NIT No.: IITH/CMD/ELE/NIT/2024-25/33

భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

NOTICE INVITING TENDER
(NIT)

Name of work: Supply, Installation, Testing and Commissioning (SITC) of Supervisory Control and Data Acquisition (SCADA) system for Auto-Operations and Centralized Monitoring of all Electrical Substations i.e.,33kV/11kV and 11kV/0.433kV substations HT & LT system across IIT Hyderabad campus.

Executive Engineer - Electrical
IIT Hyderabad

INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD

NOTICE INVITING TENDER (NIT)

NIT No. IITH/CMD/ELE/NIT/2024-25/33

The Indian Institute of Technology(IIT) Hyderabad invites on behalf of President of India online bids (e-tenders) in Item rate/Percentage rate in Two-bid system (Technical Eligibility plus Financial) System, from the approved and eligible Electrical contractors of CPWD and those of appropriate list of M.E.S./BSNL/Railways/State P.W.D./Central PSUs/State PSUs/State Govt. departments/Central Govt. Departments or Original Equipment Manufacturers(OEMs) of SCADA system or the Specialized Agencies authorized from the OEM for the following work as per the stipulated terms and conditions mentioned below.

Copy of valid Registration of Firm (ROF) certificate, PAN card, GST Registration certificate & GSTIN should accompany the Technical Bid and those certificates should be valid on the last date of submission of bid.

1.1	NIT No.:	**IITH/CMD/ELE/NIT/2024-25/33**
1.2	Name of Work:	**Supply, Installation, Testing and Commissioning (SITC) of Supervisory Control and Data Acquisition (SCADA) system for Auto-Operations and Centralized Monitoring of all Electrical Substations i.e., 33kV/11kV and 11kV/0.433kV substations HT & LT system across IIT Hyderabad campus.**
1.3	Estimated Cost: (*given merely as a rough guide)*	***Rs.4,03,14,374/- only***
1.4	Earnest Money Deposit (EMD):	***Rs.8,06,300/- only***
1.5	Period of Completion:	***60 days***
1.6	Date of Online Publication/Download of Tender	***19/02/2025 @ 09:00hrs***
1.7	Last Date for Submission of Bids	***27/02/2025 @ 15:00hrs***
1.8	Date and time of Opening of Technical Bids	***28/02/2025 @ 15:30hrs***
1.9	Date and time of Opening of Financial Bids	**To be decided**
1.10	Cost of Bid Document:	**NIL**
1.11	Website	**https://eprocure.gov.in/eprocure/app**

Executive Engineer - Electrical

SECTION-01

Instructions to the Bidders for Online Bid Submission

The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, preparing their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

More information useful for submitting online bids on the CPP Portal may be obtained at: https://eprocure.gov.in/eprocure/app.

REGISTRATION

1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL: https://eprocure.gov.in/eprocure/app) by clicking on the link "Online bidder Enrollment" on the CPP Portal which is free of charge.

2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.

3) Bidders are advised to register their valid email addresses and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.

4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.,), with their profile.

5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.

6) Bidder then logs in to the site through the secured log-in by entering their user ID/password and the password of the DSC / e-Token.

SEARCHING FOR TENDER DOCUMENTS

1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.

2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e- mail in case there is any corrigendum issued to the tender document.

3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.

2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.

3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document/schedule and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black-and white option which helps in reducing the size of the scanned document.

4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates, etc.) has been provided to the bidders. Bidders can use the "My Space" or ''Other Important Documents'' are available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

Note: My Documents space is only a repository given to the Bidders to ease the uploading process. If Bidder has uploaded his Documents in My Documents space, this does not automatically ensure these Documents being part of Technical Bid.

SUBMISSION OF BIDS

5) Bidder should log into the site well in advance for bid submission.

6) ion so that they can upload the bid in time i.e., on or before the bid submission time. Bidder will be responsible for any delay due to other issues.

7) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.

8) Bidder has to select the payment option as "offline" to pay the tender fee / EMD as applicable and enter details of the instrument.

9) Bidder should prepare the EMD as per the instructions specified in the tender document. The original should be posted/couriered/given in person to the concerned official, latest by the last date and time of bid submission or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise, the uploaded bid will be rejected.

10) Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and complete the white coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.

11) The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc., The bidders should follow this time during bid submission.

12) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128-bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid opener's public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.

13) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.

14) Upon the successful and timely submission of bids (i.e., after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.

15) The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

ASSISTANCE TO BIDDERS

16) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.

17) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact details of the helpdesk are 0120-4711508, 0120-6277787, 0120-4001002, 0120- 4001005 and support-eproc@nic.in.

SECTION-02

NIT No. IITH/CMD/ELE/NIT/2024-25/33

Technical Eligibility Criteria:

1. Bidders shall produce definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified below:

   Experience of having successfully completed similar works during the last 07 years ending the last day of the month previous to the one in which tenders are invited.

   Three similar completed works each costing not less than Rs.1,61,25,750/-only or

   Two similar completed works each costing not less than Rs.2,41,88,624/-only or

   One similar completed work costing not less than Rs.3,22,51,500/-only

   The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum, calculated from the date of completion to the last date of submission of tender.

   "Similar Work" shall mean the work of Supply, Installation, Testing and Commissioning (SITC) of Supervisory Control and Data Acquisition(SCADA) system for Auto-Operations and Centralized Monitoring of HT/LT Substations in any Institutional Campus/Industries/ Universities/Hotels/IT Companies/Power Plants/Pharmaceuticals/R&D Laboratories/State Power Discoms/PSUs etc.

   (For private works TDS certificate or Form-26 AS in support of value of work done.)

2. **Turnover:** The Average Annual financial turnover of the bidder should be at least **Rs.1,20,94,312/- only** during the immediate last three(03) consecutive financial years **ending 31st March 2024**. The value of annual turnover figures shall be brought to current value by enhancing the actual turnover figures at simple rate of 7% per annum. The certificate from CA shall be attached with the bid.

3. **Banker's Certificate or Net worth Certificate** (as per the prescribed format given in NIT): The bidder shall submit the Banker's certificate or Net-worth certificate as per the below:

   Banker's Certificate of the amount equal to **Rs.1,61,25,750/-only** issued by any scheduled bank,

   or

   Net worth certificate of minimum amount **Rs.40,31,437/-only**, issued by certified Chartered Accountant with UDIN.

4. To become eligible, the tenderer shall have to furnish an affidavit as per Form 'J' of the NIT.

5. The bidder shall have Employees Provident Fund (EPF) enlistment and proof of the same shall be attached along with the Technical Bid clearly showing the Provident Fund Code number.

6. The bidder shall submit the Indemnity bond as per format provided in Annexure-II.

7. The bidder shall submit the authorization certificate from the Approved Original Equipment Manufacturer (OEM) of SCADA system as per the format enclosed as Annexure- III.

8. Agreement shall be drawn with the successful tenderer on prescribed Form which is available in the website: *https://drive.google.com/file/d/19_LkFZ1IeQb_3BznXQtinslcLISYVdbo/view* **(with up to date correction slips if any)** Tenderer shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.

9. The time allowed for carrying out the work will be as stated at para 1 from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the tender documents.

10. **The site for the work is available**.

11. Tender documents consisting of plans, specifications, the schedule of quantities of the various classes of work to be done and the set of terms & conditions of contract to be complied with by the contractor whose tender may be accepted and other necessary documents can be seen for information at the above-mentioned website.

12. Applicants are advised to keep visiting the above-mentioned website from time to time (till the deadline for bid submission) for any updates in respect of the tender documents, if any. Failure to do so shall not absolve the applicant of his liabilities to submit the applications complete in all respects including updates thereof, if any. An incomplete application may be liable for rejection.

13. The contractor whose tender is accepted, will be required to furnish a **Performance Guarantee of 5%(Five Percent)** of the tendered amount within the period specified in Schedule F. This guarantee shall be in the form of Deposit at Call receipt of any scheduled bank/Banker's cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay order of any scheduled bank or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F'. including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor.

14. The description of the work is as follows:

Supply, Installation, Testing and Commissioning (SITC) of Supervisory Control and Data Acquisition (SCADA) system for Auto-Operations and Centralized Monitoring of all Electrical Substations i.e., 33kV/11kV and 11kV/0.433kV substations HT & LT system across IIT Hyderabad campus.

Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

15. Tenders with any condition including that of conditional rebates shall be rejected forthwith.

16. Cost of **Bid document cost** and **EMD** may also be remitted to Institute's account number as per bank particulars given below:

Name of the Account Holder	**: Indian Institute of Technology Hyderabad**
Account Number	**: 30412797764 (Current Account)**
Name of the Bank	**: State Bank of India**
Address of the Bank	**: IIT Kandi, IIT Hyderabad Campus, Kandi, Sangareddy, Telangana - 502284**
Branch code	**: 14182**
IFSC code	**: SBIN0014182**
MICR code	**: 502002528**
SHIFT code	**: SBININBB762**

17. The Competent Authority on behalf of the President of India does not bind itself to accept the lowest or any other tender and reserves to itself the authority to reject any or all the tenders received without the assignment of any reason. All tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer shall be summarily rejected.

18. Canvassing whether directly or indirectly, in connection with tenderers is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.

19. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rate quoted.

20. The contractor shall not be permitted to tender for works if his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Institute.

21. No Engineer of gazette rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the previous permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the tender or engagement in the contractor's service.

22. The tender for the works shall remain open for acceptance for a period of Ninety (90) days from the date of opening of tenders/Ninety days from the date of opening of financial bid in case tenders are invited on 2/3 envelop system (strike out as the case may be) if any tenderer withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the tenderer shall not be allowed to participate in the re-tendering process of the work.

23. **(A) All taxes, Labor Cess etc., as applicable shall be borne by the contractor himself. The contractor shall quote his rates considering all such taxes including GST on works. Any recovery towards GST is notified by the competent authority, the same shall be effected and no claim what so ever shall be entertained by IITH. The contractor shall quote his rates accordingly.**

(B) 2% as TDS amount of GST amount payable on the bills will be deducted as per the Govt. of India, Ministry of Finance, Department of Revenue notification vide No.65/39/2018-DOR, dtd: 14-09-2018.

24. ***GST registration certificate of the state in which the work is to be taken up, if already obtained by the bidder.***

If the bidder has not obtained GST registration in the state in which the work is to be taken up or as required by GST authorities, then in such a case the bidder shall scan and upload following under taking along with other bid documents.

"If the work awarded to me, I/We shall obtain GST registration certificate of the state, in which work is to be taken up, within one month from the date of receipt of award letter or before release of any payment by IIT Hyderabad, whichever earlier, failing which I/We shall responsible for any delay in payments which will be due towards me/us on a/c of the work executed and/or for any action taken by IIT Hyderabad or GST department in this regard."

25. This notice inviting Tender shall form a part of the contract document. The successful tenderer/contractor, on acceptance of his tender by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of :-

a) The Notice Inviting Tender, all the documents including additional conditions, specifications and drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto.

b) Standard Contract form (General Conditions of Contract) as posted in the website of the Institute. The bidder is deemed to have gone through and understood the Standard Contract Form and the General Conditions of Contract.

Executive Engineer - Electrical
IIT Hyderabad

(Signature of bidder)

SECTION-03

Special Conditions of Contract

1. Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract, Schedule of Quantities, specifications of work, approved drawings and any other documents forming part of this contract wherever the context so requires. The order of precedence of the above documents shall be interpreted as per General Conditions of Contract.

2. Notwithstanding the sub-division of the document into these separate sections and volumes, every part of each shall be deemed to be supplementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.

3. The materials, design and workmanship shall satisfy the relevant Indian Standards (Latest), the job specifications contained herein and other national / international codes (Latest) referred to. Where the job specifications, stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied. In the absence of any Standards/Specifications/Codes of practices for detailed specifications covering any part of the work covered in this tender, Contractor shall ensure that the work is executed as per the best and sound engineering practices and/or as per the instructions/ directions of Engineer- in-Charge. The decision of EIC as regards the specification to be adopted and their interpretation and the mode of execution of work shall be final and binding on the Contractor and no claim whatsoever shall be entertained on this account.

4. The Contractor shall execute the whole and every part of the Works in the most professional and workman-like manner and both as regards materials and in other respects in strict accordance with specifications and latest Indian and international codes.

5. **AMENDMENT OF TENDER DOCUMENT**

5.1 Before the deadline for submission of tenders, the Tender Document may be modified by Indian Institute of Technology Hyderabad by issue of addendum/ corrigendum. Issue of addendum/ corrigendum will however be stopped 03 days prior to the deadline for submission of tenders as finally stipulated.

5.2 Addendum/ corrigendum, if any, will be hosted on e-procurement portal of Ministry of Education, Govt. of India (https://eprocure.gov.in/eprocure/app;) and IITH Website (https://www.iith.ac.in/tenders) only and shall become a part of the tender document. All Tenderers are advised to see the website for addendum/ corrigendum to the tender document which may be uploaded up to 03 days prior to the deadline for submission of Tender as finally stipulated.

5.3 To give prospective tenderer reasonable time in which to take the addendum/ corrigendum into account in preparing their tenders, extension of the deadline for submission of tenders may be given as considered necessary by IITH.

6. **WORK PROGRAMME:**

6.1 The Contractor shall, within 07 days after the date of award of the work, submit his detailed work programme preferably in Microsoft Project (Level-3), detailed Project quality plan for works executable at site and also at manufacturer's place, safety plan, for the approval of the Engineer in - charge, which shall clearly set out his proposed schedule for the whole of the Works, the time for completing the major sections of the Works and his schedule for mobilizing the materials and equipment necessary for implementing the

Works in a timely cohesive and efficient manner. The Contractor shall submit the above Resource Mobilization Plan on the basis of site /region prevalent labour constants/ productivity factors and separately a Project Material Procurement Plan clearly mentioning the procurement strategy for long lead items.

7. **PROJECT REVIEW MEETINGS:**

7.1 The contractor, immediately on award of work shall submit details of his key personnel to be engaged for the work at site. In addition, he shall furnish the Engineer-in-Charge detailed organogram involved with the work.

7.2 The Contractor shall present the programme and status at various review meetings as required.

i) Weekly Review Meetings: Shall be attended by Local Team headed by Project -in-Charge.

i) Agenda:

a) Weekly programme v/ s actual achieved in the past week and programme for next week.
b) Remedial Actions and hold up analysis.
c) Client query approval.

iii)Monthly Review Meetings: Shall be attended by Project -in- Charge and the Management Representative who can take independent decisions.

iv) Agenda:

a) Progress Status/ Statistics.
b) Completion Outlook.
c) Major hold ups / slippages.
d) Assistance required.
e) Critical issues.
f) Client query/ approval.
g) Anticipated cash flow requirement for next two months

8. Before tendering, the Agency shall inspect the site of work and shall fully acquaint himself about the conditions prevailing at site, availability of materials, avail- ability of land and suitable location for construction of godowns, stores and camp, transport facilities, the extent of lead and lifts involved in the work (over the entire duration of contract) including local conditions, as required for satisfactory execution of the work and nothing extra whatsoever shall be paid on this account.

9. The Agency shall at his own expense and risk arrange land for accommodation of labour, setting up of office, the storage of materials, erection of temporary work- shops, and construction of approach roads to the site of the work including land required for carrying out of all jobs connected with the completion of the work. In any case. IIT Hyderabad (Institute) shall not permit setting up of labour camps within its premises. If during construction it becomes necessary to remove or shift the stored materials shed workshop, access roads, etc. to facilitate execution of any other work by any other agency, the contractor shall do as directed by the Engineer-in-charge and no claim whatsoever, shall be entertained on this account.

10. It shall be deemed that the contractor shall have satisfied himself as to the nature and location of the work, transport facilities, availability of land for setting up of camp etc. The department will bear no responsibility for lack of such knowledge and the consequences thereof.

11. The Agency shall have to make approaches to the site, if so required and keep them in good condition for transportation of labour and materials as well as inspection of works by the Engineer-in-charge. Nothing extra shall be paid on this account.

12. The Agency shall at his own cost submit samples of all materials sufficiently in advance and obtain approval of the Engineer-in-charge. Subsequently, the materials to be used in the actual execution of the work shall strictly conform to the quality of samples approved by the Engineer- in-charge and nothing extra shall be paid on this account. The acceptance of any sample or material on inspection shall not be a bar to its subsequent rejection, if found defective.

13. The contractor shall at his cost, make all arrangements and shall provide necessary facilities as the Engineer-in-charge may require for collecting, preparing, packing forwarding and transportation of the required number of samples for tests for analysis at such time and to such places as directed by the Engineer-in-charge, and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. The cost of tests shall be borne by the contractor/Institute in the manner indicated below (except for water):

14. By the contractor, if the results show that the material does not conform to relevant specifications and BIS codes or any other relevant code for which conformity test is carried out.

15. By the Institute, if the results show that the material conforms to relevant specifications and BIS codes or any other relevant code for which conformity test is carried out.

16. Materials used on work without prior inspection and testing (where testing is necessary) and without approval of Engineer-in-charge are liable to be considered unauthorized, defective and not acceptable. The Engineer-in-charge shall have full powers to require removal of any or all of the materials brought to site by contractor which are not in accordance with the contract, Specifications or do not conform in character or quality to the samples approved by the Engineer-in-charge. In case of default on the part of the contractor in removing rejected materials, the Engineer-in- charge shall be at liberty to have them removed at the risk and cost of the contractor.

17. The work shall be carried out in such a manner so as not to interfere/or effect or disturb other works being executed by other agencies, if any.

18. Any damages done by the contractor to any existing work or work being executed by other agencies shall be made good by him at his own cost.

19. The work shall be carried out in the manner complying in all respects with the requirement of relevant rules and regulations of the local bodies under the jurisdiction of which the work is to be executed and nothing extra shall be paid on this account.

20. The contractor shall maintain in good condition all work executed till the completion of the entire work entrusted to the contractor under this contract and nothing extra shall be paid on this account.

21. No payment will be made to the contractor for damage caused by rain, floods and other natural calamities whatsoever during the execution of the works and any damage to the work on this account shall have to be made good by the contractor at his own cost and nothing whatsoever' shall be paid on this account.

22. The Item Rates or Percentage Rates for all items of work, unless clearly specified otherwise shall include the cost of all labour for materials, de-watering and other inputs involved in the execution of the items.

23. No claim whatsoever for idle labour, additional establishments, costs of hire and labour charges for tools and plants etc. would be entertained under any circumstances.

24. For the safety of all labour directly or indirectly employed in the work for the performance of the contractor's part of this agreement, the contractors shall, in addition to the provisions of Safety code and directions of the Engineer-in-charge make all arrangements to provide facility as per the provisions of Indian Standard Specifications (Codes) listed below and nothing extra shall be paid on this account.

IS 3696 Part I Safety Code for scaffolds and ladders
IS 3696 Part II Safety Code for scaffolds and ladders Part II ladders
IS 764 Safety Code for excavation work
IS 4081 Safety Code for Blasting and Drilling operations,
IS4138 Safety Code for working in compressed air.
IS 7293 Safety Code for working with construction machinery
IS 7969 Safety Code for storage and handling of building materials
IS 5216:1982 code of safety procedures and practices in electrical works

25. The contractor shall take all precautions to avoid all accidents by exhibiting necessary caution boards and by providing red flags, red lights and barriers. The con- tractor shall be responsible for any accident at the site of work and consequences thereof.

26. Labour Welfare Cess @ 1% shall be deducted at source from the bills of Gross value (which includes the cost of stipulated materials) of the work done and Government shall not entertain any claim whatsoever in this respect in this contract. The Labour cess will be deducted in conformity with the Govt. guidelines for Electrical works and Civil works accordingly.

27. The ESI and EPF Contribution on the part of the employer in respect of the contract shall be paid by the contractor.

28. The contractor shall obtain a valid licence under the contract labour (R A) Act, 1970 and the contract labour (Regulation and Abolition) Central Rules, 1971 before the commencement of the work, and continue to have a valid licence until the completion of the work. The contractor shall also comply with provision of the Inter- State Migrant Women (Regulation of Employment and conditions of service) Act 1979.

29. All tools, tackles, safety equipment and labours required for execution at all levels and heights shall have to be provided by the tenderer at no extra cost.

30. Spare parts used by vendor should conform to IS specifications as applicable.

31. Any damaged due to mishandling by the person deputed by the vendor shall have to be restored back to its original condition by the vendor at their own cost.

32. **The Defect Liability Period (DLP)/Guarantee Period of the executed works shall be minimum 36 (Thirty Six) months only from the date of satisfactory completion, as recorded by the Engineer-in-Charge. Any additional Warrantee/Guarantee provided by the Manufacturer is also applicable.**

33. **Payment of Running bills:**

The running bills shall be submitted by the contractor as per the progress of work done at site. However, the following will be the basis of payment for the items claimed under running bills:

a) Gross Payment to be made on supply of material at site: **70% of quoted rate.**

b) Gross Payment to be made on installation of material at site: **15% of quoted rate.**

c) Gross Payment to be made on satisfactory Testing & Commissioning of material at site: **15% of quoted rate.**

After receipt of the running bill at IITH, the contractor shall get the executed work and claimed quantities in bill checked and verified from the Engineer-In-charge or his authorized Engineer and after satisfactory verification of work executed at site, the payment to the contractor shall be released.

34. **Advance Payment:** If the work is not completed on or before 21st March 2025 with all the final bill and measurements submitted by the contractor then for the balance quantum of work (to be assessed by EE-Electrical), the Advance Payment may be made to the contractor on or before 31st March 2025 for the balance quantum of work, at the discretion of IITH in accordance with the Rule 172(1) of General Financial Rules(GFR) of Ministry of Finance, Govt. of India against advance submission of the Irrevocable Bank Guarantee of equal amount by the contractor to IITH, which will be binding on the contractor. This Advance Payment may be released without Prejudice to the right of Govt. to recover Compensation for delay in the execution (if any) in accordance with the Clause 2 of the General Conditions of Contract (GCC).

35. **MEDIA RELEASES**

The Contractor shall not issue any information, publication, document or article for publication concerning the project to the media without the express approval of Indian Institute of Technology Hyderabad.

SECTION-04

PROJECT DETAILS

OBJECTIVE OF THIS NIT:

The IIT Hyderabad is in the process of selecting well-established, experienced and specialized company/contractor for the work of ***Supply, Installation, Testing and Commissioning (SITC) of Supervisory Control and Data Acquisition (SCADA) system for Auto-Operations and Centralized Monitoring of all Electrical Substations i.e., 33kV/11kV and 11kV/0.433kV substations HT & LT system across IIT Hyderabad campus*****,*** through a competitive bidding process.

The objective of this document is to invite Tenders from the interested parties, who satisfy the eligibility criteria set out in this document and who can Offer, Supply, Install, Test and Commission the SCADA system for all HT and LT Electric substations at IIT Hyderabad upto the satisfaction level of Institute.

It is expected that only the System Integrators/Original Equipment Manufacturers(OEMs)/EPC contractors/Specialized agencies having proven experience in Planning, Design, Build & Commissioning of Substation SCADA system and must have executed similar SCADA Projects will respond to this Notice Inviting Tender(NIT).

SITE DETAILS:

The Project site is the IIT Hyderabad campus. The Indian Institute of Technology Hyderabad (IITH) is a premier institute of science and technology established in 2008. IITH has been consistently ranked in the top 10 institutes in India for Engineering according to NIRF making it one of the most coveted schools for science and technology in the country. The IIT Hyderabad campus is spread across 600+ acres of campus in the Kandi Village of Sangareddy District, Telangana, India.

TABLE 1: PROJECT SITE LOCATION

a.	Nearest Town	Hyderabad
b.	Nearest Railway station	Tellapur
c.	Nearest Port	Vishakapatanam
d.	Nearest airport	Hyderabad
e.	Nearest High way	Close to Hyderabad - Mumbai highway
f.	Height above MSL	+ 542 mtr
g.	Max. Temp / Min Temp	50^{o}C / 9.4^{0} C
h.	Rain fall	Annual average 1035 mm Monsoon period July to Sept.
i.	Prevailing wind direction	Predominantly south-west (43.1 %)
j.	Longitude	78.12^{0} E
k.	Latitude	17.59^{0} N

Currently, the IIT Hyderabad campus is being fed from the 33kV supply given by the Southern Power Distribution Company of Telangana Ltd. (TGSPDCL). This supply is received at the Main Receiving Station (MRS) located in IITH campus and further step down to 11kV through 33/11kV Step-Down Power Transformers. The 11kV supply is further distributed among 14 different substations located across the IITH campus for feeding different set of buildings. In each downstream 11kV substations, the voltage levels are further step-down to 11/0.433kV by Step Down Transformers and further LT supply is given to different buildings. The aforesaid MRS substation also consists of 03Nos. x 2MVA, 11KV DG sets which are used for Captive DG backup in case of Mains Power supply failure from the TSSPDCL.

At present all the electrical substations operations and monitoring is in manual mode only right starting from MRS, in Phase-I construction 10 electrical substations where constructed and charged including MRS and in Phase-II campus development 4 electrical substations were constructed and charged all these substations have

been handled manually, which is causing a lot of delay in Preventive Maintenance, fault analysis and restoration of power during Tripping/breakdown conditions causing inconvenience to campus residents and Power Quality issue to Academic & Research Buildings.

Hence in order to eradicate the Power Quality issues and Downtime minimization in all Electrical substations across IITH campus, the Supervisory Control and Data Acquisition(SCADA) system is hereby proposed to be installed and commissioned across all 33kV and 11kV substations across IITH. This will enable the effective Auto-operations and remote monitoring & control of all Electrical substations both HT & LT switch-gears leading to minimization of Power breakdowns and also monitoring and maintaining the Quality Power supply thru Data Analysis. The Master Plan of IITH campus showing the locations of each individual substations and the Electrical Single Line Diagram(SLD) of MRS substation is also enclosed herewith the NIT document for ready reference of the intending bidders.

SCOPE OF THE REQUIREMENT:

The Scope of the work includes, but not limited to the following:

a) Site survey, Technical feasibility, regulatory & policy assessment.

b) Securing all necessary permits and approvals, from all local authorities (Central & State Govt.), DISCOM, and IITH authorities as applicable.

c) The whole installation should be in conformity with Central Electrical Authority Regulations and those of State Government and the TGTRANSCO and TGDISCOMs as applicable.

d) Providing all necessary labour, material, services, tools, plant and equipment for the works ;

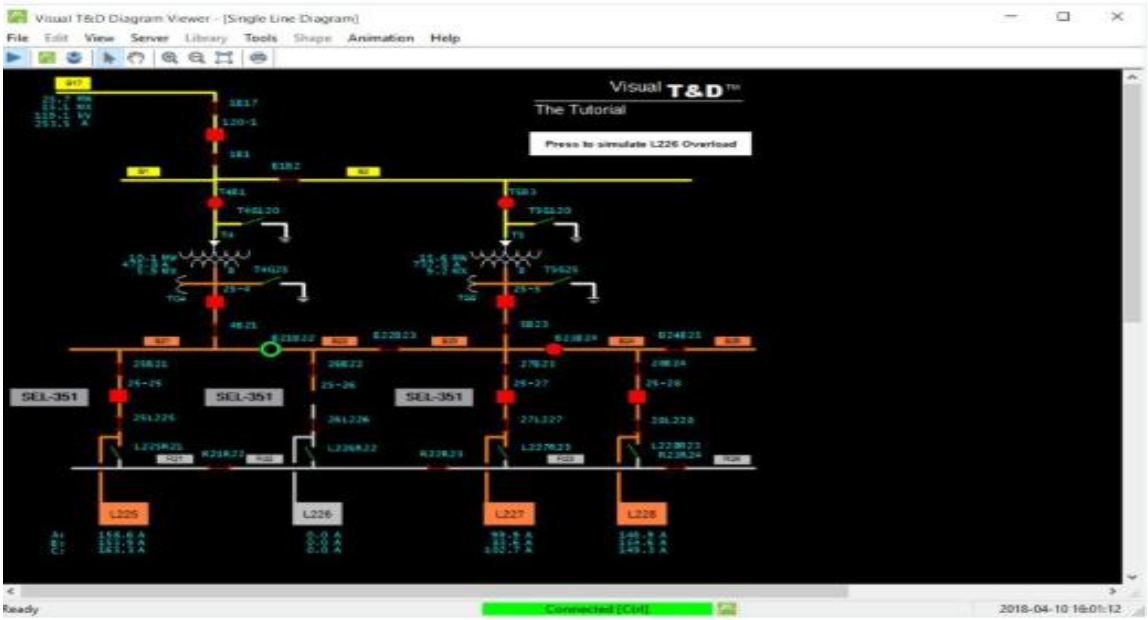
e) Offer a range of viable project delivery options and extensive proposals, including but not limited to:

i. Planning, Design, Construct, Commission and maintain the SCADA system to the best of its performance during the Liability Period.

ii. Any other value addition feature to the proposed SCADA system.

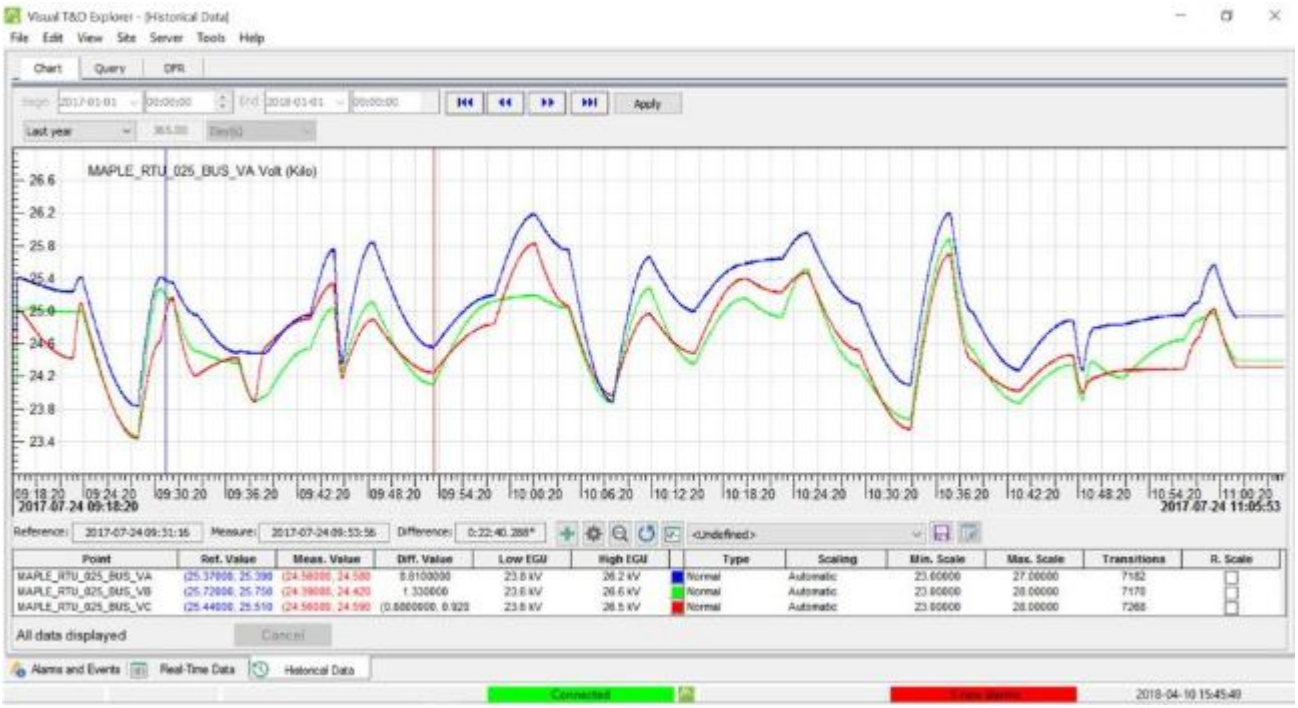
SCADA system: A Supervisory Control and Data Acquisition (SCADA) system is an enterprise-level software whose main task is to monitor and control an electrical grid system based on the information it collects from the substations within that system. A SCADA system is normally installed in a control room where operators can consistently monitor the overall health and function of the electric system. To provide enough information for an operator, a SCADA system supports a range of features and functions such as a single-line diagram and a historian.

Single-line diagram: A single-line diagram is an interactive graphical representation of the grid system via which an operator can monitor different parameters of the system and issue commands as necessary. A SCADA single-line diagram generally consists of an overview of the system plus multiple detailed pages for different components of the system to which an operator can navigate.



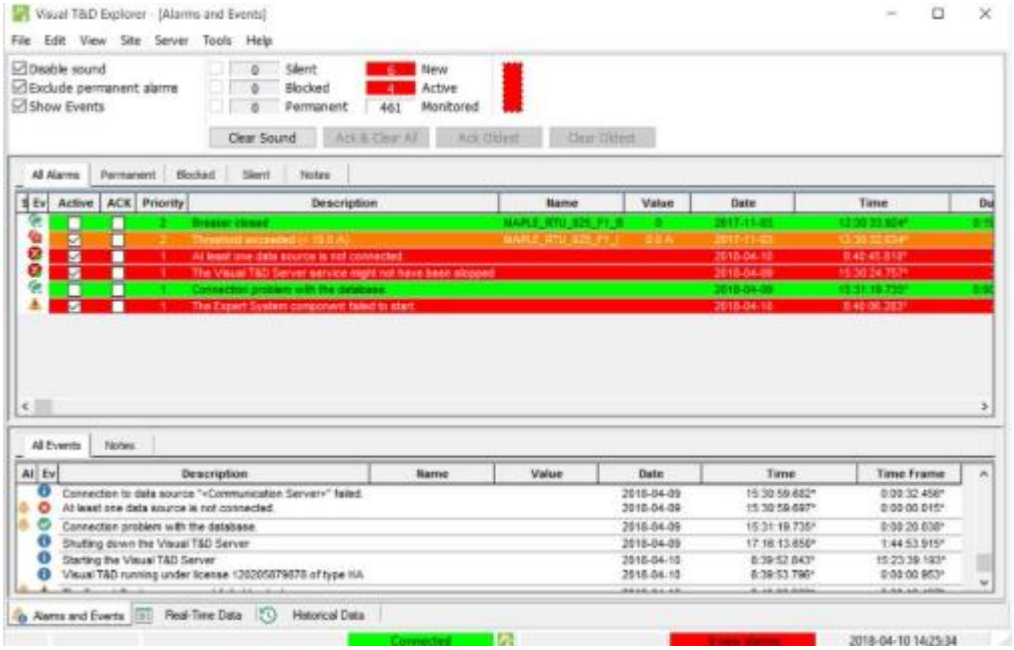
Real-time trending: Unlike single-line diagrams that show the components and connection of the system, the real-time trending function provides the operator with a real-time chart that monitors the values it receives from devices in the substation. An operator can add one or several points to the chart and follow the real-time value changes for better analysis of the system.

Historian: Recording information is another important function in a SCADA system. Except for some buffering capabilities, most IEDs and gateways have insufficient internal storage to maintain a record of real-time value changes for an extended period of time. One of the main tasks of a SCADA system is to record the real-time values it collects from the devices in the field. This information is saved in a relational database and can be surveyed based on various filters using the historian function. The recorded information can also be accessed directly from the database using a third-party application for further analysis.



Event and alarm management: Event and alarm management is also part of the standard functions offered by a SCADA system. An alarm can be raised by the SCADA system in an alarm window based on predefined criteria. The operator can then acknowledge the alarm and clear it when the value of the point the alarm was created on goes back to its normal status.

Like alarms, events can also be generated based on the status of the data points collected from the field. Contrary to an alarm management system, an event management system doesn't require an operator's intervention – as generally events are not considered critical.



User notification: One of the main tasks of a SCADA system is to provide the necessary information to the right people in a timely manner. In a new SCADA system, the software administrator can assign notifications for different alarms and events to specific users or a group of users and send them email or text message notifications based on that list.

Note: ***The bidder shall consider all the above requirements as a part of scope of this work and shall bid accordingly inclusive of all above-mentioned features.***

SECTION-5

TECHNICAL SPECIFICATIONS

5.1 SPECIFICATION FOR CONTROL INSTRUMENTS

Scope

This specification covers the design requirements necessary to design, engineer, select hardware, and configure software for Control systems.

5.1.1 Standards and Specifications

a. Codes and Standards

TABLE 2 CODE & STANDARD FOR INSTRUMENTATION SYSTEM

IEC 60079	Installation and Maintenance of Electrical Apparatus for Use in Potentially Explosive Atmospheres.
IEC60529	Degrees of Protection of Enclosures.
IEC 617	Graphic Symbols for Electronic Diagrams.
ISA S5.1	Instrumentation, Symbols and Identification.
ISA S5.2	Binary Logic Diagrams for Process Operations.
ISA S5.3	Graphic Symbols for Distributed Control / Shared Display Instrumentation, Logic and Computer Symbols.
ISA 71.01	Environmental Conditions for Process Management and Control System, Temperature and Humidity.
ISA 71.04	Environmental Equipment Conditions for Process Management and Control System, Air-borne Contaminants.
ISO 9001	Quality Systems.
ANSI/ISATR99.00.01-2004	Security Technologies for Manufacturing and Control Systems
ANSI/ISATR99.00.02-2004	Integrating Electronic Security into the Manufacturing and Control Systems Environment
EEMUA 191	Alarm System, a guide to design, management & procurement.
IEC 61000-4	Electromagnetic Compatibility (EMC) Part 4: Testing and measurement Techniques
IEC 61131-3	Programming Languages

5.2 SCADA

5.2.1 General Requirements

5.2.1.1 The Contractor shall provide complete SCADA system with all accessories, auxiliaries and associated equipment and cables for the safe, efficient and reliable operation and monitoring of all Electric substations and its auxiliary systems.

5.2.1.2 The Contractor shall provide all the components including, but not limited to, Hardware, Software, Panels, Power Supply, HMI, Laser Printer, Gateway, Networking equipment and associated Cables, firewall etc. needed for the completeness.

5.2.1.3 SCADA System shall have the provision to perform the following features and/or functions:

(i) Web enabled Operator Dashboards: Showing key information on Power Distribution, Performance and Current Status of various equipments in Substations in Single Line Diagram (SLD) format I/c

Transformers, DG sets, HT/LT Panels, capacitor panels etc.

(ii) Real time Data Logging with Integrated Analytics & Reporting: Logging of all parameters - AC, DC, Weather, System Run Hours, Equipment Status and Alarms as well as derived/ calculated/ integrated values. The SCADA User interface shall be customizable and enable Report Generation and Graphical Analysis.

(iii) Fault and System Diagnostics with time stamped event logging.

(iv) Generate, store and retrieve user configurable Sequence of Event (SOE) Reports.

(v) Interface with different field equipment in the substations and work seamlessly with field equipment supplied by different companies.

5.2.1.4 The Control system shall be designed to operate in non-air-conditioned area. However, the Contractor shall provide a Package/ Split AC of suitable capacity decided by heat load requirement in SCADA room at Main Control Room.

5.2.1.5 The SCADA System shall comply with CEA (Cyber Security in Power Systems) Guidelines, 2021, amended from time to time, and the technical standards for communication system in Power Sector laid down by the relevant Authority.

5.2.1.6 All the Electric Substations shall be connected on a SCADA system for remote monitoring as well and the Centralized monitoring station of SCADA System shall be installed and commissioned in the MRS Substation of IITH Campus.

5.2.1.7 The SCADA System shall be supplied with approved make only and the I/O summary, technical datasheets, product catalogue of each and every component of complete SCADA system shall be got approved from the Engineer In Charge i.e., Executive Engineer-Electrical before any procurement on site.

5.2.2 Architecture

5.2.2.1 The SCADA System shall be built over Industrial IoT architecture with integrated Analytics, secure web access, enterprise software and Database.

5.2.2.2 Data acquisition shall be distributed across MCR and LCRs while plant level data aggregation shall be done in plant servers.

5.2.2.3 Analog and Digital IO modules shall have integrated processor for distributed IO processing and control.

5.2.2.4 Data communication system shall be built over fibre optic cables/ wireless network with high bandwidth TCP/IP communication (Fast Ethernet or 802.11a/b/g/n) across all Inverter and Control Rooms with Internet/Intranet access at Main Control Room. Firewall shall be provided for network security.

5.2.2.5 Plant SCADA Server shall have Industrial Grade server hardware running SCADA & Monitoring Software with data storage (complete plant data) space for 03 years.

Note: One redundant server shall be provided along with separate SMPS power supply.

5.2.2.6 Plant data for monitoring and control operations should be accessible without dependence on external network.

5.2.2.7 Operator Workstation/PC shall be of Industrial Grade for browser-based access to plant data from Plant shall be installed/stored on local and remote servers only with user access control for protecting the software and data assets from accidental deletion or corruption.

5.2.2.8 Internet/Intranet at Plant: Public or private network access shall be provided at the plant through any broadband/VSAT connectivity of 2Mbps or higher bandwidth. In case no broadband/VSAT connectivity can be provided at the plant, a 3G/4G data card from any Internet Service Provider (ISP) may be provided.

5.2.2.9 GPS based Time Synchronization System: The SCADA system shall have a Master/Slave Clock system

along with antenna, receiver, cabinet and internal interconnection cables. All SCADA controllers, servers, OWS and communicating equipment shall be synchronized to the GPS clock.

5.2.3 Industrial IoT Controllers & Data Acquisition

The Plant SCADA and Monitoring System may use one or more IoT Controllers at each Substation and MCR for the purpose of data acquisition and data forwarding to the SCADA Servers. The IoT Controllers shall meet the following minimum requirements:

5.2.3.1 The IoT Controllers shall be distributed in nature and work independently of other IoT Controllers or any central controller in the system.

5.2.3.2 Shall be capable of supporting wide range of field protocols to communicate with different field equipment (Modbus over RS485/Ethernet, etc.)

5.2.3.3 Shall have local storage for a minimum of 2 weeks (in case of network failure).

5.2.3.4 Provide web-based interface to configure the controller for various equipment in the field.

5.2.3.5 IO Functionality: Shall support status monitoring of VCBs & Trip relays on RMU/HT & Transformer panels through distributed DI/AI modules.

5.2.3.6 Controls: Shall be capable of Controlling breakers (ON/OFF). Both ON/OFF and Parameter control of inverters shall be supported.

5.2.3.7 Data Communication with Servers: Shall send the data collected, from all the equipment at Inverter Control Room and/or Main Control Room, to the Monitoring & Control Server.

5.2.3.8 Controllers shall be capable of sending data over Internet connections, USB data cards.

5.2.4 System Spare Capacity

Over and above the equipment and accessories required to meet the fully implemented system as per specification requirements, Control System shall have spare capacity and necessary hardware/ equipment/ accessories to meet following requirement for future expansion at site:

(i) 10 % spare channels in input/output modules fully wired up to cabinets TB.

(ii) Wired-in "usable" space for 10% modules in each of the system cabinets for mounting electronic modules wired up to corresponding spare terminals in system cabinets.

(iii) Empty slots between individual modules/group of modules, kept for ease in maintenance or for heat dissipation requirement as per standard practice of Contractor shall not be considered as wired-in "usable" space for I/O modules.

(iv) Terminal assemblies (if any in the offered system), corresponding to the I/O modules shall be provided for above mentioned 10 % blank space.

(v) Each processor / controller shall have 20% spare functional capacity to implement additional function blocks, over and above implemented logic/ loops. Further, each processor / controller shall have spare capacity to handle minimum 20% additional inputs/ outputs of each type including above specified spare requirements, over and above implemented capacity. Each of the corresponding communication controllers shall also have same spare capacity as that of processor/controller.

(vi) The Data communication system shall have the capacity to handle the additions mentioned above.

(vii) Ten (10) percent spare relays of each type and rating mounted and wired in cabinets TB. All contacts of relays shall be terminated in terminal blocks of cabinets.

(viii) The spare capacity as specified above shall be uniformly distributed throughout all cubicles. The system design shall ensure that above mentioned additions shall not require any additional controller/processor/ peripheral drivers in the system delivered at site. Further, these additions shall not deteriorate the system response time / duty cycle, etc. from those stipulated under this specification.

5.2.5 Functionalities

5.2.5.1 The SCADA system shall monitor instantaneous and cumulative electrical parameters from all DC & AC Equipment including inverters, MFM, Transformer, DG sets, Battery Chargers and Switchgear (LT & HT Panels) at regular intervals not greater than one minute.

5.2.5.2 The SCADA system shall provide Alarms and Alerts on equipment faults and failure in less than 5 seconds. Alarms on status change of hardwired DI shall also be provided.

5.2.5.3 The SCADA system shall provide configurable alerts on any parameter crossing settable thresholds. The list of such parameters shall be finalised in consultation with the IITH.

5.2.5.4 The SCADA system shall have user-friendly browser-based User Interface for secure access from anywhere, for minimum ten concurrent connections from the Operator PC or other securely connected laptop/mobile, for plant monitoring, O&M, daily reporting, and analysis.

5.2.5.5 Reporting: The SCADA system shall provide downloadable reports in Excel/PDF, configurable for equipment parameters across the plant.

5.2.5.6 Power Plant Control: SCADA system shall provide required interface to the local SCADA operator to set various power control modes (active/reactive power/frequency/PF) through the inverters over industry standard communication protocols like Modbus over TCP/IP.

5.2.5.7 All programming functionalities shall be password protected to avoid unauthorized modification.

5.2.5.8 The Contractor shall provide software locks and passwords to Employer for all operating & application software. Also, the Contractor shall provide sufficient documentation and program listing so that it is possible for the Employer to carry out modification at a later date.

5.2.6 Communication Cable Laying

5.2.6.1 All RS485, IO and CAT6 cables shall be laid in separate conduits with a minimum separation of 1.5ft from AC/DC power cables all along.

5.2.6.2 Power cables shall be laid deep in the trenches first. Data cables shall be laid in separate conduits after partially filling the trenches to ensure minimum 1.5 ft separation between power and communication cables all along the trench.

5.2.6.3 IO Cables between switch gear panels and SCADA panel shall be laid on separate cable trays, with a minimum of 1.5ft separation from trays carrying AC Power cables.

5.2.6.4 RS485 & CAT6 cables between switch gear panels or Inverters and SCADA panel shall be laid on separate cable trays, with a minimum of 1.5ft separation from trays carrying AC Power cables.

5.2.7 Control Cabinets / Panels / Desks at Main Control Room

5.2.7.1 The cabinets shall be IP 22 protection class. The Contractor shall ensure that the temperature rise is well within the safe limits for system components even under the worst condition and specification requirements for remote I/O cabinets.

5.2.7.2 The cabinets shall be totally enclosed, free standing type and shall be constructed with minimum 2 mm thick steel plate frame and 1.6 mm thick CRCA steel sheet or as per supplier's standard practice for similar applications.

5.2.8 Software Licences

The Contractor shall provide software license for all software being used in Contractor’s System. The software licenses shall be provided for the project and shall not be hardware/ machine-specific.

5.2.9 Hardware at Main Control Room

The Hardware as specified shall be based on latest state of the art Workstations and Servers and technology suitable for industrial application & power plant environment.

5.3 PLC

- Programmable according to IEC 61131 standard.
- Consistent data storage of user program on the CPU.
- Automatic reporting of system events and presenting them on the display, in the web server, in the engineering and on the HMI system.
- Integrated web-server with standard and user defined pages.
- Integrated communication protocols (MODBUS TCP).
- Integrated security functions like access protection
- Support Counters, Timers, Analog input / Outputs.
- Extensive integrated control functions with easy to configure function blocks and possibility to connect drives via standardized PLC-open function blocks.
- Trace function for all CPU variables, for diagnosis in real time and sporadically fault detection.
- Expanded applications with the support of floating point.
- Convenient programming environment by providing analog register and index register.
- Improved maintenance ability by operating multiple programs and task program through module program.
- Improved maintenance ability by types of comment backup.
- With analog dedicated register (U) and monitoring dedicated function, convenient use for I/O is maximized.
- Integrated programming environment: intensified program convenience, diverse monitoring, diagnosis and editing function.
- Built-in high-speed counter function.
- Built in PID function
- Data Logging Function through SD card, FTP link
- Monitor/Control data in PLC through commercial web-browser, Max. 4 web clientscan access the web server at once & Also User defined web pages
- SMTP E-mail service & SNTP time sync Email service through commercial email
- Dual port Ethernet which support daisy chain topology.
- Supports SD card interface (Max. 16 GB)

1. Ambient Temperature:

- PLC shall be designed to operate continuously at ambient temperature 55 deg C without deration.

2. Storage Temperature:

- User shall be allowed to store PLC at temperature, min -25 deg & max 75 deg C.

3. Humidity:

- Maximum 95% RH (non – condensed) shall be allowed.

4. Altitude:

- Up to 2,000 m

5. Vibration Resistance:

- 0.5 G (4.9 m/sec ^ 2) shall be sustained by PLC.

6. Shock Resistance:

- Peak acceleration: 147 m/s2 (15G)
- Duration: 11ms

7. Conformal Coating:

- All PCBs of PLC must be coated with conformal coating complying with the IEC standards IEC60721-3-3 (level – 3C3), IEC60068-2-60 & IEC60068-2-43.

8. Book type installation:

- Book type installation shall be allowed with maximum spacing of 25mm between the
- two PLC inside the control cubicle.

9. Memory:

- Integrated work memory (for program): 384 kB
- Integrated work memory (for data): 256 kB
- CPU processing time
- Basic Instructions: 0.06μs/Steps
- Inputs/Outputs
- Local Max Input / Output points: 352 Point
- Remote Input / Output Module Expandable: 5728 Point
- Self-Diagnostic functions
- Watchdog timer, Memory error detection, IO error detection
- Interfaces
- Modbus communication: RS232, RS485 & Ethernet (Dual Port)
- Modbus TCP/IP, CANopen, DeviceNet, PROFIBUS, RAPIEnet, EtherNet/IP
- Convenient network-diagnostic function through network & communication frame
- monitoring.

10. Supply Voltage

- Type of supply voltage: AC 100 – 240 V / DC 24 V
- Inrush Current: 50Apeak or less
- Input Current: 0.5A or less (220 VAC), 1A or less (110 VAC)
- About 4mA (Contact point 0~3: about 7mA)

11. Efficiency: 65% or more

- Permitted momentary power failure: Less than 10ms
- Power supply status indication: LED on when power supply is normal
- Certificates CE; UL

5.4 MODBUS Gateway:

- IP Address conflict indication.
- Gateway supports Modbus RTU, ASCII (Master/Slave) with and without mapping.
- Gateway supports Modbus TCP/IP (Server/Client) with and without mapping.
- Configurable using embedded Web Server and Application software.
- Standard Protocols used: HTTP, DHCP, Auto IP, UPnP, TCP, UDP, IP, ARP, ICMP
- Baud Rate: 300 to 115.2Kbps Parity: Odd, Even, None Stop Bits: 1,2
- Healthy/ Error Indication
- Din rail mounting
- CE, RoHS certified

5.5 Network Ethernet Switch:

- Standard : IEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX Fast Ethernet, IEEE 802.3ab
- Standard 802.1d Spanning Tree support
- Fast convergence using 802.1w (Rapid Spanning Tree [RSTP]), enabled by default Multiple Spanning Tree instances using 802.1s (MSTP); 8 instances are supported
- Support for up to 4093 VLANs simultaneously
- Port-based and 802.1Q tag-based VLANs, MAC-based VLAN, protocol-based VLAN, IP subnet-based VLAN
- SSH is a secure replacement for Telnet traffic. Secure Copy Protocol (SCP) also uses SSH. SSH v1 and v2 are supported
- Web-based authentication provides network admission control through a web browser to any host devices and operating systems
- A switch can be configured to act as a supplicant to another switch. This enables extended secure access in areas outside the wiring closet (such as conference rooms)
- Relay of broadcast information across Layer 3 domains for application discovery or relaying of Bootstrap Protocol (BOOTP)/DHCP packets
- Switch functions as an IPv4 DHCP server, serving IP addresses for multiple DHCP pools or scopes
- Support for DHCP options
- Up to 8 switches in a stack. Up to 200 ports managed as a single system with hardware
- LEDs can be manually turned off to save energy

5.6 Software:

Software should be capable to log data from various communicable devices.

- RMU
- VCB
- ACB
- MCCB
- Meters
- Relays

Software should be capable of communicating with communicable Meters, releases of switchgear, VFD, Soft- starters and I/O devices, wherever applicable.
Software should be based on SCADA platform, for higher reliability and scalability.

Software should allow to read/write parameters and store data over time.

Software should be able to control switchgear devices, wherever applicable.

Mimic Plant SLD feature with detail information based on IEC 617-2-8 symbol library.

- Dashboard should have an option to mimic plant SLD based on IED 617-2-8 symbol library.
- Device integrated in SLD -UI should be interactive.
- Integrated device on the SLD-UI should clearly indicate device status, alarms etc.

Interactive customizable User defined Dashboard.

- Dashboard should have an option to customize user KPI's.
- Dashboard should have an option to read/write, user defined values as applicable. (Wherever required).

Configurator module, which allow user to:

- Add/remove devices.
- Add/remove parameters.
- Create customized business logics and deliver intelligence.

Energy management system, which allow user to:

- Generate customized scheduled reports.
- Set up user defined billing system.
- Give flexibility to customize devices, parameters, set tariffs, set schedulers, diagnostics facility and automated e-mail facility.

Reporting tool, which allow user to:

- Create report templates with user defined KPI's.
- Generate reports in the user defined templates.
- Automatic scheduling module to generate reports such as daily report, weekly report, shift wise report, panel wise report etc.
- Reporting tool has a facility to e-mail reports to the user defined mailing list.

Diagnostic tool, which allow user to:

- Generate trends of user defined parameters with respect to time.
- Compare multiple trends on single window.
- Compare single/multiple parameter values at two different time.
- Generate trends with daily data, weekly, monthly panel wise etc.
- Take print of the trends.

Database management system, Which allow user to:

- Manage data base efficiently.
- Functionality to select data logging time to reduce unnecessary storage of data, thus optimizing data storage.
- Auto-schedulers for auto archiving of data.

Software should be upgradable to add or remove devices in future.

User Management module, which provide user access control for better security and safety. The software should have followings roles:

- Guest: User can view limited screens, as decided by customer.
- Operator: User can view all screens.
- Supervisor: User can view all screens and has customer defined control.
- Engineer/ Manager: User has full access of the system.

Customer fully customize the user management module such as rename the user as per there convention, define user specific roles, add users, delete users, modify users etc.

Alarm configurator tool, which allow user to:

- Define upper limit and lower limit of parameters.
- Define upper limit text and lower limit text.
- Generate user defined alarms and ask user acknowledgement to take actions.

Web client

The software should allow user to access application from anywhere in the company's network system.

Communication module, which allow user to have:

- E-mail configuration: create e-mailer list and email reports automatically as defined by user.
- SMS Configuration: create mobile number list and report alarm over GSM, whenever applicable.

Time Synchronization feature:

The Software shall have the capability to provide time synchronization signals over an Ethernet network with 16ms accuracy.

5.7 Server PC Configuration

- Intel i7, 8 core CPU (3 GHz or better), 64 bit
- Preferably 16 GB RAM, if not feasible, 8GB will also do.
- DVD ROM
- 2TB HDD (Approx. 2 year data saving)
- USB PORT (2 Nos.)
- NIC (2 Nos. – 4 ports)
- 2GB graphics card
- 24" inch full LED monitor
- USB Keyboard
- USB Mouse three button & scrolling

5.8 Server PC should be equipped with following software:

- MS Office 2010 or better 32 bit only.
- Windows 7/8/8.1/10, 64 bit
- Anti-Virus
- Adobe Reader

5.9 INTERNAL WIRING

- All auxiliary wiring shall be carried out with 650V grade, single core stranded copper conductor, color coded, PVC insulated wires. Conductor size shall be 1.5 mm2 (min.) for control circuit wiring and 2.5 mm2 (min) for CT and space heater circuits.
- Extra flexible wires shall be used for wiring to devices mounted on moving parts such as hinged doors. The wire bunches from the panel inside to the doors shall be properly sleeved or taped.
- All wiring shall be properly supported, neatly arranged, readily accessible and securely connected to equipment terminals and terminal blocks.
- All internal wiring terminations shall be made with solderless crimping type tinned copper lugs which shall firmly grip the conductor or an equally secure method.
- Similar lugs shall also be provided at both ends of component to component wiring.
- Insulating sleeves shall be provided over the exposed parts of lugs to the extent possible.
- Screw-less(spring-loaded) / cage clamp type terminal shall also be provided with lugs.
- Printed single tube ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. The wire identification marking shall be in accordance with IS: 375. Red Ferrules should be provided on trip circuit wiring.
- Wiring for equipment, which are to be supplied by the Contractor and for which the Contractor has to provide mounting arrangement in his panels, shall also be provided by the Contractor, upto the terminal blocks.
- All connections from vertical busbars for individual modules shall be by Copper / Aluminum links only.
- The cable connections shall be selected in such a way that there will not be any melting in cable.
- Shorting in case of a short circuit inside the module and the cable shall have current rating to carry the let through energy of the corresponding fuses in case of a fault.

- The insulation of the cable and its cross section shall be decided considering the high ambient temperature within the module.

5.10 CONTROL TERMINAL BLOCKS

- Terminal blocks shall be 650V grade, 10Amps rated, made up of unbreakable polyamide 6.6 grade. The terminals shall be either screw type or screw-less (spring loaded) / cage clamp type with lugs. Marking on terminal strips shall correspond to the terminal numbering in wiring diagrams. All metal parts shall be of non-ferrous material. In case of screw type terminals the screw shall be captive, preferably with screw locking design.
- Terminal blocks for CT and VT secondary leads shall be of stud type, made up of unbreakable polyamide 6.6 grade. They shall be provided with links to facilitate testing, isolation star/ delta formation and earthing. Terminal blocks for CT secondary shall have the short-circuiting facility. The terminals for remote ammeter connection etc. shall also be disconnecting type only. All metal parts shall be of non-ferrous material. Screws shall be captive.
- In all circuit breaker panels at least 10% spare terminals for external connections shall be provided and these spare terminals shall be uniformly distributed on all terminal blocks.
- All terminal blocks shall be suitable for terminating on each side two (2) nos. stranded copper conductors of size up to 2.5 sq. mm each, or alternatively, the terminal blocks shall have the possibility of double shorting space to facilitate looping. However for DDCMIS terminals shall be suitable for 1.5 mm2 cable.
- All terminals shall be numbered for identification and grouped according to the function. Engraved white-in-black labels shall be provided on the terminal blocks.
- Wherever duplication of a terminal block is necessary it shall be achieved by solid bonding links.
- The local push button stations shall be metal enclosed, suitable for outdoor / indoor mounting on wall or steel structures.
- The enclosure shall be die-cast aluminium or cold-rolled sheet steel of at least 1.6 mm thickness.
- Terminal blocks shall be arranged with at least 100mm clearance between two sets of terminal blocks. The minimum clearance between the first row of terminal blocks and the associated cable gland plate shall be 250 mm.

5.11 Multi function Meters:

- Modbus Rs485 port
- Input Current:1/5A
- Size:96X96 SQ.MM
- Accuracy Class 1 as per IEC 62053-21
- Mounting: Flush mounting
- Type: True RMS 3-PHASE V,I, kW,PF & kWH indication Basic + Power,
- Energy + THD%, Individual phases, V, A, , P, , KVA, KVAR KWH, KVAH KVARH,
- runhours, On hours, Phase angle, interrupts, THD, Events
- True PFand displacement Power factor

- (High low), Neutral Current , K factor
- Dedicated buttons avilable for direct access to Basic, Power and
- Energy parameters
- Site selectable for 3 Phase 4 wire, 3 Phase 3 wire, 1 Phase
- Input Voltage Measurement range 50-520 VAC (P-P)
- Aux supply 80-300 VAC /DC
- 4 line seven segment LED display/LCD display, with floating decimal
- Communication: In built RS 485 bus port
- Operating Frequency:45 HZ-65HZ
- Dielectric Test: 2KV RMS for 1 minute
- Over Current: 10 times for 3 sec.
- Aux supply: 90V-300V AC/DC
- Compliance: EMC/EMI
- Field programmable CT ratio
- Auto scrolling and freeze mode for constant single page viewing available
- Suitable to 11kv/33kv feeders

5.12 CONTROL AND SELECTOR SWITCHES:

- Control and selector switches shall be of heavy duty, rotary type with escutcheon plates clearly marked to show the positions.
- The control & selector switches should be as per IS/IEC 60947-part v section 1. The switches shall be of sturdy construction suitable for Mounting on panel front. Switches with shrouding of live parts and sealing of contacts against Dust ingress shall be preferred 3pole local remote/auto/off

5.13. Communication Twisted Pair 2core Shielded 0.5 Sqmm Cables:

- 8760 Multi-Conductor - Shielded Twisted Pair Cable.
- Conductor AWG: # Pairs AWG Stranding Conductor Material 1 18 16x30 TC - Tinned Cop
- Insulation Insulation Material: Insulation Material Wall Thickness (mm) PE - Polyethylene 0.457
- Outer Shield Outer Shield Material: Outer Shield Trade Name Type Outer Shield Material Coverage (%) Beldfoil® Tape Aluminum Foil-Polyester Tape w/Shorting Fold 100
- Outer Jacket Outer Jacket Material: Outer Jacket Material Nom. Wall Thickness (mm) PVC - Polyvinyl Chloride 0.711
- Pair Pair Color Code Chart: Number Color 1 Black & Clear
- Mechanical Characteristics (Overall) Operating Temperature Range: -20°C To +60°C Bulk Cable Weight: 37.205 Kg/Km Max. Recommended Pulling Tension: 240.203 N Min. Bend Radius/Minor Axis: 57.150 mm
- AWM Specification: UL Style 2092 (300 V 60°C)
- Flame Test UL Flame Test: UL1685 UL Loading Suitability Suitability - Indoor:

- Electrical Characteristics (Overall) Nom. Inductance: Inductance (µH/m) 0.59058 Nom. Capacitance Conductor to Conductor: Capacitance (pF/m) 89.243 Nom. Conductor DC Resistance: DCR @ 20°C (Ohm/km) 21.3265 Max. Operating Voltage - UL: Voltage 300 V RMS Max. Recommended Current: Current 7.2 Amps per conductor @ 25°C
- Applicable Standards & Environmental Programs NEC/(UL) Specification: CM CEC/C(UL) Specification: CM

5.14 Control cables:

- ARMOUR :ARMOURED
- INSULATION MATERIAL :POLYVINYL CHLORIDE
- TYPE: FRLS STANDARD: IS 1554
- The cables shall be suitable for laying on racks, in ducts, trenches, conduits and under ground buried installation with chances of flooding by water
- All cables including EPR cables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses develop under steady state and transient operating conditions as specified elsewhere in this specification.
- Conductor of control cables shall be made of stranded, plain annealed copper.
- PVC insulation shall be suitable for continuous conductor temperature of 70 deg C and short circuit conductor temperature of 160 deg. C.
- The cable cores shall be laid up with fillers between the cores wherever necessary. It shall not stick to insulation and inner sheath. All the cables, other than single core unarmoured cables, shall have distinct extruded PVC inner sheath of black colour as per IS: 5831
- Outer sheath shall be of PVC as per IS: 5831 and grey in colour.
- In addition to meeting all the requirements of Indian Standards referred to, outer sheath of all the cables shall have the following FRLS properties.
- Oxygen index of min. 29. (As per IS 10810 Part-58)
- Acid gas emission of max. 20% (As per IEC-754-I) (c.) Smoke density rating shall not be more than 60% during Smoke Density Test as per ASTMD-2843.
- In addition to manufacturer's identification on cables as per IS, following marking shall also be provided over outer sheath: (a.) Cable size and voltage grade - To be embossed (b.) Word 'FRLS' at every 5 metre - To be embossed (c.) Sequential marking of length of the cable in metres at every one metre - To be embossed / printed.
- The embossing / printing shall be progressive, automatic, in line and marking shall be legible and indelible. For EPR cables identification shall be printed on outer sheath
- All cables shall meet the fire resistance requirement as per Category-B of IEC-332 Part-3
- Allowable tolerances on the overall diameter of the cables shall be +\-2 mm maximum over the declared value in the technical data sheets.
- 1.1 KV Grade Control Cables shall have stranded copper conductor and shall be multicore PVC insulated, PVC inner sheathed, armoured, FRLS PVC outer sheathed conforming to IS: 1554. (Part-I).

- 1.1 KV grade Trailing cables shall have tinned copper(class 5)conductor, insulated with heat resistant elastomeric compound based on Ethylene Propyline Rubber(EPR) suitable for withstanding 90 deg.C continuous conductor temperature and 250deg C during short circuit, inner-sheathed with heat resistant elastomeric compound, nylon cord reinforced, outer sheathed with heat resistant, oil resistant and flame retardant heavy duty elastomeric compound conforming to IS 9968.

5.15 PLC Panel Enclosure (System Enclosure):

- Control cabinet for individual installation in integral construction, consisting of basic body, doors, rear panel and base assembly.
- Basic body made of profiled side walls and roof. Housing profile with System perforation in 25 mm DIN dimensional grid. Vertical profiles, as well as front and rear roof frame profile with two mounting levels for space-saving system expansion.
- Rear panel screwed, base assembly welded in, consisting of base frame and multiple divided, sliding floor panels, with lock and side door.
- **Doors:** overlapping doors with foamed PU foam seal, with removable square tube frame with perforation in DIN dimension grid of 25 mm, lock door right with Bar lock with four-way locking, Double-bit insert according to DIN 43668,Side door additionally double-locked with swing lever Hinges with screwed-on stops, door hinge exchangeable, with captive hinge pins, Door opening angle 130° can be retrofitted to 180° without tools, automatic potential equalisation to the housing body.
- **Gland plates:** 3-part, removable and exchangeable, mounted, automatic potential equalisation for housing body.
- **Rear panel:** with foamed PU seal, screwed, automatic potential equalisation to the housing body. Mounting plate: C-edged at the sides, via integrated plastic gliders and mounting rails, depth adjustable in grid of 25 mm. Including mounting grid for simplification the positioning of components.
- **Material:** Body, rear panel, top, bottom panels: 1.5 mm sheet steel door: 2 mm sheet steel mounting plate: 3 mm sheet steel
- **Surface finish:** Triple surface treatment for corrosion protection and resistance to mineral oils, lubricants, Processing emulsions and solvents, nanoceramics coating, electrophoresis dip primer, outer surfaces powder coated in RAL 7035 texture.
- **Mounting plate and gland plates:** galvanised
  Protection class: IP 55 according to IEC 60 529
  Protection class to UL 508A: Type 12, 3R
  Impact protection to IEC 62 262: IK10

5.16 Network rack:

- Ack Standard : Conforms to DIN 41494 or equivalent standard
- Construction : Welded
- Front Door : Lockable Toughened Glass Door
- Basic Frame : Steel
- Equipment Mounting : DIN Standard Slots

- Mounting Angle : 19” Mounting angles made of formed steel
- Standard Finish : Powder Coated
- Top and Bottom Cover : Welded to Frame, Vented and Field Cable entry exit cut outs
- Standard Color : Grey or Black
- Depth adjustable mounting slots
- Provision to mount the cooling fans on the top panel
- Static Load : 25 kgs.
- Easy access removable side panels.
- A surface finish featuring Degrease, Acid Pickling, Rust Prevention and Parkerizing, Pure Water Cleaning and a Static Electricity Powder Coating.
- Ventilation rate between 63% and 72%.
- Wall Mount 6U x 550 W x 450 D ,Front Glass Door (tinted, Toughened) with Lock & Key,2 pairs of 19 inch Mounting Rails with U-Marking Welded Side Walls Standard Accessories:1U Cable Manager (1), Hardware Packet (1 Pkt) 6 Socket 5/15 Amp. Power Distribution Unit (1 No) Roof Mounted Fan Unit/90CFM/230V AC(1 No)

5.17 Power supply UPS 1kVA: 15 min back up

- Input Specifications
- Nominal Input Voltage 230 V
- Input Frequency 40-70 Hz
- Input Voltage
- 100-285 V
- Output de-rated < 160 V … 50% capacity at 100V
- Input Power Factor 0.98
- Input Protection Circuit Breaker
- Output Specifications
- Output Power Capacity 1kVA / 800 W (capable of 3kVA/2.1kW thru battery paralleling**)
- Nominal Output Voltage 230 V
- Other Programmable Voltages 220 V / 240 V
- Efficiency in Double-Conversion Mode, Full Load > 93%
- Annual Savings in Double-Conversion Mode, Typical* Rs 6,000
- Efficiency in Green mode, Full Load 97%
- Waveform Sine wave
- Bypass Specifications
- Bypass Type Internal Bypass (Automatic & Manual), Self-Powered
- Bypass Input Voltage Range 160 V – 270V
- Battery Charger Specifications
- Supported Battery Types (Selectable) Panasonic 2.4kW Li-ion (Contact us for Details)
- Battery Bank Voltage 48 V nominal
- Charger Current 25 A max (Selectable)
- Environmental Specifications
- Operating Temp 0 – 500C (Output de-rated above 400C)
- Storage Temp -150C to 600C
- Operating Elevation 1,000 m without de-rating
- Storage Elevation 15,000 m
- Humidity 0 to 95% RH, non-condensing

Power Supply UPS: 5kVA 30 minute Back up

- Main Input Voltage 230 V
- Output voltage 230 V
- Output voltage 220 V
- Output connection type 22 IEC 60320 C13
- 6 IEC Jumpers
- 2 IEC 60320 C19
- Number of rack unit 42U
- Battery type Lead-acid battery
- Provided equipment CD with software
- Rack mounting support rails
- Smart UPS signalling RS-232 cable
- User manual
- Web/SNMP management card
- Batteries & Runtime
- Battery charger power 341 W rated
- Battery recharge time 2.5 H
- Number of battery replacement quantity 1.0
- Battery power in VAh 855 VAh
- Physical
- Colour Black
- Height 207.01 Cm
- Width 59.69 Cm
- Depth 107.19 Cm
- Net weight 220.41 Kg
- Mounting mode Not rack-mountable
- Number of rack free space 39
- Permanent permissible load 907.2 Kg dynamic
- 907.2 Kg static
- Input
- Network frequency 50/60 Hz +/- 5 Hz auto-sensing
- Input voltage limits Adjustable
- 160...280 V
- Number of input connectors 1 hard wire 3-wire
- Output
- Bypass type Internal bypass (automatic and manual)
- Crest factor 3 : 1
- Output frequency 50/60 Hz +/- 3 Hz user adjustable +/- 0.1 Hz sync to mains
- Minimum configurable power in W 3500 W
- Wave type Sine wave
- Conformance
- Product certifications C-Tick[RETURN]CE[RETURN]GOST[RETURN]VDE
- Standards EN 50091-1
- EN 55022 class A
- EN 60950
- EN 61000-3-2
- Environmental
- Acoustic level 55 dBA
- Ambient air temperature for operation 0…40 °C
- Operating altitude 0...10000 ft

- Relative humidity 0…95 %
- Ambient air temperature for storage -15…45 °C
- Storage altitude 0.0000000000…15240.0000000000 M
- Storage Relative Humidity 0…95 %
- Heat dissipation 1040 Btu/H
- Communications & Management
- Alarm Alarm when on battery : distinctive low battery alarm : overload continuous tone alarm
- Control panel LED status display with load and battery bar-graphs and on line : on battery : replace
- battery : overload and bypass indicators
- Preinstalled device Network management card with environmental monitoring

5.18 COMMISSIONING CHECKS:

Cubicle Wiring

- Check all switch developments.
- Each wire shall be traced by continuity tests and it shall be ensured that the wiring is as per relevant drawing. All inter-connections between panels / equipment shall be similarly checked.
- Functional checking of all control circuit e.g., closing, tripping, contro,l interlock

Meters

- Visual inspection.
- Megger all insulated partitions.
- Check CT and VT connections with particular reference to their polarities for power type meters.

5.19 CODES AND STANDARDS

All equipment shall, generally, comply with the updated issues of aApplicable Indian Standards

a) Indian Electricity Act.

b) Indian electricity rules.

- Equipment complying with any other authoritative / internationally recognized standards such as IEC. will also be considered if it ensures performance equivalent or superior to Indian Standards. In such cases the contractor shall clearly indicate the standard adopted and furnish the copy of latest English version of the same along with the bid and bring out the salient features for comparison.

- All standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions as published one month prior to the date of opening of bids. In case of conflict between this specification and those (IS codes, Standards etc.) referred to herein, the former shall prevail. All work shall be carried out as per the following codes and standards.

IS: 5	Colors for ready-mixed paints and enamels.
IS: 694	PVC insulated cables for working voltages upto and including 1100V.
IS: 722	A.C. Electricity Meters
IS: 1248	Electrical Indicating instruments
IS/IEC: 60947- 1	Degree of protection provided by enclosures for low voltage Switchgear

IS/IEC: 60947-2	A.C. circuit Breakers
IS: 2551	Danger Notice Plates
IS: 2705	Current Transformers
IS: 3043	Code of practice for earthing.
IS: 3072	Code of practice for installation and maintenance of Switchgear
IS: 3156	Voltage Transformers
IS: 3202	Code of practice for climate proofing of electrical equipment.
IS: 3231	Electrical relays for power system protection.

5.20 List of Approved Makes: The bidder/contractor shall strictly follow the below specified Approved Makes list while bidding and further execution of contract-

Sl. No.	Name of the Equipment/Item	Approved Makes
1	SCADA system & Software	Schneider-Electric/ Siemens /ABB/ Lauritz-Knudsen Electrical & Automation (L&T)/ Mitsubishi Electric/Emerson Electric/Rockwell Automation/ Alstom /General Electric(GE)/ Honeywell International
2	Multi-function Meters	Siemens /Lauritz Knudsen Electrical & Automation(L&T) /Schneider-Electric/Secure or Approved Equivalent
3	UPS	Socomec/ APC/ Vertiv or Approved Equivalent
4	PLC	Schneider-Electric/ Siemens /ABB / Lauritz Knudsen Electrical & Automation(L&T)/ Mitsubishi Electric/Emerson Electric/Rockwell Automation/ Alstom /General Electric(GE)/ Honeywell International
5	Gate way converters	Moxa/ HMS Networks/Novus Automation/ Lauritz Knudsen electrical & Automation(L&T)/ICP DAS or Approved Equivalent
6	Network Switches	Cisco/ HPE Aruba/Juniper/Dell
7	LED Display units/ Monitors	Sony Bravia /LG/Samsung or Approved Equivalent
8	PC	HP/LENOVO/ DELL/APPLE
9	Laptop	HP/LENOVO/ DELL/APPLE
10	Communication cables/OFC	Lapp/ Bonton /Polycab/ Beldon/Havells/Finolex/Commscope/ Schneider-Electric
11	Control Cables	Polycab/ Bonton/Lapp/ Salzer/Havells/Finolex
12	ACB Accessories	Lauritz Knudsen electrical & automation (L&T) or Approved Equivalent

Sl. No.	Name of the Equipment/Item	Approved Makes
13	VCB Accessories	Lauritz Knudsen electrical & automation (L&T)/ ABB or Approved Equivalent
14	RMU Accessories	Lauritz Knudsen electrical & automation (L&T)/ ABB or Approved Equivalent
15	Aux Contacts relays	Lauritz Knudsen electrical & automation (L&T) /ABB/ Salzer or Approved Equivalent
16	Switches	Lauritz Knudsen electrical & automation (L&T) /ABB/ Salzer or Approved Equivalent
17	Optical Media converter	HPE Aruba/ Cisco or Approved Equivalent
18	IO/ PLC panel enclosure	AnD/Rittal/ Netrack or Approved Equivalent
19	Power supply 24 VDC	Schneider/ Phoenix/ Siemens/Socomec/Vertiv/APC or Approved Equivalent
20	Terminal blocks	Phoenix/Connect well/Eaton or Approved Equivalent
21	Cable Lugs	Comet/ Cosmos/ Dowell's / Jainsons
22	Cable Glands	Comet/Dowells/Jainsons/HMI

Note: ***Any other item if not specified in the NIT then the same has to be got approved from the Engineer In charge (EIC) before any procurement on site. The contractor shall also take prior TDS and sample approval from the Engineer-in-Charge before any procurement of material at site.***

Annexures

Annexure-I

On Non-judicial stamp paper of minimum Rs. 100/- only

Guarantee offered by Bank to IITH in connection with the execution of contracts) Form of Bank Guarantee for Earnest Money Deposit /Performance Guarantee/Security Deposit/Mobilization Advance/ Refund of milestone with held amount

1. Whereas the Executive Engineer …… (name of division)…… , IITH on behalf of the President of India (hereinafter called "The Government") has invited bids under (NIT number)…….. dated …… for …… (name of work)…… The Government has further agreed to accept irrevocable Bank Guarantee for Rs. …….. (Rupees …… only) valid up to …… (date)*…as Earnest Money Deposit from …….. (Name and address of contractor) (hereinafter called "the contractor") for compliance of his obligations in accordance with the terms and conditions of the saidNIT.

   OR**

   Whereas the Executive Engineer …….. (name of division)…… , IITH on behalf of the President of India (hereinafter called "The Government") has entered into an agreement bearing number…….. with ……..(name and address of the contractor)……(hereinafter called "the Contractor") for execution of work …… (name of work) …….. The Government has further agreed to accept an irrevocable BankGuarantee for Rs. …….. (Rupees …… only) valid upto …….. (date)…… as Performance Guarantee/Security Deposit/Mobilization Advance/Refund of mile stone withheld amount from the said Contractor for compliance of his obligations in accordance with the terms and conditions ofthe agreement.

2. We, ……. (indicate the name of the bank)…… (herein after referred to as "the Bank"), hereby undertake to pay to the Government an amount not exceeding Rs. …….. (Rupees……..only) on demand by the Government within 10 days of the demand.

3. We, ……(indicate the name of the Bank)……, do here by undertake to pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating thatthe amount claimed is required to meet the recoveries due or likely to be due from the said Contractor. Any suchdemand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ……..(Rupees only).

4. We, …… (indicate the name of the Bank)…… , further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor in any suit or proceeding pending On non-judicial stamp paper of minimum Rs. 100 before any Court or Tribunal, our liability under this Bank Guarantee being absolute and unequivocal. The payment so made by us under this Bank Guarantee shall be a valid discharge of our liability for payment there under and the Contractor shall have noclaim against us for making such payment.

5. We, …… (indicate the name of the Bank)……, further agree that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation here under to varyany of the terms and conditions of the said agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the

terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension beinggranted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. We, …… (indicate the name of the Bank)…… , further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Government may have in relation to the Contractor's liabilities.
7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.
8. We, …….. (indicate the name of the Bank)…… , undertake not to revoke this guarantee except with the consent of the Government in writing.
9. This Bank Guarantee shall be valid up to…… unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs…… (Rupees…… only) and unless a claim in writing is lodged with us within the date of expiry or extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date .....

Witnesses:

1. Signature…… Authorized signatory

   Name and address

   Name
   Designation Staff code no.
2. Signature …….. Bank seal
   Name and address

* Date to be worked out on the basis of validity period of 90 days where only financial bids are invited and 180 days for two/three bid system from the date of submission of tender.

**In paragraph 1, strike out the portion not applicable. Bank Guarantee will be made either for earnest money or for performance guarantee/security deposit/mobilization advance/Refund of mile stone withheld amount, as the case may be.

Annexure-II

INDEMNITY BOND (VIOLATION OF LAWS, NORMS, ACCIDENTS, DAMAGES ETC)
(On Non-Judicial Stamp Paper of Rs.100/-only)

Name of work:

KNOW all men by these presents that I/We _____ (Name of Contractor with address) do hereby execute Indemnity Bond in favour of Indian Institute of Technology (IIT) Hyderabad having their office at Kandi, Sangareddy-502284, Telangana, India and for the project …….. IIT Hyderabad under consideration.

On this day of ……..2025

THIS DEED WITNESSETH AS FOLLOWS:

I/We, (Name of Contractor) hereby do indemnify and save harmless IITH having their office at Kandi-502284, Sangareddy, Telangana, India from the following: -

1. Any third party claims, civil or criminal complaints/liabilities/material/life loss during site mishaps and other accidents such as snake bites etc or disputes and/or damages occurring or arising out of any mishaps at the site due to faulty work, negligence, faulty construction and/or for violating any law, rules and regulations in force, for the time being while executing/executed civil works by me/us.

2. Any damages, loss or expenses due to or resulting from any negligence or breach of duty on the part of me/us or any sub-Contractor/s if any, servants or agents.

3. Any claims by an employee of mine/ours or of sub-Contractors if any, under the workman compensation act and employers' Liability act, 1939 or any other law rules and regulations in force for the time being and any acts replacing and/or amending the same or any of the same as may be in force at the time and under any law in respect of injuries to persons or property arising out of and in the course of execution of the Contract work and/or arising out of and in the course of employment of any workman/employee.

4. Any act or omission of mine/ours or sub-Contractor/s if any, our/their servants or agent which may involve any loss, damage, liability, civil or criminal action.

IN WITNESS WHEREOF THE HAS SET HIS/THEIR HANDS ON THIS DAY OF SIGNED AND DELIVERED BY THE AFORESAID IN THE PRESENCE OF WITNESSES:

1.
2.

Annexure-III

Proforma for Authorization certificate from Approved OEM of SCADA system

REF.No._____ Dated _____

To,
The Executive Engineer-Electrical,
Indian Institute of Technology (IIT) Hyderabad
Kandi-502284, Sangareddy, Telangana, India

Dear Sir,

We _____ who are established and reputable manufacturers/Technology Providers of _____having factory/ factories at_____ (*address of factory)* do hereby authorize M/s _____ *(Name and address of bidder)* to submit a bid, negotiate and receive the order from you against your Tender enquiry no. IITH/CMD/ELE/NIT/2024-25/33

Name of work: ***Supply, Installation, Testing and Commissioning (SITC) of Supervisory Control & Data Acquisition (SCADA) system for Auto-Operations and Centralized Monitoring of all Electrical Substations i.e., 33kV/11kV and am 11kV/0.433kV substations HT & LT system across IIT Hyderabad campus.***

We ensure that we shall support/ facilitate the M/s _____on regular basis with technology/product updates for up-gradation /maintenance/repairing/servicing of the intended SCADA System at IIT Hyderabad (if awarded) as per the terms and conditions mentioned in this tender document on direct payment basis from the successful bidder.

We hereby extend our full guarantee for the services offered by the above firm.

Yours faithfully,

(Name of authorised signatory with signature)

(Name of manufacturer with stamp)

Note: This letter of authorization should be on the **letter-head of the OEM** and should be signed by an authorised person. It should be enclosed by the Bidder with the tender documents.

Annexure-IV

FORM OF BANKERS' CERTIFICATE" FROM A SCHEDULED BANK

To
The Executive Engineer -Electrical,
Construction and Maintenance Division,
IIT Hyderabad.

This is to certify that to the best of our knowledge and information that Ms./Shri…… …… having marginally noted address, a customer of our bank are/is respectable and can be treated as good for any engagement up to a limit of Rs……(Rupees……).

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature with seal of Branch Manager)

For the Bank NOTE: (1) In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

2. The bankers certificate should be on letter head of the bank

Annexure-V

FORM FOR CERTIFICATE OF NET WORTH FROM CHARTERED ACCOUNTANT

It is to certify that as per the audited balance sheet and profit & loss account during the **financial year 2023-24** the Net Worth of M/s _____(Name & Registered Address of contractor/ Individual/firm/company), as on _____(the relevant date) is Rs._____after considering all liabilities. It is further certified that the Networth of the company has not eroded by more than 30% in the last three years ending on **31st March 2024.**

Signature of Chartered Accountant

Name of Chartered Accountant

Membership No. of ICAI

Date and Seal

FORM 'J'

AFFIDAVIT

I/we undertake and confirm that our firm/partnership firm has not been blacklisted by any state/Central Departments/PSUs/Autonomous bodies during the last 07 years of its operations. Further that, if such information comes to the notice of the department then I/we shall be debarred for bidding in IIT Hyderabad in future forever. Also, if such information comes to the notice of IIT Hyderabad on any day before date of start of work, the Engineer-in-charge shall be free to cancel the agreement and to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee (Scanned copy of this notarized affidavit to be uploaded at the time of submission of bid)

NOTE: Affidavit to be furnished on a 'Non-Judicial' stamp paper worth Rs.100/-

Signature of Bidder(s) or an authorized Officer of the firm with stamp

Signature of Notary with seal

Checklist of documents to be submitted along with Technical Bid

Sl. No.	Doc Ref	Description of the Document	Enclosed Yes/No	Remarks
	Applicant shall submit the following documents for technical scrutiny			
1	Registration of Firm (ROF)	Copy of valid Registration of Firm (ROF)		
2	PAN details	Copy of PAN card		
3	GST registration details	Copy of GST Registration certificate & GSTIN should accompany the Technical Bid		
4	As per S.No.(1) of NIT, Details of similar woks executed. *(Detailed statements to be enclosed)*	Not less than Rs.1,61,25,750/-only (Three similar works)		
		Not less than Rs.2,41,88,624/-only (Two similar works)		
		Not less than Rs.3,22,51,500/-only (One Similar work)		
5	As per Para No. 1.4 of NIT	Cost of EMD of Rs. 8,06,300/- only		
6	As per S. No.(2) of NIT	The Average annual financial turnover of the bidder should be at least **Rs.1,20,94,312/-only** during the immediate last three consecutive financial years ending 31st March 2024. The value of annual turnover figures shall be brought to current value by enhancing the actual turnover figures at simple rate of 7% per annum. The certificate from CA shall be attached with the bid.		
7	As per S. No.(3) of NIT	The bidder shall submit the Banker's certificate or Net-worth certificate as per the below: Banker's Certificate of the amount equal to **Rs.1,61,25,750/-only,** issued by any scheduled bank, or Net worth certificate of minimum amount **Rs.40,31,437/-only**, issued by certified Chartered Accountant with UDIN.		
8	As per S. No.(4) of NIT	To become eligible, the tenderer shall have to furnish an affidavit as per Form 'J' of the NIT.		

9	As per S. No.(5) of NIT	The bidder shall have Employees Provident Fund (EPF) enlistment and proof of the same shall be attached along with the Technical Bid clearly showing the Provident Fund Code number.		
10	As per S. No.(6) of NIT	The bidder shall submit the Indemnity bond as per format provided in Annexure-II.		
11	As per S. No.(7) of NIT	The bidder shall submit the authorization certificate from the Approved Original Equipment Manufacturer (OEM) of SCADA system as per the format enclosed as Annexure- III.		
12	As per S.No.(24) of NIT	Undertaking for GST registration in the state in which the work is to be taken up		

Note: ***The above check-list is broad and indicative only. Apart from the above, the bidder shall ensure to submit all the relevant documents along with his technical bid, which are specified in this Notice inviting Tender document and also which are otherwise appropriately required in support of its bid.***

PROFORMA OF SCHEDULES

SCHEDULE 'A'

Schedule of quantities (Enclosed): Part A (Item Rate)

SCHEDULE 'B'

Schedule of materials to be issued to the contractor

Sl. No.	Description of item	Quantity	Rates in figure & words at which the material will be charged to the Contractor	Place of issue
…… NIL ……				

SCHEDULE 'C'

Tools and plants to be hired to the contractor

Sl. No.	Description	Hire Charges per day	Place of issue
…… NIL ……			

SCHEDULE 'D'

Extra schedule for specific requirements/documents for the work, if any.

--- NIL ---

SCHEDULE 'E'

Reference to General Condition of Contract.: *Posted in the website of the Institute.*

Name of work	:	**Supply, Installation, Testing and Commissioning (SITC) of Supervisory Control & Data Acquisition (SCADA) system for Auto-Operations and Centralized Monitoring of all Electrical Substations i.e., 33kV/11kV and am 11kV/0.433kV substations HT & LT system across IIT Hyderabad campus.**
Estimated cost of work	:	***Rs. 4,03,14,374/- only***
Earnest money	:	***Rs. 8,06,300/- only***
Performance Guarantee	:	***5.0%*** *of the accepted tendered value*

Security Deposit	:	***2.5%*** *of the tendered value*

SCHEDULE 'F'

GENERAL RULES AND DIRECTIONS:

Officer inviting tender:	:	*Executive Engineer-Electrical, IITH*
Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses12.2 & 12.3	:	***1)Electro-Mechanical works…100%*** ***2) Civil works…0%***

Definitions:

2(v) Engineer -in- Charge	:	*Executive Engineer-Electrical, Indian Institute of Technology, Hyderabad.*
2(viii) Accepting Authority	:	*Superintending Engineer-Electrical, Indian Institute of Technology, Hyderabad.*
2(x) Percentage on cost materials and Labour to cover all overheads and profit	:	*15% (Fifteen) per cent.*
2(xi) Standard Schedule of Rate	:	*CPWD, Delhi Schedule of Rates (DSR) 2022 E &M, with up to date correction slips.*
Standard Contract Form	:	*IITH General Conditions of Contract for Construction Works, CPWD General Conditions of Contract for Construction Works with latest amendment upto date.*

Clause 1

ii) Time allowed for submission of Performance Guarantee, Programme Chart (Time and Progress) and applicable licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance, in days	:	*7 (Seven) Days*
ii)Maximum allowable extension beyond the period provided in (i) above	:	*7 (Seven) Days*
Clause 1A Whether Clause 1A is applicable	:	Yes
Clause 2 Authority for fixing Compensation under Clause 2	:	*Superintending Engineer, Indian Institute of Technology, Hyderabad*

Clause 3(VII): If the contractor had secured the contract with Government as a result of wrong tendering or other non-bonafide methods of competitive tendering or commits breach of Integrity Agreement-will be made ineligible.

Number of days from the date of issue of letter of acceptance for reckoning date of start	:	07 *Days from the date of issue of LOA or handing over of site, whichever is later*
Milestones	:	Not Applicable
Time allowed for execution of work	:	***60 Days***
Authority to give fair and reasonable Extension of time for completion of work (Web based hindrance register)	:	*Superintending Engineer, IITH*
Rescheduling of mile stones	:	*Superintending Engineer, IITH*
<u>Clause 6</u>:- Measurement Book Clause applicable, 6	:	*(i) For works having estimated cost more than Rs 15 Lakh – Clause 6* (ii) *For works having estimated cost Rs. 15 Lakh or less – Contractor's option of Clause 6 or to be exercised at the time of Tender Submission*
<u>Clause 7:</u> Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment	:	*Rs. 5 Lakhs/-*
<u>Clause 7A:</u> Whether Clause 7A is applicable	:	*Yes.* *No running account bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the contractor to the Engineer-in-charge.*
<u>Clause 10A:</u> List of testing equipment to be provided by the contractor at site lab	:	*As given in additional specifications*
<u>Clause 10B</u> (i)- Secured advance on Materials: Whether Clause 10 B (i) shall be applicable	:	NA
<u>Clause 10C:</u> Component of labour expressed as percent of value of work	:	*NA*

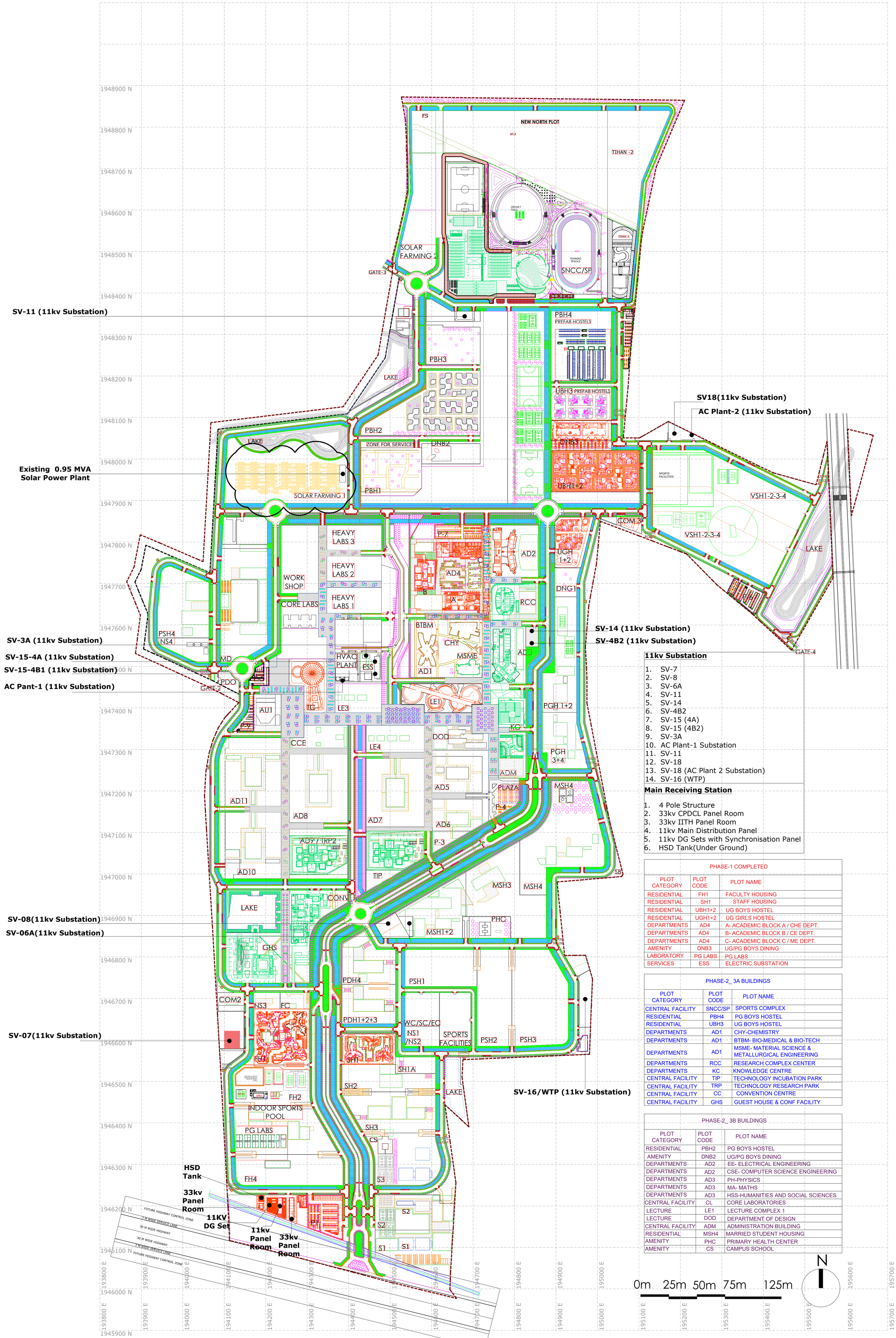
Clause 10CA	:	*Not Applicable*
Clause 10CC	:	*Not Applicable*
Clause 10D	:	*Applicable*
Clause 11:		
		For ELECTRICAL WORKS
Specification to be followed for execution of work	:	CPWD General Specifications for Electrical works: Part I Internal 2013 Part II External 1994 Part IV Substations 2013 up to date Corrections Slips. Particular/OEM Technical Specifications in NIT
Clause 12:		
12.2 & 12.3: Deviation limit beyond which Clause 12.2 &12.3 shall apply for building work	:	*100% (One hundred per cent)*
12.5 : Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for foundation work	:	*100% (One hundred per cent)*
Clause 14: Whether Clause 14 is applicable	:	*Yes.*
Clause 16 Competent Authority for deciding reduced rates.	:	*Superintending Engineer, IIT Hyderabad up to 5% of tendered amount, beyond which, Director, IITH.*
Clause 18: List of mandatory machinery, tools & plants to be deployed by the contractor at site	:	*As required for the work.*
Clause 25: Settlement of disputes by Conciliation and Arbitration:		
Conciliator	:	*Dean (Planning)*
Authority to appoint arbitrator	:	*Director, IIT Hyderabad*
Place of arbitration	:	*Hyderabad*
Venue of arbitration	:	*IIT Hyderabad*
Type of Arbitration Tribunal	:	Sole Arbitrator

Note: Provisions of Arbitration and Conciliation Act 1996 with latest amendments in force shall be applicable.

Clause 32: *As required for the work*

Clause 38

(i): Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates	*: Not Applicable* *DSR –2023 Civil published by CPWD*
(ii): Variations permissible on theoretical quantities:	
(a) Cement	*2% plus/minus*
(b) Bitumen All Works	*2.5% plus only & nil on minus side.*
(c) Steel Reinforcement and structural steel sections for each diameter, section and category	2% plus/minus



11kv Substation

1. SV-7
2. SV-8
3. SV-6A
4. SV-11
5. SV-14
6. SV-4B2
7. SV-15 (4A)
8. SV-15 (4B2)
9. SV-3A
10. AC Plant-1 Substation
11. SV-11
12. SV-18
13. SV-18 (AC Plant 2 Substation)
14. SV-16 (WTP)

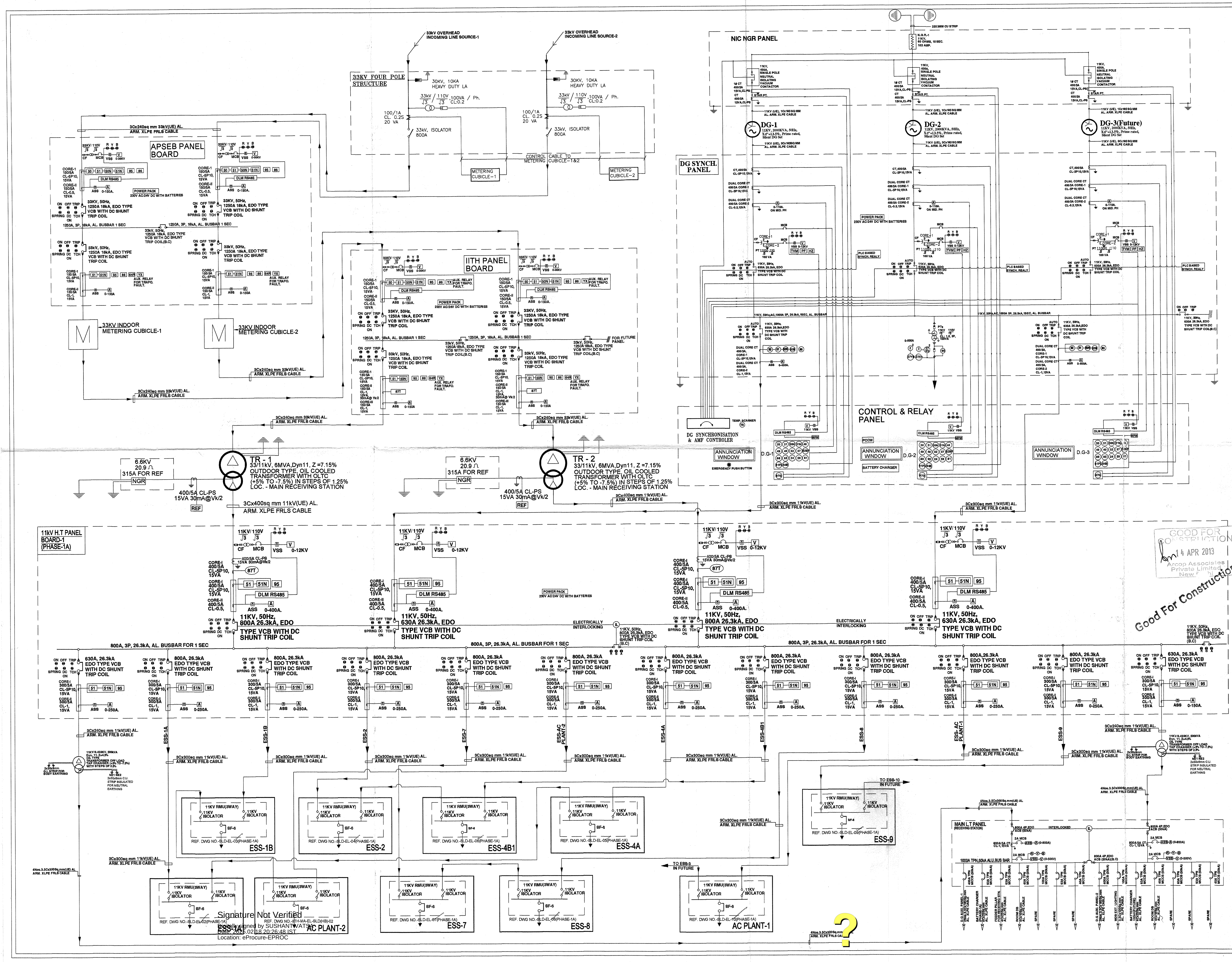
Main Receiving Station

1. 4 Pole Structure
2. 33kv CPDCL Panel Room
3. 33kv IITH Panel Room
4. 11kv Main Distribution Panel
5. 11kv DG Sets with Synchronisation Panel
6. HSD Tank(Under Ground)

PHASE-1 COMPLETED		
PLOT CATEGORY	PLOT CODE	PLOT NAME
RESIDENTIAL	FH1	FACULTY HOUSING
RESIDENTIAL	SH1	STAFF HOUSING
RESIDENTIAL	UBH1+2	UG BOYS HOSTEL
RESIDENTIAL	UGH1+2	UG GIRLS HOSTEL
DEPARTMENTS	AD4	A- ACADEMIC BLOCK A / CHE DEPT.
DEPARTMENTS	AD4	B- ACADEMIC BLOCK B / CE DEPT.
DEPARTMENTS	AD4	C- ACADEMIC BLOCK C / ME DEPT.
AMENITY	DNB3	UG/PG BOYS DINING
LABORATORY	PG LABS	PG LABS
SERVICES	ESS	ELECTRIC SUBSTATION

PHASE-2_ 3A BUILDINGS		
PLOT CATEGORY	PLOT CODE	PLOT NAME
CENTRAL FACILITY	SNCC/SP	SPORTS COMPLEX
RESIDENTIAL	PBH4	PG BOYS HOSTEL
RESIDENTIAL	UBH3	UG BOYS HOSTEL
DEPARTMENTS	AD1	CHY-CHEMISTRY
DEPARTMENTS	AD1	BTBM- BIO-MEDICAL & BIO-TECH
DEPARTMENTS	AD1	MSME- MATERIAL SCIENCE & METALLURGICAL ENGINEERING
DEPARTMENTS	RCC	RESEARCH COMPLEX CENTER
DEPARTMENTS	KC	KNOWLEDGE CENTRE
CENTRAL FACILITY	TIP	TECHNOLOGY INCUBATION PARK
CENTRAL FACILITY	TRP	TECHNOLOGY RESEARCH PARK
CENTRAL FACILITY	CC	CONVENTION CENTRE
CENTRAL FACILITY	GHS	GUEST HOUSE & CONF FACILITY

PHASE-2_ 3B BUILDINGS		
PLOT CATEGORY	PLOT CODE	PLOT NAME
RESIDENTIAL	PBH2	PG BOYS HOSTEL
AMENITY	DNB2	UG/PG BOYS DINING
DEPARTMENTS	AD2	EE- ELECTRICAL ENGINEERING
DEPARTMENTS	AD2	CSE- COMPUTER SCIENCE ENGINEERING
DEPARTMENTS	AD3	PH-PHYSICS
DEPARTMENTS	AD3	MA- MATHS
DEPARTMENTS	AD3	HSS-HUMANITIES AND SOCIAL SCIENCES
CENTRAL FACILITY	CL	CORE LABORATORIES
LECTURE	LE1	LECTURE COMPLEX 1
LECTURE	DOD	DEPARTMENT OF DESIGN
CENTRAL FACILITY	ADM	ADMINISTRATION BUILDING
RESIDENTIAL	MSH4	MARRIED STUDENT HOUSING
AMENITY	PHC	PRIMARY HEALTH CENTER
AMENITY	CS	CAMPUS SCHOOL



LEGEND

Symbol	Description
	DP MINIATURE CIRCUIT BREAKER TPN MINIATURE CIRCUIT BREAKER TPN MOULDED CASE CIRCUIT BREAKER
	CURRENT TRANSFORMER
	DRAWOUT POTENTIAL TRANSFORMER
	3PH. POWER TRANSFORMER
	INDICATION LAMP (OFF/TRIP/SPRING/TCH)
A	AMMETER
V	VOLTMETER
ASS	AMMETER SELECTOR SWITCH
VSS	VOLTMETER SELECTOR SWITCH
	GROUNDING
DLM RS485	DIGITAL LOAD MANAGER WITH RS485 PORT
51N	LONG TIME EARTH FAULT RELAY
46	PHASE BALANCE RELAY
40	FIELD RELAY
32	DIRECTIONAL POWER RELAY
	3 PH DG SET
81EL	FREQUENCY RELAY FAULT LOCATOR
87G	GENERATOR DIFFERENTIAL RELAY
64B	STATER RESTRICTED EARTH FAULT RELAY
86	LOCK-OUT RELAY
VCB	VACUUM CIRCUIT BREAKER
27	UNDER VOLTAGE RELAY
49	MOTOR THERMAL RELAY
60V	VOLTAGE BALANCE RELAY
50N	EARTH FAULT RALAY
51	LONG TIME OVER CURRENT RELAY
50	INSTANTANEOUS OVER CURRENT RELAY
86	LOCK-OUT RELAY
95	TRIP CIRCUIT SUPERVISION RELAY
87T	DIFF. RELAY FOR TRAFO.
YX	AUX. RELAY FOR TRAFO. FAULT.
64R	RESTRICTED EARTH FAULT RELAY
*	NORMAL OPEN
37	UNDER POWER RELAY
52BF	AC BREAKER FAILURE PROTECTION RELAY
24	VOLTS PER HERTZ RELAY
59	OVER VOLTAGE RELAY
81	FREQUENCY RELAY
HZ	FREQUENCY METER
PF	POWER FACTOR METER
TVM	TRI VECTOR METER
MFM	MULTI FUNCTION METER
PCCM	POWER COMMAND CONTROL MODULE

NOTES

- Dimensions are not to be scaled.
- All Dimensions are in Meters unless stated otherwise.
- All Levels are in Meters .
- The contractor shall verify all dimensions, details,specifications & site conditions & shall report any error, omission and/or anomaly to the architect before commencement of work.
- For construction purposes, the dimensions shall not be measured directly of the drawings. The drawings shall not be used for construction until they are issued for construction.
-These drawings are to be read in co-ordination with Civil, Architecture, Road Layouts, HVAC, Electrical, ELV, PHE, GAS and other service drawings & all relevant sections of specifications..
-All shop drawings should be provided to the architect for approval.

ISSUES

DATE	REVISION	DESCRIPTION

KEY PLAN:

IIT HYDERABAD

CLIENTS
Indian Institute of Technology(IIT) Hyderabad,
Ordnance Factory Estate,
YeddumAllaram-502205,
Andhra Pradesh, INDIA

ARCHITECTS & PLANNERS
ARCOP ASSOCIATES PVT. LTD.
E-106, G.K. ENCLAVE PART 1
NEW DELHI 110048
PHONE : 011 - 26242050
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MEP CONSULTANTS
M.J. CONSULTANTS
606, MADHUBAN BUILDING, 55, NEHRU PLACE
NEW DELHI-110 019
TEL: +91-(011)-66274552, 53/54/55
EMAIL: mjc@mjc.co.in

Architect's Signature | Client's Signature

Job Title
IITH DETAIL UD & INFRA PHASE 1A

Drawing Title
SCHEMATIC DIAGRAM FOR 33/11KV DISTRIBUTION SYSTEM(PHASE-1A)

Document Release Type
ELECTRICAL
GOOD FOR CONSTRUCTION

Job No. 10-148
Scale NTS
Date 14 APR 2013
Drawn by VINOD
Checked by SSY
Drawing No. SLD-EL-01-(PHASE-1A)
Revision : R0
AUTHORITY: