	IS : 10118-1982	Code of practices for selection, installation and maintenance of switchgear and control gear.
27	IS : 12063-1987	Classification of degrees of protection provided by enclosures of electrical equipment.
28	IS :7752-1975	Guide for improvement of power factor in consumer installation
29	IS : 12360-1988	Voltage bands for electrical installations including preferred voltages and frequency.
30	IS : 2147 – 1962	Degrees of Protection provided by enclosures for low voltage switchgear and control gear.
31	IS : 3070-1993	Metal oxide surge arrestors with gaps for AC system.
32	IS :13947-1993	L.V. Switchgears and controlgears
33	IS:13032-1991	Miniature circuit breaker boards for voltage upto and including 1000 volts A.C.
34	IS:13925-1998	Shunt capacitors for ac power systems having a rated voltage above 1000V.
35	IS:12729-2004	Common specification for high voltage switchgear & controlgear standards.
36	IS:1293-2005	Plug & socket outlets for house hold & similar purposes.
37	IS:4160-2005	Interlocking switch socket outlets –specification
38	IS:60309-2002	Plug socket –outlets & couplers industrial purposes.
		E – CABLE
39	IS:12943-1990	Brass glands for PVC cables.
40	IS:1255-1983	Code practice for installation and maintenance of power cables upto and including 33kV rating.
41	IS:10418-1982	Drums for electric cables.
42	IS:7098-1988	Cross linked polyethylene insulated PVC sheathed cables.
43	IS:1554-1988	PVC insulated (heavy duty) electric cables.
44	IS:694-1990	PVC insulated (heavy duty) electric cables

		F – INTERNAL (POINT WIRING, FAN, FIXTURES)
45	IS : 4648 – 1968	Guide for electrical layout in Residential buildings.
46	IS : 732 - 1989	Code of practice for electrical wiring installations.
47	IS:6665-1972	Code of practice for industrial lighting
48	IS : 2268 – 1994	Electrical appliances electrical call bells and buzzers for indoor use.
49	IS : 3646-1992 1994	Code of Practice for interior illumination
50	IS :11037-1984	Electronic type fan regulators.
51	IS:9537-1980	Conduits for electrical installation
52	IS:14768-2000	Conduits fittings for electrical installations general requirements.
53	IS: 14927-2001	Cable trunking & ducting systems for electrical installations
54	IS : 1913 - 1978	General and safety requirement for luminaries
55	IS:3528-1966	Water proof electric lighting fitting
56	IS:1944-1970	Code of practice for lighting of public thorough fare
		G – OTHER CODES
57	SP30-1985	National Electrical code (Fourth Reprint 1998)
58	NBC-2008	National Building Code First Reprint 2006
59	ECBC 2009	Energy Conservation Building Code
		H – GENERAL
60	SP : 31-1986	Chart and treatment for electrical wiring installations.
61	IS : 2551 – 1982	Danger notice plates.
62	IS : 5216 - 1982	Guide for safety procedures and practices in Electrical work

SECTION - I

DEVIATIONS FROM GENERAL CONDITIONS OF CONTRACT

All deviations from general condition of contract shall be filled in hereby the bidder.

SECTION	CLAUSE NO.	DEVIATION

The bidder hereby certificates that the above mentioned are only deviations from general conditions of contract of enquiry.

DATE **Signature And Seal of Bidder**

SECTION - J

DEVIATIONS FROM TECHNICAL SPECIFICATIONS

All deviations from specification shall be filled in hereby the bidder.

SECTION	CLAUSE NO.	DEVIATION SPEC. NO.

The bidder hereby certificates that the above mentioned are only deviations from technical specifications of this enquiry.

DATE **Signature And Seal of Bidder**

SECTION – K

LIST OF DRAWINGS

Sr.No.	Description	Drawing No.
1	Main Single Line Diagram	1109/EL/01
2	External Electrical Layout	1109/EL/02
3	Ground Floor Lighting Layout	1109/EL/3.1
4	Ground Floor Power Layout	1109/EL/3.2
5	First Floor Lighting Layout	1109/EL/4.1
6	First Floor Power Layout	1109/EL/4.2
7	Second Floor Lighting Layout	1109/EL/5.1
8	Second Floor Power Layout	1109/EL/5.2
9	AHU Room Lighting Layout	1109/EL/06
10	Bridge Lighting Layout	1109/EL/07
11	External Lighting Layout	1109/EL/08
12	Earthing Schematic	1109/EL/09
13	Wind Tower Lighting Layout	1109/EL/10

SECTION - L
DETAILS OF CONTRACTORS

1.	**Name & Address**	:	
2.	**Banker**	:	
3.	**Solvency**	:	
4.	**Turn over of last Three Years**	a)	
		b)	
		c)	
5.	**Type of Firm**	:	Proprietor / Partnership / Pvt. Ltd. / Ltd.
6.	**No. of Employees**		
i)	Directors / Partners	:	
ii)	Managers	:	
iii)	Sr. Engineer	:	
iv)	Jr. Engineer	:	
v)	Supervisors	:	
vi)	Skilled Technicians	:	
vii)	Unskilled Workers	:	
7.	**Panel Manufacturing facility as per specifications required**	:	Own / Outside
8.	**Facilities:** Fabrication	:	
	Painting / Powder coating	:	
	Testing	:	
9.	**Testing Equipment available**		
i)	500 / 1000 V Megger	:	
ii)	5000 V Megger	:	
iii)	Earth tester	:	
iv)	H.V. Test set	:	
v)	Oil Test Set	:	
vi)	Multimeter	:	
vii)	Continuity tester	:	
viii)	Tong Tester	:	
10.	**H.V. Testing Name of Separate Testing Party**	:	

11.	**Tentative site infrastructure proposed**	:	

SECTION - M

DATA SHEETS TO BE FILLED BY BIDDER

TECHNICAL SPECIFICATIONS FOR LV SWITCHGEAR

A. AIR CIRCUIT BREAKERS:

	DELETED	

B. MOULDED CASE CIRCUIT BREAKER

Sr.No.	LV Switchgear Requirements		Confirmation by the Panel Manufacturer - Yes `or No			
1	Circuit Breakers shall confirm to Electrical Standards	IEC60947-I & II, IS 13947	YES		NO	
2	Rated Operational Voltage: Ue	433V, +10%	YES		NO	
3	Current Rating(In) of Circuit Breaker shall be declared at	$50^{O}C$	YES		NO	
4	**Current Rating Guideline for the Use of MCCB**	**Maximum Upto 800A**	YES		NO	
5	Utilisation Category	Class A	YES		NO	
6	Suitable for Isolation	Yes	YES		NO	
7	Operating Principle	Current Limiting	YES		NO	
8	Method of Installation	Fixed	YES		NO	
9	No. Of Poles	As mentioned in SLD	YES		NO	
10	Type of Release	Upto 160A-TM, 200A and Above-Microprocessor Based	YES		NO	
11	Rated Insulation Voltage: Ui at 50 Hz	690V	YES		NO	
12	Rated Impulse withstand Voltage at Main Circuits	8KV	YES		NO	
13	Rated Impulse withstand Voltage at Aux.Circuits	4kV	YES		NO	
14	Short Circuit Making Capacity-Max. Prospective Peak Current	Shall be equal to (Icu X 2.1)	YES		NO	
15	Rated Ultimate Short Circuit Breaking Capacity-Icu at Ue	As mentioned in SLD	YES		NO	
16	Rated Service Short Circuit Breaking Capacity- Ics at Ue	Ics=Icu	YES		NO	
17	**Mechanical Features:**					
a)	Three Disctinct Positions ON/OFF/TRIP on MCCB	Required	YES		NO	
b)	Flexibility of Connecting load either on TOP or BOTTOM	Required	YES		NO	
c)	Possibility of Interchanging the protection release of MCCB on site	Required	YES		NO	
d)	Extended Rotary Handle with Padlocking Facility	Required	YES		NO	

e)	Door Interlock	Required	YES		NO	
18	**Electrical Indications:**					
a)	ON/OFF(With Red & Green LED Lamp on Panel Door)	Required	YES		NO	
b)	Trip Signalling (With Amber LED Lamp on Panel Door)	Required	YES		NO	
19	**Release Functions**		YES		NO	
a)	True RMS Sensing	Required	YES		NO	
b)	Overload(L)Protection With Setting	Ir =Adjustable	YES		NO	
c)	Instantaneous Protection (I)	Ir =Adjustable	YES		NO	
d)	Integral Test facility for testing healthiness of Release	Required	YES		NO	
e)	LED Indication to show % Loading of the release	Required	YES		NO	
f)	Thermal Memory	Required	YES		NO	
20	Castell(Mechanical) Interlock	As specified in SLD	YES		NO	
21	Under Voltage Coil with Continuous Rating and front Accessible	As specified in SLD	YES		NO	
22	Shunt trip Coil with Continuous Rating and front Accessible	As specified in SLD	YES		NO	

C. MINIATURE CIRCUIT BREAKER

Sr.No.	**LV Switchgear Requirements**		**Confirmation by the Panel Manufacturer - Yes `or No**			
1	Circuit Breakers shall confirm to Electrical Standards	IEC60898, IS8828	YES		NO	
2	Rated Operational Voltage: Ue (AC)	240/415V, 50/60Hz	YES		NO	
3	Current Rating Guideline for the Use of MCB-	Maximum Upto 63A.	YES		NO	
4	Suitable for Isolation	Yes	YES		NO	
5	Operating Principle	Current Limiting	YES		NO	
6	Method of Installation	On 35 mm DIN Rail.	YES		NO	
7	No. of Poles	As mentioned in SLD	YES		NO	
8	Type of Release	thermo magnetic	YES		NO	
9	Rated Insulation Voltage: Ui at 50 Hz	250/440V AC	YES		NO	
10	Tripping Characteristics	C or D as specified in SLD	YES		NO	
11	Two Distinct Positions ON/OFF on MCB	Required	YES		NO	
12	Flexibility of Connecting load either on TOP or BOTTOM	Required	YES		NO	

TENDER DOCUMENTS

FOR

(PRICE BID- PART 2)

FOR INTERNAL & EXTERNAL ELECTRICAL WORK OF CCCR BUILDING TENDER

AT

INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PASHAN, PUNE

Summary Sheet

CLIENT : - PROPOSED CCCR BUILDING AT IITM
PROJECT : - INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE
WORK : -EXTERNAL & INTERNAL ELECTRICAL WORK

DESCRIPTION			Supply AMOUNT Rs. Ps.	Installation AMOUNT Rs. Ps.
SECTION - 'I' -	**Earthing & Lighting Protection**	**: RS.**		
SECTION - 'II' -	**M. V. Panels & Distribution Boards**	**: RS.**		
SECTION - 'III' -	**M. V. Cables**	**: RS.**		
SECTION - 'IV' -	**Point Wiring, Mains & Fixtures**	**: RS.**		
SECTION - 'V' -	**Telephone & Data Provisions**	**: RS.**		
SECTION - 'VI' -	**External & Landscape Lighting**	**: RS.**		
	TOTAL	**: RS.**		
	GRAND TOTAL	**: RS.**		
	VAT	**: RS.**		
	SERVICE TAX	**: RS.**		
	GRAND TOTAL	**: RS.**		

PROJECT : - PROPOSED CCCR BUILDING AT IITM
CLIENT : - INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE
WORK : - EXTERNAL & INTERNAL ELECTRICAL WORK

Bill of Quantity

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
	SECTION - I						
	Earthing & Lightning Protection						
1.0	Supply & making following Earthing station as per IS 3043 by using GI plate / Cu. plate / Pipe earthing as electrode complete with watering pipe, 50 x 6 mm connecting GI strip up to chamber, soil treatment with charcoal & salt / bentonite powder brick inspection chamber of suitable size with 400 x 400 mm, CI cover, disconnecting link complete, including excavation of earth pit in all type of strata, refilling as detailed below.						
1.1	Earthing station as above but using 600mm X 600mm X 6mm GI. Plate as electrode complete.	Set	UR				
1.2	Earthing station as above but using 600mm X 600mm X 3.15mm thick Cu. plate as electrode complete.	Set	UR				
1.3	As above but bore earthing with 6.5 mtr. long 100mm dia.., GI pipe earth electrode & treatment with bentonite as earth powder complete including 150 mm dia.. boring.	Set	UR				
1.4	Earthing as above but using maintenance free earth electrode with chemical treatment 3mtr. long "Ashlok" CAT NO. T39 / Alltec / UES make or equivalent. Including boring of hole upto 6.5 mtrs. in all types of strata as required.	Set	10				
2.0	Supply, installation, testing of brass 5 spike Lightning arrester with stem and fixing arrangement with accessories.	Set	UR				
2.1	Supply, installation, testing of disconnecting link box for Lightning down conductor at 1mtr. from GL. with SMC insulator & Gunmetal disconnecting link of 6mm size width equal to down conductor and 250mm long with bolting arrangement for brass bolts & nuts of 12mm Ø complete as required.	Set	2				
2.0	Supply, installation, testing of early warning lightning protection system Alltec TSE 4.5 / Indelec Cat. Ref. No. TS 3.40 to provide 50 mtr. radius of protection with 5 mtr. mounting stack, connections arrangement etc. complete as required.	Set	1				
	OR						
2.0	Supply, installation, testing of early warning lightning protection system Alltec TSE 4.5 / Indelec Cat. Ref.No. S 4.5 to provide 65 mtr. radius of protection with 5 mtr. mounting stack, connections arrangement etc. complete as required.	Set	UR				
3.0	Supply, tagging, laying or fixing, testing of GI / Cu earthing strip / wire in ground at a depth of 600mm including excavation in all type of strata except hard rock or in readymade trenches with necessary clamps, rivet jointing as per specification complete as required.						
3.1	75mm x 6mm thick GI strip.	Rmt	UR				
3.2	50mm x 6mm thick GI strip.	Rmt	UR				
3.3	32mm x 6 mm thick GI strip.	Rmt	UR				
3.4	25mm x 3 mm thick GI strip.	Rmt	400				

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
3.5	25mm x 6 mm thick GI strip.	Rmt	70				
3.6	75 mm x 6 mm thick Cu strip.	Rmt	UR				
3.7	50 mm x 6 mm thick Cu strip.	Rmt	UR				
3.8	25mm x 3 mm thick Cu Strip with Heat shrink PVC sleeve for UPS Earthing.	Rmt	65				
3.9	25mm x 3 mm Cu Strip down conductor mounted on SMC insulator for Lightning Arrestor.	Rmt	65.0				
3.10	8 SWG GI wire.	Rmt	200.0				
3.11	16 SWG GI wire.	Rmt	160.0				
3.12	12 SWG GI wire .	Rmt	UR				
3.13	14 SWG Cu. wire.	Rmt	UR				
3.14	12 SWG Cu. wire with Heat shrink (Green colour) sleeve for UPS earthing.	Rmt	UR				
3.15	16 sq. mm. PVC insulated copper wire(Green colour)	Rmt.	UR				
3.16	10 sq. mm. PVC insulated copper wire.(Green colour)	Rmt.	UR				
3.17	6 sq. mm. PVC insulated copper wire. (Green colour)	Rmt.	300.0				
4.0	Supply and installation of earth busbar box consisting of 50 x 3 mm size, 300mm long Cu. Strip with multiple tapping and nut bolt arrangements etc. mounted on SMC insulators. Box shall be fabricated from M.S. sheet including power coated, clear acrylic hinged door etc. complete.	Nos.	1.0				
	TOTAL OF SECTION - I						

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
	SECTION - II						
	M. V. Panels and Distribution Boards.						
1.0	Supply, installation, testing & commissioning of MV panel boards compartmental cubicle type freestanding with appropriate cable entries, front operating, front maintained wherever required complete with base frame etc. as required and as per IS 8623 specifications. Panel has to be fabricated out of 14 / 16 SWG CRCA sheet, and surface treated with phosphating seven tank process and duly powder coated with RAL 7032 or any approved color. (Refer Single Line Diagram drg. no.1109/EL/01 for Switchgear and other details).						
1.1	Main Distribution Panel	No.	1				
1.2	Main LDB	No.	1				
1.3	Main PDB	No.	1				
1.4	External Lighting DB.	No.	1				
1.5	UPS MAIN PDB.	No.	1				
2.0	Supply, installation, testing, tagging, (Circuit numbering) and commissioning of following double door readymade recessed type MCB, DB, fabricated out of CRCA sheet and painted with powdercoating process OR made out of scratch proof polycarbonate body, and concealed in wall or on surface with necessary frame complete as required.						
2.1	2 Way TPN DB with 25 A 4P RCCB 100mA Incomer and 10A SP MCB as outgoing (as per SLD). **LDB No 01,02,03,04,05,07,08**	No.	7				
2.2	4 Way TPN DB with 25A 4P RCCB 100mA Incomer and 10A SP MCB as outgoing (as per SLD). **LDB No 06,09 & ELDB 01 TO 03**	No.	5				
2.3	4 Way TPN DB with 40 A 3P MCB as I/C and 10A SP MCB as outgoing Complete as RPDB (as per SLD). **RPDB No 01 TO 08**	No.	8				
2.4	4 Way TPN DB with 40 A Si RCCB 100mA as I/C and 20A SP MCB as outgoing Complete as UPSDB (as per SLD). **UPSDB No 01 TO 08**	No.	8				
2.5	6 Way TPN DB with 40 Amp MCB as incomer & 20 Amp SP MCB as outgoing.	No.	UR				
3.0	Supply, fixing, testing of good quality following readymade modular Power sockets with switch, in readymade modular box with switch plate. Box should be suitable to terminate cables / wires easily complete as required.						
3.1	1no. 6 / 16A, 3pin round pin socket with shutter & switch.	No.	UR				
3.2	1no. 13A, 3pin Flat pin socket with shutter & switch.	No.	UR				
3.3	1no. 6A, 3pin round pin socket with shutter & switch.	No.	UR				
3.4	2 Nos. modular 6A socket for UPS & 1 Nos modular 6A socket for Raw Power below the table and 1 Nos. 6A switch for both UPS socket & 1 Nos 6A switch for Raw Power socket above the table at one place.	No.	175				
4.0	Supply, installation, testing of set of Bulkhead fixture with 9 W CFL lamp and 1 No. 6A, 3 pin socket + switch on common good quality board in lift pit.	Set	3				

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
5.0	Supply, fixing, testing, of good quality industrial sockets with MCB's or MCB isolators of different ratings in readymade **IP 20** metal enclosure. Box should be suitable to terminate cables / wires easily, complete as required.						
5.1	16A 1Ø, 2P+E, Socket with 16A DP MCB in a Readymade Box.	No.	UR				
5.2	32A, 3Ø, 3P+N+E, Socket outlet with 32A TPMCB in readymade metal enclosure.	No.	UR				
5.3	63A, 3Ø, 3P+N+E, Socket outlet with 63A TPMCB in readymade metal enclosure.	No.	UR				
5.4	40 A 4 Pole, 100 mA RCCB + 16A DP MCB in one box for lift machine room.	No.	1				
5.5	6-32 A TP MCB in a Readymade box.	No.	UR				
5.6	16A SP MCB-2Nos in Readymade Box(Emergency Lighting MCB Box)	No.	UR				
5.7	40-63 A TP MCB in a Readymade box.	No.	UR				
5.8	125 A TP MCCB in a Readymade box.	No.	1				
5.9	160 A TP MCCB in a Readymade box.	No.	UR				
5.10	200 A TP MCCB in a Readymade box.	No.	UR				
5.11	DOL starter suitable for 5 - 7.5 hp motors.	No.	3				
6.0	Supply, fixing, testing, of good quality industrial interlocked switched sockets with MCB's of different ratings in readymade **IP 65** metal enclosure. Box should be suitable to terminate cables / wires easily, complete as required.						
6.1	20A 1Ø, 2P+E Socket with 20A SP MCB in a Readymade Box IP65 .	No.	UR				
6.2	32A, 3Ø, 3P+N+E, Socket outlet with 32A TPMCB in readymade metal enclosure IP65.	No.	UR				
6.3	63A, 3Ø, 3P+N+E, Socket outlet with 63A TPMCB in readymade metal enclosure IP65.	No.	UR				
6.4	6-32A, TPMCB in readymade metal enclosure IP65.	No.	UR				
6.5	40-63A, TPMCB in readymade metal enclosure IP65.	No.	UR				
	TOTAL OF SECTION - II						

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
	SECTION - III						
	M.V. Cables						
1.0	Supply, testing, tagging, laying, and commissioning following sizes of 1100V grade XLPE / PVC insulated multistrand Al. / Cu. conductor armoured / unarmoured cables (As Per IS 1554 & IS 7098), including excavation in all types of strata except hard rock, sand cushioning of 75mm, laying of bricks to form a box type cover over cables, refilling of trench with excavated earth, leveling of trench **(NOTE: Only hard rock Strata will be measured separately).**						
1.1	4C x 16 Sq.mm. AYFY cable.	Rmt	UR				
1.2	4C x 6 Sq.mm. AYFY cable.	Rmt	500				
1.3	4C x 6 Sq.mm. YWY cable.	Rmt	UR				
1.4	4C x 4 Sq.mm. YWY cable.	Rmt	UR				
1.5	4C x 2.5 Sq.mm. YWY cable.	Rmt	UR				
1.6	3C x 6 Sq.mm. YWY cable.	Rmt	UR				
1.7	3C x 4 Sq.mm. YWY cable.	Rmt	UR				
1.8	3C x 2.5 Sq.mm. YWY cable.	Rmt	UR				
2.0	Supply, testing, tagging, laying and commissioning following sizes of 1100 Volt grade, XLPE / PVC insulated multistrand Al. / Cu. Conductor armoured / unarmoured cables (As Per IS 1554 & IS 7098) in readymade RCC trench, in provided PVC pipe, RCC pipe hume pipe, on cable trays / ladders etc. as. required complete with clamps for fixing tagging etc.						
2.1	3.5C x 300 Sq.mm. A2XFY cable.	Rmt	UR				
2.2	3.5C x 240 Sq.mm. A2XFY cable.	Rmt	1000				
2.3	3.5C x 185 Sq.mm A2XFY cable.	Rmt	UR				
2.4	3.5C x 150 Sq.mm A2XFY cable.	Rmt	50				
2.5	3.5C x 120 Sq.mm. A2XFY cable.	Rmt	UR				
2.6	3.5C x 95 Sq.mm. A2XFY cable.	Rmt	UR				
2.7	3.5C x 70 Sq.mm. A2XFY cable.	Rmt	170				
2.8	3.5C x 50 Sq.mm. A2XFY cable.	Rmt	UR				
2.9	3.5C x 35 Sq.mm A2XFY cable.	Rmt	100				
2.10	3.5C x 25 Sq.mm. A2XFY cable.	Rmt	UR				
2.11	4C x 16 Sq.mm. AYFY cable.	Rmt	50				
2.12	4C x 10 Sq.mm. AYFY cable.	Rmt	UR				
2.13	4C x 6 Sq.mm. AYFY cable.	Rmt	UR				
2.14	4C x 6 Sq.mm. YWY cable.	Rmt	UR				
2.15	4C x 4 Sq.mm. YWY cable.	Rmt	1300				
2.16	4C x 2.5 Sq.mm. YWY cable.	Rmt	675				
2.17	3C x 6 Sq.mm. YWY cable.	Rmt	UR				
2.18	3C x 4 Sq.mm. YWY cable.	Rmt	UR				
2.19	3C x 2.5 Sq.mm. YWY cable.	Rmt	UR				
2.20	3C x 1.5 Sq.mm. Cu. Sheathed cable.	Rmt	UR				
2.21	3C x 4 Sq.mm. Cu flexible cable for UPS wiring in floor trunking including necessary terminations.	Rmt	UR				
2.22	3C x 2.5 Sq.mm. Cu flexible cable for UPS wiring in floor trunking including necessary terminations.	Rmt	4000				
3.0	End termination for above cables including glands Brass heavy duty, lugs, consumable etc. (End terminations for flexible cables will not be considered separately).						
3.1	3.5C x 300 Sq.mm. A2XFY cable.	Nos.	UR				
3.2	3.5C x 240 Sq.mm. A2XFY cable.	Nos.	8.0				

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
3.3	3.5C x 185 Sq.mm A2XFY cable.	Nos.	UR				
3.4	3.5C x 150 Sq.mm A2XFY cable.	Nos.	8.0				
3.5	3.5C x 120 Sq.mm. A2XFY cable.	Nos.	UR				
3.6	3.5C x 95 Sq.mm. A2XFY cable.	Nos.	UR				
3.7	3.5C x 70 Sq.mm. A2XFY cable.	Nos.	10.0				
3.8	3.5C x 50 Sq.mm. A2XFY cable.	Nos.	UR				
3.9	3.5C x 35 Sq.mm A2XFY cable.	Nos.	6.0				
3.10	3.5C x 25 Sq.mm. A2XFY cable.	Nos.	UR				
3.11	4C x 16 Sq.mm. AYFY cable.	Nos.	2.0				
3.12	4C x 10 Sq.mm. AYFY cable.	Nos.	UR				
3.13	4C x 6 Sq.mm. AYFY cable.	Nos.	44				
3.14	4C x 6 Sq.mm. YWY cable.	Nos.	UR				
3.15	4C x 4 Sq.mm. YWY cable.	Nos.	66				
3.16	4C x 2.5 Sq.mm. YWY cable.	Nos.	16				
3.17	3C x 6 Sq.mm. YWY cable.	Nos.	UR				
3.18	3C x 4 Sq.mm. YWY cable.	Nos.	UR				
3.19	3C x 2.5 Sq.mm. YWY cable.	Nos.	UR				
4.0	Supply & installation of readymade hot dip GI. Ladder type tray, shall have 50mm "C" shape channel and rungs at every 200 mm CC including readymade accessories e.g. vertical & horizontal bends, Tee's, right angles etc.						
4.1	300 mm ladder tray 14 SWG.	Rmt	UR				
4.2	450 mm ladder tray 14 SWG.	Rmt	UR				
4.3	600 mm ladder tray 14 SWG.	Rmt	UR				
4.4	750 mm ladder tray 14 SWG.	Rmt	UR				
5.0	Supply and installation of readymade hot dip GI perforated trays of following size with 50 mm depth unless otherwise specified including readymade accessories e.g. Vertical, horizontal bends, tee's, rightangles etc.						
5.1	50 mm perforated tray 16 SWG.	Rmt	UR				
5.2	100 mm perforated tray 16 SWG.	Rmt	25				
5.3	150 mm perforated tray 16 SWG.	Rmt	UR				
5.4	200 mm perforated tray 16 SWG.	Rmt	45				
5.5	300 mm perforated tray 14 SWG.	Rmt	110				
5.6	450 mm perforated tray 14 SWG.	Rmt	15				
5.7	600 mm perforated tray 14 SWG.	Rmt	UR				
6.0	Supply and installation of readymade hot dip GI tray covers 16/18 SWG including readymade shape of Vertical & Horizontal Bend, Tee's, Right angles etc. to suit tray for all vertical runs.						
6.1	50 mm tray cover (18 SWG).	Rmt	UR				
6.2	100 mm tray cover (18 SWG).	Rmt	5				
6.3	150 mm tray cover (18 SWG).	Rmt	UR				
6.4	200 mm tray cover (18 SWG).	Rmt	10				
6.5	300 mm tray cover(18 SWG).	Rmt	25				
6.6	450 mm tray cover (16 SWG).	Rmt	5				
7.0	Supply, fabrication & installation of M.S. angle / channel supports for trays, DB panels, frames etc. including necessary painting with 2 coats of primer & 2 coats of enamel paint & required hardware for fixing of supports etc. complete.	Kg.	1000				
	TOTAL OF SECTION - III						

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
	SECTION - IV						
	Point Wiring, Mains & Fixtures						
1.0	Surface / concealed point wiring for light / fan / call bell / 6A points with 2 x 2.5 + 1 x 1.5 Sq.mm. multistrand ZHLS Cu. conductor wires 1100 V gr. in suitable **GI ERW** conduits as submains and 2 x 1.5 + 1 x 1.5 Sq.mm. wires for each point complete (submains will not be measured separately) with necessary modular switch board, switch plates & accessories complete with testing. **Note**: All conduit in area with false ceiling shall be concealed below false ceiing.						
1.1	Point wiring for light points with necessary 6A SP switch, ceiling rose / Holders complete. (Maximum 2 points controlled by one switch).	Pt.	UR				
1.2	Point wiring as above but for MCB controlled light points with 2 x 2.5 + 1 x 1.5 sq.mm. Cu wires from LDB, including accessories like ceiling rose etc. (Approx. 6 to 8 points shall be controlled by a SP MCB in respective LDB.)	Pt.	UR				
1.3	As above but for Emergency Lighting	Pt.	UR				
1.4	2 Way Light points with 6A 2 Way switch & wiring .	Pt.	UR				
1.5	Fan point with 6A SP Switch, Ceiling Rose, with electronic step Regulator (modular).	Pt.	UR				
1.6	Ex. Fan point with 6A SP Switch.	Pt.	UR				
1.7	6A 3 pin socket outlets independent (Modular).	Pt.	UR				
1.8	6A 3 pin socket outlets on board (Modular).	Pt.	UR				
1.9	As above but wiring for 6/16A, socket point with 2 x 2.5 + 1 x 1.5 Sq.mm. Cu. wires from DB including 6/16A, 6 pin Socket outlet + 16 SP modular switch complete. In case 2 points looped of one circuit 2 x 4.0 + 1 x 2.5 sq.mm. Cu. Wiring shall be done upto 1st point.	Pt.	UR				
1.10	Point wiring as above but for Basement area 20A points with 3 x 2.5 Sq. mm. Cu. flexible cable from DB including 20A, 1ph, 3 pin Industrial socket & 20A SP MCB in readymade box.	Pt.	UR				
2.0	Surface / concealed point wiring for light / fan / call bell / 6A points with 2 x 2.5 + 1 x 1.5 Sq.mm. multistrand ZHLS Cu. conductor wires 1100 V gr. in 25mm dia., 2mm thick FRPVC conduits as submains and 2 x 1.5 + 1 x 1.5 Sq.mm. wires for each point complete (submains will not be measured separately) with necessary modular switch board, switch plates & accessories complete with testing. Note: All conduit in area with false ceiing shall be concealed below false ceiling.						
2.1	Point wiring for light points with necessary 6A SP switch, ceiling rose / Holders complete. (Maximum 2 points controlled by one switch).	Pt.	470				
2.2	Point wiring as above but for MCB controlled light points with 2 x 2.5 + 1 x 1.5 sq.mm. Cu wires from LDB, including accessories like ceiling rose etc. (Approx. 6 to 8 points shall be controlled by a SP MCB in respective LDB.)	Pt.	UR				
2.3	As above but for Emergency Lighting	Pt.	181				
2.4	2 Way Light points with 6A 2 Way switch & wiring .	Pt.	UR				

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
2.5	Fan point with 6A SP Switch, Ceiling Rose, with electronic step Regulator (modular).	Pt.	80				
2.5	Ex. Fan point with 6A SP Switch.	Pt.	12				
2.6	6A 3 pin socket outlets independent (Modular).	Pt.	25				
2.7	6A 3 pin socket outlets on board (Modular).	Pt.	95				
2.8	As above but wiring for 6/16A, socket point with 2 x 2.5 + 1 x 1.5 Sq.mm. Cu. wires from DB including 6/16A, 6 pin Socket outlet + 16 SP modular switch complete. In case 2 points looped of one circuit 2 x 4.0 + 1 x 2.5 sq.mm. Cu. Wiring shall be done upto 1st point.	Pt.	25				
2.9	Point wiring as above but for Basement area 20A points with 3 x 2.5 Sq. mm. Cu. flexible cable from DB including 20A, 1ph, 3 pin Industrial socket & 20A SP MCB in readymade box.	Pt.	UR				
3.0	**Mains & Submains**						
3.1	Supply & installation, testing & commissioning of following mains in provided GI/FRPVC conduit complete for power point.						
3.1.1	2 x 2.5 + 1 x 1.5 sq.mm. Cu. wires.	Rmt	500				
3.1.2	2 x 4.0 + 1 x 2.5 sq.mm. Cu. wires.	Rmt	200				
3.1.3	2 x 6.0 + 1 x 2.5 sq.mm. Cu. wires.	Rmt	UR				
4.0	Supply & installation of suitable guage GI / 2 mm thick FR PVC conduit of following sizes including all accessories e.g. deep junction box, bends etc. for concealing in slab / wall & spacer, saddles for open on slab / wall.						
4.1	32 mm dia. FRPVC.	Rmt	UR				
4.2	25 mm dia. FRPVC.	Rmt	300				
4.3	25 mm dia. GI conduit.16 SWG	Rmt	UR				
5.0	Supply,Installation, testing & commissioning of lighting fixtures (with suitable controlgear, electronic controlgear for fluorescent) / fans / Ex. Fans etc. including necessary accessories, lamps, wiring connection chain, down drops, supports as required etc. complete.						
5.1	Patti fitting (For Indirect Light) Complete as required (Wipro Cat. 2011 - WDF 9128 SG 1 x 28 W FTL (T5) or equivalent.)	No.	82				
5.2	WRF 21136 1 x 36 W FTL (T8) or equivalent (Wipro Cat. 2011)	No.	43				
5.3	WRF 21118 1 x 18 W FTL (T8) or equivalent (Wipro Cat. 2011)	No.	29				
5.4	2 x 18 Watt CFL recessed Downlighter (Wipro Cat. 2010 - WCP 27218 SGW or equivalent.)	No.	76				
5.5	T5C2427 140 Circline 40C TL5C 1x40W 2GX13 (Tulip) or equivalent	No.	13				
5.6	Tulip Diskette ceiling TPC3118 Diskette 1 PL-S 2x9W G23/2 Pin	No.	2				
5.7	2X28 W FTL (T5) (Wipro Cat. 2011) WVF 87228 SGW or euivalent	No.	136				
5.8	Tulip Light trough suspended T5P1062 228 Light trough 228 For lamp TL-5 2x28W G5 + Cost shall include all required accessaries	No.	UR				
5.9	2 x 6 Watt LED recess mounted Down lighter LD44-012-XXX-WH-XX 2 x 6 W LED (Wipro Cat. 2011) or equivalent.	No.	198				

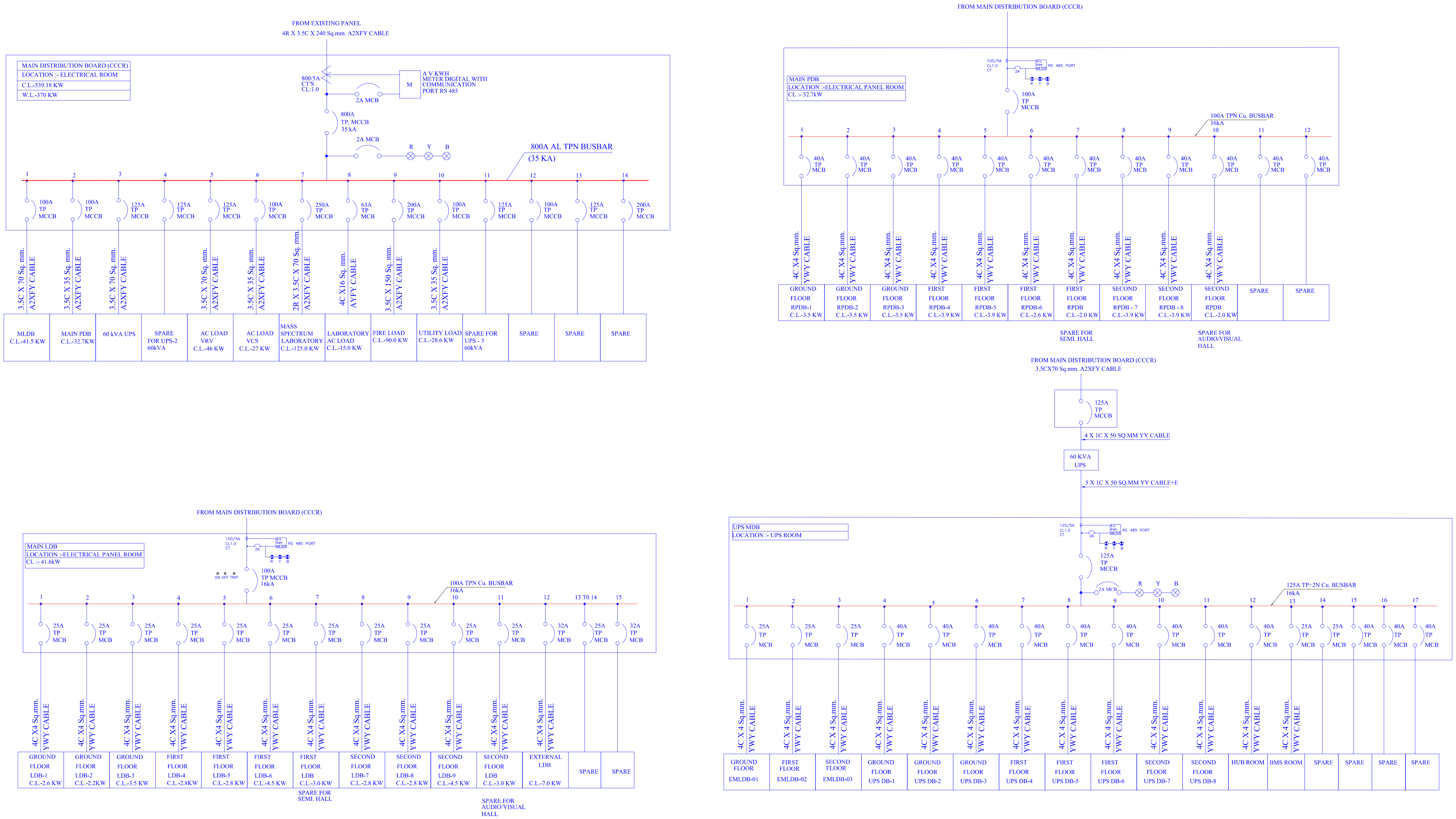
Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
5.10	KOLORS DOWNLIGHTER LD20-003-045-WW-XX* 3 x 1 W 350mA (Wipro cat 2011) or equivalent. Cost shall include all accessaries like LED Driver or equivalent.	No.	9				
5.11	Up-down lighter Outdoor Type (Wipro Cat. 2011 UWH 11070S 1 x 70 W HIT-CE - Silver) or equivqlent.	No.	11				
5.12	Down Lighter Outdoor Type(Wipro Cat No.UCH 21070S 1X70 W HIT-CE	No.	4				
5.13	WPR-06-7104, 1 X 40 Watt FC (T5 Circular)Surface Mounted Fixture(Only downlighter) Wipro (Sign Round) OR Equivalent	No.	4				
5.14	Symmetrical bush light (Wipro cat - 2011. FFQ 51050 1 x 50 W Halogen PAR 20 + FFX 511 Directional Shield + FFX 512 Earth Spike) or equivalent.	No.	10				
5.15	DAY LIGHT SENSOR + OCCUPANCY SENSOR (WIPRO CATLOGUE NO CDA 24010)	No.	64				
5.16	OCCUPANCY SENSOR(WIPRO CATLOGUE NO COP 11010)	No.	13				
6.0	Supply, installation, testing & commissioning of 1200 mm sweep ceiling fan & upto 600mm length down rod with canopies.	No.	80				
7.0	Supply installation, testing & commissioning of 150 mm sweep exhaust fans with frame & bird protection louvers including all hardware etc. complete as required.	No.	UR				
8.0	Supply, installation, testing & commissioning of 250mm exhuast fan with frame and bird protection louvers including all hardware etc. complete as required.	No.	12				
9.0	Supply, installation, testing & commissioning of heavy duty 450mm exhaust fan with frame & bird protection louvers including all hardware etc. complete as required.	No.	UR				
	TOTAL OF SECTION - IV						

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
	SECTION - V						
	Telephone & Data Provisions						
1.0	Supply & installation of Krone type telephone junction box fabricated and painted as per panel specifications.(Telephone Box Size should be such that it should accommodate outgoing cables)						
1.1	200 Pair Box.	No.	1				
1.2	100 Pair Box.	No.	UR				
1.3	50 Pair Box.	No.	UR				
1.4	20 Pair Box.	No.	UR				
1.5	10 Pair Box.	No.	UR				
2.0	Supply, installation, testing & commissioning of jelly filled armoured twisted pair 0.51 mm Cu. telephone cable with PVC insulation in ready trenches / trays / pipes etc.						
2.1	200 Pair.	Rmt	100				
2.2	100 Pair.	Rmt	UR				
2.3	150 Pair.	Rmt	UR				
2.4	20 Pair.	Rmt	UR				
2.5	10 Pair.	Rmt	UR				
2.6	5 Pair.	Rmt	UR				
3.0	Supply & laying of CAT 5E cable for Data points in existing raceways or in pre laid FRPVC blank conduits.	Rmt	UR				
4.0	Supply and laying of CAT 6 cable for Data & Telephone points in existing raceways or in pre laid FRPVC blank conduits.	Rmt	9800				
5.0	Supply and installation of 2 mm thickness Aluminium extruded raceway for under floor installation including necessary cutting of floor providing couplers and clamps for raceway fixing as details provided making good the surface of floor complete as per sizes provided.						
5.1	82mm X 38mm deep Al raceways.	Rmt	UR				
5.2	100mm X 45mm deep Al. raceways.	Rmt.	680				
5.3	125mm X 25mm deep Al. raceways.	Rmt.	UR				
6.0	Supply and installation of good quality floor junction boxes of appropriate sizes for raceways with folded frames including counter sunk screw arrangements such that covers are in level with the floor level. The cover will be M.S, power coated & have 4 Nos. 25 / 32 mm Ø holes with rubber grommets at appropriate location.						
6.1	100mm X 100mm X 50mm deep 16SWG junction box with 14 SWG cover.	No.	UR				
6.2	150mm X 150mm X 50mm deep 16SWG junction box with 14 SWG cover.	No.	150				
6.3	225mm X 225mm X 50mm deep 16SWG junction box with 14 SWG cover.	No.	10				
6.4	330mm X 330mm X 50mm deep 16SWG junction box with 14 SWG cover.	No.	UR				
6.5	450mm X 450mm X 50mm deep 16SWG junction box with 14 SWG cover.	No.	UR				

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
7.0	Supply & installation of Stainless Steel cover (for exposed floor areas) suitable for following size boxes in lieu of M.S. power coated covers						
7.1	100mm X 100mm X 50mm deep 16SWG junction box.	No.	UR				
7.2	125mm X 125mm X 50mm deep 16SWG junction box.	No.	150				
7.3	225mm X 225mm X 50mm deep 16SWG junction box.	No.	10				
7.4	330mm X 330mm X 50mm deep 16SWG junction box.	No.	UR				
7.5	450mm X 450mm X 50mm deep 16SWG junction box.	No.	UR				
8.0	Supply & laying of 2mm thick blank FRPVC / GI. conduits of following sizes in floor or in slab including all accessories, deep junction box bends etc.						
8.1	32mm dia PVC conduit	Rmt	50				
8.2	25mm dia PVC conduit.	Rmt	UR				
8.3	25mm dia GI. pipe.	Rmt	UR				
9.0	Supply, installation of following set of modular sockets with box, switch plates for telephone & data cables etc. as required as detailed below.						
9.1	1 Nos. RJ 11 socket for telephone and 1 Nos. RJ 45 socket ford data with box & cover plate at one place.	No.	175				
9.2	3 Nos. RJ 45 for data socket with boxes & cover plates at one place.	No.	UR				
9.3	1 No. RJ 45 data socket with modular box & cover plate.	No.	UR				
9.4	1 No. RJ 11 telephone socket with modular box & cover plate.	Nos.	5				
	TOTAL SECTION - V						

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
	SECTION VI						
	External & Landscape Lighting						
1.0	Supply, installation of 7.0 mtr. tubular poles SP 3 or equivalent complete including excavation of pole pit in all types of strata except hard rock & 1000 x 450 x 450 mm foundation, couping 2 Nos. 40 mm dia. 1500 mm long GI. pipes bend to shape in foundation for cable entry, cable loop box with 15 A, 4 way connector, 16 A SP MCB, earthing of pole with 8 SWG wire, painting with 2 coats of primer & bottom with black paint & balance with silver paint.						
1.1	Poles with single bracket.	No.	22.0				
1.2	Poles with double bracket.	No.	UR				
1.3	Same as above but 10 mtr. Tubular pole SP-42 & fixing arrangement / bracket for 3 Nos. flood lights.	No.	UR				
2.0	Supply, installation of 4.0mtr long 63 mm dia. class 'B' G.I. pipes with base plate, including excavating of pole pit in all types of strata except hard rock, concreting foundation, couping & earthing of pipes and with 40mm. dia., 1500 mm long G.I. pipes bend to shape in foundation for cable entry, cable loop box with 15 A 4 way connector, 16 A SP MCB, earthing of pipe with 8 SWG wire, painting with 2 coats of primer & bottom with black paint & balance with silver paint.(for mounting 70 Watt HPSV post top lantern fixtures.)	No.	UR				
3.0	Supply, installation, testing & commissioning of street / flood light fixture on above poles with necessary controlgear, lamp, hardware etc. including cable connection box.						
3.1	150W HPSV weatherproof street light luminaire on above pole with toughened glass cover complete. Wipro Cat. No. WST 25150 or equivalent.	No.	UR				
4.0	Supply, installation, testing & commissioning of external light fixture with necessary controlgear, lamp, hardware etc. including cable connection box.						
4.1	150 Watt Metal Halide Uplighter (Wipro Cat. No. FDH 32150 or equivalent).	No.	12				
4.2	FANTASY DRIVEOVER, FDQ 46050 1 x 50 W Halogen PAR-20 or equivalent	No.	6				
4.3	IP 65 INTEGRAL WELLGLASS LUMINAIRE SUITABLE equivalent FOR CFL (TC-D)/TC-DE) LAMPS (WIPRO CAT NO. WWP 62218 SGW)	No.	9				
4.5	Indirect light pathway (Wipro cat - 2011 UPH 31070S 1 x 70 W HIT-CE) or euivalent. Note - Price shall include accessaries like pole etc.	No.	6				
4.6	LED bollard [0.8m height] - (Wipro cat - 2011 LB10-003-360-WW-08 1 x 3 W 230V) or equivalent.	No.	31				
4.7	Step light TPW1159D PL-S 1x5/7W G23/2 Pin Step light 2D (Tulip) or equivalent	No.	20				
4.8	Wall recessed step light (Wipro cat - 2011 USP 11126S 1 x 26 W CFL (TC-D)) or equivalent	No.	18				

Item. No.	Description	Unit	Qty.	Supply		Installation	
				Rate	Amount Rs. Ps.	Rate	Amount Rs. Ps.
4.9	Orio LED Cat.no.LR01-001 or equivalent. 4 x 6 W . Cost shall include accessaries like bracket 32/25 diameter powdercoated same shade as luminaire, pole upto 65 diameter	No.	22				
	TOTAL SECTION - VI						



KEY PLAN

LEGEND

NOTE :

1. ALL MCCB'S SHALL BE WITH ON, OFF & TRIP INDICATIONS.
2. ALL METERS UNLESS OTHERWISE SPECIFIED SHALL BE DIGITAL TYPE WITH RS485 PORT.
3. SPECIFIC REQUIREMENT FOR BMS SYSTEM SHALL BE REFERED AS PER SPECIFICATIONS.

SUFFIX	DATE	REVISIONS
R0	08-11-2011	FOR TENDER ONLY

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INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

PROJECT
CCCR BUILDING AT IITM

TITLE
MAIN SINGLE LINE DIAGRAM

SCALE : NTS DATE : 04.11.2011 DRAWN NILESH
DWG.NO. 1109/EL/01 SUFFIX R0 CHECKED SHWETA APPROVED N.P.N
REF. DWG \\Server\2011\1109-IITM-CCCR\Drawings\Electrical\Tender drawings
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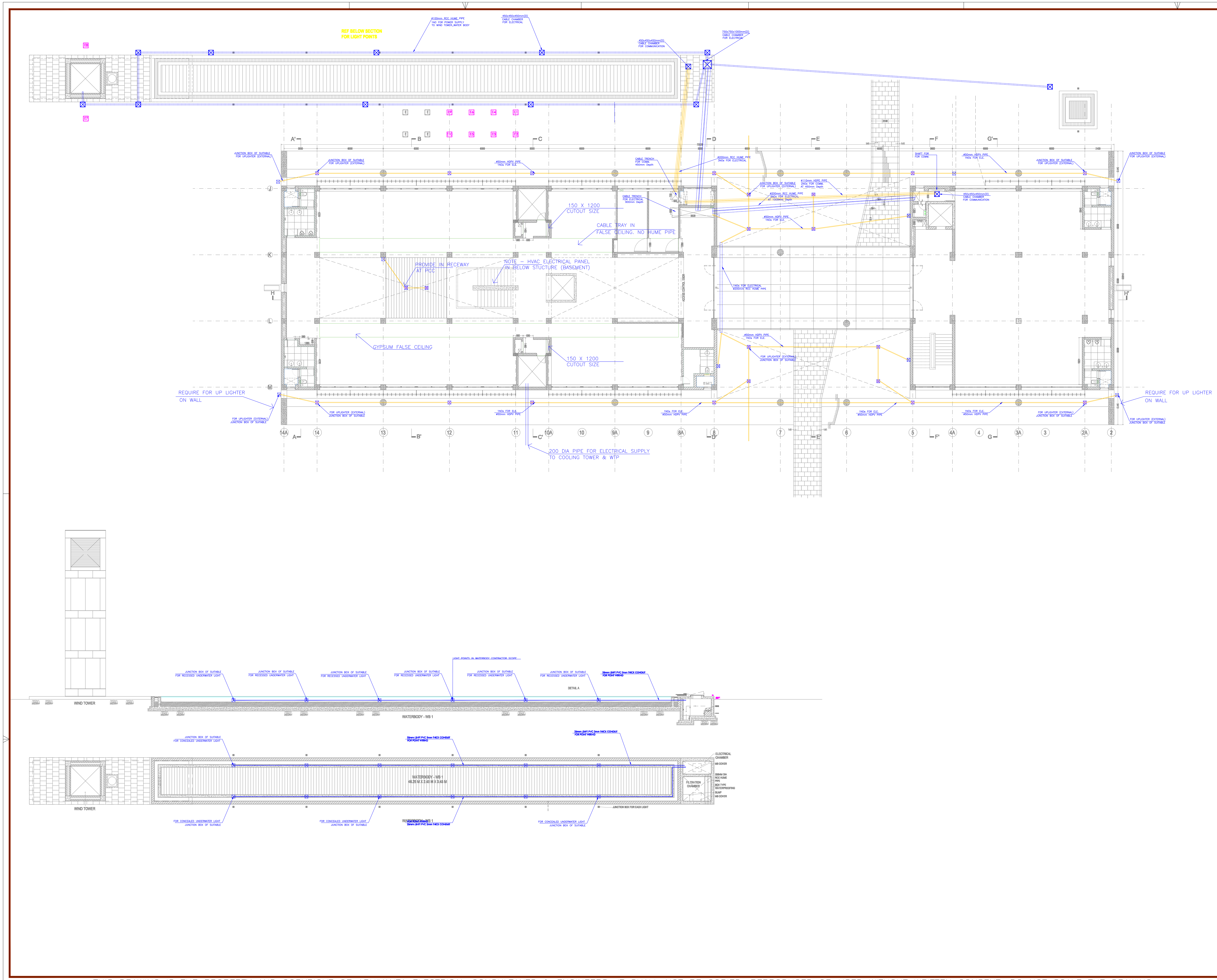

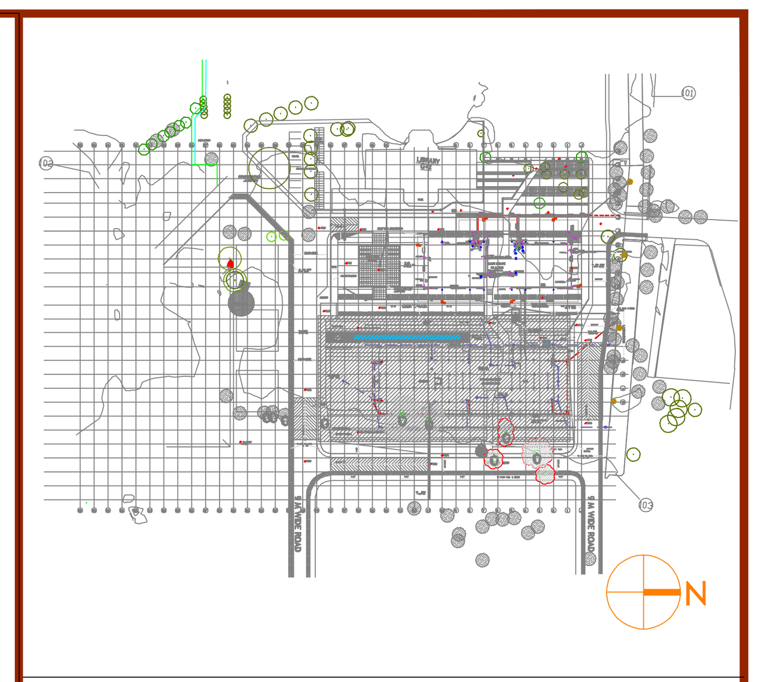

KEY PLAN

LEGEND

	2 X 18 WATT CFL SURFACE MOUNTED FIXTURE FWP 41218
	150 WATT METAL HALLIDE UPLIGHTER WIPRO CAT NO. FDH 32150 OR EQUIVALENT
	35 W MHL DOWN LIGHTER/ SPOT LIGHT WIPRO CAT .NO WCH56035 OR EQUIVALENT
	1X70 W DOWN LIGHTER OUTDOOR TYPE(WIPRO CAT NO UCH 21070S HIT-CE)
	1 X 50 W HALOGEN PAR 20 + FFX 511 DIRECTIONAL SHIELD SYMMETRICAL BUSH LIGHT (WIPRO CAT -FFQ 51050 + FFX 512 EARTH SPIKE) OR EQ.
	1 X 70 W UP-DOWN LIGHTER FOR ATRIUM (WIPRO CAT. UWH 11070S HIT-CE - SILVER) OR EQ.
	JUNCTION BOX OF SUITABLE FOR UPLIGHTER (EXTERNAL)
	750x750x1000mm(D) CABLE CHAMBER
	450x450x450mm(D) CABLE CHAMBER
	Ø200mm RCC HUME PIPE
	Ø110mm HDPV PIPE
	Ø50mm HDPV PIPE
E	EARTHING

EARTHING SCHEDULE

E1	E2	LT BODY EARTHING
E3	E4	UPS BODY EARTHING
E5	E6	UPS NEUTRAL EARTHING
E7	E8	LA EARTHING
E9		ELECTRONICS EARTHING
E10		LIFT EARTHING

NOTE :

1) REFER THIS DRAWING FOR TENDER PURPOSE ONLY.
2) ALL ELECTRICAL RELATED CHAMBER & PIPES TO BE COORDINATED WITH OTHER SERVICES & AS PER SITE CONDITIONS.
1) REFER DRAWING 1109/EL/02 FOR ELECTRICAL & COMM. CONNECTIVITY BETWEEN TRENCH TO SHAFT DB FOR ADMIN WING.

SUFFIX	DATE	REVISIONS
R0	08-11-2011	FOR TENDER ONLY

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PROJECT
CCCR BUILDING AT IITM

TITLE
EXTERNAL ELECTRICAL LAYOUT

SCALE : NTS | DATE : 25.05.2011 | DRAWN NILESH
DWG.NO. 1109/EL/02 | SUFFIX A0 | CHECKED SHWETA | APPROVED N.P.N

REF. DWG \\Server\2011\1109- IITM-CCCR\Drawings\Electrical\Tender drawings
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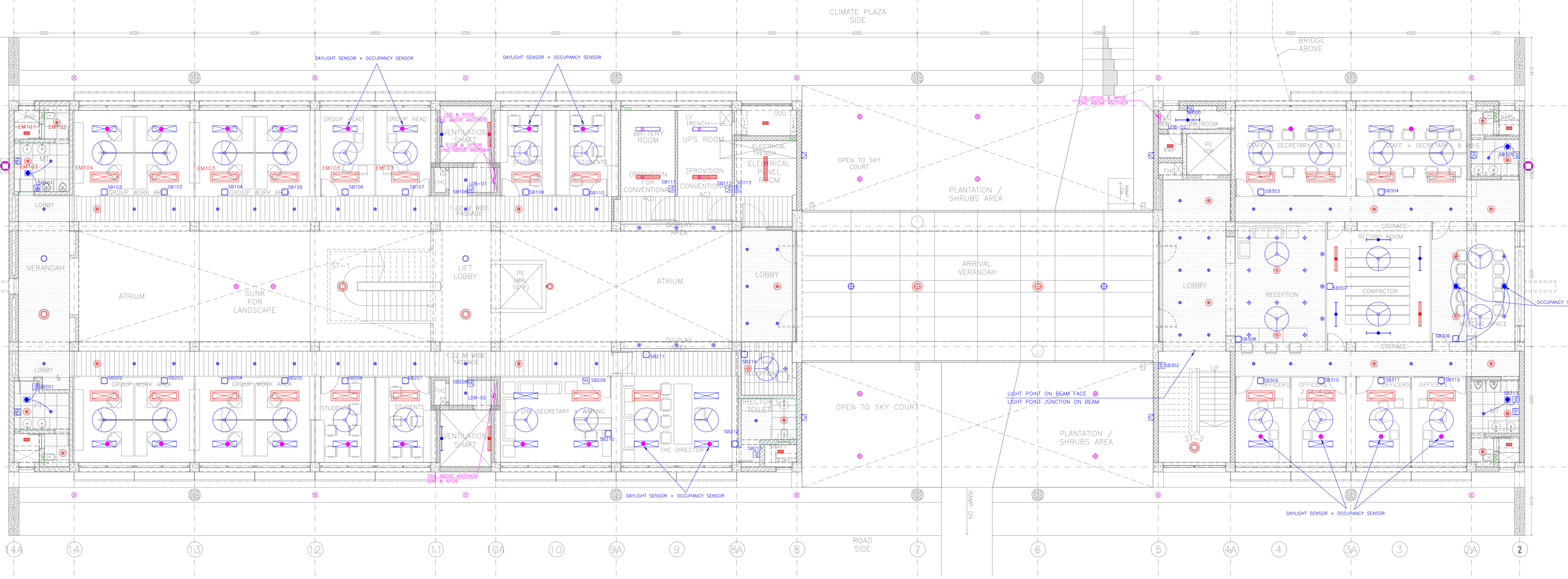

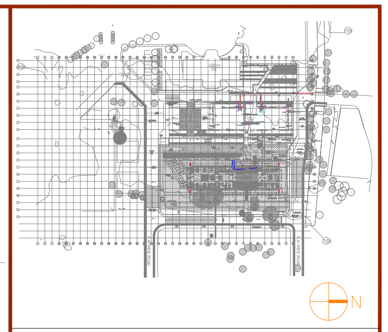

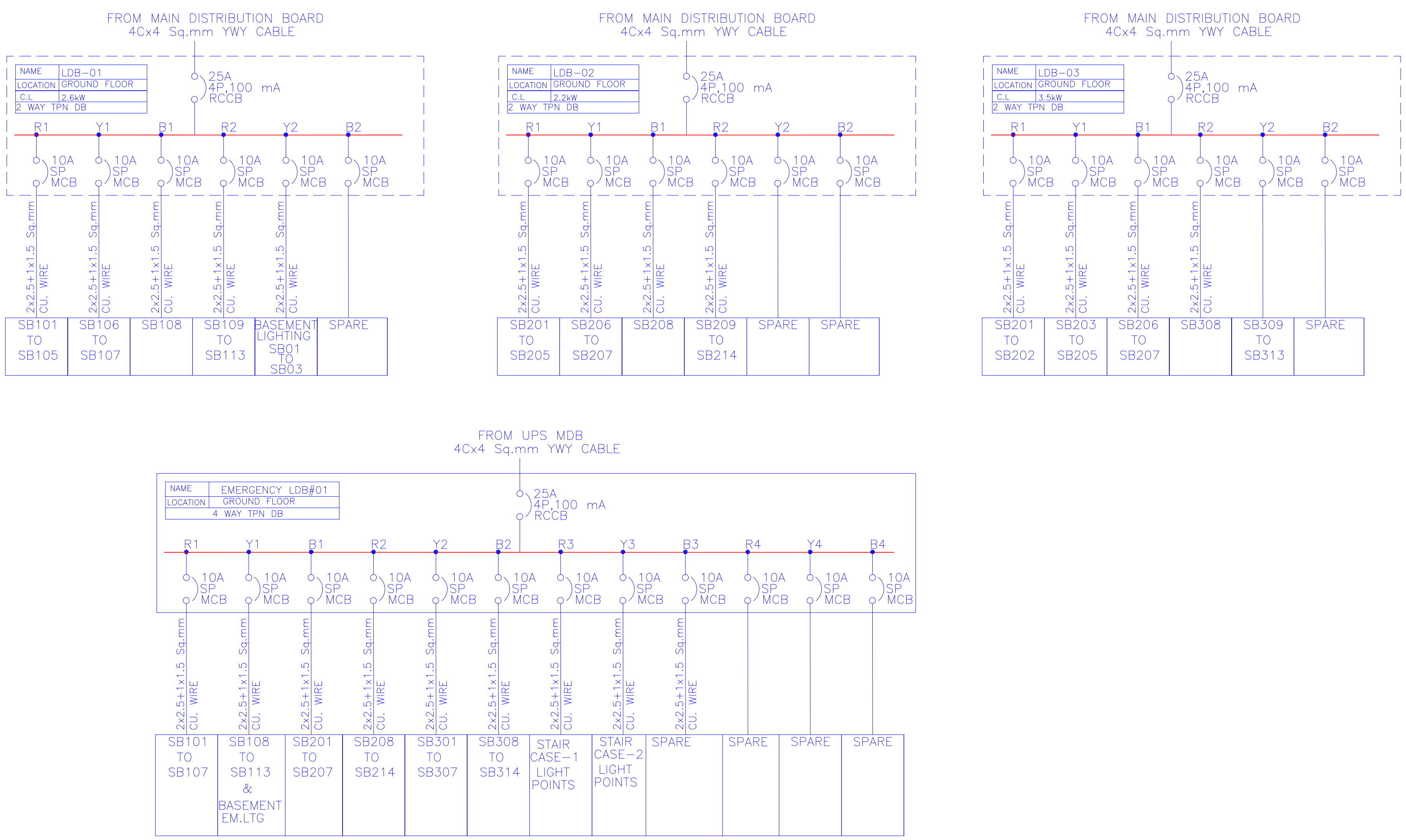

KEY PLAN

LEGEND

	1 X 28 WATT FTL. TUBE LIGHT FOR INDIRECT LIGHTING WIPRO CAT NO. WDF 9128 OR EQUIVALENT
	1x40W. IND. RAIL FIXTURES WIPRO CAT NO. WIF14140 OR EQUIVALENT
	1x40W. IND. RAIL FIXTURES ON EMERGENCY WIPRO CAT NO. WIF14140 OR EQUIVALENT
	2 X 18 WATT DOWN LIGHTERS WIPRO CAT NO. WCP27218 OR EQUIVALENT
	2 X 18 WATT DOWN LIGHTERS ON EMERGENCY WIPRO CAT NO. WCP27218 OR EQUIVALENT
	2 X 28 WATT CFL PENDENT MOUNTED DIRECT/INDIRECT LIGHT (WITH DAYLIGHT SENSOR – GROUPING OF LIGHTS DONE BY ABHIYANTA) WIPRO CAT NO. WVF87228 (EDGE) OR EQUIVALENT
	2 X 28 WATT CFL PENDENT MOUNTED ON EMERGENCY (WITH DAYLIGHT SENSOR) WIPRO CAT NO. WVF87228 (EDGE) OR EQUIVALENT
	2 X 18 WATT CFL SURFACE MOUNTED FIXTURE WIPRO CAT NO. FWP 41218 OR EQUIVALENT
	2 X 18 WATT CFL SURFACE MOUNTED FIXTURE ON EMERGENCY WIPRO CAT NO. FWP 41218 OR EQUIVALENT
	2 X 18 WATT CFLWALL MOUNTED FIXTURE WIPRO CAT NO. FWP 41218 OR EQUIVALENT
	2 X 18 WATT CFLWALL MOUNTED FIXTURE ON EMERGENCY WIPRO CAT NO. FWP 41218 OR EQUIVALENT
	2x55W RECESSED MOUNTED MO LUMINAIRS
	2x55W RECESSED MOUNTED MO LUMINAIRS ON EMERGENCY
	1 x 36 W SURFACE MOUNTED FTL MIRROR OPTIC FIXTURE
	1 x 36 W SURFACE MOUNTED FTL MIRROR OPTIC FIXTURE ON EMERGENCY
	9 W CFL BULKHEAD FIXTURE
	9 W CFL BULKHEAD FIXTURE ON EMERGENCY
	2 X 18 WATT CFL SURFACE MOUNTED FIXTURE FWP 41218
	150 WATT METAL HALLIDE UPLIGHTER WIPRO CAT NO. FDH 32150 OR EQUIVALENT
	35 W MHL DOWN LIGHTER/ SPOT LIGHT WIPRO CAT .NO WCH55035 OR EQUIVALENT
	1X70 W DOWN LIGHTER OUTDOOR TYPE(WIPRO CAT NO UCH 21070S HIT–CE)
	1 X 50 W HALOGEN PAR 20 + FFX 511 DIRECTIONAL SHIELD SYMMETRICAL BUSH LIGHT (WIPRO CAT –FFQ 51050 + FFX 512 EARTH SPIKE) OR EQ.
	1 X 70 W UP–DOWN LIGHTER FOR ATRIUM (WIPRO CAT. UWH 11070S HIT–CE – SILVER) OR EQ.
	1 X 70 W UP–DOWN LIGHTER FOR ATRIUM ON EMERGENCY (WIPRO CAT. UWH 11070S HIT–CE – SILVER) OR EQ.
	2 X 6 WATT LED RECESS MOUNTED DOWNLIGHTER (WIPRO CAT LD44–012–XXX–WH–XX OR EQUIVALENT) .
	2 X 6 WATT LED RECESS MOUNTED DOWNLIGHTER ON EMERGENCY (WIPRO CAT LD44–012–XXX–WH–XX 2 OR EQUIVALENT) .
	1200 MM CEILING FAN
	150mm EXHAUST FAN
	SWITCH BOARD WITH LIGHT SWITCHES & 5A SOCKET & SWITCH.
	SWITCH BOARD WITH LIGHT SWITCHES FAN REGULATOR & 5A SOCKET & SWITCH.
	DAY LIGHT & OCCUPANCY SENSOR
	OCCUPANCY SENSOR
	25mm LSHFT PVC 2mm THICK CONDUIT FOR POINT WIRING
	25mm LSHFT PVC 2mm THICK CONDUIT FOR MAINS/SUBMAINS
	JUNCTION BOX
	25mm LSHFT PVC 2mm THICK CONDUIT FOR FAS
	LIGHTING DISTRIBUTION BOARD (LDB)
	RAW POWER DISTRIBUTION BOARD (RPDB)
	UPSDB
	EMERGENCY LIGHTING DISTRIBUTION BOARD (ELDB)

NOTE :

SUFFIX	DATE	REVISIONS
R0	08-11-2011	FOR TENDER ONLY

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PROJECT
CCCR BUILDING AT IITM

TITLE
GROUND FLOOR LIGHTING LAYOUT

SCALE : NTS	DATE : 04.11.2011	DRAWN NILESH
DWG.NO. 1109/EL/3.1	SUFFIX R0	CHECKED SHWETA / APPROVED N.P.N

REF. DWG \\Server\2011\1109- IITM-CCCR\Drawings\Electrical\Tender drawings

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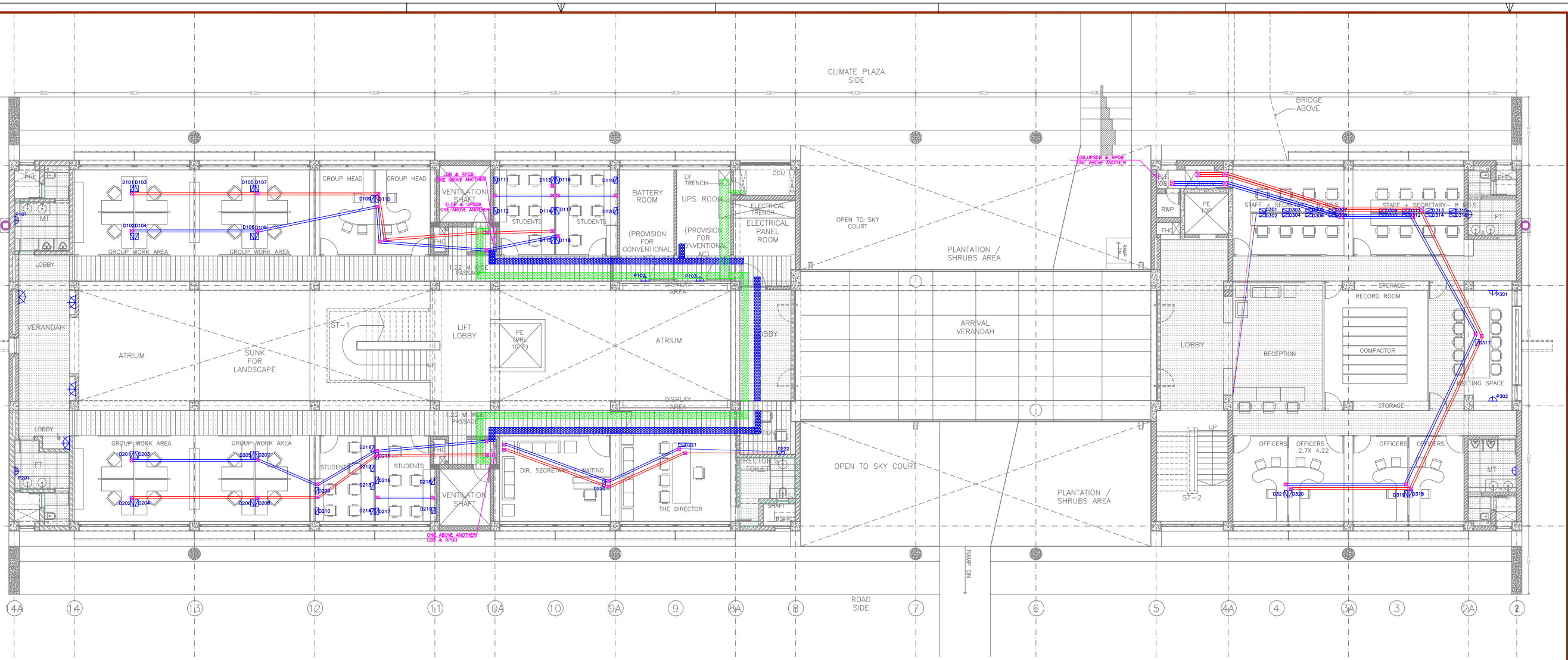
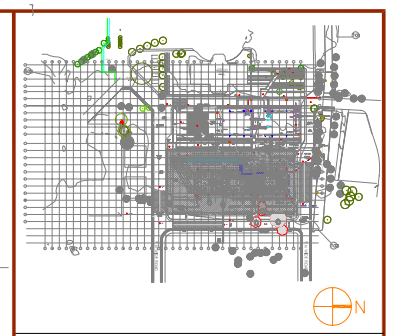
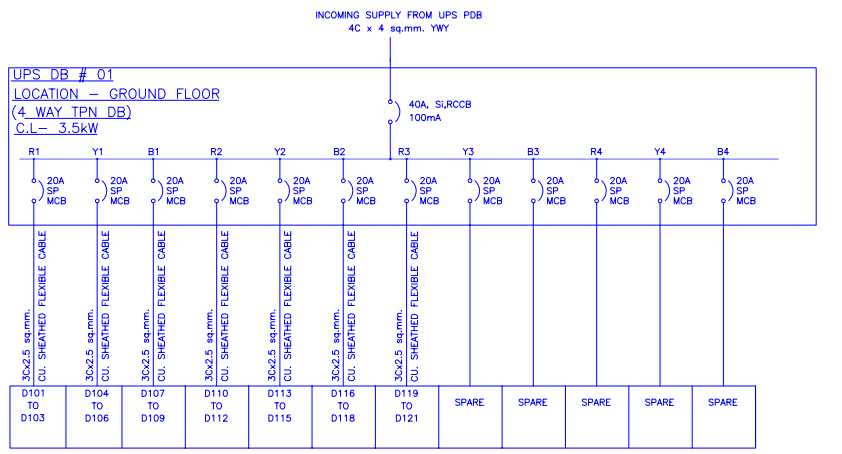


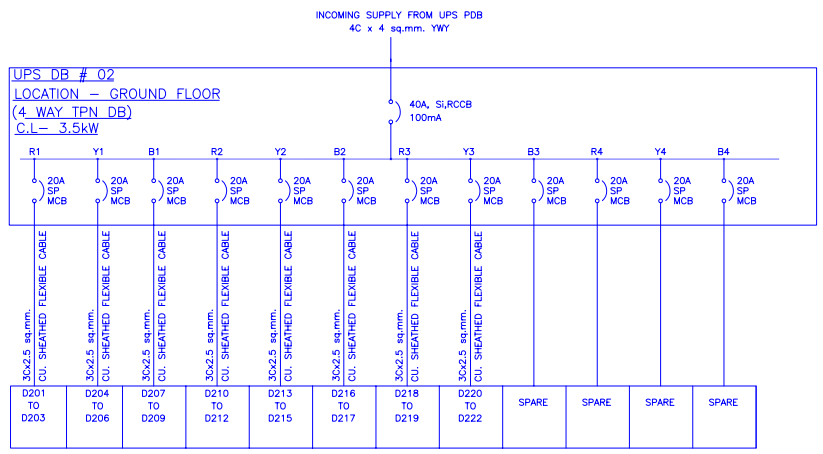


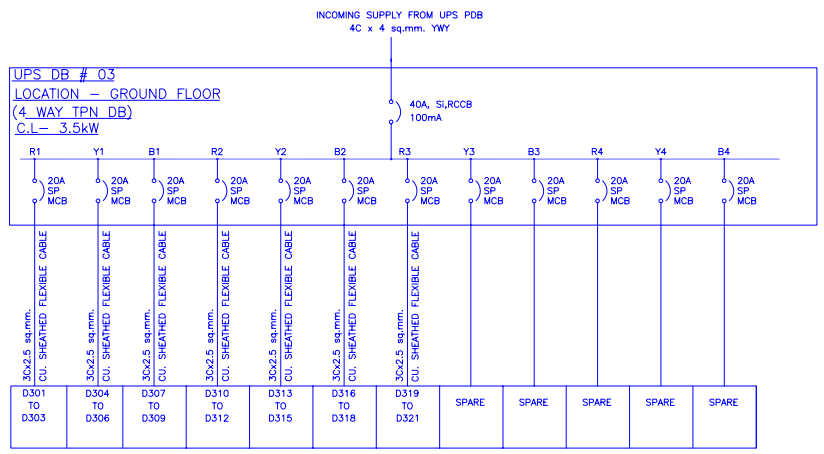
LEGEND

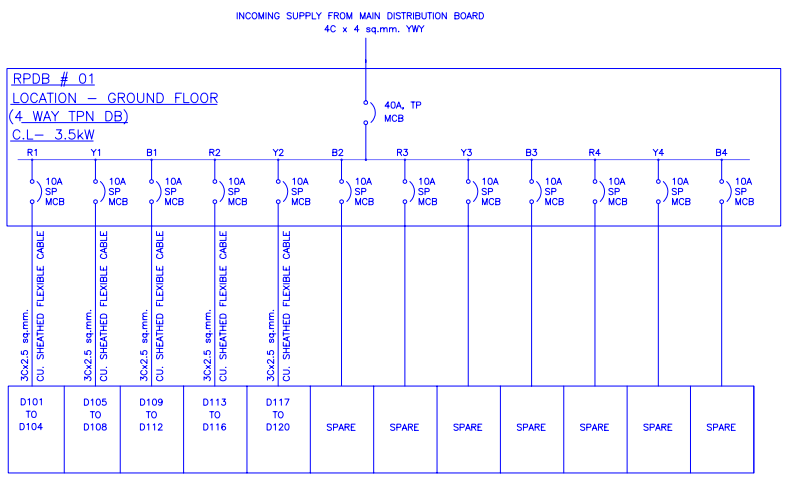
	150 X 150 MM JUNCTION BOX
	225 X 225 MM JUNCTION BOX
	330 X 330 MM JUNCTION BOX
	450 X 450 MM JUNCTION BOX
	200 mm CABLE TRAY FOR POWER
	100 x 45 mm (D) AL.RACEWAY FOR DATA & VOICE
	100 x 45 mm (D) AL. RACEWAY FOR UPS & RAW POWER
	ø32 MM FRPVC CONDUIT FOR RAW POWER
	2 Nos. 6 A SOCKET & SWITCH FOR UPS POWER 1 No. RJ45 DATA SOCKET & 1 NOS RJ11 VOICE SOCKET 1 Nos 6 A SOCKET & SWITCH FOR RAW POWER
	2 Nos. RJ45 DATA SOCKET 4 Nos. 6 A SOCKET & SWITCH FOR RAW POWER
	4 NOS RJ45 DATA SOCKETS & 4 NOS RJ11 VOICE SOCKET 4 NOS 6A SOCKET & SWITCH FOR UPS 4 NOS 6A SOCKET & SWITCH FOR RAW POWER
	1 NO RJ45 DATA SOCKETS 2 NOS 6A SOCKET & SWITCH FOR UPS
	3 Nos 6A SOCKET & SWITCH FOR UPS POWER 3 Nos RJ45 DATA SOCKET 2 Nos 6A SOCKET & SWITCH FOR RAW POWER
	6A SOCKET WITH SWITCH
	6 / 16A SOCKET WITH SWITCH
	RJ11 TELEPHONE SOCKET
	ACDB
	6A SOCKET WITH SWITCH FOR CASSETE UNIT
	LIGHTING DISTRIBUTION BOARD (LDB)
	RAW POWER DISTRIBUTION BOARD (RPDB)
	UPSDB
	EMERGENCY LIGHTING DISTRIBUTION BOARD (ELDB)
	300 mm CABLE TRAY FOR POWER
	450 mm CABLE TRAY FOR LV
	300 mm CABLE TRAY FOR LV
	ø150mm SLEEVE FOR ELECTRICAL
	ø40mm SLEEVE FOR ELECTRICAL
	ø40mm SLEEVE FOR LV
	25mm LSHFT PVC 2mm THICK CONDUIT FOR POINT WIRING
	25mm LSHFT PVC 2mm THICK CONDUIT FOR MAINS/SUBMAINS
	25mm LSHFT PVC 2mm THICK CONDUIT FOR FAS
	32mm LSHFT PVC 2mm THICK CONDUIT FOR FAS
	JUNCTION BOX
	32mm LSHFT PVC 2mm THICK CONDUIT FOR MAINS/SUBMAINS

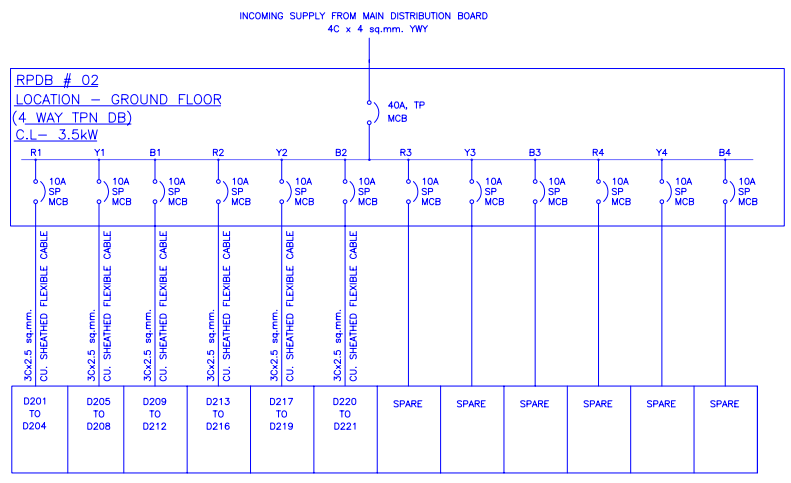
NOTE :

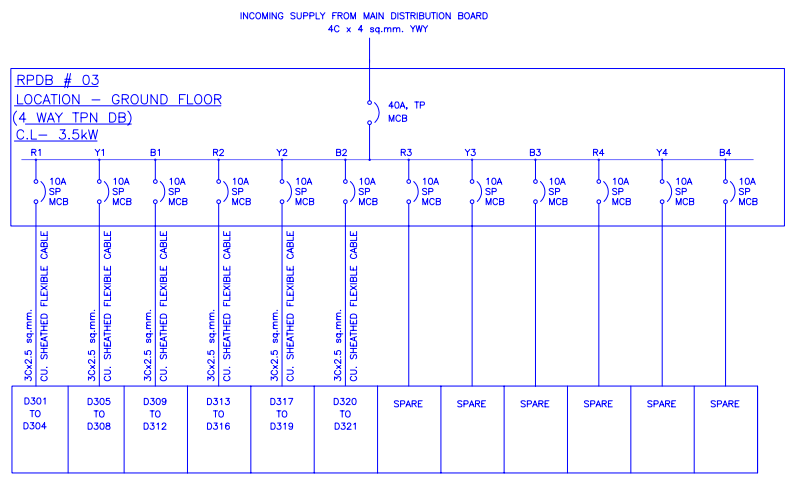












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CLIENT
INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

PROJECT
CCCR BUILDING AT IITM

TITLE
GROUND FLOOR POWER LAYOUT

SCALE : NTS	DATE : 04.11.2011	DRAWN NILESH
DWG.NO. 1109/EL/3.2	SUFFIX R0	CHECKED SHWETA
		APPROVED N.P.N

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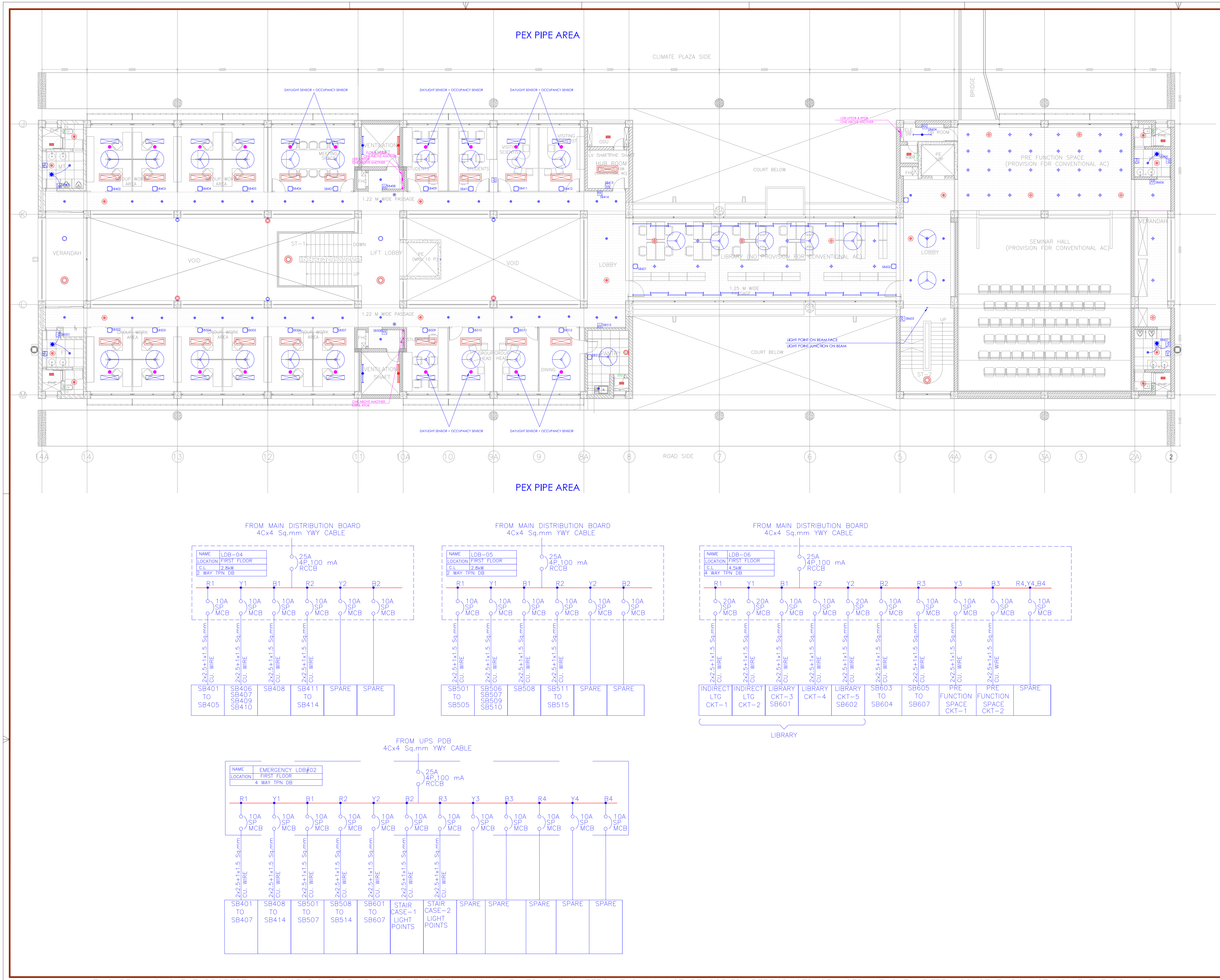

KEY PLAN

LEGEND

NOTE :

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SUFFIX	DATE	REVISIONS

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INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

PROJECT
CCCR BUILDING AT IITM

TITLE
FIRST FLOOR LIGHTING LAYOUT

SCALE : NTS | DATE : 04.11.2011 | DRAWN NILESH
DWG.NO. 1109/EL/4.1 | SUFFIX A0 | CHECKED SHWETA | APPROVED N.P.N

REF. DWG \\Server\2011\1109- IITM-CCCR\Drawings\Electrical\Tender drawings

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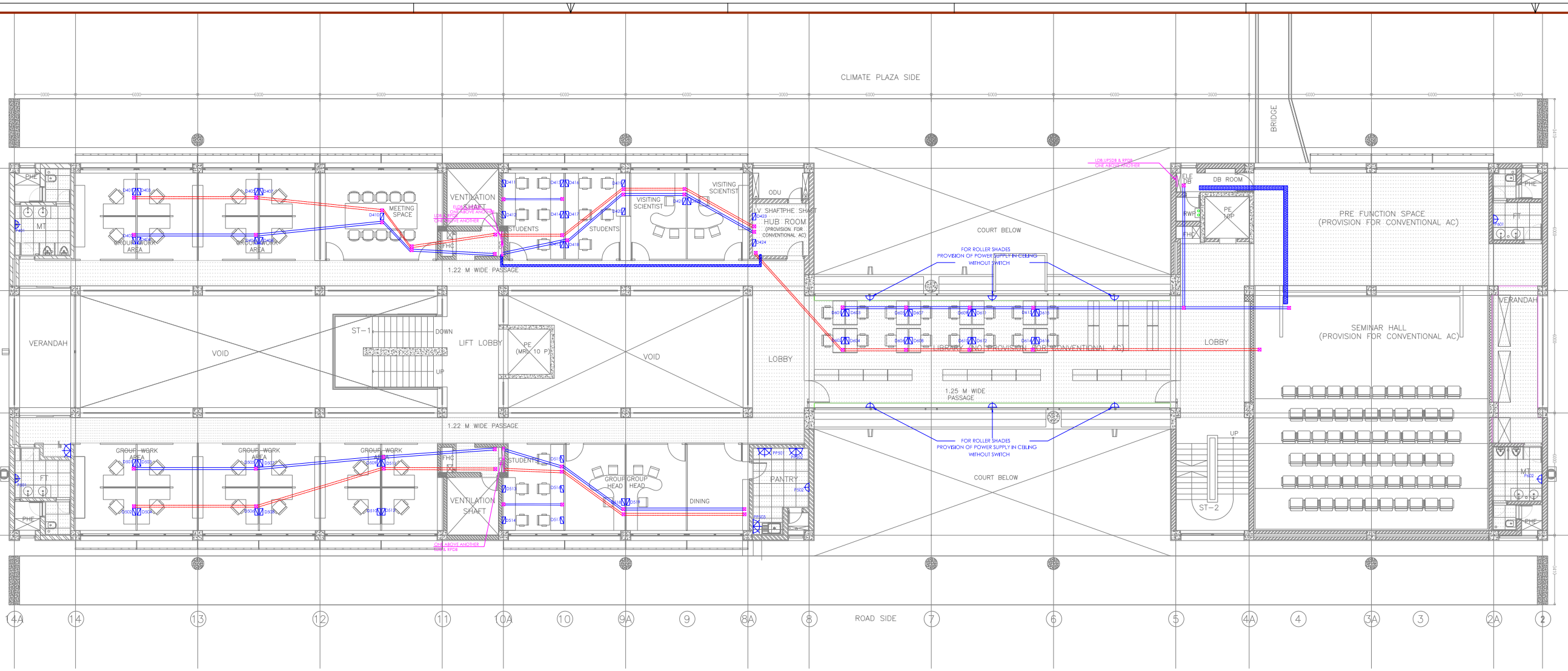

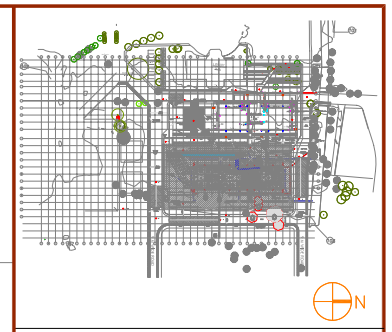

KEY PLAN

LEGEND

	150 X 150 MM JUNCTION BOX
	225 X 225 MM JUNCTION BOX
	330 X 330 MM JUNCTION BOX
	450 X 450 MM JUNCTION BOX
	200 mm CABLE TRAY FOR POWER
	100 x 45 mm (D) ALRACEWAY FOR DATA & VOICE
	100 x 45 mm (D) AL. RACEWAY FOR UPS & RAW POWER
	Ø32 MM FRPVC CONDUIT FOR RAW POWER
	2 Nos. 6 A SOCKET & SWITCH FOR UPS POWER 1 No. RJ45 DATA SOCKET & 1 NOS RJ11 VOICE SOCKET 1 Nos 6 A SOCKET & SWITCH FOR RAW POWER
	2 Nos. RJ45 DATA SOCKET 4 Nos. 6 A SOCKET & SWITCH FOR RAW POWER
	4 NOS RJ45 DATA SOCKETS & 4 NOS RJ11 VOICE SOCKET 4 NOS 6A SOCKET & SWITCH FOR UPS 4 NOS 6A SOCKET & SWITCH FOR RAW POWER
	1 NO RJ45 DATA SOCKETS 2 NOS 6A SOCKET & SWITCH FOR UPS
	3 Nos 6A SOCKET & SWITCH FOR UPS POWER 3 Nos RJ45 DATA SOCKET 2 Nos 6A SOCKET & SWITCH FOR RAW POWER
	6A SOCKET WITH SWITCH
	6 / 16A SOCKET WITH SWITCH
	RJ11 TELEPHONE SOCKET
	ACDB
AC	6A SOCKET WITH SWITCH FOR CASSETE UNIT
	LIGHTING DISTRIBUTION BOARD (LDB)
	RAW POWER DISTRIBUTION BOARD (RPDB)
	UPSDB
	EMERGENCY LIGHTING DISTRIBUTION BOARD (ELDB)
	300 mm CABLE TRAY FOR POWER
	450 mm CABLE TRAY FOR LV
	300 mm CABLE TRAY FOR LV
	Ø150mm SLEEVE FOR ELECTRICAL
	Ø40mm SLEEVE FOR ELECTRICAL
	Ø40mm SLEEVE FOR LV
	100 mm CABLE TRAY FOR POWER

NOTE :

INCOMING SUPPLY FROM UPS PDB
4C x 4 sq.mm. YWY

UPS DB # 04
LOCATION -FIRST FLOOR
(4 WAY TPN DB)
C.L- 3.9kW

40A, SI,RCCB 100mA

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
20A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D401 TO D403	D404 TO D406	D407 TO D409	D410 TO D412	D413 TO D415	D416 TO D418	D119 TO D121	D122 TO D124	SPARE	SPARE	SPARE	SPARE

INCOMING SUPPLY FROM UPS PDB
4C x 4 sq.mm. YWY

UPS DB # 05
LOCATION - FIRST FLOOR
(4 WAY TPN DB)
C.L- 3.9kW

40A, SI,RCCB 100mA

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
20A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D501 TO D503	D504 TO D506	D507 TO D509	D510 TO D512	D513 TO D515	D516 TO D517	D518 TO D519	SPARE	SPARE	SPARE	SPARE	SPARE

INCOMING SUPPLY FROM UPS PDB
4C x 4 sq.mm. YWY

UPS DB # 06
LOCATION - FIRST FLOOR
(4 WAY TPN DB)
C.L- 2.6kW

40A, SI,RCCB 100mA

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
20A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D601 TO D603	D604 TO D606	D607 TO D609	D610 TO D612	D613 TO D614	D615 TO D316	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

INCOMING SUPPLY FROM MAIN DISTRIBUTION BOARD
4C x 4 sq.mm. YWY

RPDB # 04
LOCATION - FIRST FLOOR
(4 WAY TPN DB)
C.L- 3.9kW

40A, TP MCB

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
10A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D401 TO D404	D405 TO D408	D409 TO D412	D413 TO D416	D417 TO D420	D421 TO D424	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

INCOMING SUPPLY FROM MAIN DISTRIBUTION BOARD
4C x 4 sq.mm. YWY

RPDB # 05
LOCATION - FIRST FLOOR
(4 WAY TPN DB)
C.L- 3.9kW

40A, TP MCB

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
10A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D501 TO D504	D505 TO D508	D509 TO D512	D513 TO D516	D517 TO D519	PP501 TO PP502	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

INCOMING SUPPLY FROM MAIN DISTRIBUTION BOARD
4C x 4 sq.mm. YWY

RPDB # 06
LOCATION - FIRST FLOOR
(4 WAY TPN DB)
C.L- 2.6kW

40A, TP MCB

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
10A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D601 TO D604	D605 TO D608	D609 TO D612	D613 TO D616	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

SUFFIX	DATE	REVISIONS
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CLIENT
INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

PROJECT
CCCR BUILDING AT IITM

TITLE
FIRST FLOOR POWER LAYOUT

SCALE : NTS	DATE : 04.11.2011	DRAWN NILESH
DWG.NO. 1109/EL/4.2	SUFFIX R0	CHECKED SHWETA
		APPROVED N.P.N

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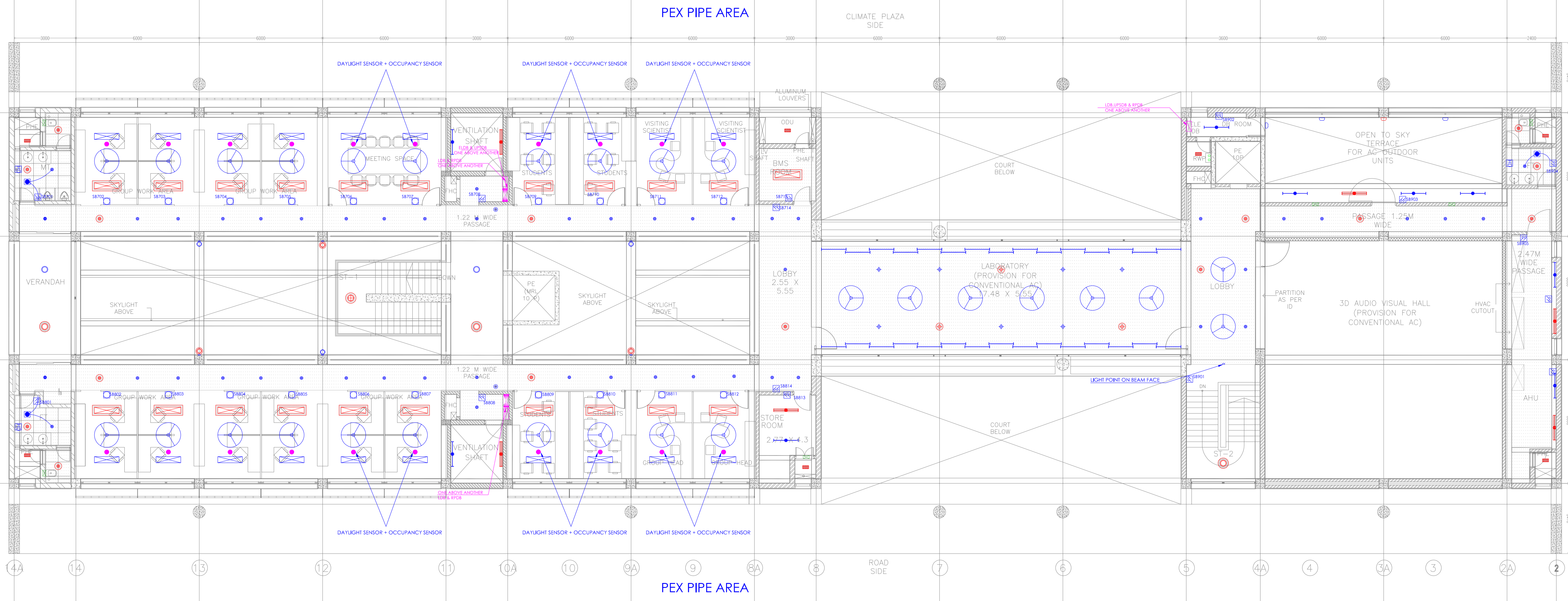

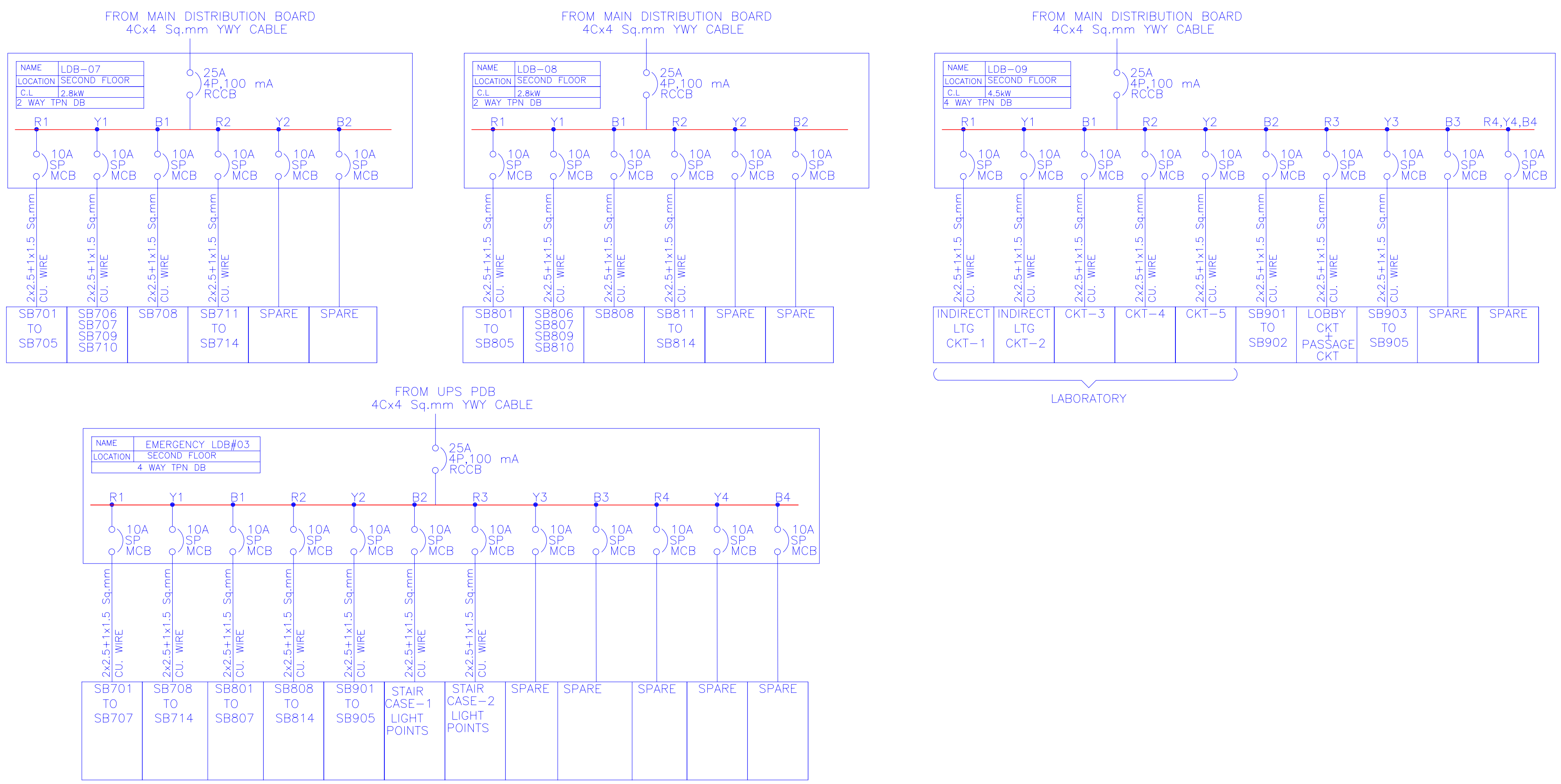

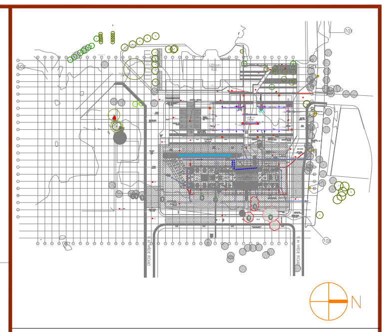

KEY PLAN

LEGEND

NOTE :

SUFFIX	DATE	REVISIONS
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ARCHITECT : MADHAV JOSHI AND ASSOCIATES, ARCHITECTS AND URBAN PLANNERS

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CLIENT: INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

PROJECT: PROPOSED CCCR BUILDING AT IITM

TITLE: SECOND FLOOR LIGHTING LAYOUT

SCALE : NTS | DATE : 04.11.2011 | DRAWN NILESH

DWG.NO. 1109/EL/5.1 | SUFFIX R0 | CHECKED SHWETA | APPROVED N.P.N

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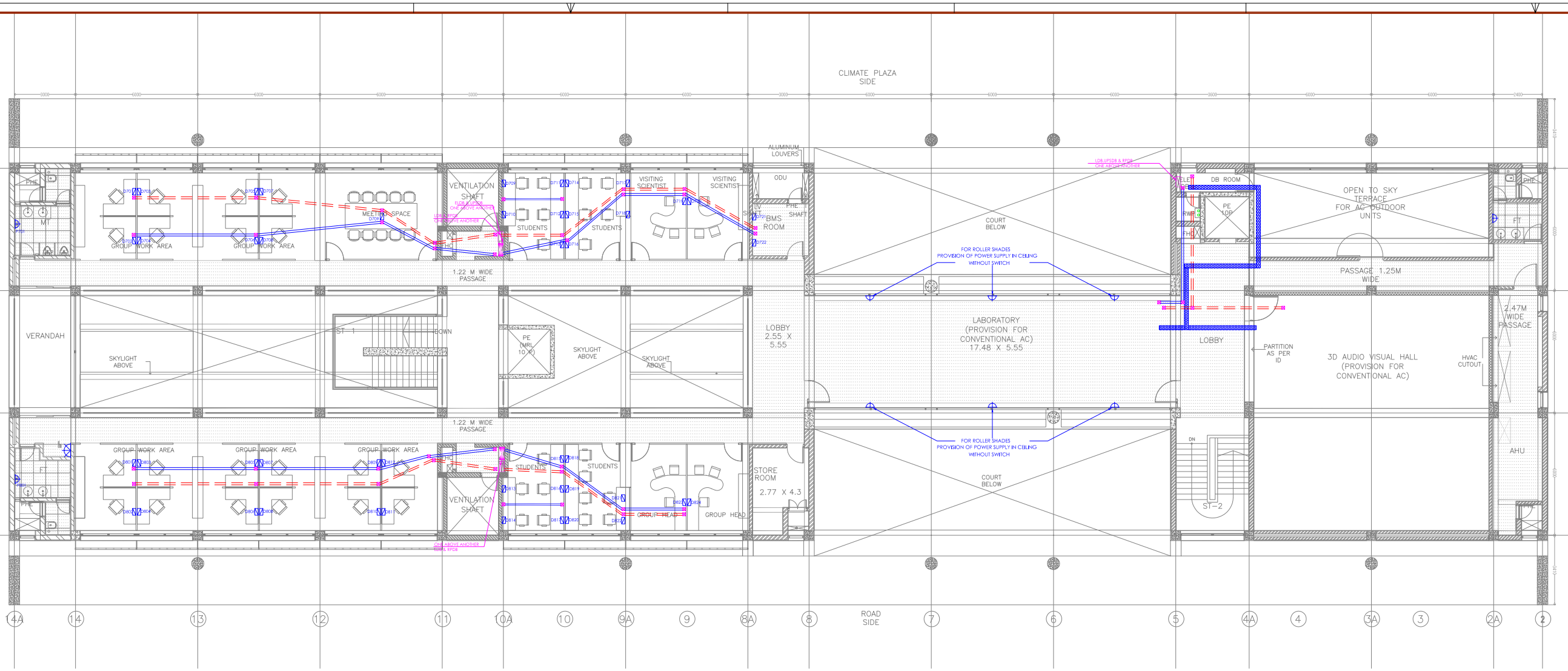

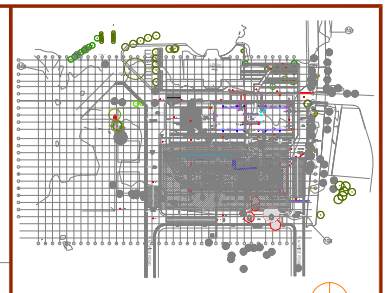

KEY PLAN

LEGEND

	150 X 150 MM JUNCTION BOX
	225 X 225 MM JUNCTION BOX
	330 X 330 MM JUNCTION BOX
	450 X 450 MM JUNCTION BOX
	200 mm CABLE TRAY FOR POWER
	100 x 45 mm (D) ALRACEWAY FOR DATA & VOICE
	100 x 45 mm (D) AL RACEWAY FOR UPS & RAW POWER
	Ø32 MM FRPVC CONDUIT FOR RAW POWER
	2 Nos. 6 A SOCKET & SWITCH FOR UPS POWER 1 No. RJ45 DATA SOCKET & 1 NOS RJ11 VOICE SOCKET 1 Nos 6 A SOCKET & SWITCH FOR RAW POWER
	2 Nos. RJ45 DATA SOCKET 4 Nos. 6 A SOCKET & SWITCH FOR RAW POWER
	4 NOS RJ45 DATA SOCKETS & 4 NOS RJ11 VOICE SOCKET 4 NOS 6A SOCKET & SWITCH FOR UPS 4 NOS 6A SOCKET & SWITCH FOR RAW POWER
	1 NO RJ45 DATA SOCKETS 2 NOS 6A SOCKET & SWITCH FOR UPS
	3 Nos 6A SOCKET & SWITCH FOR UPS POWER 3 Nos RJ45 DATA SOCKET 2 Nos 6A SOCKET & SWITCH FOR RAW POWER
	6A SOCKET WITH SWITCH
	6 / 16A SOCKET WITH SWITCH
	RJ11 TELEPHONE SOCKET
	ACDB
AC	6A SOCKET WITH SWITCH FOR CASSETE UNIT
	LIGHTING DISTRIBUTION BOARD (LDB)
	RAW POWER DISTRIBUTION BOARD (RPDB)
	UPSDB
	EMERGENCY LIGHTING DISTRIBUTION BOARD (ELDB)
	300 mm CABLE TRAY FOR POWER
	450 mm CABLE TRAY FOR LV
	300 mm CABLE TRAY FOR LV
	Ø150mm SLEEVE FOR ELECTRICAL
	Ø40mm SLEEVE FOR ELECTRICAL
	Ø40mm SLEEVE FOR LV

INCOMING SUPPLY FROM UPS PDB
4C x 4 sq.mm. YWY

UPS DB # 07
LOCATION -SECOND FLOOR
(4 WAY TPN DB)
C.L- 3.5kW

40A, Si,RCCB 100mA

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
20A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D701 TO D703	D704 TO D706	D707 TO D709	D710 TO D712	D713 TO D715	D716 TO D718	D119 TO D120	D121 TO D122	SPARE	SPARE	SPARE	SPARE

INCOMING SUPPLY FROM UPS PDB
4C x 4 sq.mm. YWY

UPS DB # 08
LOCATION -SECOND FLOOR
(4 WAY TPN DB)
C.L- 3.9kW

40A, Si,RCCB 100mA

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
20A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D801 TO D803	D804 TO D806	D807 TO D809	D810 TO D812	D813 TO D815	D816 TO D818	D819 TO D821	D822 TO D824	SPARE	SPARE	SPARE	SPARE

INCOMING SUPPLY FROM MAIN DISTRIBUTION BOARD
4C x 4 sq.mm. YWY

RPDB # 07
LOCATION -SECOND FLOOR
(4 WAY TPN DB)
C.L- 3.5kW

40A, TP MCB

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
10A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D701 TO D704	D705 TO D708	D709 TO D712	D713 TO D716	D717 TO D719	D720 TO D722	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

INCOMING SUPPLY FROM MAIN DISTRIBUTION BOARD
4C x 4 sq.mm. YWY

RPDB # 08
LOCATION -SECOND FLOOR
(4 WAY TPN DB)
C.L- 3.9kW

40A, TP MCB

R1	Y1	B1	R2	Y2	B2	R3	Y3	B3	R4	Y4	B4
10A SP MCB											
3Cx2.5 sq.mm. CU. SHEATHED FLEXIBLE CABLE											
D801 TO D804	D805 TO D808	D809 TO D812	D813 TO D816	D817 TO D820	D821 TO D824	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

NOTE :

SUFFIX	DATE	REVISIONS
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CLIENT
INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

PROJECT

TITLE
SECOND FLOOR POWER LAYOUT

SCALE : NTS	DATE : 04.11.2011	DRAWN	NILESH
DWG.NO. 1109/EL/5.2	SUFFIX R0	CHECKED	SHWETA
		APPROVED	N.P.N

REF. DWG \\Server2011\1109- IITM-CCCR\Drawings\Electrical\Tender drawings

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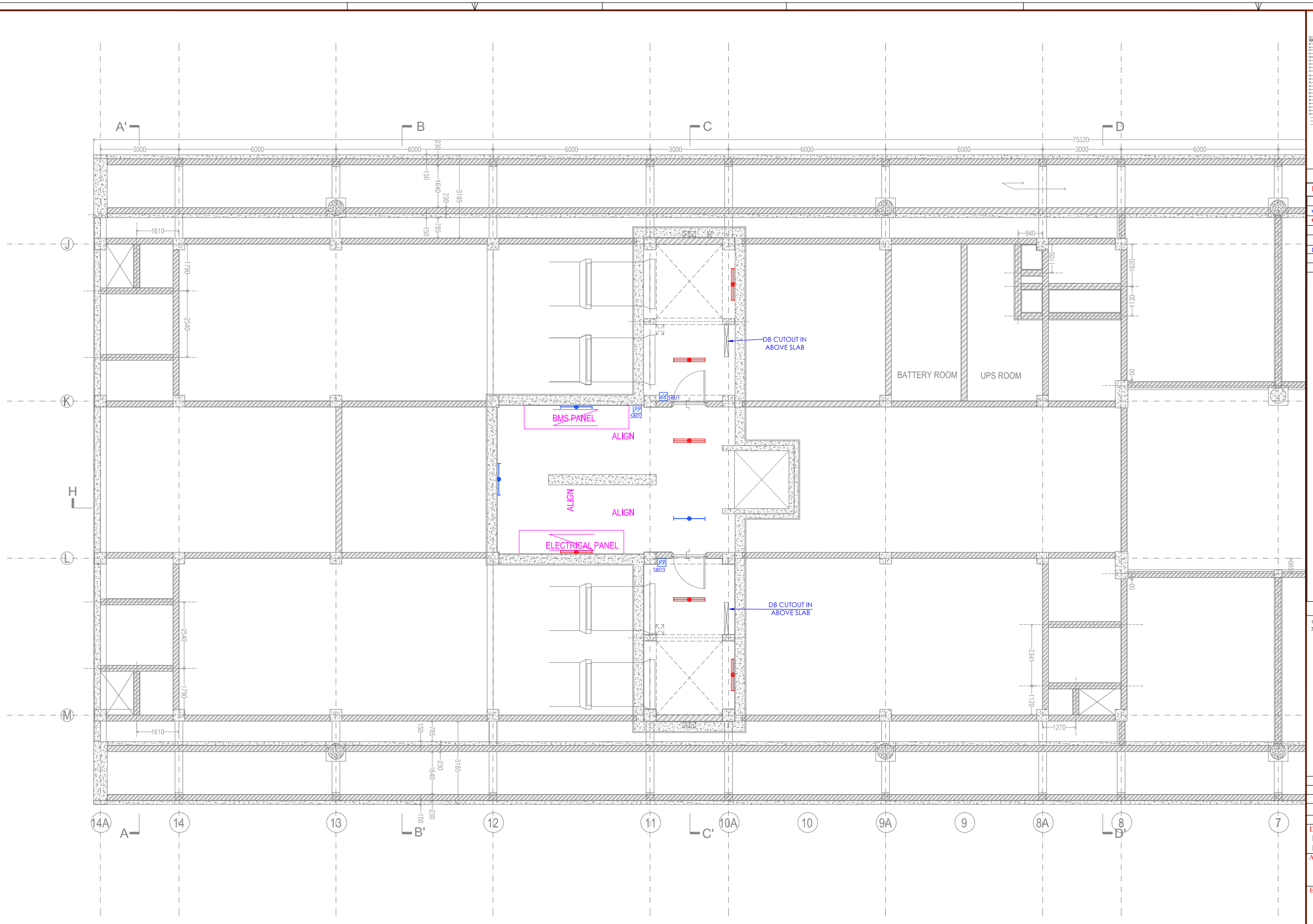

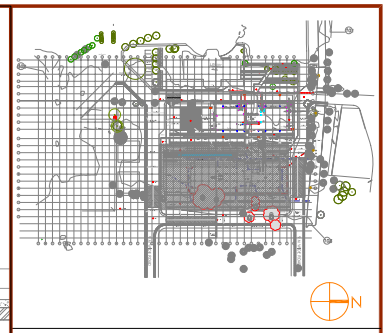

KEY PLAN

LEGEND

	1x40W, IND. RAIL FIXTURES. WIPRO CAT NO.: WIF14140 OR EQUIVALENT
	1x40W, IND. RAIL FIXTURES, ON EMERGENCY. WIPRO CAT NO.: WIF14140 OR EQUIVALENT
	SWITCH BOARD WITH LIGHT SWITCHES & 5A SOCKET & SWITCH.
	25mm DEPTT PVC 0.9mm THICK CONDUIT FOR POINT WIRING
	Ø200mm RCC HUME PIPE

NOTE :

1) REFER THIS DRAWING FOR TENDER PURPOSE ONLY.
2) ALL ELECTRICAL RELATED CHAMBER & PIPES TO BE COORDINATED WITH OTHER SERVICES & AS PER SITE CONDITIONS.

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CLIENT
INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

PROJECT
PROPOSED CCCR BUILDING AT IITM

TITLE
BASEMENT AHU ROOM LIGHTING LAYOUT

SCALE : NTS	DATE : 04.11.2011	DRAWN NILESH
DWG.NO. 1109/EL/06	SUFFIX R0	CHECKED SHWETA
		APPROVED N.P.N

REF. DWG \\Server\2013\1109- IITM-CCCR\Drawings\Electrical\Tender drawings

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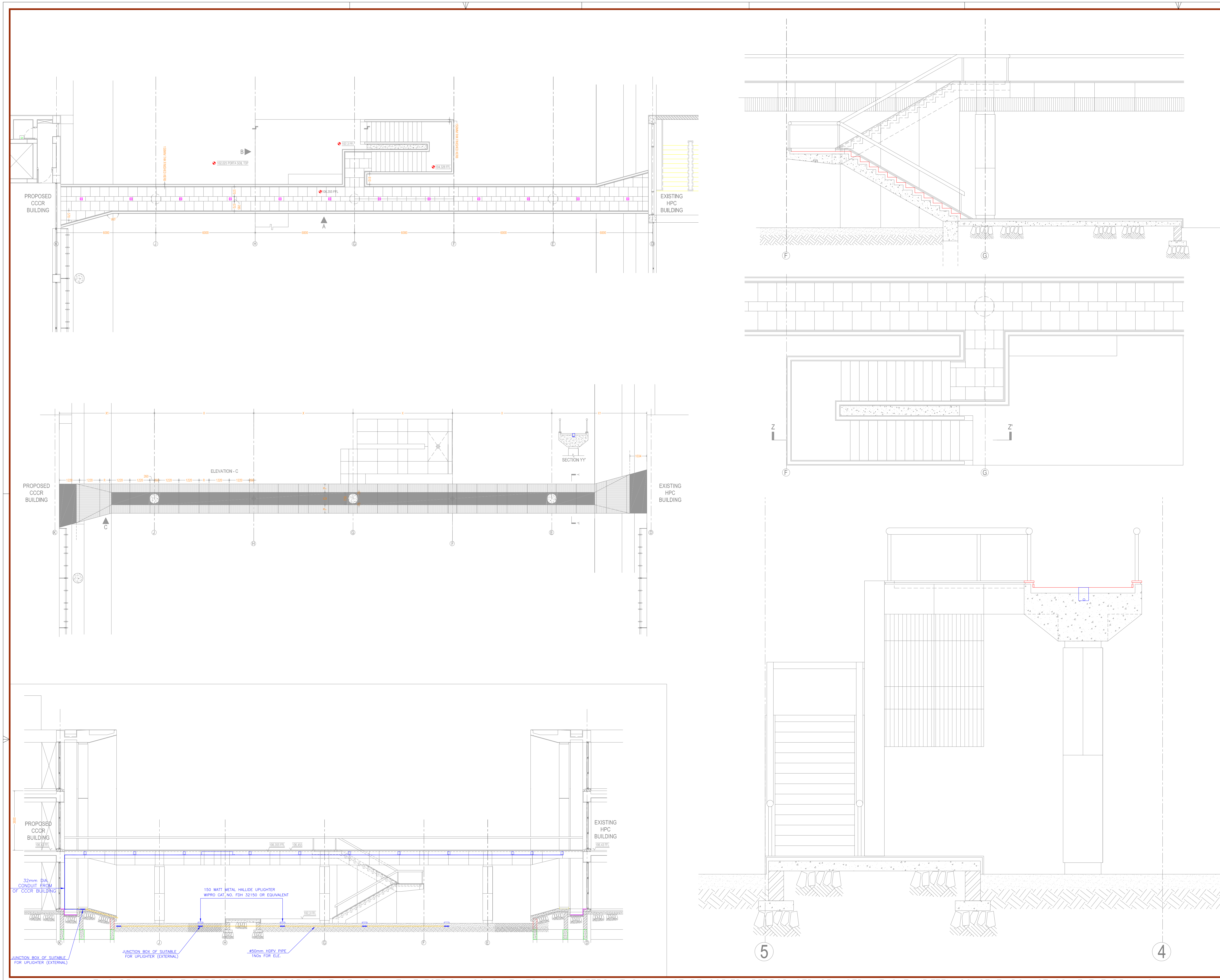

KEY PLAN

LEGEND

Symbol	Description
⊠	Step light TPW11590 PL-S 1x5/7W G23/2 Pin Step light 20 (Tulip) or equivalent
—	32mm LSHFT PVC 2mm THICK CONDUIT FOR POINT WIRING
⊗	150 WATT METAL HALLIDE UPLIGHTER WIPRO CAT NO. FDH 32150 OR EQUIVALENT
—	ø50mm HDPV PIPE 1NOs FOR ELE.
▬	JUNCTION BOX OF SUITABLE FOR UPLIGHTER (EXTERNAL)

NOTE :

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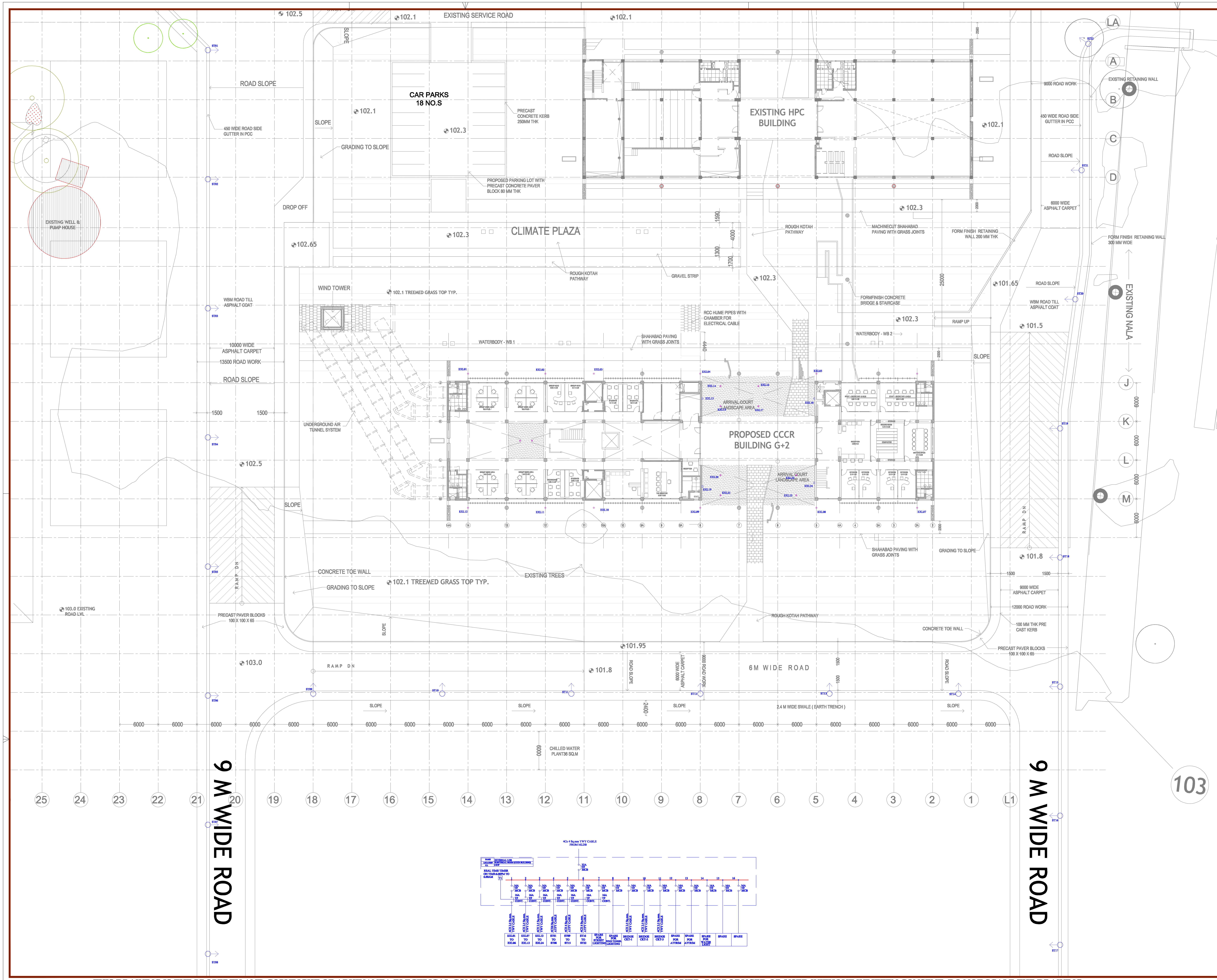
INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

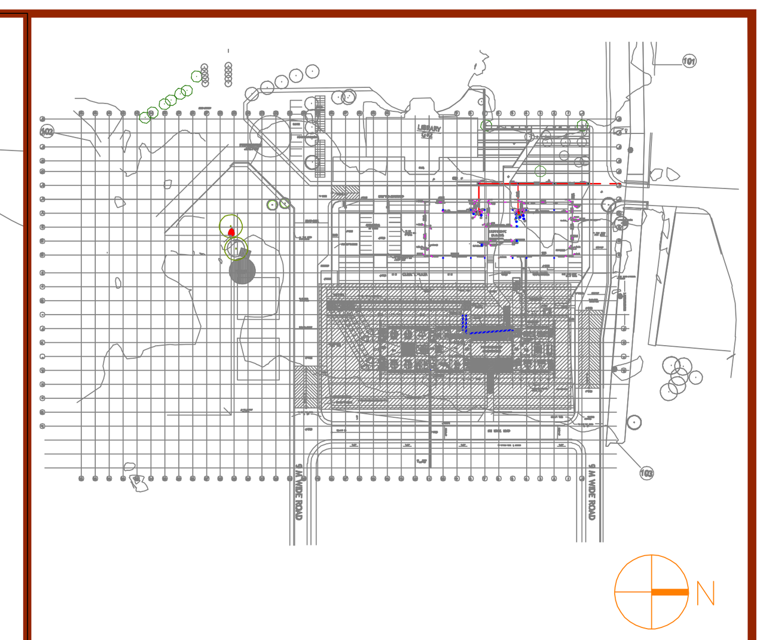
PROJECT
CCCR BUILDING AT IITM

TITLE
BRIDGE LIGHTING LAYOUT

SCALE : NTS | DATE : 04.11.2011 | DRAWN NILESH
DWG.NO. 1109/EL/07 | SUFFIX R0 | CHECKED SHWETA | APPROVED N.P.N

REF. DWG \\Server\2011\1109- IITM-CCCR\Drawings\Electrical\Tender drawings
ARCH DWG REF:


9 M WIDE ROAD
9 M WIDE ROAD
6M WIDE ROAD
PROPOSED CCCR BUILDING G+2
EXISTING HPC BUILDING
CLIMATE PLAZA
CAR PARKS 18 NO.S
EXISTING SERVICE ROAD
EXISTING NALA
EXISTING WELL & PUMP HOUSE
WIND TOWER
UNDERGROUND AIR TUNNEL SYSTEM
102.1 TREEMED GRASS TOP TYP.
CONCRETE TOE WALL
GRADING TO SLOPE
EXISTING TREES
ROUGH KOTAH PATHWAY
GRAVEL STRIP
WATERBODY - WB 1
WATERBODY - WB 2
SHAHABAD PAVING WITH GRASS JOINTS
RCC HUME PIPES WITH CHAMBER FOR ELECTRICAL CABLE
FORMFINISH CONCRETE BRIDGE & STAIRCASE
MACHINECUT SHAHABAD PAVING WITH GRASS JOINTS
FORM FINISH RETAINING WALL 200 MM THK
FORM FINISH RETAINING WALL 300 MM WIDE
EXISTING RETAINING WALL
ARRIVAL COURT LANDSCAPE AREA
DROP OFF
ROAD SLOPE
SLOPE
RAMP DN
RAMP UP
PRECAST CONCRETE KERB 250MM THK
PROPOSED PARKING LOT WITH PRECAST CONCRETE PAVER BLOCK 80 MM THK
450 WIDE ROAD SIDE GUTTER IN PCC
WBM ROAD TILL ASPHALT COAT
10000 WIDE ASPHALT CARPET
13500 ROAD WORK
9000 WIDE ASPHALT CARPET
12000 ROAD WORK
6000 WIDE ASPHALT CARPET
9000 ROAD WORK
100 MM THK PRE CAST KERB
PRECAST PAVER BLOCKS 100 X 100 X 65
2.4 M WIDE SWALE (EARTH TRENCH)
CHILLED WATER PLANT36 SQ.M
103.0 EXISTING ROAD LVL
102.5
102.1
102.3
102.65
101.65
101.5
101.8
101.95
103.0
103
25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 L1
LA A B C D J K L M



KEY PLAN

LEGEND

- 4X6W Orio LED Cat.no.LR01-001 or equivalent
- 2 X 18 WATT CFL SURFACE MOUNTED FIXTURE FWP 41218
- 150 WATT METAL HALLIDE UPLIGHTER WIPRO CAT NO. FDH 32150 OR EQUIVALENT
- 1 X 50 W HALOGEN PAR 20 + FFX 511 DIRECTIONAL SHIELD SYMMETRICALBUSH LIGHT (WIPRO CAT -FFQ 51050 + FFX 512 EARTH SPIKE) OR EQ.

NOTE :

SUFFIX	DATE	REVISIONS
R0	08-11-2011	FOR TENDER ONLY

DWG ISSUED FOR
- [ ] COMMENTS
- [ ] APPROVAL
- [x] TENDER
- [ ] ADVANCE COPY
- [ ] RECORD
- [ ] G.F.C

ARCHITECT :
MADHAV JOSHI AND ASSOCIATES
ARCHITECTS AND URBAN PLANNERS

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CLIENT
INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE

PROJECT
CCCR BUILDING AT IITM

TITLE
EXTERNAL LIGHTING LAYOUT

SCALE : NTS | DATE : 04.11.2011 | DRAWN NILESH
DWG.NO. 1109/EL/08 | SUFFIX R0 | CHECKED SHWETA | APPROVED N.P.N

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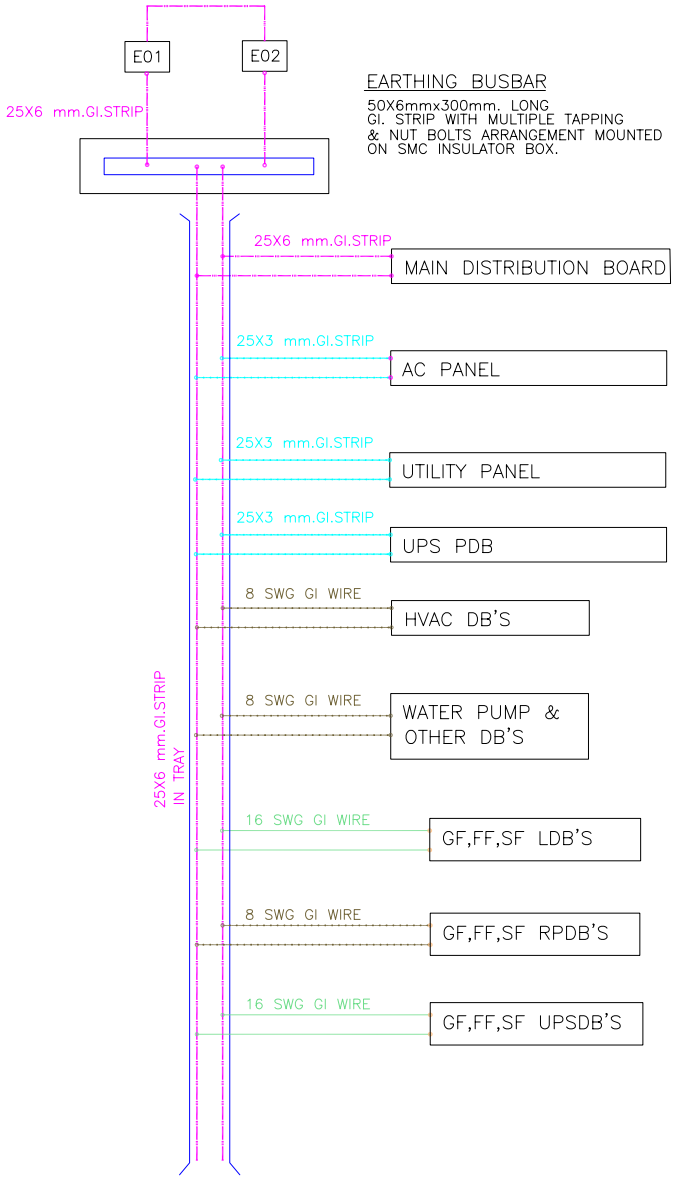
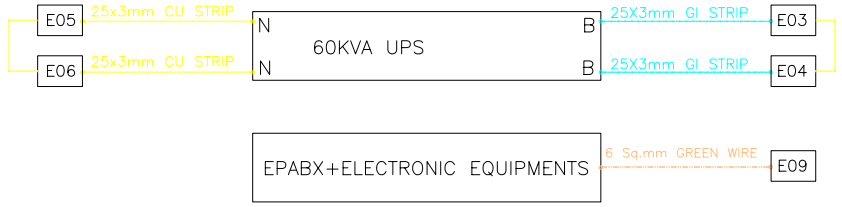
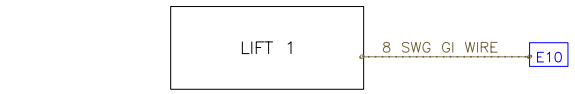


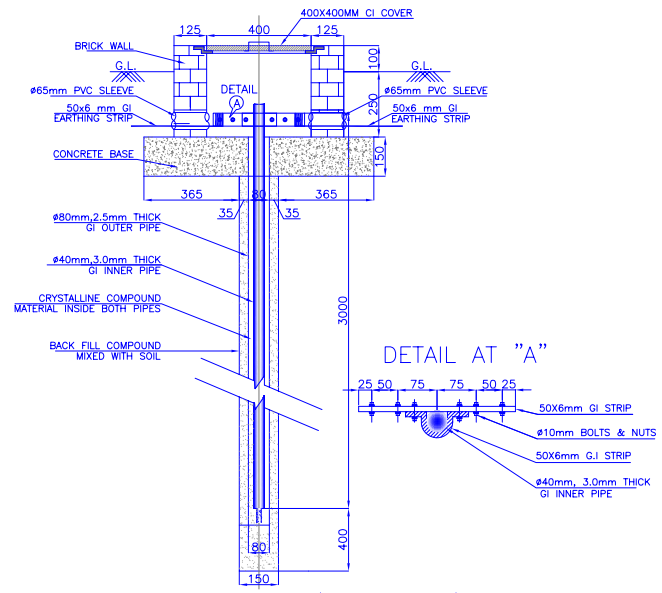
EARTHING DETAILS FOR MAIN DB AND OTHER DB'S

EARTHING DETAILS FOR LA-1

(AS PER EARTHING SCHEDULE)







MAINTENANCE FREE EARTHING (T-39 OR EQUIV.)
(ALL DIMENSION ARE IN MM)

NOTE
BORE ø150MM UP TO 6.5MTR DEPTH AND MAINTENANCE FREE EARTH ELECTRODE – "ASHLOK" MODEL T-39 CHEMICAL TREATMENT AS MENTIONED ABOVE.

LEGEND

EARTHING STRIP	EARTHING STRIP SIZE
	50x6mm GI STRIP
	25X6 mm.GI.STRIP
	25X3mm GI STRIP
	25x3mm CU STRIP
	8 SWG GI WIRE
	16 SWG GI WIRE
	6 Sq.mm GREEN WIRE

EARTHING PIT Nos.	EARTHING SCHEDULE
E01 E02	MAIN DB, AC PANEL, UTILITY PANEL AND OTHER DB'S EARTHING.
E03 E04	UPS NEUTRAL EARTHING
E05 E06	UPS BODY EARTHING
E07 E08	BUILDING LA EARTHING.
E09	ELECTRONIC EARTHING
E10	LIFT EARTHING

KEY PLAN

LEGEND

NOTE :

1) EARTHING PIT SHALL NOT BE DONE IN FILLING AREA
2) EARTHING STRIP WELDED JOINTS SHALL CLEANED AFTER REMOVING WELDING SLAGS & THEN PAINTED WITH BITUMIN PAINT.
3) EARTHING PIT SHALL NOT BE LOCATED IN THE FUTURE EXPANSION AREAS.

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PROJECT
CCCR BUILDING AT IITM

TITLE
EARTHING LAYOUT

SCALE : NTS	DATE : 04.11.2011	DRAWN NILESH
DWG.NO. 1109/EL/09	SUFFIX R0	CHECKED SHWETA
		APPROVED N.P.N

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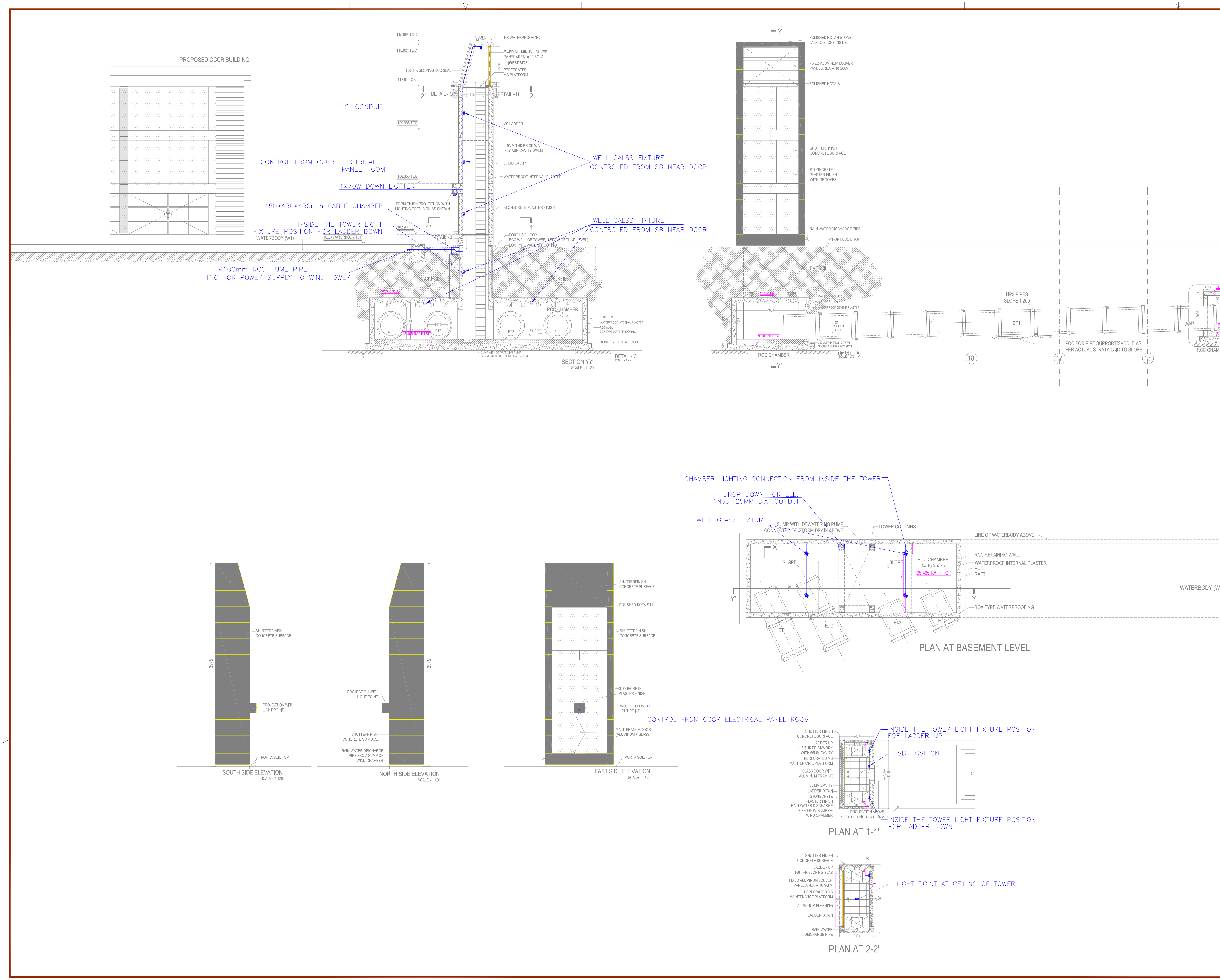

KEY PLAN

Symbol	Description
	1X70W DOWN LIGHTER(WIPRO CAT NO UWH 11070S)
	WELL GALSS FIXTURE
	GI CONDUIT
	ø40mm SLEEVE FOR ELECTRICAL

NOTE :

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PROJECT
CCCR BUILDING AT IITM

TITLE
TOWER LIGHTING LAYOUT

SCALE : NTS | DATE : 04.11.2011 | DRAWN NILESH
DWG.NO. 1109/EL/10 | SUFFIX R0 | CHECKED SHWETA | APPROVED N.P.N

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ARCH DWG REF:

NAME OF THE WORK - INTERNAL & EXTERNAL ELECTRICAL WORK FOR CCCR OFFICE BLDG. AT INDIAN INSTITUTE OF TROPICAL METEOROLOGY, Dr. HOMI BHABHA ROAD, PASHAN, PUNE 411008			
NAME OF CLIENT - INDIAN INSTITUTE OF TROPICAL METEOROLOGY, DR. HOMI BHABHA ROAD, PASHAN, PUNE 411008			
MINUTES OF PRE BID MEETING HELD AT INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PUNE ON 15.11.11 AT 11.00 AM			
SR. NO.	**ITEM DESRIPTION FROM TENDER DOCUMENT / QUERY RAISED**	**PRE BID MEETING DECISION/ CLARIFICATION**	
1	Section II item 1.1 to 1.5 (MV Panels) Please confirm the Fault Current for the MCCB's mentioned in the SLD's.	KA rating have been mentioned in SLD's .OG MCCB'S will be same rating as busbar.	
2	Section II item 1.1 to 1.5 (MV Panels) other than the listed make can we quote with CPRI Vendors.	Bidders should quote for approved makes only.	
3	Section II item 2.1 (Distribution Board) as per the BOQ it is mentioned that 2Way TPN DB. Can quote for 4Way TPN DB since 2Way DB is not in the manufactures scope.	Appropriate DB enclosure can be selected as bidders.	
4	Section II item 2.1 to 2.5 (Distribution Board) Please confirm can we quote for DB's with 18 SWG as standard DB's.	Readymade DB's available from approved vendors are acceptable.	
5	Section II item 5.1 to 5.10 (Sockets) Please confirm can we quote with IP - 42 type Socket enclosure instead of IP - 20.	Socket above IP 20 will be accepted.	
6	Section III item 4, 5 & item 6 (Cable tray) Please specify the height for the cable trays since same is not provided in the BOQ and also the Specification.	Building flooor to floor height is 3.63 mtr .Tray mounting will be 300 mm bellow slabs/beams soffits.	
7	Section III item 4, 5 & item 6 (Cable tray) Other than the listed makes can we quote with M/s. Shruti, West Coast & Metallems for the cable tray.	Cable tray sample shall be provided for approval before procuring trays.	
8	Section III Item 3 (Cable Termination) : Can we quote Double Compression type of glands with AL/Cu lugs	Refer cable end termination specs. All end terminations outside the building will be with double compression type glands.	
9	Point wiring defnition in technical specification F.9.10	Circuit mains from DB to switch board will not be measured separately. Cables / mains from panel to DB will be measured separately.	
		TECHNICAL CLARIFICATIONS MADE BY THE COMMITTEE	
10	Item no. 9.0 section V and related specification (RJ11 socket have been asked for Telephone connection in above items.)	These will be replaced by RJ 45 sockets in all sub items whereever applicable.	
11	Conduiting in the all slabs is in scope of civil contractor.	Electrical contractor needs to provide supervision assistance for balance slabs after mobilsiation	
12	Bid Documents to be submitted	**A) Technical Bid:-** Technical Bid Envelope should contains the following documents i) Forwarding letter of the company ii) Technical Bid duly signed and stamped iii) Blank BOQ to comply, duly signed and stamped. iv) DD for tender fee v) EMD in the form of DD/BG vi) Company profile with supporting documents vii) Bar Chart viii) Bank solvency for Rs. 30 lakhs ix) Copy of Pre Bid MOM duly signed and stamped. x) Pan Card xi) 3 years I.T. returns xii) Other relevent document as specified in tender. **B) Commercial Bid:-** Commercial Bid duly filled and stamped on specified BOQ. **NOTE:-** Bidders should super subscribes clearly name of work, tender notice no., due date and time and address clearly on both the envelopes.	