Bharat Heavy Electricals Limited
ELECTRONICS DIVISION
Mysore Road, Bangalore – 560026 Ph. 080-26998497
SC&PV – PVSS- DEPT.

NOTICE INVITING TENDERS

1	TENDER NUMBER(RFQ)	:	EDN/ PVSS/ NTPC/ KAYAMKULAM/ FSPV/ 22 MW/ IP/RT/02; Dt.: 04.08.2020
2	NAME OF WORK	:	Construction of PEB Equipment Room foundations, RCC Underground water Tank and civil works for Pooling station includes Inverter Transformer foundations, platforms for PCU, HT Panels and other electrical equipment's, Ground Improvement Works and other associated works for 22 MWp (AC) Floating Solar PV power plant for NTPC at Kayamkulam, Kerala. (All listed works shall be Undertaken and executed)
3	ESTIMATED COST	:	**Rs.427.86 lakhs (Approx.) Plus applicable GST.**
4	EARNEST MONEY DEPOSIT	:	**Rs.8.60 Lakhs (Mandatory for MSME also)** **(a) Bidders can submit Rs.8.60 Lakhs EMD through DD/SBI Collect (Please refer point no.: 21 of "Instructions to tenderer" for guideline for payment through SBI Collect)** **(b) Alternatively bidders can submit Rs.2.0 Lakhs EMD through DD/SBI collect and balance Rs.6.60 Lakhs in the form of Bank Guarantee from the scheduled bank as per attached BG format.**
5	SECURITY DEPOSIT	:	50% of SD shall be submitted before start of work; Balance will be recovered from running Bills at a rate of 10%. (SD= 5% of the work order amount); 50% of SD will be released after completion of all the works and remaining 50% after 6 months from the date of completion of all the works.
6	COMPLETION TIME	:	5 Months (From the date of placement of Order/handing over of the site.)
7	LAST DATE AND TIME FOR THE SUBMISSION OF DULY FILLED IN TENDER DOCUMENT	:	19.08.2020 Before 01:00 P.M
8	E-MAIL ADDRESS FOR SUBMISSION OF TENDER DOCUMENT	:	**finpvse1@bhel.in** (Please refer "Note" page no.2 and page no. 6 for details about "Mode of tender document submission"),
9	ORIGINAL BG/DD FOR EMD SHALL BE SENT THROUGH SPEED POST/COURIER/ANY OTHER AVAILABLE MODE TO	:	Sh. Sreenath M-Office of AGM (SC&PV- PCG, M) 5th Floor, New Engineering Building, BHEL- Electronics Division Mysore Road, Bangalore -560 026.
10	DATE AND TIME OF TECHNICAL BID OPENING	:	19.08.2020 Before 01:30 P.M

NOTE: The tenderer shall return the dully filled in tender document after affixing signature on all pages and submit.

NIT Issued By
Sampangi C,
Sr. Manager, BHEL-EDN

CONTACTOR (SIGN & SEAL)

Bharat Heavy Electricals Ltd
Electronics Division
Mysore Road, Bangalore – 560026

Tender Document for

Construction of PEB Equipment Room foundations, RCC Underground water Tank and civil works for Pooling station includes Inverter Transformer foundations, platforms for PCU, HT Panels and other electrical equipment's, Ground Improvement Works and other associated works for 22 MWp (AC) Floating Solar PV power plant for NTPC at Kayamkulam, Kerala.

TENDER NUMBER RFQ: EDN/ PVSS/ NTPC/ KAMKULAM/ FSPV/ 22 MW/ IP/RT /02; Dt.: 04.08.2020

TECHNICAL BID DATE OF OPENING: 19-08-2020 (Price bid opening date intimation will be given separately)

Part – I	Technical cum Commercial Bid	.....	40 Pages
	Unpriced Price Bid	.....	06 Pages
	Technical and General Specification	.....	27 Pages
	BHEL Safety Plan	.....	60 Pages
	BHEL General Conditions of Contract 2019	.....	33 Pages
	Tentative Tender Drawing	.....	14 Pages
	Tentative Field Quality Plan	.....	06 Pages
	Bank Guarantee format for EMD	.....	02 Pages
Part – II	Price Bid	.....	06 Pages

Note:

1. Part – I: To be submitted along with the EMD through separate E-Mail.
2. Part – II: To be submitted through separate E-Mail.
3. Earnest Money Deposit of Rupees 8.60 Lakhs shall be submitted as per point No. 4 of page No. 1 of this tender document (to be submitted along with Part-I through E-Mail).
4. Tenders will be liable for rejection if the above mentioned EMD is not submitted along with the tender.
5. **Part-I and Part-II to be submitted in separate E-Mail.**
6. **Bidders are instructed to submit the tender document only through E-Mail (Please refer page no. 6 for "Mode of tender document submission"). No other mode of submission is allowed.**
7. **Firms banned by BHEL are not eligible to participate in the tender. The tender submitted by such a firms will not be opened for evaluation and no communication in this regard will be entertained.**
8. **Please ensure submission of offer before the due date and time. No other mode of submission is permitted. Late offers will be rejected.**

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Sr. Manager, BHEL-EDN

CONTACTOR (SIGN & SEAL)

BHARAT HEAVY ELECTRICALS LTD, ELECTRONICS DIVISION, BANGALORE-26

TENDER NUMBER RFQ: EDN/ PVSS/ NTPC/ KAMKULAM/ FSPV/ 22 MW/ IP/RT /02; Dt.: 04.08.2020

PART-I TECHNICAL-CUM-COMMERCIAL BID

(To be furnished by the Bidders)

01. NAME OF THE WORK : **Construction of PEB Equipment Room foundations, RCC Underground water Tank and civil works for Pooling station includes Inverter Transformer foundations, platforms for PCU, HT Panels and other electrical equipment's, Ground Improvement Works and other associated works for 22 MWp (AC) Floating Solar PV power plant for NTPC at Kayamkulam, Kerala.**
(All listed works shall be Undertaken and executed)

02. APPROXIMATE ESTT.COST RS. : Rs.427.86 Lakhs (APPROX.) plus applicable GST.

03. COMPLETION PERIOD : 5 Months (From the date of placement of Order/handing over of site.)

04. NAME OF THE CONTRACTOR :
(WITH CONTACT PERSON)

05. ADDRESS

(A) OFFICE :

E-mail :

TEL. PH. NO. :

(B)RESIDENCE :

TEL.PH NO :

06. PAN NO :

07. GST NO :

08. STAFF STRENGTH :

09. PLANT/EQUIPMENTS : List enclosed/not enclosed

10. a) SCOPE OF WORK : UNDERSTOOD/ NOT UNDERSTOOD
(As per schedule of items)

b) Accept to execute in total : YES/ NO

c) Bar chart to be submitted : YES/ NO
Individually for each work for L1 Scope

d) In order to complete the project in the specified months schedule, vendor to deploy separate Five gangs/teams (or) more as per site requirement for each individual activities along with tools and machineries, Undertaking

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should be submitted along with offer : YES/ NO

11. a) EMD PARTICULARS (DEMAND DRAFT/ SBI COLLECT REF NO. / BG DETAIL) :

    b) Electronic Funds Transfer (EFT) form enclosed : Please fill up the form in ANNEXURE-II

12. Penalty as per BHEL General conditions of contract 2019 clause No. 2.7.9 : Accepted / Not accepted

13. Constitution of Firm : Individual / Sole Proprietorship Concern / Partnership Firm / Public Ltd. Company/ Private Ltd. Company.

14. BHEL reserves right to conduct reverse auction : Accepted / Not accepted
    "BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among all the techno-commercially qualified bidders.
    Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

15. Accept to pay statutory payments like ESI, PF, BOCW, etc., as per terms and conditions of BHEL and Govt. guideline's : Accepted / Not accepted

16. BHEL Payment terms acceptance (Cl. no. 21, 22.1 & 22.2 of "Special Conditions of Contract") : Accepted / Not accepted

17. The bidder should encourage to use local labor that has the necessary skills as per the requirement of work. : Accepted / Not accepted

Note:

1. **Bidders are advised to quote their best prices (% above/below the total estimate +/_ (or) at par) as no further price bids will be accepted in case BHEL decides to open price bids instead of reverse auction.**
2. **Reverse auction seal bid opening price should not be more than the manual quoted (hand written) price bid.**
3. **In view of the necessity to complete the works as per the schedule and for stringent quality control it is required that works awarded to contractor shall not be sublet by the contractor to any other agency in partial or full, without prior approval of BHEL. All works shall be carried out under the supervision of contractor by placing their regular employees at site**
4. **In view of present pandemic situation it is advised to all bidders to mandatorily ensure all precautionary measures as per guidelines issued by State/Central government/District administration to prevent spread of COVID-19 like usage of Personal protective Equipment's and other norms like wearing masks, maintaining social distance and other instructions issued from time to time**

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PRE QUALIFICATION CRETERIA

1. Experience of having successfully completed RCC building works and Ground Improvement work during last 7 years from the date of tender notice.

a) Three similar completed RCC building works and Ground Improvement work, each costing not less than an amount equal to 40% (i.e., Rs.172 lakhs).

OR

b) Two similar completed RCC building works and Ground Improvement work, each costing not less than an amount equal to 50% (i.e., Rs.214 lakhs).

OR

c) One similar completed RCC building works and Ground Improvement work, each costing not less than an amount equal to 80% (i.e., Rs.343 lakhs).

2. Average annual financial turn over during the last 3 years, ending 31st March of the previous financial year, should be 30% (i.e., Rs.129 lakhs).

Note: Offers of the Tenderers not meeting the above requirements are liable to be rejected.

Documents required to be submitted

1. Registration Certificate with ESI and PF Authority/Declaration.
2. Income Tax Returns for last Three years
3. Balance Sheet and Profit & Loss Account for the last 03 years by auditor.
4. Availability of Technical personnel in letter head.
5. Registration with BHEL/CPWD/other Govt. organization/PSU if any.
6. Declaration for full filling the BOCW requirements.
7. List of equipment to be mobilized at site.
8. GST Registration details or Declaration.

All the supporting documents to be signed and sealed by the bidder (BHEL have the rights to verify the original documents if required)

MODE OF OFFER SUBMISSION / OPENING OF BID/BID's:

Due to existing Covid-19 lockdown and non-availability of proper courier and postal service. Sealed tenders are invited to from all eligible bidders in two-part bid system in **soft copies** and same can be sent to BHEL email ID **finpvse1@bhel.in** [finpvse1(at the rate)bhel(dot)in] by two separate emails for technical bid and price bid (i.e., one separate email for technical bid and one separate e-mail for price bid),

(a) The bidders shall submit the bids only through the said email ID and no copy (Cc and Bcc) shall be marked, to maintain the secrecy of the bid. Violation of these instructions shall be entirely at the risk and responsibility of the bidder**.**

(b) The bid documents shall be accepted in "**.PDF"** format only. The maximum size allowed per document shall be **8 MB**. The documents should not be password protected.

(c) ONE email subject heading shall be indicated with "**Bidder name (Principal) – EDN/ PVSS/ NTPC/ KAYAMKULAM/ FSPV/ 22 MW/ IP/RT/02 - Technical bid**" consisting of Part-I (technical offer, PQC documents, commercial terms and conditions).
If the size of email is bigger than allowed limit, kindly send email in parts clearly indicating in the subject header as Part-1,2,3….. (of) Total no. of mails.

(d) No deviation in the tender is allowed.
(To reduce the size of Technical offers by bidder, Bidder has to fill and submit "**TECHNO-COMMERCIAL DEVIATION SHEET" (see page no. 38)** for deviation sheet against sealed and signed copies of technical and commercial terms of NIT. All other documents required in technical cum commercial bid format shall be submitted along with Part-I (technical bid)).

(e) SECOND email subject indicating "**Bidder name (Principal) – EDN/ PVSS/ NTPC/ KAYAMKULAM/ FSPV/ 22 MW/ IP/RT/02 - Price bid**" where in the Part-II (price bid) to be submitted as an attachment.

(f) **Part-I (Technical Bid) and EMD to be submitted in separate E-Mail.**

(g) **Part-II (Price Bid) to be submitted in separate E-Mail.**

(h) EMD SUBMISSION: In case total amount of EMD is being submitted through SBI Collect, then electronic receipt of SBI collect to be submitted along with technical bid. In case the EMD shall be submitted in other forms as allowed in NIT, original EMD shall be sent to following address through speed post/courier/other available means:

Sh. Sreenath M, Office of AGM (SC&PV- PCG, M)
SC & PV- ENGG., 5th Floor New Engineering Building
Bharat Heavy Electricals Limited
Electronics Division Mysore Road, Bangalore -560 026

The original hardcopy EMD should reach us before price bid opening/RA. In case, it would not have reached before price bid opening/RA, the offer shall be liable for rejection.

(i) Email is password protective and will be opened by tender opening committee on due date and time.

(j) **<u>Note:</u> Please ensure submission of offer before the due date and time. No other mode of submission is permitted. Late offers will be rejected.**

(k) **Offer submission is bidder's responsibility, any issue arising while submitting the offer may be brought to the notice of BHEL well before tender due date and time, so that BHEL has sufficient time to take suitable action, if any**

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CONTACTOR (SIGN & SEAL)

INFORMATION TO THE TENDERER:

(i) Successful Bidder should establish their Site office at Construction site, including common facilities such as toilet, water, electricity etc. in consultation with BHEL. Contractor has to arrange water and power as required for completing the job in the stipulated time frame at their own cost.

(ii) Contractors shall take at most care on their manpower deployed, considering the current outbreak due to COVID-19, contractor shall take all precautionary measures and follow guideline issued by state and central government to contain and spreading of CORONA VIRUS.

(iii) Contractor shall issue face mask and gloves to the labours and maintain social distancing while carrying out the work. WEARING OF FACE MASK AND GLOVES IS MANDATORY AT THE WORK PLACE.

(iv) The bidders should furnish "Site Inspection Certificate" in Annexure-III enclosed herewith.

(v) Bidders should study the prevailing Market trend of Construction materials/laborers/other relevant requirement before quote and submit the competitive price.

(vi) The bidder should encourage to use local labor that has the necessary skills as per the requirement of work.

(vii) Before engaging the labour in to work, Contractor should get the NOC from labours' native police station as well as NOC from local police station (If applicable).

(viii) The bidders should carry out preliminary survey at proposed construction site before submission of offer to ensure that the rate quoted for the relevant schedule of items are correct.

(ix) Contractor to note BHEL reserves the right to get any part of the work done through other agency or deploy BHEL's own/hired/otherwise arranged resources, at the risk and cost of the contractor after due notice of a period of two weeks by BHEL, in the event of:-

a) Contractors continued poor progress
b) Withdrawal from or abandonment of the work before completion of the work.
c) Contractor's inability to progress the work for completion as stipulated in the contract
d) Poor quality of work
e) Corrupt act of Contractor
f) Insolvency of the contractor
g) Persistent disregard to the instructions of BHEL
h) Assignment, transfer, sub-letting of contract without BHEL's written permission
i) Non fulfillment of any contractual obligations
j) In the opinion of BHEL, the contractor is overloaded and is not in a position to execute job as per required schedule.

(x) The liquidated damages/penalties arising out of Risk and Cost as explained under Sl.no (vii). BHEL shall recover the amount from any money due from Contractor, or from any money due to the contractor including security deposit, or by forfeiting any T & P or material of the contractor under this contract or any other contract of BHEL or by any other means or any combination thereof.

(ix) **Documents to be submitted on award of work (as applicable):**

a) Security deposit in the form of Cash/DD/ NSC's / Kisan Vikas Patra / FDR / Bank Guarantee in favour of BHEL

(b)Electronic Fund Transfer Form duly signed & sealed by banker along with cancelled cheque copy

(c) Labour license of the workmen engaged valid for contract period (If applicable)

(d) Workmen Compensation Insurance Policy for the workmen engaged valid for contract period

(e) Deduction of statutory taxes (as applicable) at source would be enforced from the running bills at the rates prescribed unless exemption certificate is produced from the concerned authorities.

The following documents are to be submitted along with the Running Account Bills for process of payment

a) Tax Invoice with details of GST number of BHEL and contractor.
b) Measurement books duly filled and signed by officials of BHEL and contractor
c) Provident PF Remittance challan for the bill duration.
d) ESI Remittance challan for the bill duration.
e) Invoice submitted along with running bills to indicate the GST amount charged and bear GST NUMBER etc. as per prevailing taxes.

Bill submitted subsequently to be accompanied with a declaration that GST liability on the earlier bill has been discharged.

i) by paying money to the Government (along with Tax paid Challan Copy)
ii) by utilization of Input GST Credit

f) BOCW Registration and payment proof.
g) Field quality assurance documents (as applicable) as per instruction of Engineer In-charge.
h) List of supplier/supplier's (material and manpower).
i) After completion of work, bidders should mandatorily furnish NOC from all declared suppliers along with the running/Final Bill.

Mobilization at site:

1) Requisite Material (all construction materials like cement, sand, coarse aggregate, reinforcement steel, etc.,), men (mason, carpenter, bar binder, fabricator, etc.,) and machinery (DTH, Concrete mixer machine/RMC/AJAX with printing facility, Power chain saw, JCB/excavator/dozer, grader, tipper, etc., Total station & other equipment required for building works and levelling, grading works, and other associated works as listed in BOQ) should be arranged in order to complete the project within stipulated time period.
2) The contractor shall carry the work as per the approved Field Quality Plan issued by BHEL (Field quality plan enclosed with this tender for reference)
3) Calibration of equipment's should be done by NABL accredited laboratories.
4) Contractor shall submit the design mix report (from NABL/Govt. approved labs) and shall carry the work as per the approved design mix report, approved by BHEL/NTPC.
5) Contractor shall conduct the pile load test (Initial and routine test) (OR) any test (as applicable) and shall submit the report (from NABL/Govt. approved labs) as approved by BHEL/NTPC.

Bharat Heavy Electricals Limited
ELECTRONICS DIVISION
MYSORE ROAD- BANGALORE-26
INSTRUCTIONS TO TENDERER

1. Sealed Tender for the above noted work is hereby invited from Contractors experienced in similar civil works like RCC building works (such as Industrial, commercial and Residential).
2. Scope of work for, "**Construction of PEB Equipment Room foundations, RCC Underground water Tank and civil works for Pooling station includes Inverter Transformer foundations, platforms for PCU, HT Panels and other electrical equipment's, Ground Improvement Works and other associated works for 22 MWp (AC) Floating Solar PV power plant for NTPC at Kayamkulam, Kerala**" at location as specified under Sl. No. 3 "Project scope, detail and location" as per Tender/approved construction drawing, works as per instruction of Engineer in charge, terms and condition of contract. However Depending on site conditions minor modification in works may be necessary.
3. Project Scope, detail and Location:

Site Detail	**Project detail**	**Location**
Project Site	22MWp (AC) FSPV Power plant for NTPC, Kayamkulam	Kayamkulam, Dist: Alappuzha, State: Kerala

4. **Tender should be sent to BHEL E-mail ID "finpvse1@bhel.in" [finpvse1(at the rate)bhel(dot)in]. Two separate E-mails for "Technical cum Commercial Bid and EMD" and "Price Bid" (i.e., one separate E-mail for Technical Bid & EMD and one separate E-mail for Price Bid), indicating subject header as per page no. 6 "<u>MODE OF OFFER SUBMISSION / OPENING OF BID/BID's</u>".**
5. The local address of the Contractors, the name of the person to whom all the Correspondence are to be addressed should be indicated, with telephone number (both office and residence).
6. All entries in tender documents should be in one ink (preferably blue ink). Erasing and overwriting is not permitted. All corrections should be duly signed by tenderer concerned.
7. Tenderers shall fill in all the required particular in the blank space provided for this purpose in the tender documents and also sign in each and every page of the tender document including the drawings attached there to before submitting tender.
8. Unit rate/percentage above or below estimate should be quoted in figures as well as in words in Indian Currency only i.e. Rupees and Paisa with reference to each item and for the items shown in the attached schedule. These rates shall be for the finished work at site. The rate shall include all taxes and duties payable on account of Octroi, Sales Tax, tax on work contract etc., (as applicable)

and also expenses towards PF and ESI contributions (see clauses 8, 40 and Enclosure 'C') but excluding GST.

9. In case the rate quoted in figures differs from those quoted in words, the lower of the rates quoted will be taken as the tendered rate and shall be binding on the tenderer.

10. The rate to be quoted by the tenderer shall be firm and shall cover and include all statutory levies such as "BOCW, Octroi, sales tax, excise duty etc., arising from Act passed by Parliament or State Legislature and rules framed there under. The rates shall further be deemed to include statutory levies arising from such Acts, Central or State, which may come into force, subsequent to submission of tenders.

11. (a) The rate quoted in the tender shall remain valid for a period of 'THREE MONTHS' from the date of opening tender.

(b) Tenderer shall not increase quoted rates, once the tenderer has submitted offers/quotation/price and during execution of contract in case tender is accepted.

(c) Successful bidder should execute the work strictly in accordance with Tender schedule quoted rates as accepted by BHEL.

(d) **PRICE VARIATION clause not applicable**.

12. The rates quoted should be inclusive of all taxes arising on the transaction. If BHEL is required to discharge the liability of any taxes on the transaction like TDS(IT), TDS(WCT), TDS(GST) (as applicable) under reverse charge mechanism or any other similar taxes, which is or becomes payable by BHEL, the same shall be deducted from the bills of the contractor. **The rate/Percentage quoted by bidder shall be including all taxes but excluding GST which shall be shown separately in price bid.**

13. Quantities shown in the schedule are only approximate and are liable to variation without entitling the Contractors to any compensation.

14. Before tendering, the tenderer are advised to inspect the site of work and its environments and be well acquainted with the actual working and other prevailing conditions, position of material and labour. They should be well versed with BHEL General Conditions of Contract instruction to the tenderers, drawing and specification and all other documents which form part of the agreement to be entered into subsequent to award of work. The tenderer should be specially note that it is tenderers responsibility to provide any items which is not specifically mentioned in the specifications and drawing, but which is necessary to complete the work.

15. Details and quantities of each item of work shown in the bill of quantities attached here to only approximate. They are given as a guide for the purpose of tendering only and are liable for variation

and alteration at the discretion of the competent authority. The work under each item as executed shall be measured and price at the corresponding rates to be quoted by the Contractor in the bill of quantities attached hereto.

16. Should a tenderer find discrepancies or omission in the drawing attached to the tender documents or should be in doubt as to their meaning he should at once address to the authority inviting the tender for clarifications. Every endeavor is made to avoid any error which can materially affect the basis of the tender but successful tenderer shall take upon himself to provide for the risk of any error which may be subsequently discovered and shall make no subsequent claim on account thereof.

17. In the event of the tender being submitted by a firm the tender must be signed separately and legibly by each partner or member of the firm or in their absence, by the person holding the power of Attorney on behalf of firm concerned. In the latter case, a copy of the power of Attorney duly attested by a Gazette Officer must accompany the tender.

18. If in any case, the date of Tender Opening falls on holiday, the Tender will be opened on the next working day.

19. Every tender must be accompanied by Earnest Money Deposit. This earnest money will be refunded to the unsuccessful tenderer after finalization of the award of work. In the case of successful tenderer, the earnest money will be retained as a part of Security Deposit for satisfactory completion of the work in accordance with Clause-16 of BHEL General Conditions of the Contract. Tenders without Earnest Money Deposit receipt are liable to reject. No interest will be paid on the earnest money deposit.

20. **The Earnest money deposit may be furnished**

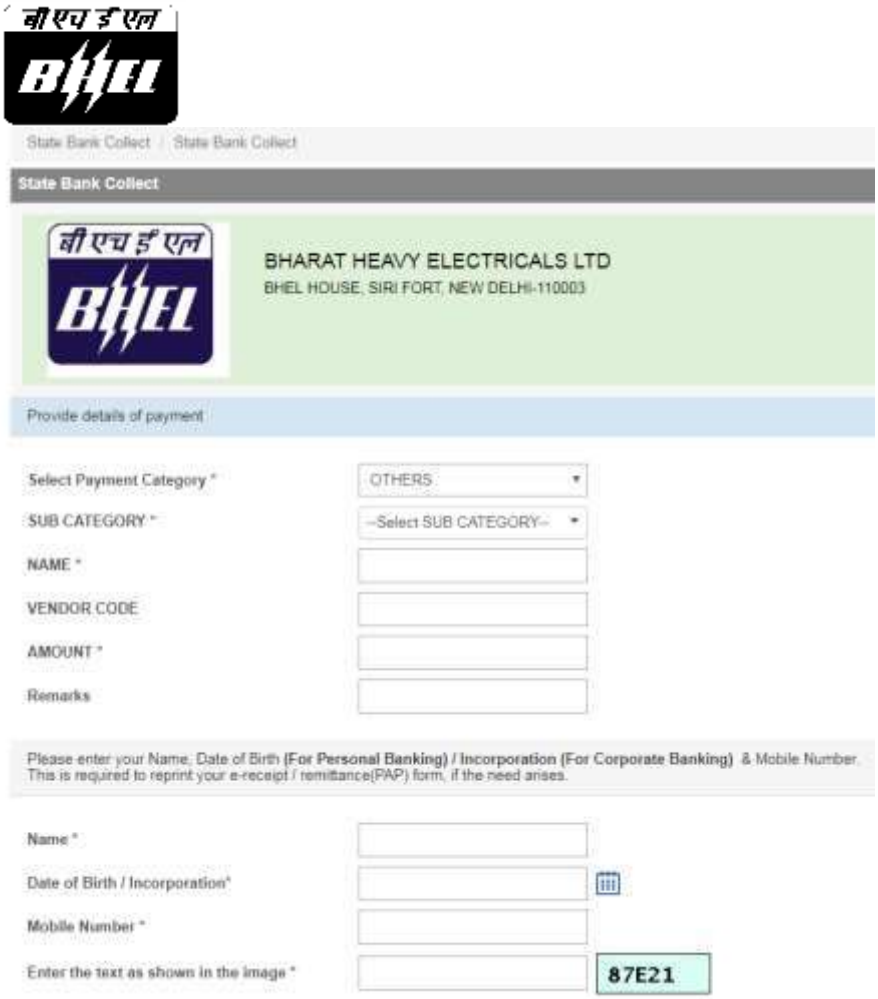
a) Demand Draft in favour of BHEL EDN, Bangalore – 560026.

b) The Earnest money deposit may be furnished through online from SBI Collect.

c) Bank Guarantee as per Sl. No. 4 (b), page No. 1.

Guidelines for payment of EMD Fee

Step-1: Please enter the following link in your internet address browser or click on the following link.
https://www.onlinesbi.com/sbicollect/icollecthome.htm
Please click on ”proceed” after Clicking “Check Box” to proceed for payment
Step-2: Now the SBI’s SB-Collect site gets opened. Please select State of Corporation as “Karnataka” and type of Corporation as “PSU-PUBLIC SECTOR UNDERTAKING” and then click on “Go” appearing on the screen.
Step-3: Now select “Bharat Heavy Electricals LTD” from the dropdown table appearing against “Industry Name” and click Submit
Step-4: Now select “Others” from the dropdown table appearing against “Category” and click Submit
Step-5: The below screen (similar) will appear. Please select sub category “EMD” and fill up other details and transfer money.



21. For reimbursement of Earnest Money Deposit, the tenderer should fill the enclosed EFT form, obtain the Banker's signature and also enclose a photocopy of cancelled cheque leaf.

22. EMD may be submitted in Bank guarantee as per Sl. No. 4 (b), page No. 1, in BHEL format in Non-judicial stamp paper amounting Rs.200 (or) applicable rate at bidder's state, whichever is higher. **Bank guarantee from any Co-operative banks are not acceptable in any circumstances.**

23. Unless the bidder whose tender is accepted signs contract agreement (If applicable) within fifteen days (15 days) of the date of the order directing to do so, the amount of Earnest Money already deposited by bidder will be forfeited and acceptance of the tender withdrawn as per discretion of BHEL.

24. If after opening of tenders a tenderer revokes the tender or increase of earlier quoted rates or after acceptance of his tender does not commence the work in accordance with the instruction of Engineer-in-charge, the Earnest Money Deposited by bidder will be forfeited and acceptance of bidder's tender withdrawn.

If only a part of work included in the tender had been awarded to the tenderer, the amount of Earnest Money to be retained will be based on value of the contract so awarded.

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Sampangi C,
Sr. Manager, BHEL-EDN

CONTACTOR (SIGN & SEAL)

25. The BHARAT HEAVY ELECTRICALS LIMITED reserve the right to reject any or all the tenders received or accept any tender or part thereof without assigning reason thereof. In the case of acceptance of a part of tender, the time for completion may also be reduced to the extent considered necessary by the accepting authority.

26. Conditional and Unsigned tenders, tenders which are incomplete or otherwise considered defective, tenders which are not in accordance with the tender conditions laid down by the accepting officer and tenders not submitted in the prescribed forms are liable to be rejected.

27. Tenderer shall submit Solvency Certificate for the value specified from a Bank of standing regarding the tenderer's financial position (as applicable).

28. The tenderers should enclose relevant documents regarding constitution of firm i.e. Individual / Sole Proprietorship Concern / Partnership Firm / Public Limited Company / Private Limited.

29. The tenders should be enclosed with a list of contracts already held by the tenderer at the time of submitting the tender and giving the following particulars:

    a) Name of the work, value and address.

    b) The balance work remaining to be done on the same.

30. a) The filled in tender shall be **sent to BHEL E-mail ID "finpvse1@bhel.in" [finpvse1(at the rate)bhel(dot)in]. Two separate E-mails for "Technical cum Commercial Bid and EMD" and "Price Bid" (i.e., one separate E-mail for Technical Bid & EMD and one separate E-mail for Price Bid), indicating subject header as per page no. 6 "MODE OF OFFER SUBMISSION / OPENING OF BID/BID's"** before the date and time fixed for submission of tender.

    b) Tenders received after the due date & time of opening of tenders will be rejected.

31. The Contractors responsibility under this contract shall commence from date of receipt of the order or acceptance of tender.

32. Tenders submitted by speed post or courier service shall be posted with due consideration of any delay in postal delivery. Tenders received after the due date of opening tenders are liable to be rejected.

33. If proprietor or partner of a firm expires after the submission of tender or after the acceptance of tender, BHEL reserves the right to cancel the contract if the character of the firm undergoes a substantial change.

34. THE BHARAT HEAVY ELECTRICALS LIMITED will not be bound by any power of Attorney granted by the tenderer or changes in the composition of firm made subsequent to signing of the contract. They may however recognize such power of Attorney and changes after obtaining proper legal advice.

35. If the tenderer deliberately gives wrong information on tender regarding past unsatisfactory performance with BHEL sister units, BHEL reserves the right to reject such tender at any stage including contract execution period.

36. Words imparting the singular number shall also be deemed to include the plural number and vice-versa where the context so require.

37. The General and Special Conditions are complementary to each other and where they are in conflict, the special condition shall prevail.

38. The expenses for completing the stamping agreement shall be paid by the contractor.

39. Unless or otherwise stated above tendered work includes men, material, machine and commissioning of equipment as agreed to in the contract.

40. After completing of the job, the contractor has to furnish actual drawings of work done in consultation with Engineer-in-charge.

41. Any covering letter and comments of the tenderer should be submitted along with the offer.

42. Cement and steel for carrying out Civil Works will have to be procured by the Contractor. Materials shall be accompanied with Test certificates and connected dispatch documents for proof of source from approved manufacturer's works or stockyard. The Contractor shall provide all the materials needed for trial run, testing including chemicals, consumables etc. In quoting their rates, the Contractors are advised to take into account the cost of the above materials. All the construction materials should be approved by BHEL before commencement of work.

43. Contractor are required to follow Field Quality Plan (FQP) for Civil construction as approved by BHEL/customer in respect of Tests to be carried out and reports and documents to be furnished.

44. Should a tenderer or a contractor has a relative or in the case of firm or company, any of its shareholders relative is employed in Bharat Heavy Electricals Limited, the authority inviting tenders shall be informed of this fact at the time of submission of the tender, failing which tender may be disqualified or if such fact subsequently comes to light.

45. These 'INSTRUCTIONS TO TENDERER' & GENERAL CONDITIONS OF CONTRACT OF BHEL' shall be deemed to form an integral part of the Contract agreement for the work to be entered into. The Contractor has to scrutinize the same, and when submitting his tender, indicate his acceptance of both. In cases of variation between the two in any matter, the conditions in the 'THE INSTRUCTIONS TO TENDERER' shall prevail. (Extracts of important clauses of BHEL GCC are enclosed).

46. All operations to be carried out by the Contractor during the execution of the contract such as drilling, welding etc., shall be done with proper equipment to be brought by the tenderer. Contractor shall make his own power and water supply.

47. The Contractor shall comply with the provision of Employees Provident Fund's and miscellaneous Provisions Act 1952 and rules, regulations and other orders issued there under. He as an employer shall be liable to pay employer's contribution/deductions towards PF under the PF Act in respect of all labour employed by him for the execution of the contract in accordance with the provisions of the Employees' Provident Funds and Miscellaneous Provisions Act, 1952 as amended from time to time. For this purpose he shall indicate the code number obtained from the Regional Provident Fund Commissioner or he should obtain a code number if he has not and produce the Photostat copy of the challan receipt of monthly remittance of the contribution made by him to the Commissioner. He shall also furnish such returns such returns as are due, under the Act, to be sent to the appropriate authorities through the Principal Employer".

48. The Contractor should get himself registered with the E.S.I Authorities as an independent Employer, obtain a separate code number and remit the dues in respect of the Labour employed by him for the work and produce the challan/Receipts of remittance of the ESI contributions due under the E.S.I Act to the Company authorities. He shall also furnish such returns, as are due, under the Act, to be sent to the appropriate authorities' through the Principal Employer. The contractor can remit their ESI & PF through a sub-agent who processes the ESI & PF code and agrees to enter an MOU with the contractor.

45. If any action is brought in by P.F. Commissioner/ESI authorities on BHEL for the work done by the Contractor for his labourers regarding PF/ESI amount due, short remittances, non-remittances etc., the Contractor shall defend the case on behalf of BHEL and / or reimburse BHEL the expenses so incurred.

46. The Contractor shall apply and obtain license under Contract labour (R&A) Act 1970 and comply the relevant provisions of this Act in respect of the labour employed by him for executing this contract. The contractor shall furnish necessary returns to the authority through the Principal Employer.

47. Contractor shall insure all his labourers and material. Any claim by his Employees for damages shall be settled by the Contractor even if action is against BHEL or to reimburse the legal expenses incurred by BHEL.

48. Any action brought in by anybody on BHEL regarding patent, right etc., used by Contractor in execution of work shall be defended by the Contractor and / or reimburse BHEL the cost of the same.

49. Contractor shall produce necessary records, documents; explanation whenever he is called upon to do by any Government Agencies.

50. Contractor should obtain "Workmen Compensation Policy" for their Employees.

51. LEAD, LIFT, DEWATERING ETC.,

a) Unless otherwise specified in the tender schedule, the rates for all items will be deemed to include all leads, lifts and descents involved in the work.

b) No separate payment will be made for dewatering (including seepage, surface drainage and monsoon water) desludging and allied operations at any stage of the work, and the cost of such operations will be deemed to be included in the contract rates.

c) No separate payment will be made for curing including pumping of curing water where ever necessary.

52. EXTRA ITEMS

No extra items of work shall be carried out by the contractor other than those authorized to do so in writing by the Engineer-in-charge. For any such items of work executed as per instructions of Engineer-in-charge, the rates will be fixed on the basis indicated under clause 50 of BHEL GCC/as per terms and conditions of BHEL. The schedule of rates to be followed in this case will be CPWD schedule of rates.

BHARAT HEAVY ELECTICALS LIMITED

(ELECTRONICS DIVISION)

MYSORE ROAD- BANGALORE-26

GENERAL CONDITIONS OF CONTRACT/TECHNICAL SPECIFIC ATION

It is hereby agreed by me/us that the BHEL General Conditions of Contract including subsequent amendments/ additions/deletions to clauses if any, and conditions pertaining the settlement of disputes by Arbitration form an integral part of the tender documents and that the tender submitted by me/ us is subject to the aforesaid BHEL General Conditions of Contract/ Technical Specification for scope of tender works which has been read and accepted by me/us.

NIT Issued By

Sampangi C,
Sr. Manager, BHEL-EDN

CONTACTOR (SIGN & SEAL)

SAFETY CODE

RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF SAFETY OF MEN, EQUIPMENT, MATERIAL AND ENVIRONMENT

1. Before commencing the work, contractor shall submits a "SAFETY PLAN" to the authorized BHEL Official. The 'SAFETY PLAN' shall indicate in detail the measure that would be taken by the contractor to ensure safety of men, equipment, material and environment during execution of the work. The plan shall take care to satisfy all requirements specified hereunder. The contractor shall submit Safety Plan along with his offer. During negotiations before placing of work order and during execution of the contract BHEL shall have right to review and suggest modification in the Safety Plan. Contractor shall abide by BHEL decision in this respect.
2. The contractor shall take all necessary safety precautions and arrange for appropriate appliances as per direction of BHEL or its authorized officials to prevent loss of human lives, injuries to personnel engaged, and damage to property and environment.
3. The contractor shall provide to its work force and ensure the use of the following personal protective equipment as found necessary and as directed by the authorized BHEL Officer:-Safety Helmets conforming to IS-2925: 1984.
   (i) Safety Belts conforming to IS-3521: 1983.
   (ii) Safety Shoes conforming to IS-1989: 1978.
   (iii) Eye and Face protection devices conforming to IS-8520: 1977 and IS-8940: 1978.
   (iv) Hand and body protection devices conforming to:
   IS-2573: 1975
   IS-6994: 1973
   IS-8807: 1978
   IS-8519: 1977

All tools, tackles, lifting appliances, material handling equipment scaffolds, cradles, safety nets, ladders, equipment's etc. used by the contractor shall be of safe design and construction. These shall be tested and certificate of fitness obtained before putting them to use and from time to time as instructed by authorized BHEL Official who shall have the right to ban the use of any item.

All electrical equipment's, connections and wiring for constructions power, its distribution and use shall conform to the requirement of the Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carry out all types of electrical works.

All electrical appliances including portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed. The contractor shall not use any hand lamp energized by electric power with supply voltage of more than 24 volts. For work in confined space lighting shall be arranged with power sources of not more than 24 volts.

The Contractor shall adopt all fire safety measures as laid down in the "Code for fire Safety at Construction Sites" issued by the Safety Department of the Construction Management (HQ) of BHEL and as per directions of the authorized BHEL Official. A copy of the above referred "Code of Fire Safety at the Construction Sites" shall be made available by BHEL to the contractor for reference, on demand by the contractor, during tendering stage itself.

Where it becomes necessary to provide and/or store petroleum products, explosives, chemicals and liquid or gaseous fuel or any other substance that may cause fire or explosion, the contractor shall be responsible for carrying out such provisions and/or storage in accordance with the rules and regulations laid down in the relevant government acts, such as Petroleum Act, Explosives Act, Petroleum and Carbides of Calcium Manual of the Chief Controller of Explosives, Govt. of India. etc., prior approval to the authorized BHEL Official at the site shall also be taken by the contractor in all such matters.

The contractor shall arrange at his cost (wherever not specified) appropriate illumination at all work spots for safe working when natural daylight may not be adequate for clear visibility.

The contractor shall be held responsible for any violation of statutory regulations local, state or central and BHEL instructions that may endanger safety of men, equipment, material and environment in his scope of work or another contractor or agencies. Cost of damages if any, to life and property arising out of such violation of statutory regulations and BHEL instructions shall be borne by the contractor.

In case of a fatal or disabling injury accident to any person at construction sites due to the lapses by the contractor, the victim and/or his/her dependents shall be compensated by the contractor as per statutory requirements. However, if considered necessary, BHEL shall have the right to impose appropriate financial penalty on the contractor and recover the same from payments due to the contractor for suitably compensating the victim and/or his/her dependents. Before imposing any such penalty, appropriate enquiry shall be held by BHEL giving opportunity to the contractor to present his case.

In case of any damage to property by the contractor, BHEL shall have the right to recover cost of such damages from payments from payments due to the contractor after holding an appropriate enquiry.

In case of any delay in the completion of a job due to mishaps attributable to lapses buy the contractor; BHEL shall have to recover cost of such delay from payments due to the contractor, after notifying suitably and giving him opportunity to present his case.

If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so; and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the authorized BHEL Official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor after giving a notice of not less than seven days indicating the steps that would be taken by BHEL.

The contractor shall submit report of all accidents, fires and property damage, dangerous occurrence to the authorized BHEL Official immediately after such occurrence, but in any case not later than twelve hours of the occurrence. Such reports shall be furnished in the manner prescribed by BHEL. In addition, the contractor to the authorized BHEL Official shall also submit periodic reports on safety from time to time as prescribed.

Before commencing the work, the contractor shall appoint/nominate a responsible officer to supervise implementation of all safety measures and liaison with his counterpart of BHEL.

If safety record of the contractor in execution of the awarded job is to the satisfaction of Safety Department of BHEL, issue of an appropriate certificate to recognize the safety performance of the contractor may be considered by BHEL after completion the job

SPECIAL CONDITONS OF CONTRACT

1. GENERAL

The special conditions of contract and other contract documents are complimentary to each other and shall be read in conjunction with each other. In case of any conflict of meanings between the special conditions of contract and the BHEL General Conditions of Contract the provisions of the special conditions of contract shall override the corresponding provisions of the BHEL General Conditions of Contract.

2. SCOPE OF WORK

The scope of work includes for the full, final and entire completion **Construction of PEB Equipment Room foundations, RCC Underground water Tank and civil works for Pooling station includes Inverter Transformer foundations, platforms for PCU, HT Panels and other electrical equipment's, Ground Improvement Works and other associated works for 22 MWp (AC) Floating Solar PV power plant for NTPC at Kayamkulam, Kerala** as detailed in specifications and drawings, which forms part of this Contract. The scope of work also includes cleaning/removing all debris in line with bill of quantity as directed by Engineer In-charge. The scope of work under this contract shall cover supply of all materials, labour, tools, and plants etc., unless otherwise specified in the specifications, descriptions of items or in foregoing clauses.

3. SITE CONDITIONS

a) Before tendering the Contractor shall get themselves acquainted with site conditions such as the nature of soil likely to be encountered during the course of the work etc,. The rates quoted by the contractor shall be deemed to have been quoted after getting acquainted with the prevailing site conditions. Initial jungle clearance, stripping of top soil etc., shall also be included in the quoted rates. No claims on the pretext of ignorance of site conditions shall be entertained.

b) The site of work is as mentioned in the Tender document.

4. SITE FACILITES

A. LAND

The Employer will allot land as available free of cost to the contractor for his office stores. He must maintain the areas allotted to him in a neat and clean conditions as required by the Employer. The contractor shall provide adequate storage and office facilities with approval from the Engineer. The rate quoted by the contractor shall be deemed to include for these and no separate payment will be made towards these. On completion of work, the site shall be cleaned by the contractor of all materials, temporary debris, rubbish plants and equipment's, belonging to the contractor at no extra

cost. The site and surroundings shall be handed over in a neat and clean condition. In case of any failure by the contractor, the employer will get inside cleared at risk and cost of the Contractor.

B. POWER AND WATER SUPPLY

Facilities for drawing Power and water required at site for execution of the works shall be arranged by the contractor at his expense and risk. The necessary source for power & water supply has to be organized by vendor. Necessary distribution box, extension board points duly earthed, and with armoured safe power cables to be laid across the field provided point shall be in the scope of the tenderer. Further, laying of water intake and distribution pipes across the Site to various points of work from Electricity source provided water source point shall be in the scope of the tenderer. If required D.G generation sets shall be provided for Power arrangement by the contractor at his own cost. The tenderer shall make provision for temporary storage of water at suitable locations with pump if required to reach the water supply to work areas. The contractor will have to make his own arrangements for the same, without claiming any extra charge for the power and water drawal and distribution equipment.

5. MACHINERY

The Contractor shall at his own expense, supply all tools, plant and equipment (hereinafter referred to as T & P) required for execution of contract, as specified in the tender documents. whole of the works shall be executed in perfect conformity with the specifications and drawings. If contractor perform any works in a manner contrary to the specifications and drawings and without reference to the Engineer-in-charge, he shall bear all the costs arising or ensuring there from.

a) All technical documents regarding the construction of works are given in the metric system and work should be carried out according to metric system.

b) The work shall be carried out as per detailed drawings supplied by the employer. The working drawings shall be emailed progressively to the contractor free of cost. The contractor shall keep one set of drawings (duly protected from dust and wear and tear) at his own expenses always available at site for reference of Engineer-in-charge and other representatives.

d) The works shall be carried out as per detailed specifications enclosed with the tender. For items for which there is no mention in the drawings, detailed specification relevant IS specification (latest edition) shall be followed.

e) The contractor shall submit to the Employer for their approval complete drawings, of all temporary works and staging which he may require for carrying out the works shown in the drawings.

He shall at the same time if so required by the Employer submit his calculations relating to strength and anticipated deflection in respect of any aforesaid temporary works. He shall also submit for the approval of Employer drawings showing the methods he proposes to adopt for the erection of the various parts of the temporary works. Any modification to the drawings that may be required by the Employer shall be made by the contractor at his own cost. However, notwithstanding the approval of modification required for temporary works, the contractor shall be fully responsible for their efficiency, security and maintenance and for all obligations and risks in regard to such works, specified or implied in this contract and be shall reinstate the same at his own cost, should any mishap or accident occur causing damage or injury there from, subject however, to such clauses of the General conditions as may be applicable in such cases.

6. BENCH MARKS AND REFERENCE POINTS

The contractor shall construct and maintain proper benchmarks and reference points of the inter section of all main walls, no separate payment shall be made for this and rates quoted deemed to include this cost. Surveying where ever required is in contractor scope.

7. SAFETY PRECAUTIONS

The contractor shall at times observe the safety code and make necessary action as required in the tender. In default thereof, the employer may get this done departmentally or through other agencies and recover the cost from the contractor.

The Contractors shall also abide by all the security regulations promulgated from time to time by employer.

8. RATES

The rates to be quoted are intended to provide for works duly and properly completed in accordance with the general and special conditions of contract and specifications and drawings together with such alteration and/or conditions as may be required / ordered without prejudice to the generality thereof shall include for detail of construction which are obviously and fairly intended and which may not have been specifically referred in these documents and working drawings and but are essential for execution and satisfactory completion of work including those of minor nature and shall be deemed to include and cover internal the followings.

a) Arrangements for obtaining the clearance wherever required from statutory bodies, regarding license for construction, permanent electricity, water supply, and sanitary connections including

payment of necessary fees, inspection charges and obtaining financial certificates for using these services.

The various items rates quoted in the schedule as applicable shall be deemed to include the above services and no separate payments shall be made towards these.

b) The cost of all superintendence and labour materials, tools, plants, equipment's, mobilizing and demobilizing equipment fuel lubricants, fixture, transport charges, temporary and permanent works and quarrying charges, testing, screening, washing, handling of materials, stacking and removal charges, of any rejected materials and water and power arrangements and satisfactory maintenance of the same satisfactory completion of the work intended.

c) All fees, duties, royalties, rent and compensation to owner for surface damage or taxes and impositions payable to local authorities, in respect of land an structure, for all materials supplied for the work or any other duties/expenses for which the contractor may become liable or may be put to under any provision of the law for the purpose of in connection with the execution of the contract including levies payable on the transactions.

d) Settings out of works profiles etc., and of construction repair and up-keep of all centre lines, bench marks and levels and page there of including provisions of masonry/concrete pillars showing the centre line of structure/gridlines and levels and maintenance and protection of the some including providing fencing etc., throughout the period of contract.

e) Breaking, maintenance and removal of temporary works and buildings.

f) Supply of complete, Moulds, cost of testing of materials etc.

g) Working in all conditions including in/under water liquid, conditions etc., and shall also include bailing or pumping out water from the foundations, basements or any other sources of whatsoever de-sludging and allied operation at any stage of work including all suspension period and delays whatsoever. Cost of curing including pumping and cost of water whatever necessary.

h) In the interest of completion of work within the stipulated time, certain works are to be carried out during the monsoon period also. No separate payment will be made to the contractor for such works and it will be deemed to be included in the contract rates.

i) Diversion and draining works, protection works, temporary facilities, bridges, gangway.

j) Work at all depth in foundation below the ground level and in superstructure up to all height above ground level including all lifts and distances involved at any other place of work and disposed/barrow areas.

k) Unless otherwise specified in the specification schedule cost of all leads/lifts etc.

l) Provision of centering, scaffolding, strutting props etc.,

m) All materials and labour required for fencing in a protection against risk of accidents and for providing necessary/planking strutting with hand rails, gumboots, helmets, safety belts etc., during the progress of work.

n) Prevention on trespassing by providing barrier arrangements for the safety of the public or employees during the provision of works.

o) Works in all shapes include and curved all sizes as shown are as required.

p) Cleaning the site after the completion of work all debris, left out construction materials machine equipment's, temporary offices, stores, works shop etc., including dressing the area neat and clean shape.

q) Such other incidental charges or contingencies as may have been provided for in the specifications.

9. LABOUR COLONIES

Labour camp will not permitted within the project premises.

10. ESCALATION

The rates to be quoted by the tenderer shall be firm and shall cover and include all statutory levies, arising from, acts passed by parliament or by state legislature, the rates shall further be deemed to include statutory levies arising from such Acts, Central or State, which may come in to force subsequent to submission of tenders. The tenderer shall note that no claim for enhancement of rates, on the ground that existing statutory levies have been increased, or that new statutory levies have come in to effect after tender, or on any other ground, will be entertained on any account.

11. QUANTITY

The probable quantities of the several items of work are furnished in the schedule of quantities. It must be clearly understood that neither the probable quantities nor the value of individual items nor the aggregate value of the entire work shall be binding on the Employer/Engineer does not in any way assure the contractor or Guarantee that the said probable quantities are correct or that the work will correspond to these. The Employer/Engineer reserve the right to omit, vary or add to the item/work described in the schedule, of quantities and no claim for compensation will be entertaining on this account.

12. VARIATION/DEVIATION IN QUANTITIES

The contractor shall not make any alteration in addition to or omission from the work as described in the tender document except in pursuance of the written instructions of the Engineer-in-charge. No such deviation from the work described in the tender documents shall

be valid unless the same has been specifically confirmed and accepted by the accepting officer in writing and incorporated in the contract. The rates quoted are firm.

13. MATERIALS

BHEL will not supply any materials unless otherwise specified.

14. SUPPLY OF CEMENT, STEEL , PAINT AND OTHER CONSTRUCTION MATERIALS, IS TO BE MADE BY CONTRACTOR

Makes / Source of supply of cement, steel, paint and other construction materials shall be as per approval of BHEL/NTPC.

15. SUPPLY BY CONTRACTOR

The work is for a completed job including labour and supply of all materials except those otherwise specified in the bid document.
The material and works shall be subject to inspection and test as per field quality plan (FQP) duly approved by BHEL/NTPC.

All materials supplied by the contractor according to the contract conditions shall be subject to inspection and passing by the Engineer-in-charge or his representatives from time to time, the contractor providing all facilities for such instruction free of cost.

BHEL officers connected with the contract shall have the power at any time to inspect and examine any stores or materials intended to be used in or on the work, whether on the site or at any factory or workshop or other place where such stores or materials are being fabricated or manufactured or at any place the same are lying and the contractor shall give necessary facilities for such inspection and examination.

The Engineer-in-charge shall be entitled to have tests made of any stores or materials supplied by the contractor shall provide at his own expense all facilities which the Engineer-in-charge may require for this purpose. If at the discretion of the Engineer-in-charge an independent expert is employed to make any such tests his charges shall be borne by the contractor only if the tests disclosed that the said stores or materials are not in accordance with the provision of the contract.
Should the Engineer-in-charge/Civil Engineer consider at any time during the construction or reconstruction on prior to the expiry of the Maintenance Period that the stores or materials provided by the contractor are unsound or of quality inferior to that contracted for, or otherwise not in accordance with the contract (in respect where the decision of the Engineer-in-charge/Civil Engineer shall be final and conclusive) the contractor shall on demand, in writing from the Engineer-in-charge specifying the stores or materials complained of, not with-standing that the same may have been inadvertently passed, certified that and paid forth with remove the stores or materials so specified and provide other and suitable stores or materials at his own expense, to the entire satisfaction of the Engineer-in-charge/Civil Engineer and in the event of his failing to do so within a period to be specified by the Engineer-in-charge/Civil Engineer, in his demand aforesaid, the Engineer-in-charge/Civil Engineer may replace within the other stores or materials complained of at the risk and expense in all respect of the contractor.

The liability of the contractor under this conditions, shall not extend beyond the maintenance period aforesaid except as regards stores or materials which the Engineer-in-charge/Civil

Engineer shall have previously given notice to the contractor to replace (Maintenance period for any work under this organization will be six months from the date of actual completion of the particular work and handing over to BHEL).

16. <u>INTERRUPTION TO THE WORKS</u>

While quoting the rates/prices the Contractor should take in to account the fact that due to the design or other stipulations at site, or the necessity to follow a particular sequence of overall construction operation, or non-supply of particular drawings, or the connected work or other reasons, interruptions are likely to be encountered in a work of this nature and magnitude. No claims for such interruptions will be entertained on any account.

17. <u>EXTENSION OF TIME OR PENALTY/LIQUIDATED DAMAGES</u>

Extension of time or penalty/liquidated damages as the case may be will be determined as stipulated in clause No. 2.7.9 of BHEL General Conditions of Contract 2019.

18. <u>COMPLETION OF WORK AND MEASUREMENT</u>

a) All work shall be carried out according to authorized dimensions and measurement will be restricted to those authorized dimension even though the Contractor may for convenience of this work exceed the authorized dimensions.
b) All work shall be measured in accordance with the applicable standard method of measurements prescribed by the Indian Standard Institution (1200 latest edition) unless otherwise specified.
c) The Contractor shall admit for technical inspection, works which are likely to be embedded or covered by other works and have the necessary measurement books and certificates to this effect duly signed by the Engineer before the works are covered.
d) On completion of the work, the Contractor must submit to the Engineer the following documents for passing of works.
   i) A copy of the working drawing showing there on all addition and alterations in the process of execution.
   ii) A certificate for embedded and covered up works as in sub-para (C) above
e) The authorized Contractors representative and a representative of the Employer shall jointly sign a certificate of handing over any completed work and date of signature of that certificate will be that the date from which the maintenance period of that unit will reckoned.
f) Notwithstanding the above, insurance cover has to be taken by the contractor for the full value of work as also for the duration of the contract period. 50% of the Security Deposit shall be released only on the total completion of the building and handing over to BHEL to their satisfaction. Remaining 50% of Security Deposit shall be released subject to the stipulation in BHEL's GCC after 6 months from the date of completion of the building.

19. MAINTENANCE OF WORK

The contractor will be responsible for the maintenance of works during the period of construction until the various items are taken over, and for a further period of six months, from the date of taking over.

If the contractor fails to maintain the building satisfactorily, it will be got done by other agency and cost towards such maintenance together with departmental charges will be recovered from his bills/dues.

20. SECURITY DEPOSIT

Upon acceptance of the tender, the successful tenderer shall remit the security deposit with Bharat Heavy Electricals Ltd within the time as specified in the Letter of Intent.
The rate of Security Deposit will be 5% of work order value.

The contractor should submit the Security Deposit before the start of the work by

i) Cash (as permissible under the income Tax Act).

ii) Pay order, demand draft in favour of BHEL.

iii) Local cheques of scheduled banks, subject to realization.

iv) Securities available from Post Offices such as National Saving Certificates, Kisan Vikas Patras etc.,(Certificate should be held in the name of contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).

v) Bank Guarantee from scheduled Banks/Public financial Institutions as defined in the companies Act subject to a maximum of 50% of the total security deposit value. The balance 50% has to be remitted either by cash or in the other form of security. The Bank Guarantee format should have the approval of BHEL.

vi) Fixed Deposit Receipt issued by scheduled Banks/Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.

vii) Security Deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be collected before start of the work and balance 50% may be recovered from the running bills.

viii) EMD of the successful tenderer shall be converted and adjusted against the Security Deposit. The Security Deposit shall not carry any interest.

NOTE: Accepting of Security Deposit against Sl. No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour on BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.
For extra items of work and deviated quantities, security deposit will be recovered at 10% of the value of deviated amount. The security deposit will be released as stipulated under relevant clause of GCC 2019.

21. RUNNING ACCOUNT PAYMENTS

During execution of work, monthly payments of all works in place will be made on the basic measurements recorded in measurement sheet/book in respect of items executed but no claim on the account will be entertained, if for any reason payments are not so made. PRICE VARIATION clause not applicable.

22.1 MOBILIZATION ADVANCE/ADVANCE PAYMENT - NOT APPLICABLE

22.2 INTEREST & RECOVERY - NOT APPLICABLE

23. Statutory Deduction towards Income Tax will be made as per rules.

24. In respect of all labour directly or indirectly employed on the work by the Contractor, the Contractor shall comply with the provisions of the contract labour (Regulation and Abolition) Act 1970 or any amendment thereof and all legislations and rules of the State and or Central Government or other Authority **(Whichever is higher),** framed from time to time governing the protection of health, sanitary arrangements, wages, welfare and safety for labour employed on building and construction works. The rules and other statutory obligations with regard to fair wages, welfare and safety measures, maintenance of the register etc., will be deemed to be part of the contract.

25. The Contractor is required to take insurance for all workers employed on works towards payment for workmen compensation. The insurance has to be taken out within 15 days of the award of work and has to be produced at the time of signing agreement. Half (1/2%) shall be deducted for every bill if the contractor fails to produce a proof of having taken such an insurance to cover his workmen. However the contractor shall be fully responsible for all the consequences arising out of such default. This may also be read with relevant clauses of BHEL GCC 2019.

25. TIME OF COMPLETION

The date of commencement of work shall be counted from the date of handing over the site to the contractor. It may be clearly understood that time is the essence of the contract and the entire work should be completed within the time imposed in the tender document letter of intent.

26. The Contractor has to pay the Works Contract Tax (Under relevant section of the State Government Act) of their own on Monthly basis.

27. The management of BHEL shall be at liberty to terminate the contract by issuing a month's notice to the contractor without assigning any reason what so ever. As regards unsatisfactory performance or noncompliance with any of the terms & conditions of the contract by the contractor. The management of BHEL shall have the right to terminate the contractor forthwith without notice & rearrange the balance work through other agencies at the risk & cost of the contractor & under such circumstances, the Earnest Money Deposit/Security Deposit paid by the contractor shall stand forfeited.

28. SPECIAL CONDITIONS OF TENDER

i) The successful bidder should open local office for Technical staff/Administrative group at Bangalore City for easy interactions/ monitoring of work at site./ Attend meetings at Bangalore city/site as and when instructed by BHEL.

ii) Tenderers should not disclose any price bid details/discounts in the technical bids.

iii) The successful bidder should construct site office / toilets for their workmen at site in consultation with Engineer-in-charge.

29. WORKMEN COMPENSATION POLICY

The contractor is required to take Insurance for all the workers employed on the works towards payments for workmen compensation. The Insurance has to be taken out within 15 days of the award of work and has to be provided at the time of signing the agreement. Half percent (0.5%) of the amount shall be deducted from every bill if the contractor fails to produce a proof of having taken such an insurance to cover his workmen. However the contractor shall be fully responsible for the consequences arising out of such default.

LIST OF INDIAN STANDARD

Following is the list of various Indian Standards,
Relevant to the Civil Engg., work

---

1. EARTH WORK

i) IS 1200-1992, Method Part I Earthwork, Measurement of Building, and Civil Engineering works, and chapter No.2 of CPWD/specification 1977.

2. MORTAR (PLASTERING)

1) IS 2394-1984: Code of practice for application of lime plasters finish.
2) IS 1661-1972: Code of practice for application of cement lime plasters finish.
3) IS 2402-1963: Code of practice for external rendered finishes.

3. CONCRETE WORK & RCC WORK

1) IS 456-2000: Code of practice for plain and reinforced concrete.
2) IS 432(part 1) –1982(Third Revision): Mild steel and medium tensile steel bars
3) IS 1766-1998: Cold twisted steel bars for concrete reinforcement.

4. BRICK WORK

1) IS 2212-1991: Code of practice for brick work.

5. STONE WORK

1) IS 1597-1992 (Part – I & II): Code of practice for construction of stone masonry.

6 MARBLE WORK

1) IS 1124-1974: Methods of test for water absorption of natural building works.

7. STEEL WORK

1) IS 800-2007(Third Revision): Code of practice for use of structural steel in general building construction.
2) IS 1308-1984: Steels doors, windows and ventilators
3) IS 1081-1960: Code of practice for fixing glazing of metal (steel & aluminium doors, windows & ventilators)
4) IS 1161-1998: Steel tubes for structural purposes.
5) IS 4351-2003: Steel doorframes.
6) IS-6245-5245-1971: Metal rolling shutters and rolling grills.

8. FLOORING

1) IS 2114-1984: Code of practice for laying in situ terrazzo floor finish.
2) IS 2571-1970: Code of practice for in situ cement concrete flooring.
3) IS 5318-1969: Code of practice of lying of flexible P.V.C. sheet & tiles flooring.

9. ROOFING

1) IS 3007(pt-I)-1999: Code of practice of lying of corrugated cement sheets.

10. FINISHING

1) IS 133-2004: Enamel, Interior (a) under coating (b) Finishing colour as required.
2) IS 348-1968: French Polish.
3) IS 427-2005: Distemper, dry colour as required.
4) IS 425-1969: Distemper, oil emulsion as required.
5) IS 5410-1992: Cement paint, Colour as required.
6) IS 5411 (pt.1)-1974: Plastic emulsion paint for interior use.
7) IS 6278-1971: Code of practice for white washing & color washing.

11. DEMOLISION AND DISMANTILING

1) IS 1200 (pt. 18)-1974: Method of measurements of demolition and dismantling.

12. SAFETY CODE

1) IS 5916-1970: Safety code for construction including use of hot bituminous materials.
2) IS 4130-1991: Safety code for demolition of building.
3) IS 3754-1966: Safety code for excavation works.
4) IS 3696(Pt-1)-1987: Safety code for Scaffolds.

A) DISTEMPERING ON NEW SURFACE. (OILBOUND)

1. COAT OF PRIMER	….	0.07 Litre/Sq.m (one coat)
2. COAT OF DISTEMPER	…..	0.10 Kg/Sq.m (2 coats)

DISTEMPERING WITHOUT PRIMER

FOR 1 COAT	……	0.10 Kg/Sq.m (For 1 coat)
FOR 2 COATS	…….	0.15 Kg/Sq.m (For 2 coats)

B) SYNTHETIC ENAMEL PAINT.

a) ON NEW SURFACE	… PRIMER	….	0.09 Litre/Sq.m (For1 coat)
ENAMEL PAINT	(2 COATS)	….	0.15 Litre/Sq.m (For 2 coats)

b) ON OLD SURFACE

2 COATS WITHOUT PRIMER	…	0.20 Litre/Sq.m
1 COAT	…	0.10 Litre/Sq.m

c) WATER PROOF CEMENT PAINT

1 COAT	…	0.18 Kg/Sq.m
2 COAT	…	0.30 Kg/Sq.m

d) PLASTING EMULSION PAINT:

2 COATS OF PLASTIC EMULSION	….	0.09 Litre/Sq.m
1 COAT OF PLASTIC EMULSION	….	0.073 Litre/Sq.m

ON NEW SURFACE

1 COAT PLASTIC FIX PRIMER	…	0.081 Litre/Sq.m
2 COATS PLASTIC EMULSION	…	0.09 Litre/Sq.m

These standards are indicative, any additional IS standard/specification required to be followed shall be adhered to by the contractor/bidder.

FORM OF TENDER

Having examined the invitation to bid, Instructions to Bidder, General conditions of contract, Special conditions, Specifications tender schedule, Contract drawings and other documents for the above work, we the undersigned, offer to construct, erect complete and maintain the whole of the said in conformity with the said bid documents on the terms and conditions and under the provisions set out or called for in the contract documents at the rates listed in the schedule of unit prices or elsewhere in the contract documents.

We undertake if our bid is accepted, to commence the works within 7 days from the date of issue of award and to complete and delivery the whole of the works comprised in the contract as per the time schedule agreed to the contract document.

We agree to abide by this bid for the period of three months from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before expiry of the period.

Until and unless a formal agreement is prepared and executed this bid, together with your award thereof shall constitute a binding contract between us.

NIT Issued By

Sampangi C,
Sr. Manager, BHEL-EDN

CONTACTOR (SIGN & SEAL)

Annexure - I

Certificate by Chartered Accountant on letter head

This is to Certify that M/S ....., (hereinafter referred to as 'company') having its registered office at ..... is registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part–II) ..... dtd:....., Category: ..... (Micro/Small). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year ..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5, 2006 :
   Rs.....Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:
   Rs.....Lacs

(Strike off whichever is not applicable)

The above investment of Rs.....Lacs is within permissible limit of Rs.....Lacs for .....Micro / Small **(Strike off which is not applicable)** Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/ Small) **(Strike off which is not applicable)** and the date of graduation of such enterprise from its original category is ..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant

ANNEXURE II

Electronic Funds Transfer (EFT) OR
Paylink Direct Credit Form

Please Fill up the form in **CAPITAL LETTERS** only.
TYPE OF REQUEST(Tick one): _____ CREATE _____ CHANGE

BHEL Vendor / Supplier Code:	
Company Name :	
Permanent Account Number(PAN):	
Address	

City: _____ PINCODE _____ STATE _____

Contact Person(s)	
Telephone No:	
Fax No:	
e-mail id:	

1 Bank Name:	
2 Bank Address:	
3 Bank Telephone No:	
4 Bank Account No:	
5 Account Type: Savings/Cash Credit	
6 9 Digit Code Number of Bank and branch appearing on MICR cheque issued by Bank	
7 Bank swift Code(applicable for EFT only)	
8 Bank IFSC code(applicable for RTGS)	
9 Bank IFSC code(applicable for NEFT)	

A I hereby certify that the particulars given above are true, correct and complete and that I, as a representative for the above named Company, hereby authorise BHEL, EDN, Bangalore to electronically deposit payments to the designated bank account.

B If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transfering Bank responsible.

C This authority remains in full force until BHEL, EDN,Bangalore receives written notification requesting a change or cancellation.

D I have read the contents of the covering letter and agree to discharge the resposibility expected of me as a participant under ECS / EFT.

Date:

Authorised Signatory:
Designation: Telephone NO. with STD Code

Company Seal

Bank Certificate

We certify that_____has an Account No_____ with us and we confirm that the bank details given above are correct as per our records.

Date: (.....)
Place: Signature

Please return completed form along with a blank cancelled cheque or photocopy thereof to:
Bharath Heavy Electricals Ltd,
Attn:
Electronics Division, Mysore Road,
BANGALORE - 560 026
In case of any Querry, please call : 080-26998xxx / 2674xxxx or fax no. 080-2674xxxx

ANNEXURE-III

NIT Issued By CONTACTOR (SIGN & SEAL)

Sampangi C,
Sr. Manager, BHEL-EDN

(TO BE SUBMITTED IN BIDDER'S LETTER HEAD)

Ref.
Date:

SITE INSPECTION CERTIFICATE (If possible subject to COVID Restriction)

This is to Certify that, I / We……..

……. had inspected the proposed

Construction site thoroughly and understood the scope of works to be carried out in

line with construction drawings/designs/data/Bill of quantities/schedule of items /

Specifications as brought out in the Tender as desired by BHEL.

Agreeable to all Terms & Conditions of Contract and assure to complete the work

Within the stipulation time frame.

Note: In case of bidder unable to visit the site due to any reason, bidder may kindly note that it is the responsibility of the bidder to ensure and understand the scope of work and site condition in line with NIT terms and condition.

Signature of the contractor

Name:
Seal

NIT Issued By
Sampangi C,
Sr. Manager, BHEL-EDN

CONTACTOR (SIGN & SEAL)

(TO BE SUBMITTED IN BIDDER'S LETTER HEAD)

TECHNO-COMMERCIAL DEVIATION SHEET

Tender Enquiry No & Date: **EDN/ PVSS/ NTPC/ KAMKULAM/ FSPV/ 22 MW/ IP/RT /02; Dt.: 04.08.2020**

Work Description: Construction of PEB Equipment Room foundations, RCC Underground water Tank and civil works for Pooling station includes Inverter Transformer foundations, platforms for PCU, HT Panels and other electrical equipment's, Ground Improvement Works and other associated works for 22 MWp (AC) Floating Solar PV power plant for NTPC at Kayamkulam, Kerala

We have gone through the complete tender enquiry and its corrigendum mentioned above and read and understood the Pre- Qualification Criteria, Instructions to Tenderer along with Enclosures, Special Condition of Contract along with its annexures, scope of Work Cum Technical Specification, BHEL General Conditions of Contract 2019 etc.

We hereby confirm that, we have following deviations with technical and commercial terms and conditions of NIT:

Clause No. & NIT page no.	NIT Clause	Deviation proposed	Remarks

Mention any deviations from Tender enquiry if any, else mention "No deviation "

We hereby confirm that except for above, there are no other Deviation from all terms and conditions mentioned in Tender documents.

Seal & Signature of Authorized
Representative /Bidder

Name:
Designation:
Date:
Name of Bidder:

NIT Issued By

Sampangi C,
Sr. Manager, BHEL-EDN

CONTACTOR (SIGN & SEAL)

(TO BE SUBMITTED IN BIDDER'S LETTER HEAD)

DECLARETION REGARDING MSE (OR) QUALIFYING PPP-MII, ORDER 2017

(WITH SUPPORTING DOCUMENTS)

Tender Enquiry No & Date: **EDN/ PVSS/ NTPC/ KAMKULAM/ FSPV/ 22 MW/ IP/RT /02; Dt.: 04.08.2020**

Work Description: Construction of PEB Equipment Room foundations, RCC Underground water Tank and civil works for Pooling station includes Inverter Transformer foundations, platforms for PCU, HT Panels and other electrical equipment's, Ground Improvement Works and other associated works for 22 MWp (AC) Floating Solar PV power plant for NTPC at Kayamkulam, Kerala.

I/We hereby declare that, I/We……. belong to MSE (or) qualifying PPP-MII, order2017 (relevant supporting documents attached).

We also hereby declare that the information provided is correct to the best of my knowledge.

Seal & Signature of Authorized
Representative /Bidder

Name:
Designation:
Date:
Name of Bidder:

NIT Issued By
Sampangi C,
Sr. Manager, BHEL-EDN

CONTACTOR (SIGN & SEAL)

Additional Clauses for GST:

1. BHEL GST Number of Nodal Agency:

   Nodal Unit Registered as Supplier of Goods/Services in GST: Kerala
   GSTIN of Nodal Unit: Will be intimated later after award of work.

2. HSN (Harmonized System of Nomenclature) / SAC (Services Accounting Code) to be mandatorily mentioned in all quotations & invoices submitted.

3. Invoice submitted should be in the format as specified under GST Laws viz. all details as mentioned in Invoice Rules like GSTN registration number, invoice number, quantity, rate, value, taxes with nomenclature – CGST, SGST, IGST mentioned separately, HSN Code / SAC Code etc.

4. Payment of GST to vendors as applicable will be made only if it is matching with data uploaded by Vendors

5. Vendors to give undertaking that GST as mentioned in the Invoice has been paid/will be paid either through cash or admissible input credit and also file the returns

6. For invoices paid on Reverse charge basis – that it is “payable on reverse charge basis” to be mentioned on the invoice.

7. With respect to supplies, vendor should intimate BHEL immediately on dispatch for parallel billing on customer

8. Vendor should get GST registration, if not available, in the state of Kerala immediately after placement of order.

UNPRICED PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
1	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 5km and lift upto 1.5m, disposed earth to be levelled and neatly dressed at location shown by BHEL/NTPC.all type of soil as per direction of Engineer in charge.	Cum	1910.00	149.12	284820.00
2	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 5km and lift upto 1.5m, disposed earth to be levelled and neatly dressed at location shown by BHEL/NTPC.in soft rock complete as per direction of Engineer in charge.	Cum	75.00	289.01	21676.00
3	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 5km and lift upto 1.5m, disposed earth to be levelled and neatly dressed at location shown by BHEL/NTPC.in Hard rock complete as per direction of Engineer in charge.	Cum	75.00	833.28	62496.00
4	Filling available excavated earth/murram (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 2 km and lift upto 1.5 m complete as per direction of Engineer in charge.	Cum	1585.00	180.11	285475.00
5	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III) : 6 graded stone aggregate 20 mm nominal size).	Cum	239.00	5132.46	1226658.00
6	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work upto floor V level : 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20/10mm mm nominal size) complete as per direction of Engineer in charge.	Cum	12.00	5566.65	66800.00
7	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level : 1:1½:3 (M20) (1 Cement: 1½ coarse sand (zone-III) : 3 graded stone aggregate 20 mm nominal size).	Cum	15.00	5912.65	88690.00
8	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. All works upto floor level	Cum	448.00	6614.98	2963512.00
9	Providing and mixing integral crystalline admixture for waterproofing treatment to RCC structures like basement raft, retaining walls, reservior, sewage & water treatment plant, water storage tank, tunnels / subway and bridge deck etc. at the time of transporting of concrete into the drum of the ready-mix truck, using integral crystalline admixture @0.80% (minimum) to the weight of cement content per cubic meter of concrete) or higher as recommended by the manufacturer's specification in reinforced cement concrete at site of work. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90%,compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure. The crystalline admixture shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the Engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage. water proofing by FOSROC or PIDILITE, SIKA	Kg	91.00	317.50	28893.00
10	Centering and shuttering including strutting, propping etc. and removal of form for :Foundations, footings, pedestal, bases of columns etc. for mass complete as per direction of Engineer in charge.	sqm	926.00	233.58	216296.00

CONTACTOR (SIGN AND SEAL)

UNPRICED PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
11	Centering and shuttering including strutting, propping etc. and removal of form for all heights : plinth beams, Tie/Lintel beams, girders, bressumers and cantilevers FOR ANY HEIGHT	sqm	303.00	452.68	137163.00
12	Centering and shuttering including strutting, propping etc. and removal of form for Suspended floors, roofs, landings, balconies and access platform complete as per direction of Engineer in charge. FOR ANY HEIGHT	sqm	416.00	568.30	236413.00
13	Centering and shuttering including strutting, propping etc. and removal of form for all heights : Walls (any thickness)/cable trench wall including attached pilasters, butteresses, plinth and string courses etc.	sqm	518.00	499.63	258809.00
14	Supplying and filling in plinth with sand/murrum under floors, including watering,ramming, consolidating and dressing complete.	Cum	50.00	1601.50	80075.00
15	Dry stone filling for Soak pit AVERAGE 40mm down graded stones including supply of stones, filling and preparing surface complete.	sqm	125.00	598.76	74845.00
16	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure upto plinth level in all shapes and sizes in : Cement mortar 1:6 (1 cement : 6 coarse sand)	cum	29.00	4348.13	126096.00
17	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in : Cement mortar 1:6 (1 cement : 6 coarse sand)	cum	42.00	6224.17	261416.00
18	Half brick masonry with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 up to floor V level. Cement mortar 1:4 (1 cement :4 coarse sand)	sqm	10.00	764.32	7644.00
19	Random rubble masonry with hard stone in foundation, below fencing and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20mm nominal size) upto plinth level for fencing work with :Cement mortar 1:6 (1 cement : 6 coarse sand). Complete as per direction of Engineer-in-charge.	cum	90.00	5019.06	451716.00
20	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) and finishing with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 coarse sand) finished rough with sponge. EXTERNAL PLASTER	sqm	180.00	341.57	61483.00
21	12 mm cement plaster of mix : 1:4 (1 cement: 4 coarse sand) FENCING AND WATER TANK	sqm	391.00	226.44	88539.00
22	Cement concrete flooring (with ironite hardener) 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) finished with a floating coat of neat cement, including cement slurry, etc. complete. 50 mm thick with 10 mm nominal size stone aggregate IS 2571	sqm	311.00	645.75	200829.00
23	Finishing with acid and or alkali resistant Epoxy paint/COATING, 2mm thk heavy duty industrial grade (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete. On concrete work	sqm	311.00	155.31	48302.00
24	Cement plaster skirting up to 30 cm height, with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement. 18 mm thick	sqm	47.00	427.34	20085.00
25	Finishing walls with Acrylic Smooth exterior weather proof paint of required shade : New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior weather proof primer applied @ 2.20 kg/10 sqm) EXTERNAL	sqm	180.00	135.05	24309.00
26	Distempering with 1st quality acrylic distemper (ready mixed) having VOC content less than 50 gms/litre (for Internal walls and ceiling), of approved manufacturer, of required shade and colour complete, as per manufacturer's specification: Two or more coats on new work INTERNAL WALLS AND CEILING	sqm	10.00	71.46	715.00
27	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface : Water thinnable cement primer	sqm	391.00	49.20	19238.00
28	Finishing walls with water proofing cement paint of required shade : New work (Two or more coats applied @ 3.84 kg/10 sqm all complete as per direction of Engineer-in -charge	sqm	391.00	74.83	29259.00

CONTACTOR (SIGN AND SEAL)

UNPRICED PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
29	Painting with black anti-corrosive bitumastic paint of approved brand and manufacture to give an even shade : Two or more coats on new work Make Berger/Asian paints	sqm	42.00	86.96	3653.00
30	Diluting and injecting chemical emulsion for POST- CONSTRUCTIONAL anti-termite treatment (including the cost of chemical emulsion) :Treatment of soil under existing floors using chemical emulsion @ one litre per hole, 300 mm apart including drilling 12 mm diameter holes and plugging with cement mortar 1 :2 (1 cement : 2 Coarse sand) to match the existing floor: With Chlorpyriphos/Lindane E.C. 20% with 1% concentration	sqm	144.00	844.97	121676.00
31	Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	sqm	66.00	1484.24	97960.00
32	Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building, all complete as per the architectural drawings, with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand), laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade, including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge. Polished Granite stone slab, colour as approved by Engineer In-charge.	sqm	10.00	2891.81	28919.00
33	Providing & fixing Acid and alkali resistant tile in flooring on a bed of 30 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand). Tile thickness should be 20mm.	sqm	65.00	1225.90	79684.00
34	Providing & fixing dado/skirting Acid and alkali resistant tile on 12 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand). Tile thickness should be 12mm.	sqm	134.00	1318.31	176654.00
35	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto all level. High strength deformed Thermo-Mechanically Treated bars with corrosion inhibitors corrosion resistant steel CRS re-bars of grade minimum Fe-500 or more and shall conform to IS: 1786.	kg	38129.00	68.47	2610693.00
36	Providing and fixing G.I. chain link mesh fabric fencing of required width in mesh size 25 X25 mm /40X40MM made of G.I. wire of dia 4 mm including strengthening with 2 mm dia wire or nuts, bolts and washers as required both ends twisted conforming to IS 2721 complete as per the direction of Engineer-in-charge.	sqm	672.00	653.70	439287.00
37	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	kg	16345.00	83.44	1363827.00
38	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.Hot finished welded type tubes	kg	14440.00	117.63	1698578.00
39	Hot dip galvanisation of fencing column post, fencing Flat, fencing Stay post and other structure steel works. thickness 86 micron	kg	3505.00	27.22	95407.00
40	Steel work welded in built up sections/ framed work (such as supply & fixing of CI rung work & puddle pipe work req. dia), including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required. In stringers, treads, landings etc. of stair cases, including use of chequered plate wherever required, all complete	kg	400.00	76.79	30716.00
41	Fencing with R.C.C./Steel post placed at required distance, embedded in cement concrete, corner post shall be strutted on both sides and end post one side only, provided with horizontal lines and two diagonals of **barbed wire** weighing 9.38 kg per 100 metres (minimum), between the two posts fitted and fixed with G.I. staples on wooden plugs or G.I. binding wire tied to 6 mm bar nibs fixed while casting the post (cost of R.C.C. posts, struts, earth work and concrete to be paid for separately) :- Payment will be made as per metre cost of total length of barbed wire used.	meter	840.00	9.84	8266.00

CONTACTOR (SIGN AND SEAL)

UNPRICED PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
42	Painting with synthetic enamel paint of approved brand and manufacture/paint treatment to be suitable for Coastal corrosion to give an even shade : Two or more coats on new work	sqm	300.00	99.67	29901.00
43	Pointing on stone work with cement mortar 1:3 (1 cement : 3 fine sand) Flush/ Ruled pointing	sqm	10.00	234.03	2341.00
44	Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete : Serrated with central bulb (225 mm wide, 8-11 mm thick).	meter	100.00	232.22	23222.00
45	Water supply for tank leakage test. Filling the tank with 50000 Litre water and keep it for 24 hrs	5000L	10.00	738.00	7380.00
46	Hire charges of Pump set of capacity 4000 litres/hour for draining out the water after leakage test	day	10.00	574.00	5740.00
47	Providing and applying of swellable type water stop tape, 19mm x 25mm thick in linear meter (expansive nature) for construction joints treatment of RCC structure, such as raft slab, retaining walls, water storage tank and at the junctions of raft slab with the retaining walls etc.. After cleaning the surface, one coat of required primer for swellable water stop tape shall be applied throughout the length of the joint @3.78 litre per 240 running meter. Over the primed surface swellable type water stop tape shall be placed. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guaranteed for 10 years against any leakage	meter	100.00	452.80	45280.00
48	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge: 40 mm nominal outer dia Pipes.	meter	10.00	440.14	4402.00
49	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge: 100 mm nominal outer dia Pipes.	meter	10.00	2279.23	22793.00
50	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge: 150 mm nominal outer dia Pipes.	meter	10.00	4773.92	47740.00
51	Providing and fixing precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm + 0.05 %, total coated thickness with zinc coating 120 gsm as per IS: 277 in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches while transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x 55mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.	sqm	514.00	514.59	264500.00
52	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 1.5km lead as per direction of Engineer-in-charge In cement mortar	Cum	92.00	1205.32	110890.00

CONTACTOR (SIGN AND SEAL)

UNPRICED PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
53	Demolishing cement concrete manually/ by mechanical means including disposal of material within 1.5km lead as per direction of Engineer - in - charge with Nominal concrete 1:3:6 or richer mix (i/c equivalent design mix)	Cum	143.00	1424.71	203734.00
54	Demolishing stone rubble masonry manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge In cement mortar	Cum	55.00	1438.53	79120.00
55	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 1.5km lead as per direction of Engineer - in- charge.	Cum	242.00	2078.45	502985.00
56	Extra for cutting reinforcement bars manually/ by mechanical means in R.C.C. or R.B. work (Payment shall be made on the cross sectional area of R.C.C. or R.B. work) as per direction of Engineerin-in-charge.	sqm	330.00	707.95	233624.00
57	Dismantling doors, windows and clerestory windows (steel or wood) shutter including chowkhats, architrave, holdfasts etc. complete and stacking within 1.5km lead Of area 3 sq. metres and below	each	10.00	225.09	2251.00
58	Clearing jungle including uprooting of rank vegetation, grass, brush wood,trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 1.5km outside the periphery of the area cleared	sqm	1733.00	10.29	17833.00
59	Felling trees of the girth Beyond 30 cm girth upto and including 60 cm girth (measured at a height of 1 m above ground level), including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material	each	200.00	312.09	62418.00
60	Preparation and consolidation of sub grade with power road roller of 8 to 12 tonne capacity after excavating earth to an average of 22.5 cm. depth, dressing to camber and consolidating with road roller **to achieve 95% or more of standard proctor's MDD**, including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earth with lead upto 50 metres.	sqm	16.00	128.54	2057.00
61	Laying, spreading and compacting stone aggregate of specified sizes to WBM specifications in uniform thickness, hand picking, rolling with 3 wheeled road/vibratory roller 8-10 tonne capacity in stages to proper grade and camber, applying and brooming requisite type of screening / binding material to fill up interstices of coarse aggregate, watering and compacting to the required density.	Cum	5.00	629.15	3146.00
62	Supplying and stacking at site. 63 mm to 45 mm size stone aggregate (WBM Grade-II)	Cum	7.00	1259.23	8815.00
63	Supplying and stacking at site. Stone screening 11.2 mm nominal size (Type B)	Cum	2.00	1622.37	3245.00
64	Supplying and stacking at site. Moorum	Cum	2.00	662.40	1325.00
65	Providing & Grouting of dowel tubes / Shear keys / Joints of precast members / Joints of base plates with M-60 grade cementitious grout (Non Shrink) of approved make by suitable means (Free flowing / pump),curing etc. Complete as per directions of Engineer-incharge. (The payment shall be made on the basis of actual weight of approved grout injected.) Stirrer mixed cementitious grout (non shrink) of approved make in dowel tubes / Shear keys / Joints of precast members.	kg	419.00	60.89	25513.00
66	Making plinth protection 75mm thick of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, levelling & dressing & finishing the top smooth.	sqm	53.00	503.52	26687.00

CONTACTOR (SIGN AND SEAL)

UNPRICED PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
67	Providing, driving (with vibrating pile driving hammer complete with power units & accessories) and installing driven Pre-cast reinforced cement concrete piles of specified diameter and length below the pile cap in **M-30** cement concrete to carry safe working load not less than specified, with a central through preformed hole with M.S. black pipe of dia, 40 mm for grouting with cement sand grouting of mix 1:2 (1cement : 2 coarse sand) under sufficient positive pressure to ensure complete filling including centring, shuttering, driving and removing the steel casing pipe and lifting casing etc. complete but excluding the cost of steel reinforcement. (Length of pile for payment shall be measured from top of the shoe to the bottom of pile cap). **450 mm** dia piles	meter	180.00	3160.12	568822.00
68	Boring (with DTH/drilling machine) in any kind of soil/rock, providing and installing bored cast-in-situ reinforced/Plain cement concrete piles of grade **M-30** of specified diameter and length below the pile cap, to carry a safe working load not less than specified, excluding the cost of steel reinforcement but including the cost of concrete, marking of pile location as per approved drawing with total station machine, boring, with bentonite solution and temporary casing of appropriate length for setting out and removal of same and the length of the pile to be embedded in the pile cap etc. all complete, (Cement Content shall be as per approved MIX DESIGN by BHEL/Owner) including removal of excavated earth with all lifts and leads (Length of pile for payment shall be measured upto bottom of pile cap).**300 mm** dia piles	meter	10.00	1255.82	12559.00
69	Providing & installing dry Stone column by vibro compaction/ramming method using vibroflot/or any suitable arrangement with filling material of well graded crushed stone, as per relevant IS and as directed by Engineer in-charge, etc., complete in all respect. Design and complete methodology to be submitted before executing the ground improvement work for approval of BHEL/NTPC and Liquefaction analysis to be carried out post ground improvement work to guarantee the ground improvement work. Dry Stone column diameter: 300mm	meter	13600.00	1936.80	26340480.00
				TOTAL AMOUNT:	**Rs. 42,786,375.00**
QUOTE PERCENTAGE (%) ABOVE/BELOW (+/-) (OR) AT PAR TO TOTAL AMOUNT					**XXXXX**
QUOTED PERCENTAGE (%) IN WORDS ABOVE/BELOW (OR) AT PAR TO TOTAL AMOUNT					**XXXXX**
Plus applicable GST					

NOTE:
1. CONTRACTOR SHOULD QUOTE PERCENTAGE (%) ABOVE/BELOW (OR) AT PAR TO TOTAL AMOUNT
2. QUOTED PERCENTAGE (%) IS APPLICABLE ON ALL ITEM RATES UNIFORMLY.

CONTACTOR (SIGN AND SEAL)

CIVIL WORKS

NIT Issued By
Samapangi C,Sr. Manager-Civil, BHEL-EDN

CONTACTOR (SIGN & SEAL)

D-1 GEOTECHNICAL INVESTIGATION &TOPOGRAPHIC SURVEY

1.0 TOPOGRAPHICAL SURVEY

Bidder shall conduct the Topographical Survey for the allocated area in proposed solar project. The scope of work and technical specification for the same is as below:

1.1 SCOPE OF WORK

The Contractor shall carry out the Topographical Survey and preparation of Plans (Maps) and report of the assigned entire area/areas indicated for locating the Solar PV Power plant and its other systems.

Carrying out the Bench Mark (GTS) to site/sites under survey by parallel levelling, establishing and constructing bench mark, grid and reference pillars in the field, and spot level survey of the entire area/areas at specified intervals and development of the contours.

Carrying out cross-section of river/canal taking spot levels at on an average 20 meters intervals or less depending upon the site conditions.

Furnishing all field data & drawings in soft copy (on CDs) apart from hard copies.

Furnishing of the survey report as described in details in the succeeding paragraphs is also included in the scope of this work.

The enclosed Vicinity Map indicates the tentative location of the area/areas to be surveyed for locating Solar PV Project/s.

The location/area(s) indicated in the Vicinity Map, is subject to change that may be necessary during actual execution of the work.

The work shall be executed according to the specifications and good standard practice necessary to fulfill the objective of the survey work, strictly in accordance with the instructions and satisfaction of the Owner.

The Contractor shall carry out Bench Mark by fly-levelling from nearest GTS Bench Mark or available source as approved by the Owner and establish the same at two permanent Bench Mark at site. All subsequent transfer of levels shall be carried out with respect to these Bench Mark. The work shall also include constructing permanent reference pillars at suitably locations as approved by the Owner. These reference pillars shall

be labelled permanently with their respective coordinates and reduced levels for future use. The Bench Marks and reference pillars shall be shown on the survey drawings.

While carrying bench mark to the project site, levels shall be established on the permanent objects like culverts etc. at least on one object in every one km. if available along with route with adequate description about the objects and levels shall be maintained & mentioned in the survey report to facilitate locating these objects later on.

Latitude and Longitude: The work shall be carried out in UTM grids system. The contractor shall also establish the latitudes and longitudes of the corners of the project site. At least 50m width of the adjoining plots and area shall also be covered in the survey for correlation with adjoining plots.

1.2 TOPOGRAPHICAL SURVEY AND MAPPING

Positions, both in plan and elevation, of all natural and artificial features of the area like waterways, railway tracks, trees, cultivation, houses, fences, pucca and kutcha roads including culverts and crossings, foot tracks, other permanent objects like telephone posts and transmission towers etc. are to be established and subsequently shown on survey maps by means of conventional symbols (preferably, symbols of survey of India Maps), all hills and valleys within the area/areas are to be surveyed and plotted on maps by contours. Necessary levelling work of the entire area/areas are to be surveyed and plotted on maps by establishing horizontal location so that location and sketching of contours for the area/areas can be done at specified intervals and in specified scales on maps. Method of survey, contour intervals etc. shall be decided by owner on site in case of steep slopes and dense jungle etc. where grading is not possible. Any unusual condition or formations on the ground, locations of rock outcrops (if visible on the surface) and spring/falls, possible aggregate deposits etc. shall also be noted and plotted on the maps.

The field work shall be done with Total Station Equipment in the following steps:

Establishing horizontal and vertical controls and locating reference grids and bench mark in the area. Surveying for establishing spot levels and plotting contours. Surveying for locating the natural and manmade details as described earlier.

The grids for the survey work shall be established in N-S & E-W direction (Corresponding to Magnetic North) or the Plant North as directed by the Owner.

1.3 CONTOURING

Contractor shall carry out spot level surveying at an interval of on an average 25 meters for contouring the area. Levels shall also be taken on all traverse stations and on salient points located at random over the area (ground points). Contours are to be interpolated at 0.5 M intervals after the above points are plotted. The contours shall not be just interpolated but properly surveyed on the ground so that features falling between the two successive levels are also picked up. Sufficient points properly distributed over the entire area shall be located and levels taken so that accurate contouring can be done at places of sharp curvature or abrupt change in direction and elevation, points selected shall be close to each other. Salient points on ridge lines and valley lines shall also be measured.

Transfer of levels shall always start from Main/Subsidiary stations whose levels are based on bench mark established in the survey area.

1.4 PREPARATION & SUBMISSION OF SURVEY MAPS AND DOCUMENTS

The Contractor shall submit survey maps of the site in 1:10,000 scale indicating grid lines and contour lines, demarcating all permanent features like roads, railways, waterways, buildings, power lines, natural streams, trees etc. The topography drawing shall also cover at least 50m wide area of the adjacent solar plot & adjacent area (beyond the assigned plot area) and match the grids of the adjacent solar plot.

All the maps should be prepared in digitised forms using computer software like Autocad – Release 2005 or as directed by Owner. The block of name plate of all the drawings should be as per NTPC standard.

Contractor shall submit all data pertaining to the survey in original (.dwg & .pdf format) to the Owner including all levels & co-ordinates in X-Y-Z format for the entire area on CD.

Presence of any well and/or tube well in the site or adjoining areas and water level in them shall be marked in the documents. Details of earlier uses of the site i.e. mining, quarrying, agriculture etc. Existing drainage pattern of the site, possibility of water logging and high flood level of the area shall also be captured in the documents.

2.0 GEOTECHNICAL INVESTIGATION SCHEME

Geotechnical investigation for the scope of work shall be done by the bidder. The scheme for geotechnical investigation shall be as given at Clause 1.1 and shall be approved by Owner before execution. Geotechnical investigation work shall be got executed by the Bidder through the agencies as mentioned in Clause No. 1.1.4. The Bidder shall carry out geotechnical investigation for establishing the sub-surface conditions and to decide type of foundations for the structures envisaged, construction methods, any special requirements/treatment called for remedial measures for sub-soil/ foundations etc. in view of soft sub-soils, aggressive sub-soils and water, expansive/swelling soils etc. prior to commencement of detailed design/drawings. The Bidder shall obtain the approval for the field and laboratory testing scheme proposed by him from the Owner before undertaking the geotechnical investigation work.

The detailed Geotechnical Investigation has to be carried out by the bidder in line with the Technical Specification. Bidder shall carry out the design of foundation etc. based on the approved geotechnical report.

Field test shall include but not be limited to the following:

Boreholes, Standard Penetration Test (SPT), collection of disturbed and undisturbed soil samples (UDS), Trial Pits (TP), collection of water samples, Electrical Resistivity Test (ERT) etc.

Preliminary geotechnical investigation work of the proposed site area has been conducted by the owner. The details of available bore holes in the vicinity area are enclosed in Annexure-BH. These bore holes data is only for bidder information. However, detailed Geotechnical Investigation has to be carried out by the bidder in line with the Technical Specification. Bidder shall carry out the design of foundation etc. based on the approved geotechnical report.

2.1 SCHEME OF GEOTECHNICAL INVESTIGATION

Minimum 1 No. of borehole of 5m depth shall be carried out in every 12.5 acres of land. Few ERT & TPs shall be carried out as per layout.

The depth of boreholes shall be 5.0m. SPT shall be carried out in all types of soil deposits and in all rock formations with core recovery upto 20%, met within a borehole. This test shall be conducted at every 1.5 m interval or at change of strata. The starting depth of SPT shall be 0.5m from ground level. UDS shall be collected at every 1.5 m interval or at change of strata.

The laboratory tests shall be conducted on soil, rock & water samples collected during field investigations in sufficient numbers as approved by Employer. Laboratory tests shall be carried out on disturbed and undisturbed soil samples for Grain Size Analysis, Hydrometer Analysis, Atterberg Limits, Triaxial Shear Tests (UU), Natural Moisture Content, Specific Gravity and Bulk Unit Weight, Consolidation Tests, Unconfined Compression Test, Free Swell Index, Shrinkage Limit, Swell Pressure Test, Chemical Analysis test on soil and water samples to determine the carbonates, sulphates, chlorides, nitrates, pH, organic matter and any other chemicals harmful to concrete and reinforcement/ steel. Laboratory tests on rock samples shall be carried out for Hardness, Specific Gravity, Unit Weight, Uniaxial Compressive Strength (in-situ & saturated), Slake Durability etc.

On completion of all field and laboratory work, the Bidder shall submit a Geotechnical investigation report for Owner's approval. The Geotechnical investigation report shall contain field and laboratory observations/ data/ records, analysis of results and recommendations on type of foundation for different type of structures envisaged for all the areas of work. Recommendations on treatment for soil, foundation, based on subsoil characteristics, soft soils, aggressive chemicals, expansive soils, etc. shall also be covered in the report, as applicable.

2.2 FOUNDATION SYSTEM

Foundation system for various facilities shall be designed and adopted as per approved geotechnical investigation report.

D-2 SITE LEVELLING AND GRADING

SITE LEVELLING AND GRADING

Site levelling works involves the following works:

1) All works related to site clearance including removal of bushes, roots, stubs, levelling, grading, finishing and other additional works shall be carried out by the Contractor. Mandatory permission/ licenses/ statutory clearances from Competent Authorities for site levelling activities like, undertaking blasting related works, disposal of cutting material etc. shall be carried out by the contractor
2) Site grading level shall be fixed with due reference to site drainage of the whole area, existing drainage pattern, maximum flood level and system requirements.
3) Site levelling works/scheme shall match with the specific functional requirement of Solar PV generation considering the full utilization of the plot area for the desired capacity.
4) Consideration from the boundary and fencing requirements.

Based on the spot level, contour survey done and meeting above requirements, bidder can propose different site grade levels. The site levelling may be carried in patches/blocks. Bidder may also propose the site leveling and grading matching with the natural topography of the land considering the optimized use of the land, however bidder shall ensure to meet the desired power generation capacity in the allotted plot area. Bidder shall also ensure that no water ponding and flooding occurs in the low lying areas & effective drainage is provided in the whole plot area, in all kind of site levelling and grading or plant at natural topography schemes, bidders has to ensure to provide proper and effective drainage system in line “DRAINAGE SYSTEM” chapter. After performing the optimization of levels from the detailed site survey by the Contractor, the final formation level of the plot in various areas shall be finalized. The area shall be suitably cut and filled to suit the layout requirement. The site levelling and grading scheme incorporating the above aspects shall be submitted to NTPC for approval.

Fill shall normally be made up of Cohesive Non swelling material capable of being compacted upto 95% Modified Proctor density. In case earth has to be borrowed from outside the plant boundary, the same shall be arranged by the Contractor himself. The slope at the edge of graded areas shall not be flatter than 1:1.5 (1 vertical to 1.5 horizontal) in cutting and 1:2 in filling. In case of fill by rock material, the same shall be done in line with relevant Indian Standard.(Refer VICINITY MAP).

All buildings & switchyard area/sub-station area shall be constructed in levelled area. No foundation shall be allowed on back filled soil and in that case the depth of foundations shall reach up to NGL.Final Level will be approved in detail engineering.

The slope protection measure shall be provided in case inter levelled patches level difference is more than 2.0m. Random rubble/boulder/stone pitching/concrete blocks etc. shall be provided for the slope protection for road side slope, storm water ditches/drainage, embankment slopes, inter levelled patches slopes etc. as per design requirements.

D-3 GENERAL CIVIL WORKS

1. GENERAL

This chapter covers the Specific technical and functional requirements.

The design calculations and drawings for RCC structure, PEB Inverter Rooms, Steel structure, foundation system, road work, drainage, etc. shall be submitted for prior approval of NTPC before commencement of construction. The construction methodology for road works, drains shall be also be submitted for NTPC approval before start of works.

All design of RCC and Steel structures shall be carried as per IS: 456 and IS 800 respectively and other specific code as applicable to specific structures.

2. CMCS, INVERTER ROOMS, SECURITY ROOM:

The following structures shall be designed and provided by the bidder:

(I) **CMCS Building**: For the operation and maintenance of SPV Plant one Central Monitoring and Control Station (CMCS) with 33 KV switchgear room shall be provided. The CMCS building shall consist of the following:

1. Air conditioned SCADA Room
2. Inverter, battery room, ACDB and 33 KV Switchgear Room,
3. Store Room.
4. Supervisor room.
5. Toilets (Male and female).
6. Pantry.

Inverter(s), battery room, ACDB and 33 KV Switchgear room shall be based on manufacturer recommendation, easy passage of O&M persons and cable trench layout required. The CMCS shall be RCC framed structure with bricks/concrete blocks masonry walls. The CMCS shall have entry lobby and portico with roof for vehicle stoppage.

The minimum size & requirements of the CMCS Building & all items shall be as per NTPC tender drawing **5742-004-POC-A-003**.

(II) **Inverter Rooms**: Inverter rooms consist of PCU's, LT panels, batteries, etc. shall be provided based on manufacturer recommendation, easy passage of O&M persons and cable trench layout required. The inverter rooms shall be RCC building.

The battlery and its associated equipment shall be suitably segregated inside the Inverter room with proper ventilation arrangement.

The equipment inside the inverter room shall be placed so as to provide sufficient space for their maintenance.

The layout, design and drawings for all RCC structure, etc. and foundation system shall be approved from NTPC before start of works. The buildings and allied works shall be designed to meet national building code **2005** requirements.

2.1 **Specification for RCC Building for CMCS and Inverter room.**

The CMCS building shall be made of RCC framed structure with bricks/concrete blocks masonry walls. The thickness of outer masonry walls shall be minimum 230mm in case of bricks and minimum 200mm thick in case of concrete blocks. The following detailed specification shall also be followed for RCC works:

2.1.1 **Floor Finishes**

Switchgear/Inverter rooms	: Cement concrete flooring with ironite hardener.
SCADA room	: Heavy duty vitrified ceramic tiles
Battery room	: Acid Alkali resistance tile flooring or acid alkali resistant epoxy coating over concrete flooring with ironite hardener
Lobby	: Heavy duty vitrified ceramic tiles and skirting
Toilet	: Heavy duty anti-skid ceramic Tiles and dodo 210 mm
Steps	: Kota stone/Granite- 20 mm thick
Store room	: Cement concrete flooring with ironite hardener.

Flooring for air conditioned areas area shall be provided with vitrified ceramic tiles of size 600X 600 mm of min 9 mm thickness, laid with 3 mm ground joints as per approved pattern. Cement concrete flooring shall conform to IS 2571.

The floor finish for toilet shall be vitrified ceramic anti-skid tiles and Dado glaze ceramic tiles upto 2.1m shall be used. The normal size of Ceramic tiles shall be 300 mm X 300 mm X 9 mm and shall comply IS: 15622.

Finish floor level of all building shall be minimum 600 mm above from Finish graded level.

2.1.2 **False Celling**

The SCADA room shall be provided with false ceiling of 15 mm thick mineral fiber board, in tile form of size 600mm x 600mm, along with galvanized light gauge rolled form supporting system in double web construction pre painted with steel capping, of approved shade and color, to give grid of maximum size of 1200x600 mm as per manufacturers details including supporting grid system, expansion fasteners for suspension arrangement from RCC, providing openings for AC ducts(if required), return air grills(if required), light fixtures, etc., all complete.

2.1.3 **Roof Finishes**

Roof of the Building shall consist of Cast-in-situ RCC slab with decking sheet (RCC slab with permanent formwork) The slab formwork decking sheet shall be permanently colour coated profile sheet with minimum 0.6mm thickness of grade SS255 as per ASTM A653M / grade G250 as per AS 1397 coated with zinc of class designation Z275 or aluminium zinc alloy of class designation AZ150 or similar. The decking sheet shall meet the strength, deflection and other functional requirements.

Bidder can also provide Roof of the building as Cast-in-situ RCC slab conforming to Indian code.

The roof of the building shall be water proof with Polymeric membrane type waterproofing as per DSR 2013, Items no. 22.16. The roof shall be designed for minimum superimposed load to 150 kg/m2.

For efficient disposal of rainwater, the run off gradient for the roof shall not be less than 1:100 and the roof shall be provided with PVC/RCC water gutter, wherever required. Gutter shall be made water tight using suitable watertight treatment. This gradient can be provided either in structure or subsequently by screed concrete 1:2:4 (using 12.5 mm coarse aggregate) and/or cement mortar (1:4). However, minimum 25 mm thick cement mortar (1:4) shall be provided on top to achieve smooth surface. The roof of all building shall be projecting out by at least 750 mm all around the building for its external walls protection from rain water and parapet wall above the roof beam. Height of parapet wall shall be minimum 300 mm above top of roof level. Structural steel hand railings of minimum 700mm height shall also be provided over the parapet wall.

The bidder shall also provide rain water harvesting system consisting of ground water recharge pits for CMCS building roof.

2.1.4 **View point**

RCC terrace of CMCS building shall also work as view point. View point shall be used for security purposes and viewing gallery. Suitable RCC half landing staircase shall be provided for access to roof of the RCC CMCS building.

2.1.5 **Windows, Doors, Ventilators and Rolling Shutters**

Doors, windows and ventilators of air-conditioned areas, entrance lobby of all buildings, and all windows and ventilators of CMCS building shall have, powder coated (minimum thickness of powder coating 50 micron) aluminum framework with glazing. Window shall be provided with suitable aluminum grill.

All doors of toilet areas shall be of steel framed solid core flush shutter as per IS 2202. Minimum size of door provided shall be 2.1 m high and 1.2 m wide. However, for toilets minimum width shall be 0.75 m and office areas minimum width shall be 1.20 m.

Doors and windows on external walls of the buildings (other than areas provided, with insulated metal claddings) shall be provided with RCC sunshade over the openings with 300 mm projection on both side of the openings. Projection of sunshade from the wall shall be minimum 450 mm over window openings and 750 mm over door openings except for main entrance door to the control room where the projection shall be 1500 mm.

Rolling shutter (Mechanical gear operated). Rolling shutters shall be fabricated from 18-gauge steel and machine rolled with 75 mm rolling centers with effective bridge depth of 12 mm lath sections, interlocked with each other and ends locked with malleable cast iron clips to IS: 2108 and shall be designed to withstand a wind load without excessive deflection. Metal rolling shutters and rolling grills as IS: 6248

2.1.6 **Glazing**

All accessible ventilators and windows of all buildings shall be provided with min. 4mm thick float glass, tinted for preventing solar radiations, unless otherwise specified.

For single glazed aluminium partitions and doors, toughened float glass of 10 mm thickness shall be used. All glazing work shall conform to IS: 1083 and IS: 3548.

The glass to used should be from reputed brand / manufacturer and as approved by NTPC. The glass should be free from distortion and thermal stress.

2.1.7 **Paintings of wall and ceilings**

Internal wall surfaces: SCADA room All other rooms in plant buildings	 -Acrylic Emulsion -Acrylic Distemper
External faces of walls:	-Exterior emulsion paint
Walls of battery room	-Acid alkali resistant paint, an exposed wall above Dado -2100 mm high Dado of acid alkali resistant tiling.
All Ceiling	-Acrylic Distemper

The paint shall be anti-fungal quality of reputed brand suitable for masonry. All painting on masonry or concrete surface shall preferably be applied by roller. If applied by brush, then same shall be finished off with roller. For painting on concrete, masonry and plastered surface, IS: 2395 shall be followed. Minimum 2 finishing coats of paint shall be applied over a coat of primer.

For painting on steel work and ferrous metals, BS: 5493 and IS: 1477 shall be followed. The type of surface preparation, thickness and type of primer, intermediate and finishing paint shall be according to the painting system adopted.

Ceiling of all rooms except Battery room shall be white washed. The ceiling of Battery room (if provided) shall be acid/alkali resistant paint. CMCS building outside colors of paining shall be similar to PEB painting colors.

A standard color scheme for the different buildings/structures shall be prepared by the Contractor and the approval of the Owner shall be obtained, before commencement of work.

2.1.8 **Plumbing and sanitary**

CMCS building room shall have attached toilet for both gender. Each toilet shall have the following minimum fittings of ISI approved of reputed brand (subject to approval from Engineer in charge).

a) Wall mounted WC (Western type) 390 mm high with toilet paper roll holder and all fittings.
b) Wall mounted Urinal (430 x 260 x 350 mm size) with all fittings for male toilet only.
c) Wash basin (550 x 400 mm) above platform with all fittings.
d) Bathroom mirror (600 x 450 x 6 mm thick) hard board backing.
e) CP brass towel rail (600 x 20 mm) with C.P. brass brackets.
f) Soap holder and liquid soap dispenser.

Wash basin provision for hand wash shall also be provided in **battery room**.

All fittings, fastener, grating shall be brass with chromium plated as per relevant IS code. Necessary plumbing lines shall be provided for CMCS room building and Security room near main gate.

The bidder shall design & provide packaged sewerage treatment plant/septic with soak pit for CMCS and Security room assuming that a total of 15 people shall use the facility. The waste water/effluents from the sewerage plants/septic tank shall meet the state pollution board requirement.

2.2 **Water Supply**

GI pipes of Medium quality conforming to IS 1239 (Part I-1990) or CPVC pipes conforming to IS 15778 shall be used for all portable hot and cold water distribution supply and plumbing works.

The Syntax or equivalent make PVC storage water storage tank conforming to IS: 12701 shall be provided over the roof of the CMCS with adequate capacity for 10 No person and 24 hr requirement, complete with all fitting including float valve, stop cock etc. The capacity of the tank shall be minimum 500 liters.

2.3 **Plastering**

All external surfaces shall have 18 mm cement plaster in two coats, under layer 12 mm thick cement plaster 1:5 and finished with a top layer 6 mm thick cement plaster 1:6 (DSR 2013-13.11).

White cement primer shall be used as per manufacturer's recommendation.

At least one coat of plaster shall be applied to interior walls by hand or mechanically, to a total thickness of 12 mm using 1:6, 1 cement and 6 sand. Plastering shall comply to IS: 1542, IS: 1661, IS: 1630. Oil bound washable distemper on smooth surface applied with minimum 2 mm thick Plaster of Paris putty for control room. Plaster of Paris (Gypsum Anhydrous) conforming to IS: 2547 shall be used for plaster of paris punning.

Masonry Work

2.4 Brick works shall be using at least class designation 7.5 of approved quality as per IS: 1077, IS: 2212 and IS: 3495. Concrete blocks shall be of minimum compressive strength of 7.5 N/mm2 and shall be of Grade-A as per IS: 2185. Stone masonry work with hard stone in building works, foundation, plinth and drains shall be Coursed Rubble or Random Rubble masonry work with stone of good quality and durability. The masonry surface shall be plastered with minimum 18mm plaster in case of CMCS walls. The stone masonry work shall be in line with IS: 1597, IS: 1122 and IS: 1126.

The cement mortar for all kind of masonry work shall be in the ratio 1 cement and 6 sand by weight.

Bricks/blocks required for masonry work shall be thoroughly soaked in clean water tank for approximately two hours. Brick shall be laid in English bond style. Green masonry work shall be protected from rain. All masonry work shall be kept moist on all the faces for a period of seven days.

Bricks of class designation 50 and 35 may be permitted to have slight distorted & rounded edges provided no difficulty shall arise on this account in laying of uniform courses in non-load bearing structures and shall be subjected to approval of NTPC. Tolerances on dimensions up to +/- 8% shall be permitted. Dimension test to be carried out as per IS code.

The external wall for the building shall be 230 mm thick walls and internal wall 230/115 thick as per requirements. The external wall of CMCS facing the transformer area shall be as per IS: 1646 - Code of practice for fire safety of buildings (general): electrical installations.

Use of fly ash brick for masonry shall be subjected to approval of NTPC.

Suitable damp proof course shall be provided the proportion of cement, sand & aggregate shall be 1:2:4 using 6 mm down stone chips with a water proofing admixtures. The thickness of damp-proof course shall be minimum 40 mm.

2.5 **Reinforced Concrete Structure, Allied Works and Foundation**

All RCC works shall be design mix as per IS: 456-2000. For structural concrete items, Ordinary Portland cement (43 Grade) conforming to IS: 8112 and Fly ash based Portland pozzolana cement conforming to IS: 1489 (Part-1) shall be used for superstructure. Type of cement for sub- structures shall be decided based on the final Soil Investigation report.

Coarse aggregate for concrete shall be crushed stones chemically inert, hard, strong, durable against weathering of limited porosity and free from deleterious materials. It shall be properly graded. It shall meet the requirements of IS: 383.

Sand shall be hard, durable, clean and free from adherent coatings of organic matter and clay balls or pellets. Sand, when used as fine aggregate in concrete shall conform to IS: 383. For plaster, it shall conform to IS: 1542 and for masonry work to IS: 2116

Reinforcement steel shall be of high strength deformed TMT steel bars **with corrosion inhibitors, Corrosion Resistant Steel (CRS) re-bars, Fusion Bonded Epoxy Coated (FBEC) re-bars or Zinc Coasted re- bars** of grade minimum Fe-500 shall conform to IS: 1786. Ductile detailing in accordance with IS: 13920 shall be adopted for superstructure and substructure of all RCC buildings / structures. Dense concrete around reinforcement, provision of thick covers, and addition of corrosion protection with re-bars shall be provided to the RCC structures.

The following minimum grades of concrete for design mix and nominal mix shall be adopted for the type of structures noted against each unless not specified elsewhere.

M 30 - All RCC structural elements above and below ground level, precast concrete, foundation, cable trench, oil pit, Grade Slab, Paving, culverts & road.

M-20 (Equivalent nominal Mix of 1:1.5:3) * - Plain Concrete Cement

The bidder shall carry out the design mix of M-30 grade concrete on priority. The design mix shall be approved from NTPC before start of work.

In case Geotechnical investigations requires any special kind of cement or higher grade of concrete, the same shall be provided.

The foundation system shall be made which transfer loads safely to the soil for the module mounting structures, depending on soil conditions, geographical condition, regional wind speed, bearing capacity, slope stability etc. All foundation system and foundation depth shall be decided based on the approved geotechnical investigation report. No foundation allowed on back filled soil and the foundation depth to reach upto NGL.

All loads shall be considered in line with IS: 875. Seismic loads for design shall be in accordance with IS: 1893 and relevant Standards.

IS: 2502 Code of Practice for Bending and Fixing of Bars for concrete Reinforcement must be complied for reinforcements. IS: 5525 and SP: 34 shall be followed for reinforcement detailing.

A minimum 75 mm thick PCC shall be provided below RCC wherever RCC is laid over the ground. Proper and sufficient formwork/shuttering shall be provided for the required period as per IS: 456.

2.6 **Structural Steel**

All structural steel design shall be carried out as per IS 800. Structural steel shall conform IS 2062, Pipe shall be as per medium/high grade of IS 1161, Chequered plates shall conformed to 3502 and Hollow steel sections for structural use shall conform to IS: 4923.

2.7 **Grouting**

Cement mortar (1:2) grout with non-shrink additives shall be used for grouting below base plate of column. The grout shall be high strength grout having a minimum characteristic compressive strength of min 30 N/mm2 at 28 days.

3.0 **Transformer Yard Civil Works**

Transformer and equipment's foundations shall be founded on piles/isolated spread footings depending on the final geotechnical investigation report.

Transformer foundations shall have its own pit which would cover the area of the transformer and cooler banks, so as to collect any spillage of oil or oil drainage in case of emergency. The oil pit shall be filled with granite stones of 40 mm size uniformly graded.

The bidder can propose soak pit under Transformer or Burnt oil pit at a distance connected to transformer soak pit depending upon oil quantity in Transformers. It shall be sized to accommodate oil volume of the transformer connected to it, without backflow. Gravel filled level under transformer shall be in accordance with FGL outside pit and transformer bottom level.

The area around the transformer and equipment's shall be covered with gravel and galvanized chain link fence of height min 1.8 m with fence posts and gates shall be provided. All fence posts shall be 50X50X6 MS angles spaced at 2.5m c/c distance and all other specification mentioned in Tender drawing **5742-004-POC-A-004** shall be followed. M.S. angle posts shall conform to IS: 2062. The portion of the fence covering towards rail track shall be made of removable type for movement of transformer during erection /removal. In addition, a small gate, 1.2 m wide shall be provided for man entry. The transformer yard fencing work shall conform to CEIG requirements.

Transformer track rails shall conform to IS: 3443. The requirement of fire barrier wall between transformers shall be as per Electricity Rules and IS: 1646 recommendations.

4.0 **Pipe /Cable Racks & Trenches**

Trenches shall be constructed in reinforced cement concrete of M-20 grade of wall thickness min 150 mm. The top of trenches shall be kept at least 100 mm above the gravel level so that rain water does not enter the trench. Trench walls shall not foul with the foundations.

Outdoor Cable Trenches: RCC cable trenches shall be constructed in the switchyard and pre-cast RCC removable covers with lifting arrangement, edge protected with suitable galvanized angle iron designed to withstand self-weight of top slab + concentrated load of 150 kg at center of span on each panel.

Indoor Cable Trenches: RCC indoor cable trenches shall be provided with 50X50X4 mm angles grouted on the top edge of the trench wall for holding minimum 6 mm thick mild steel checkered plate covers (600 mm in length except at ends & bends) conform to IS: 3502 with lifting arrangement. Angle or channels shall also be grouted at distances of 600 mm across the indoor cable trenches to support the checkered plates.

Trench Drainage: The trench bed shall have a slope of approx. 1/500 along the run & 1/250 perpendicular to the run. In case straight length exceeds 30 m, suitable expansion joint shall be provided at appropriate

distances. The expansion joint shall run through vertical wall and base of trench. All expansion joints shall be provided with approved quality PVC water stops. Suitable drainage at lowest point of the trench shall be provided.

5.0 **ROAD AND PATHWAY**

5.1 **Road:** The approach road to the Solar Power Plant shall originate from the main approach road and connect to all Inverter rooms, CMCS building and gates. Approach road shall be 3.0 meter wide with 1meter wide shoulder on both side. Red moorum/brick, minimum 100 mm thick shall be provided for shoulder. The crown of the road shall be minimum 150 mm above FGL. The final finished roads shall have a camber of 1 in 50.

The minimum road section shall be as follows:

1) Topping: Wearing course of premix carpet 20 mm thick.
2) WBM, compacted 75 mm thick (Grade-III).
3) WBM, compacted 100 mm thick (Grade-II).
4) Granular Sub-base, compacted 150mm thick granular sub-base (Gr-I).
5) Sub-grade under road and its shoulders shall be compacted to achieve 95% or more of standard proctor's MDD. CBR value of the sub grade level should be minimum 4%. If actual CBR is less than 4% in a particular stretch then GSB thickness shall be increased suitably.

The methodology of road construction with material specifications shall be in line with IRC/MORTH and shall be submitted for approval before starts of works. Road works shall be carried out as per NTPC tender drawing **5742-004-POC-A-002**

6.0 **DRAINAGE SYSTEM:**

Surface drainage system shall be designed considering “maximum hourly rainfall intensity” at the site area considering latest 25 years return period however the minimum value of “maximum hourly rainfall intensity” shall be maintained as 60 mm in the drainage system design. The minimum value of surface run off coefficient shall be considered as 0.6 in the design of drainage system. The drainage system shall be designed as per the IRC specifications and prevailing industry practices. The drainage scheme shall be designed considering the bidder’s plot area and nearby catchment area contributing to the plot drains. Drainage scheme with detention ponds which allows for groundwater recharge & maintains the existing drainage pattern as far as possible is desired. A network of open drains shall be designed & provided to carry surface run off. The drains shall be trapezoidal or rectangle section lined with concrete slabs/brick

masonry/stone masonry/stone slabs. The minimum thickness of these lining shall be 115mm for brick masonry, 75mm thick for concrete slab, 150mm thick for stone masonry and 100mm thick for stone slab.

Grade level shall be fixed with due reference to highest high flood level of the receiving body of water. Laying of Hume pipe shall be in line with IS: 783.

7.0 ELECTRIFICATION OF BUILDING

Electrification of all building shall be carried out as per IS 732-1989, IS: 4648-1968 and other relevant standards.

8.0 LIST OF APPLICABLE INDIAN STANDARDS:

Indian codes, and/or standards shall govern, in all the cases wherever they are available. In case of a conflict between such codes and/or standards and the specifications, the stringent provisions shall govern. Such codes and/or standard referred to shall mean the latest revision, amendments/changes adopted and published by the relevant agencies. In case of any further conflict in this matter the same shall be referred to the Engineer-in-charge, whose decision shall be final and binding.

Other internationally acceptable standards shall be accepted, only if, no Indian Standards are existing. However, other standards also will be accepted if the Contractor establishes that the works are meeting the requirements of Indian Standards also.

A brief list of Indian Standards applicable to these works is as below:

General

IS: 875-I	Code of Practice for Design Dead Loads for Building and Structures
IS: 875-II	Code of Practice for Design Imposed Loads for Building and Structures
IS: 875-III	Code of practice for design loads (other than earthquake) for buildings and structures.
IS: 1893	Criteria for earthquake resistant design of structures.
IS: 4326	Code of Practice for earthquake resistant design and construction of buildings

Foundations

IS: 1080	Code of practice for design and construction of shallow foundations in soils (other than raft, ring and shell)
IS: 1904	Code of practice for structural safety of building foundations
IS: 2950	Code of practice for design and construction of raft foundations.
IS: 4091	Code of Practice for Design and Construction of Foundations for Transmission Line Towers and Poles
IS: 6403	Code of Practice for determination of bearing capacity of shallow foundations
IS: 8009	Code of Practice for foundation settlement calculations
IS: 2911	Design & Construction of Pile Foundation - Code of Practice

Concrete Structures

IS: 456	Code of practice for plain and Reinforced concrete
IS: 3370	Code of practice for concrete structures for the storage of liquids.
IS: 3414	Code of Practice for design and installation of joints in buildings
IS: 5525	Recommendation for detailing of reinforced concrete works
IS: 6313	Code of practice for anti-termite measures in buildings
IS: 13920	Ductile detailing of Reinforced Concrete Structures subjected to Seismic forces
IS: 1904	Code of practice for design and construction of foundations in soils general requirements

Steel Structures

IS: 800	Code of practice for use of structural steel in general building construction
IS: 801	Code of practice for use of cold-formed light gauge steel structure members
IS: 802	Code of Practice for use of Structural Steel in over Head Transmission Line Towers.
IS: 806	Code of practice for use of steel tubes in general building construction.
IS: 808	Dimensions for hot rolled steel beam, column channel and angle section
IS: 811	Specification for Cold Formed Light Gauge Structural Steel Sections

IS: 813	Scheme of symbols for welding
IS: 1079	Hot Rolled carbon Steel Sheet and Strip - Specification
IS: 2062	Hot Rolled Medium and High Tensile Structural Steel - Specification
IS: 4923	Hollow steel sections for structural use.
IS 1161	Steel tubes for structural purpose
IS: 2721	Galvanized steel chain link fence fabric - Specification

Painting and Coating

IS: 4736	Hot-dip zinc coatings on mild steel tubes
IS: 4759	Hot-dip zinc coatings on structural steel and other allied products – Specification
IS:1868	Anodic coatings on aluminum and its alloys
IS 2395-I	Painting of Concrete, Masonry and Plaster Surfaces - Code of: Operations and Workmanship
IS 2395-II	Code of practice for painting concrete, masonry and plaster surfaces: Schedule
IS 1477-I	Code of Practice for Painting of Ferrous Metals in Buildings: Pre-treatment
IS:1477-II	Code of practice for painting of ferrous metals in buildings: Painting

Water supply and sanitary

IS: 1239	Mild steel tubes and tubulars and other wrought steel fittings
IS: 1172	Code of basic requirements for water supply, drainage and sanitation
IS: 1742	Code of Practice for building drainage
IS: 2527	Code of practice for fixing rainwater gutters and down pipes for roof drainage.
IS: 15778	Chlorinated polyvinyl chloride pipes for potable hot and cold water distribution supplies
IS: 16088	Chlorinated polyvinyl chloride pipes for automatic sprinkler fire extinguishing system
IS: 10124	Fabricated PVC fittings for potable water supplies
IS: 4985	Un-plasticized PVC pipes for potable water supplies

IS: 13592	Un-plasticized Polyvinyl Chloride (PVC-U) Pipes for Soil and Waste Discharge System Inside and Outside Buildings Including Ventilation and Rainwater System
IS: 12818	Un-plasticized polyvinyl chloride (PVC-U)screen and casing pipes for bore/tubewell
IS: 2470	Code of Practice for installation of septic tanks

Miscellaneous

IS: 1905	Code of Practice for structural use of un-reinforced masonry
IS: 3067	Code of Practice for general design details and preparatory works for damp proofing and water proofing of buildings
SP: 6	Handbook for structural engineers (all parts)
SP: 7	National Building Code of India
SP: 16	Design Aids for reinforced concrete to IS:456
SP: 20	Handbook on masonry design and construction
SP: 22	Explanatory handbook on codes for earthquake engineering
SP: 24	Explanatory handbook on Indian Standard Code of Practice for plain and reinforced concrete
SP: 25	Handbook on causes and prevention of cracks in buildings
SP: 32	Handbook on functional requirements of industrial buildings
SP: 34	Handbook of concrete reinforcement & detailing
IRC: 37	Guidelines for design of flexible pavements
IRC: 42	Guidelines on Road Drainage
IRC: 58	Guidelines for the design of rigid pavements for highways
IRC: 73	Geometric design of roads

GENERAL DESIGN DATA

A. **VICINITY MAP**:

B. **WIND**: Basic wind speed shall as per Cl. 2.0 of Chapter A-2.

C. **SEISMIC** shall be as per IS: 1893 (Part-1)

D. The **CMCS building** shall consist of the following with area:

Sl No:	Room	Minimum Area
1	Air conditioned SCADA Room	16 sqm
2	Inverter, battery room, ACDB and 33 KV Switchgear Room	manufacturer recommendation
3	Store Room	25 sqm
4	Supervisor room	12 sqm
5	Toilets (Male and female)	16 sqm
6	Pantry	05 sqm

E. ALLBUILDINGS ARE OF RCC.

TENTATIVE TECHNICAL SPECIFICATIONS FOR INSTALLING STONE COLUMNS (ACTUAL DESIGN AND METHODOLOGY SHALL BE SUBMITTED BY THE BIDDER BEFORE EXECUTION OF THE WORK)

REFERENCE: IS 15284 (Part 1) :2003 DESIGN AND CONSTRUCTION FOR GROUNDIMPROVEMENT - GUIDELINES, PART 1 STONE COLUMNS

I. THE RECOMMENDED DIAMETER, SPACING, PATTERN AND LENGTH OF STONE COLUMNS

The recommended diameter, spacing and length of stone columns are:

(i) Dry stone columns of minimum**300 mm** diameter, as per the site conditions, sufficient number of stone columns should be maintained.

(ii) **Spacing** - **Centre to Centre** of Stone Columns shall equal to **3 times diameter** of the stone column.

(iii) Pattern: Triangular pattern as given in Fig. 1A of IS 15284 (Part 1): 2003 (Please see Enclosure 1)

I. SAILENT FEATURES FOR INSTALLING STONE COLUMNS

Dry stone columns shall be installed by **Vibro Compaction method** or **Ramming method** or the method given below.

1. The machinery and equipments used for installing the stone columns are similar to those used for bored cast in-situ concrete piles.

2. The winch should have an engine of appropriate capacity to install and lift 8 m long casing pipe and also to impart compaction energy of 2 tonne. metre to compact the stone aggregates in the bore hole.

3. Boring will be done by using bailer and chisel for the desired diameter of bore hole

4. Casing pipe will be installed up to the desired depth and the bore hole bottom will be cleaned of loose materials by bailer.

5. Pour the machine-mixed charge of 40 mm, 20 mm and 12 mm down aggregates mined in proportion of 45%, 35% and 20% respectively, for a height of 1.5 m from bore hole bottom, as per details given in Enclosure 1.

6. Pouring shall be done in such a way that there should be least segregation of coarser and finer materials.

7. Lift the casing pipe by 700 mm and impact an energy of 2 tonne. metre on top of the aggregate column in the bore hole, by using a flat end chisel of about 2 tonnes. The compaction should be done till a set of 20 mm or less is obtained for the last 10 blows of 2 tonne. metre energy.

8. Pour the next charge of 1.5 m height of aggregates and pull the casing pipe up by 700 mm to 900 mm. Impact compaction energy as described above.

9. Continue the same procedure till the stone column is build up to the desired elevation.
10. Compare the actual volume of stone aggregates consumed for each store column with the theoretical volume. The diameter of the compacted stone column will generally be 100 mm to 150 mm larger than the inner diameter of the casing pipe.

II. MATERIALS

The stone aggregates to be used for construction of stone columns should have high compressive strength, and should have good abrasive resistance. The shape of the aggregates should be angular for good interlocking when compacted. All aggregates should be machine-crushed and should be of granite rock type. Aggregates used for stone columns should conform to the strength requirements, physical properties and shape factor as mentioned in the relevant Indian Standard codes. The machine-mixed aggregates shall be got tested before an also at site to conform to the proportion mentioned in Sl. No. I (5) above.

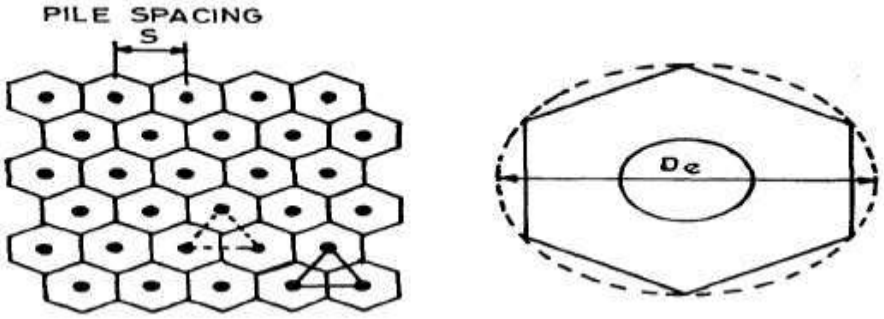
IV LAYOUT AND MARKING

The proposed solar power plant shall be marked on the ground as per the approved drawings released for construction. Stone column points shall be marked as per the specified grid size. Marking shall be firm and should not be disturbed during working. Contractor has to depute his engineer along with client"s engineer for marking the stone column points. These points are to be maintained properly without disturbance till the stone columns are installed.

V PERFORMANCE OF STONE COLUMN FOUNDATION

The effective performance of stone column foundation mainly depends on the proper mixing and compaction of aggregates inside the bore hole. Hence, the contractor has to ensure that proper mixing of aggregates in the desired proportion already mentioned and proper placing and compacting the aggregates inside the bore hole. All records are to be kept in a proper proforma approved by the Engineer in-charge and all operations like centering, boring, depth of bore hole, placing the charge in layers and compacting in layers are to be got certified by site supervisor for each stone column and at every stage of activity.

After installation of all stone columns, the foundation bed will be prepared over the stone columns and pre-loading to the desired extent shall be applied, in stages. Each stage of pre-loading shall be maintained until the rate of settlement reduces to a desired value.



1A - TRIANGULAR ARRANGEMENT OF STONE COLUMNS

PROCEDURE FOR POURING THE CHARGE AND COMPACTING

1. Place 25 cft of mixed materials (40 mm – 45%: 20 mm – 35% and 10 mm – 20%) for each pouring.

2. Pull the casing up by 700 mm

3. Compact the aggregates until the final set of 20 mm or less for last 10 blowsis reached.

4. Note the top level of compacted fill. Bottom of casing pipe should be at least 150 mm to 200 mm below the top of compacted column of aggregates.

5. Pour the next 25 cft of charge.

6. Pull the casing up by 750 mm to 900 mm (depending on the previous observation of step 2 to 4, making sure that at least 150 to 200 mm of the casing pipe should be below the top of the compacted column of aggregates).

7. Compact the second charge of aggregates until a set of 20 mm or less isreached for the last 10 blows

8. Repeat steps 4 to 7 reading of all the above steps are to be written neatlyin a sketch

9. Calculate the total volume of materials used.

10. Arrive at an average actual diameter (D) of the stone column, using thefollowing formula.

$$D = [(4V) \dagger (\pi L)]^{1/2}$$

where V = Total volume of the aggregates used,
L = Length of the bore hole (or stone column)

SAFETY PLAN

PROJECT- 22 MW FLOATING SOLAR PV PROJECT
NTPC, KAYAMKULAM

Doc ref. No.: BHEL:NTPCKYM:HSE:01 Rev. 00 Dated 12.03.2020

Rev. 01 dated 19.05.2020

PREPARED BY:

PV SYSTEM ENGINEERING

AND

HSE DEPARTMENT

BHEL EDN BANGALORE

HSE POLICY

In BHEL, Health, Safety and Environment (HSE) responsibilities are driven by our commitment to protect our employees and people we work with, community and environment. BHEL believes in zero tolerance for unsafe work/non-conformance to safety and in minimizing environmental footprint associated with all its business activities. We commit to continually improve our HSE performance by:

- Developing safety and sustainability culture through active leadership and by ensuring availability of required resources.
- Ensuring compliance with applicable legislation, regulations and BHEL systems.
- Taking up activities for conservation of resources and adopting sound waste management by following Reduce/Recycle/Reuse approach.
- Continually identifying, assessing and managing environmental impacts and Occupational Health & Safety risks of all activities, products and services adopting approach based on elimination/ substitution/reduction/control.
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, design of products & systems and for selection of plants, technologies and services.
- Imparting appropriate structured training to all persons at workplace and promoting awareness amongst customers, contractors and suppliers on HSE issues.
- Reviewing periodically this policy and HSE Management Systems to ensure its relevance, appropriateness and effectiveness.
- Communicating this policy within BHEL and making it available to interested parties.

Atul Sobti
Chairman & Managing Director

June 5, 2018

Creating BHEL of tomorrow

BHARAT HEAVY ELECTRICALS LIMITED

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this Safety Plan is to provide for the systematic identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during execution of the 22 MW Floating Solar Project. This document shall be followed by M/s BHEL, Sub-Contractors & all persons at site at all installation and servicing sites. In case customer specific documents are to be referred, the same will be followed in conjunction with this document.

2.0 APPLICATION

The document is applicable for execution of the 22 MW Floating Solar Project and it is expected that Client and Sub-contractor are committed to the following guidelines:

- Ensure that the Health and Safety of all persons at work site is not adversely affected by the work.
- Ensure protection of environment at the worksite.
- Ensure compliance at all times with the relevant statutory and contractual Safety requirements.
- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Provide all personnel with adequate information, instruction, training and supervision.
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including contractors in respects of Safety.
- Establish effective communication on SAFETY matters with all relevant parties involved in the Project works.
- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure fitness testing of all T&Ps. Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent authority.
- Ensure timely provision of resources to facilitate effective implementation of SAFETY requirements.
- Ensure continual improvements in SAFETY performance
- Ensure conservation of resources and reduction of wastage.
- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause.
- Ensure timely implementation of correction, corrective action and preventive action.

3.0 TERMINOLOGIES

❖ INCIDENT

Work- related event(s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred.

❖ **NEAR MISS**

An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause, is referred to as “Near-Miss incident”.

❖ **MAN-HOURWORKED**

The total number of employee hours worked by all employees including subcontractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract labors. Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workday for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

❖ **FIRST AID CASES**

First aids are not essentially all reportable cases, where the injured person is given medical treatment and discharged immediately for reporting on duty, without counting any lost time. Please refer Format 03 for requirement of items with respect to treatment for First Aid Cases.

❖ **LOST TIME INJURY**

Any work injury which renders the injured person unable to perform his regular job or an alternative restricted work assignment on the next scheduled work day after the day on which the injury occurred.

❖ **MEDICAL CASES**

Medical cases come under non-reportable cases, where owing to illness or other reason the employee was absent from work and seeks Medical treatment.

❖ **TYPE OF INCIDENT / ACCIDENT & THEIR REPORTING:**

The three categories of Incident / accident are as follows:

- **Non-Reportable Cases:**
  An accident, where the injured person is given medical help and discharged for work without counting any lost time.

- **Reportable Cases:**

  In this case the injured person is disabled for 48 hours or more and is not able to perform his duty.

- **Injury Cases:**

  These are covered under the heading of non-reportable cases. In these cases the accident caused injury to the person, but he still continues in his duty.

❖ **TOTAL REPORTABLE FREQUENCY RATE**

Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as:

$$\frac{\text{Number of Reportable LTI}}{\text{Total Man Hours Worked}} \times 1{,}000{,}000$$

❖ **SEVERITY RATE**

Severity rate is the Number of days lost due to Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula reads as:

$$\frac{\text{Days lost due to LTI}}{\text{Total Man Hours Worked}} \times 1{,}000{,}000$$

❖ **INCIDENCE RATE**

Incidence Rate is the Number of LTI per one thousand manpower deployed.

$$\frac{\text{Number of LTI} \times 1000}{\text{Average number of manpower deployed}}$$

❖ **MANAGEMENT REPRESENTATIVE:** Representative from Project Head

❖ **OCP:** Operation Control Procedures

❖ **PPE:** Personal Protective Equipment

4.0 ROLES & RESPONSIBILITIES

4.1 SAFETY CO-ORDINATOR

- Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, and other tools and tackles. Record observations as per Format 01 on a weekly basis.
- Facilitate inclusion of safety elements into Work Method Statement.
- Highlight the requirements of safety through Tool-box / other meetings.
- Conduct investigation of all accident/dangerous occurrences & recommend appropriate safety measures.
- Advice & co-ordinate for implementation of SAFETY permit systems & OCPs. Convene SAFETY meeting & minute the proceedings for circulation & follow-up action.
- Plan procurement of PPE & Safety devices and inspect their healthiness.
- Facilitate administration of First-Aid
- Facilitate screening of workmen and safety induction.
- Conduct fire drill and facilitate emergency preparedness
- Design campaigns, competitions & other special emphasis programs to promote safety in the workplace.
- Notify site personnel for non-conformance to safety norms observed during site visits / site inspections.
- Recommend to Site In charge for immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment.
- To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.
- Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.

4.2 ALL EMPLOYEES

- To adopt safe working practices
- To take corrective action and preventive action in case any non-conformity is observed on product / process / system with respect to Occupational Health, Safety and Environment.
- To report all incidents including near miss to Safety Coordinator.
- In case any particular activity / work has extremely high consequential risk or high environmental impact, the employee shall bring it to the notice of Site In charge before starting the work.

- To ensure that the workers are engaged by the contractor for the job after undergoing induction training.
- To ensure that the persons engaged in his area, follow the safety rules like using appropriate PPEs.
- To get involved in exercises like Job Safety Analysis and Work Permit System.
- To engage licensed electricians for site electrical works.
- To report any incident including near misses or safety lapses immediately to Safety Coordinator
- To support/co-operate with audit team members as & when safety audits are carried out.
- To involve in investigation, if any incident occurs in his work area.
- To participate in safety promotional programmers'.
- To attend the safety committee meeting, if he is a member/invitee
- To ensure that only suitable Tackles & Plants and qualified persons are engaged.

5.0 SUB-CONTRACTOR REPRESENTATIVE AT SITE

- Shall fill-up agreement form for compliance to relevant safety Plan for Site Operations.
- Shall ensure fulfillment of relevant safety requirements of 22 MW floating solar Project and practice very strictly in his area of work in consultation with his concerned engineer and the Safety Coordinator.
- Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
- Shall not engage any employee below 18 years.
- Shall arrange for all necessary PPEs like life jackets, safety helmets, belts, safety shoes, face shield, high visibility vest, hand gloves etc. before starting the job. Shall ensure that no working men/women carry excessive weight more than stipulated in BOCW Rules and Regulations.
- Shall ensure that all Tackles & Plants engaged are tested for fitness and have valid certificates from competent authorities.
- Shall adhere to the instructions laid down in Operation Control Procedures (OCPs Point No 8)
- Shall ensure that person working above 3.3 meter should use Safety Harness tied to a life line/stable structure.
- Shall ensure that materials are not thrown from height. Caution to be exercised to prevent fall of material from height.
- Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /Safety Coordinator of the 22 MW floating solar Project.
- Shall ensure that adequate illumination is arranged during all the time.
- Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
- Shall ensure display of adequate signage/posters on HSE.
- Shall ensure that mobile phone is not used by workers while working.
- Shall ensure conductance of mock drill, induction training and training on the site.
- Shall ensure good housekeeping.
- Shall ensure adequate valid fire extinguishers are provided at the worksite.

- Shall ensure adequate drinking water at work site
- Shall ensure adequate emergency preparedness.

5.1 DEPLOYMENT OF TOOLS & PLANTS

- As a measure to ensure that machinery, equipment and tools being mobilized to the construction site are fit for purpose and are maintained in safe operating condition and complies with legislative and owner requirement, inspection shall be arranged by in-house competent authority for acceptance as applicable.
- The machinery and equipment to be employed for this purpose shall include but not limited to the following:

o Mobile cranes.
o Side Booms.
o Forklifts.
o Grinding machine.
o Drilling machine.
o Air compressors.
o Welding machine.
o Generator sets.
o Dump Trucks, tractors.
o JCBs,Excavators.
o Hand tools.
o Road Rollers
o Vibration Compacters
o Boring Machine
o Chipping Machines
o Hammer Machines
o Breakers
o Boats
o Floating Machinery

5.2 DEPLOYMENT OF MANPOWER

- As a measure to ensure that manpower being mobilized to the construction site is fit and competent for safe working, screening arrangement shall be made by the sub-contractors to fulfill contractual as well as legislative requirement.
- Examination of medical fitness shall be conducted through qualified medical professional for all workers to be deployed. The Medical Examination reports are maintained by the Safety Coordinator of BHEL.
- Gate pass is linked with medical check-up fitness certificate and compulsory completion of safety induction training. For under water works valid diving certificates are compulsory.

5.3 DEPLOYMENT OF PPEs

The following matrix recommends usage of minimum PPEs against the respective job. The PPEs shall conform to the relevant standards as listed in the reference under clause 3.0 and bear ISI mark. All the PPEs shall be periodically checked for its quality before issue by safety coordinator. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be repaired/ replaced. The issuing agency shall maintain register for issue and receipt of PPEs. The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front. The body harnesses shall be serial numbered.

Sl.no	Type of work	PPEs (Subject to applicability of process)
1	Concrete, asphalt mixing	Nose mask, hand glove, apron and gum boot
2	Welders/Grinders/ Gas cutters	Welding/face screen, apron, hand gloves. Helmet fitted with welding shield is preferred for welders
3	Stone/ concrete breakers	Safety goggles, hand gloves
4	Electrical Work	Rubber hand glove, Electrical Resistance shoes
5	Insulation Work	Hand gloves
6	Work at height	Double lanyard full body harness, Fall arrestor (specific cases)
7	Grit/Sand blasting	Blast suit, blast helmet, gloves
8	Painting	Plastic gloves, respirator for spray Painting)
9	Work on water for PV floaters, floating system	Life jackets, Rescue Boat with trained rescue team.
10	Work in water for anchoring and mooring system	SCUBA apparatus, Rescue Boat with trained rescue team

Rescue boat with trained and authorized boat operators with rescue team shall be available at site all the time till all persons involved reach the shore.

Besides the PPEs mentioned above, the persons shall use helmet and safety shoe. The visitors shall be issued Helmet and any other PPEs as deemed appropriate for use in the area of work.

❖ **Color Code for Helmets:**

1. Workmen: Yellow.
2. Safety staff: Green.
3. Engg, supervisor, visitor, site in charge: White.

5.4 MEDICAL FACILITIES

➢ **FIRST AID PROVIDER**

- Every injury shall be treated, recorded and reported.
- Refresher course on first aid shall be conducted as necessary.

- List of qualified first aiders and their contact numbers should be displayed at major locations by safety Coordinator.

➢ **FIRST AID BOX**

- First aid facilities shall be provided and maintained.
- The first aid box shall be kept by first aider who shall always be readily available during the working hours of the work place. His name and contact number to be displayed on the box.
- The first aid box shall be distinctly marked with a Red Cross on white background.
- Details of contents of first aid box is given in Format No.02
- Monthly inspection of First Aid Box shall be carried out by the Site In charge as per format no 02.

➢ **HEALTH CHECKUP**

The persons engaged at the site shall undergo health checkup as per the **format no 03** before induction.

a. Height workers
b. Drivers/crane operators/riggers
c. Confined space workers
d. Shot/sandblaster
e. Welding and NDE personnel.
f. Divers for under water activity

➢ **PROVISION OF EMERGENCY VEHICLE**

A vehicle shall be stationed exclusively at workplace to handle emergencies. This shall be by way of tying up with customer's medical centre /local hospitals/ sub-contractors by mutual aid agreement.

6.0 SAFETY TRAINING & AWARENESS

❖ **SAFETY INDUCTION TRAINING**

All persons entering into project site shall be given safety induction training by the Safety Coordinator of 22 MW floating solar Project. In-house induction training subjects shall include but not limited to:

- Briefing of the Project.
- Safety objectives and targets.
- Site safety rules.
- Site safety hazards
- First aid facility.
- Emergency Contact No.
- Accident reporting.
- Fire prevention and emergency response.

- Proper safety wear & gear must be issued to all the workers being registered for the induction.
- They must arrive fully dressed in safety wear & gear to attend the induction.
- Any one failing to conform to this safety wear & gear requirement shall not qualify to attend.
- Risk of Drowning

Each employee shall undergo safety induction training.

❖ **TOOL BOX TALK**

- Tool Box talk shall be conducted by Safety Coordinator to work groups prior to the start of work. The agenda shall consist of the following:
- Details of the job being intended for immediate execution.
- The relevant hazards and risks involved in executing the job and their control and mitigating measures.
- Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
- Risk of drowning while working in water
- Recent non-compliances observed.
- Appreciation of good work done by any person.
- Record of Tool box talk shall be maintained as per format no 06

❖ **TRAINING ON HEIGHT WORK**

Training on height work shall be imparted to all workers working at height by in- house/external faculty. The training shall include following topics:

- Use of PPEs
- Use of fall arrester, life line.
- Safe climbing through monkey ladders.
- Inspection of PPEs.
- Medical fitness requirements.
- Mock drill on rescue at height.

❖ **TRAINING ON WORK IN WATER**

Training on working in water shall be imparted to all workers working in water by in- house/external faculty. The training shall include following topics:

- Use of PPEs
- Risk of drowning
- Inspection of PPEs.
- Medical fitness requirements.
- Mock drill on rescue in case of accidents.

❖ **SAFETY PROMOTION-SIGNAGE, POSTERS**

➢ **Display of safety posters and banners.**

- Site shall arrange appropriate posters, banners, slogans in local/Hindi/, English languages at workplace

➢ **Display of safety signage**

- Appropriate safety signage shall be displayed at the work area to aware workmen and passersby about the work going on and do's and don'ts to be followed.

➢ **Safety awareness program/safety training program**

- Site will arrange safety awareness program periodically on different topics including medical awareness for all personnel working at site.

- Safety Coordinator shall arrange training program based on site condition

7.0 SAFETY COMMUNICATION

❖ **MONTHLY SAFETY REPORTING**

- Safety information of Site shall be reported monthly through Monthly Site safety report (MSR) as per format 04.

- The period of reporting shall be 1st of each calendar month.

8.0 OPERATIONAL CONTROL

Permit applicant shall apply for work permit of particular work activity before starting of the work in the format 13.

8.1 EXCAVATION WORK SAFETY:

Excavation permit shall be taken before the start of the excavation work as per depth limits.

- Avoid damage / personal injury during excavation work at sites.
- Ensure proper barricading by ribbon or Hard barricading of the excavated area.
- Proper side slopes of the excavation as per the type of soil should be maintained.
- Where side slopes cannot be provided due to space constraints before excavation, sheet piling must be done to prevent the collapse of earth.
- As soon as the job is completed, immediate back filling to be done.
- No personnel be allowed within the swing area of mechanical excavator when work is in progress.
- Proper lighting to be arranged when the excavation is carried out at night.
- Excavated earth to be dumped/ stored in a designated place only.
- Surplus earth to be transported and disposed in the authorized area.

- Site safety department to identify all possible hazard areas related to excavation work and ensure control.
- Use proper PPE"s.
- Ensure adequate caution signs are displayed in the area of operation.

8.2 FLOATING WORK SAFETY

Floating work permit shall be taken before the start of any work in water.

- Ensure working with a partner or team when working around or on water. Preferably at least two people need to be in sight of each other at all times.
- Availability of communication devices to be ensured before going to work in water.
- Proper provision for first aid to be ensured.
- The availability of water rescue boat with team shall be ensured.
- Use of suitable personal buoyancy equipment, such as lifejackets shall be ensured.
- All persons who are going to work in water must trained to understand clearly any procedures in place and what action they must take to protect themselves, including in an emergency.

9.0 WORK PERMIT SYSTEM

- The following activities shall come under Work Permit System

a. Height working of 3.3 metre and above

b. Excavation more than 1.5 meter depth

c. Heavy lifting by machinery on land

d. Works of floaters involving activity in water other than shore

- "Safety Procedure for Work Permit System" shall be followed while implementing permit system.
- Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work in the format 13.
- Permit signatory shall check that all the control measures necessary for the activity are in place and issue the permit to the permit holder.
- Permit holder shall implement and maintain all control measures during the period of permit
- He will close the permit after completion of the work. The closed permit shall be archived with safety personnel of site.
- Permission for Works in water shall be permitted after checks related to compliance to wearing PPEs, availability of safety boat

10.0 HOUSEKEEPING

- Proper housekeeping to be maintained at work place and the following are to be taken care of on daily basis.
- All surplus earth and debris are removed/disposed off from the working areas to identified locations.
- Unused/Surplus cables, steel items and steel scrap lying scattered at different places/elevation within the working areas are removed to identified locations.

- All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from workplace to identified locations. Sufficient waste bins shall be provided at different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from higher location.
- Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap and other hindrances.
- Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
- Fabricated steel structures, pipes & piping materials shall be stacked properly.
- No parking of trucks/trolleys, cranes and trailers etc. shall be allowed in the camp, which may obstruct the traffic movement as well as below LT/HT power lines.
- Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas.

11.0 WASTE MANAGEMENT

❖ STORAGE AND COLLECTION

- Different types of rubbish/waste should be collected and stored separately.
- Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting lids.
- Rubbish should not be left or allowed to accumulate on construction and other workplaces.
- Construction rubbish should not be burnt near working site.

❖ SEGGREGATION

- Earmark the scrap area for different types of waste.
- Store wastes away from building.
- Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
- Clinical and first aid waste stored and incinerated separately.

❖ DISPOSAL

- Sufficient containers and scrap disposal area should be allocated.
- All scrap bin and containers should be conveniently located.
- Provide self-closing containers for flammable/spontaneously combustible material.
- Keep drainage channels free from choking.
- Maintain a schedule for collection and disposal of waste.

12.0 WARNING AND SIGNS

- Appropriate sign to be displayed at scrap storage area
- No toxic, corrosive or flammable substance to be discarded into common sewage system.
- Waste disposal shall be in accordance with best practice.

13.0 EMERGENCY PREPAREDNESS AND RESPONSE (EPR)

❖ **DEFINITION**:

An emergency occurring at site is one that may affect work at site and / or may cause serious injuries, loss of life, extensive damage to property.

❖ **OBJECTIVE:**

This EPR aims at putting into place the system for early identification of the situation, classification and setting into motion action by the concerned Action teams to mitigate the situation and normalize the area.

❖ **NATURE OF EMERGENCIES AT SITE:**

Emergencies during the course of execution of Floating SPV Project is likely from following exigencies:

1. Fire: Fire can take place at site at storage area, DG powerhouse, site offices and other areas at site.

2. Water body related accidents: Drowning, slippage, Fall in water.

3. Medical emergencies: A medical emergency refers to any situation in which a person(s) requires medical intervention. Medical emergencies include complications from medical conditions and work injuries. Having trained staff and effective emergency response procedures will reduce the impact of a medical emergency on the individual and the organization.

❖ **MODE OF OPERATION IN EMERGENCY:**

i. **Raising an Alarm:**

In the event of emergency, the security guard on duty/work supervisor will identify the nature of emergency and raise an alarm.

ii. **Assessment of The Emergency Situation**

Assessing the Emergency situation is to be done primarily by the concerned work supervisor. He assesses the situation and convey information regarding the Emergency situation to BHEL Safety Coordinator and the BHEL Site In-charge and other important persons whose Telephone numbers are given as below, as feel necessary based on assessment of situation:

EMERGENCY CONTACT NOS		
Sr. No.	Name of person Agency	Contact Nos.
1	BHEL Project In-charge	
2	BHEL Safety Coordinator	
3	BHEL site/Area in-charge / Incident Controller	
4	Bhel EPC Vendor In-charge Contact no.	
5	NTPC CISF emergency contact	
6	NTPC Fire Fighting Department Contact	
7	Kayamkulam Fire Fighting Department Contact no.	
8	NTPC Medical Centre Contact	
9	Identified Hospitals Names : with address and no. and approx. distance	
10	BHEL Emergency site vehicle Driver :	

BHEL Site Incharge in consultation with the BHEL Project Incharge will take decision on any additional resources required from outside in handling the situation. Depending on level of emergency, his job will involve co-ordination of rescue and other emergency activities on site and liaison with the respective authorities (Fire services and Hospitals) for assistance in firefighting, hospitalization etc.

iii. **Termination of the Emergency:**

When the conditions causing Emergency are brought under control and residual situation can be tackled by the site's internal resources, Site Incharge will announce termination of emergency situation and inform the project In-charge and concerned NTPC officials.

❖ **EMERGENCY MITIGATION PROCEDURE:**

1. Fire Incident:

- The emergency alarm to be raised by the concern work supervisor/security guard on duty.
- After quick assessment of situation, work supervisor shall communicate to the concern persons.
- The available personnel at site will aid the fire suppression system with the available fire extinguishing equipment
- activating water pumping sets for spraying, as available
- Provide first aid to injured persons, if any
- Suspend all operations at that area of site
-Shut off the main power supply
- Evacuation of all contractors, visitors and motor vehicles on the site to a safe distance from the site at the identified assembly point at site
- Provide access for the special equipment of the Fire Safety to sources of water
- Provide assistance to the personnel of the Fire Safety with the extinguishing of the fire;

2. Water Incident:

- Immediate information about incident to be given to BHEL site In charge and Safety Coordinator by Work Supervisor
- Information to rescue team to point in water and bringing the affected person/s to shore
- Information to BHEL emergency Vehicle for shifting of injured to nearest hospital

3. Medical emergencies:

- Immediate information about incident to be given to BHEL site in charge and Project in charge by Work Supervisor
- First Aid to be given, if possible
- Information to BHEL emergency Vehicle for shifting of injured to nearest hospital

The EPP shall be tested once in two months through Mock drills as per Format No. 14 and 15.

14.0: FIRE SAFETY PROCEDURE

1. Site-in-charge / Safety Coordinator will make periodical review of the site Fire Protection, Prevention Preparedness, Site conditions and available fire protection equipment.

2. A mutual aid agreement with local Fire station for availability of Fire tender shall be made.
3. It is very imperative good contact with Local fire station for availability of Fire tender in case of emergencies, in additional to their own fire equipment.
4. Fire Protection, Prevention and Preparedness Inspections - The Contractor /Sub-Contractor will be required to make frequent fire prevention inspections of his work site and operating facilities. Deficiencies will be corrected at once.
5. Emergency telephone number to be displayed at all important places.

15. CONTROL OF DOCUMENTS

All documents shall be controlled as per safety Procedure for Document Control and on water, in water have maintain required documents, certificates.

16.0 SAFETY INSPECTION

Inspection on safety for different activities being carried out at site shall be done to ensure compliance to safety requirements. Before start the work ensure all required PPEs on water, in water and other working locations.

❖ DAILY SAFETY CHECKS

Site Supervisors or safety Supervisors of BHEL's subcontractors are to conduct daily site safety inspection around work activities and premises to ensure that work methods and the sites are maintained to the acceptable standard.

❖ INSPECTION OF PPE

- PPEs shall be inspected by Safety Coordinator at random once in a week as per **Format no 07 for** its compliance to standard and compliance to use and any adverse observation shall be recorded in the PPE register.
- The applicable PPEs for carrying out particular activities are listed below.
- The IS standard to be complied to, for different PPEs, is given as follows:

RELEVANT IS-CODES FOR PERSONAL PROTECTION

IS: 2925 – 1984	Industrial Safety Helmets.
IS: 4770 – 1968	Rubber gloves for electrical purposes.
IS: 5557 – 1969	Industrial and Safety rubber knee boots.
IS: 5983 – 1978	Eye protectors.
IS: 9167 – 1979	Ear protectors.
IS: 3521 – 1983	Industrial Safety Belts and Harness
IROS (or MMD)	Life jackets/Vests

❖ INSPECTION OF TOOLS & PLANTS

- A master list of Tools & Plants shall be maintained by each subcontractor.
- All Tools & Plants being used at site shall be inspected by Safety Coordinator once in a month as per Format no 08 for its healthiness and maintenance.
- The Tools & Plants which require third party inspection shall be checked for its validity during inspection.
- The certificate of Tools & Plants shall be monitored as per Format no 09

❖ INSPECTION OF CRANES AND WINCHES

- Cranes and winches shall be inspected by the operator through a daily checklist for its safe condition (as provided by the equipment manufacturer) before first use of the day.
- Cranes and Winches shall be inspected by Safety Coordinator once in a month as per Format no 10 for healthiness, maintenance and validity of third party inspection and SWL shall be displayed.
- The date of third party inspection and next due date shall be painted on cranes and winches.

❖ INSPECTION ON HEIGHT WORKING (ONLY FOR CMCS AS APPLICABLE)

- Inspection on height working shall be conducted by Safety representative of Construction agency before start of work to ensure safe working condition including provision of
    - o Safety Harness
    - o Fencing and barricading
    - o Warning signage
    - o Covering of opening
    - o Proper scaffolding with access and egress.
    - o Illumination
- Inspection on height working shall be conducted once in a week by Safety Coordinator as per format no 11
- Height working shall not be allowed during adverse weather.

❖ INSPECTION ON ELECTRICAL INSTALLATION /APPLIANCES

- Ensure proper earthing in electrical installation. Verify values per month.
- Use ELCB with 30 mille amps sensitivity at electrical booth.
- Electrical installation shall be properly covered at top where required
- Use appropriate PPEs while working
- Use portable electrical light < 24 V in confined space and potentially wet area.
- Monthly inspection shall be carried out for all ELCBs/RCCBs.

17. 0 MONTHLY SAFETY REVIEW MEETING

- Site shall hold SAFETY review meeting every month to discuss and resolve SAFETY issues of site and improve SAFETY performance. It will also discuss the incidents occurred since previous meeting its root cause and corrective action and preventive action.

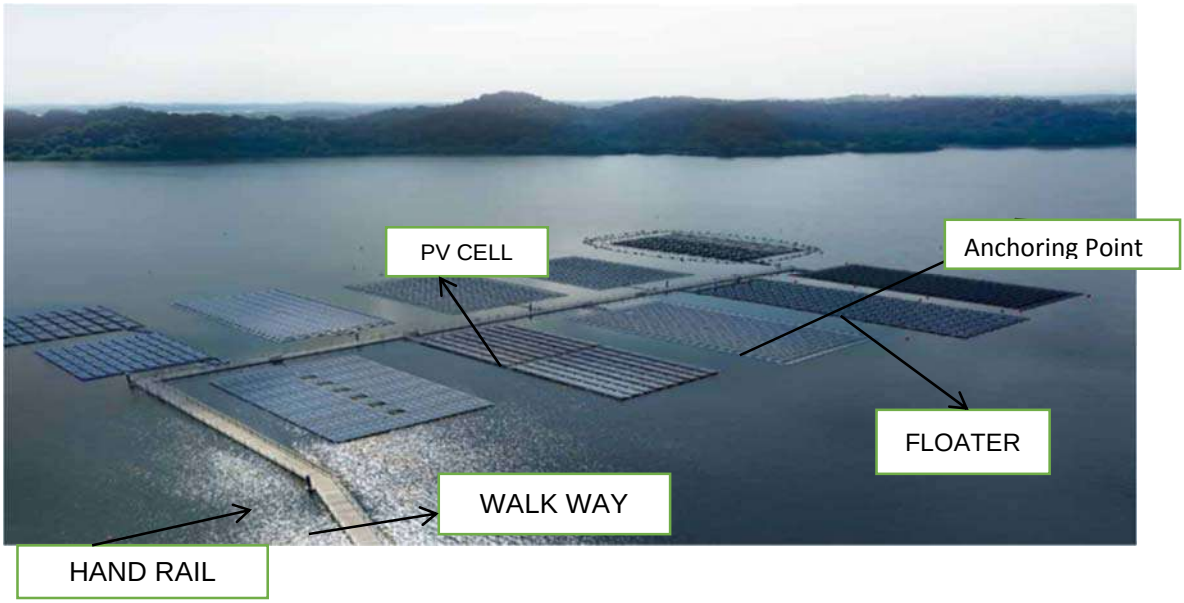
- The meeting shall be chaired by Site In charge, convened by Safety Coordinator and attended by all head of sections (HOS), Site In charge of Subcontractors and Safety representative of Subcontractors.

- MOM on the discussion will be circulated to the concerned for implementation.

18.0 TYPICAL DEPICTION OF FLOATING SOLAR PV SYSTEM (FOR GENERAL REFERENCE)

FLOATING SOLAR POWER ERECTION SAFETY

(Floating platform Under construction)



❖ **SYSTEM COMPONENTS**:

1. Solar PV modules for conversion of solar radiation to electrical energy/
2. Anchoring systems: Anchoring system refers to permanent under-water structure to secure floating platforms.
3. Pontoon: A pontoon is floatation device with enough buoyancy to float by itself as well as with a heavy load.
4. Floats: Multiple plastic hollow floats with effective buoyancy to self-weight ratio are combined over and over again, forming a giant pontoon. The floats are typically made of HDPE (high density polyethylene), known for its tensile strength, maintenance free property.
5. Mooring system: A mooring system usually refers to any permanent structure on the banks to which floats are secured.
6. Cables and connectors: Electricity is drawn from the solar array and transported to the land. Therefore, the power can be fed to the grid or stored in batteries.

19.0 RISKS AND HAZARD:

1. Identified as per Job Risk Assessment exercise and HIRA Documents attached based on planned construction activities. In case of requirement for erection or civil work of type not envisaged, JSA/HIRA for the same will be prepared and NTPC approval obtained to commence the activity.

❖ **PRECAUTIONS:**

1. As mentioned in enclosed HIRA Documents.

20.0 SITE RECORDING FORMATS: Enclosed

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HAZARD IDENTIFICATION AND RISK ASSESMENT (HIRA)	
Job Task: Tree felling and vegetation clearance	**Equipment #:** Hydra/Crane/JCB
Project/Location: 22 mw Floating Solar Project, NTPC, Kayamkulam	**Analysis done by: PV System Engg. Reviewed by: BHEL-HSE**
PPE required: Safety helmet, vest, shoes, hand gloves, goggles etc.	**Date Initiated: Revised date:**
Emergency Plan: Yes	
Tools used: Hand operated Power saws, Cutting tools	**Chemicals used:** Yes

Sequence of Job Steps	Potential Hazards	Risk/Hazard Effect	Safety Precautions	PPE
Entry to forest area (Area Survey)	1.Common Natural Hazard : A) Snake Bite, Insect bites like mosquitoe, Honey bee sting etc B) Falling branches, trees C) Fall, trip	1. Injuries 2. Fatality 3. Property damage 4. Man days lost	1. Before entry to the forest check for valid permit, and submit all documents of workers like medical fitness certificates, Group insurance, etc. 2. Briefly discuss about the job and identify line and markings of area or path of work before commencing 3. Organize for presence of a local representative/employee from forest department before start of work. 4. Exercise caution while carrying out work and before commencement of works address the workers to be always careful. 5. Work is allowed during day hours only 6. Field First aid box along with required medical kit (incl. snake anti dot, insect repellant cream) shall be available near the site 7. Awareness of types of snakes in the vicinity (poisonous/ non-poisonous) by way of display of charts	Safety knee height shoes (Gumboot) Safety Helmet, Safety goggles, Safety vest, Hand gloves, Full body protective apron ,Nose mask

Sequence of Job Steps	Potential Hazards	Risk/Hazard Effect	Safety Precautions	PPE
Cutting and shifting of heavy trees with the help of sawing machine, crane & rigging activity.	1.Pinching points. 2.Failure of lifting tools and tackles due to use of damaged / under capacity tools and tackles. 3. Failure of sawing machine. 4. Hit by load due to swinging. 5. Tree fall or collapse. 6.Electric shock 7. drowning due to sinking in swamp/ loose soil and falling in deep pits 8) Fall of logs during loading 9) Toppling of machinery due to loose soil 10) contact with Overhead live electric cable	1. Cut injuries 2. Man days lost 3. Serious injuries 4. Fatality	1.Check Submit all TPI certificates and check for proper working of cutting all machines 2.Critical Lift Permit and Lifting plan shall be prepared if use more than one crane, 75% of capacity of crane or above 50 MT material. 3. Ensure presence of an experienced and competent foreman/Signalman/Rigger. 4. Ensure that workmen keep their hands / leg away from pinching points. Proper communication & co-ordination with coworker. 5. Ensure proper supervisoin. 6. Ensure to use of certified and tested lifting tools and tackles with proper capacity. 7a. Safe working load should be displayed on all matl handling eqpt. 7. Softener or packing shall be provided in between slings and structural member. 8. While lifting ensure no one comes under suspended load. 9. Ensure use of tag lines to control the load. 10. Lifting affected area to be cordon off & caution sign to be posted to avoid unauthorized entery. 11. Only authorized operatior with valid licence to operate the crane.Authorized signal man with wearing reflective jacket shall be engaged. 12. Normal Lift Permit and Lifting plan shall be prepared if lifting Above 5 MT. 13. Daily Inspection checklist of crane/JCB/Cutting machine shall be ensured by users. 14. Stationary type Machinery shall be located in leveled platform and the same shall be ensured by the site engineer. 15.Ensure that soil bearing capacity is adequate to bear the load of machinery 16. Keep cutting tools sharp and in good condition. 17. Avoid work with oily hands. 18. Precautions for swamp/ loose soil / deep pits, etc.	Safety Knee height shoes(Gumboot), Safety Helmet, Safety goggles, Safety vest, Hand gloves, Reflective jacket, rain coat,
Housekeeping	1. Chances of fire during friction 2. Slip Trip Fall	1. Injuries 2. Fatality 3. Chances of damage natural balance.	1. Clean area properly 2. Not to dump bushes and trees in work area 3. Carry out stacking in designated area in orderly manner for further disposal.	Safety shoes (Gumboots), safety Helmet, Vest, goggles, Hand gloves.

Date	Reviewed By sub-contractor and or their authorized competent person		Is any additional precautions to be taken for the day
	Job Supervisor / Engineer	Safety Officer	

HAZARD IDENTIFICATION AND RISK ASSESMENT (HIRA)	
Job Task: Erection of materials and over all site work	**Equipment #:** Hydra/Crane, Welding M/c,
Project/Location: 22 MW Floating Solar Project, NTPC, Kayamkulam	**Analysis done by: PV System Engineering Reviewed by: BHEL- HSE**
PPE required: Safety helmet, vest, shoes, hand gloves, etc. (IS standard) **Emergency Plan:** Yes	**Date Initiated:** **Revised date:**
Tools used: Gas cutting set, Chain pulleys, Sling, D-shackle, Bow shackle.	**Chemicals used:** NO

Job activities/Work	Potential Hazards	Risk/Hazard Effect	Safety Precautions	PPE
Structural materials shifting and Lifting.	1. Pinching of leg/hands of workmen while handling 2. Structural members. 3. Swinging of load. 4. Poor weather condition. 5. Overloading of crane. 6. Unauthorized operation of crane by helper.	1. Head injuries. 2. Cut injuries 3. Man days lost 4. Property damage. 5. Chances of Fatality	1. Pre work cautioning & proper Permit must be followed before starting the work. 2. Ensure that workmen keep their body parts away from pinching points. 3. Ensure proper stacking of Structural members. 4.While fit up work structural member must be secured safely. 5. Experienced rigger and signalman should be assigned. Ensure competence Validation card. 6. Ensure use of tag lines at both ends to control the load. 7. Use crane/Hydra within the capacity and do not over load. 7a. Safe working load should be displayed on all matl handling eqpt. 8. Avoid work in poor visibility / poor weather condition / Raining and in heavy wind. 9. Affected area to be cordon off and caution sign to be posted to avoid unauthorized entry. 10. Only authorized operatior with valid licence to operate the crane.	Safety shoes, Safety Helmet, Safety goggles, Safety vest, Hand gloves.
	7.Failure of lifting tools and tackles due to use of damaged / under capacity tools and tackles.	1. Serious injuries. 2. Property damage.	1. Only single person signaling to the hydra/crane operator. 2. Ensure to use of certified and tested lifting tools and tackles with proper capacity, color code &identification number. 3. While lifting ensure no one comes under suspended load. 4. Barricading the area.	

Job activities/Work	Potential Hazards	Risk/Hazard Effect	Safety Precautions	PPE
Erections of structural materials with the help of crane& rigging activity.	1.Pinching points. 3.Failure of lifting tools and tackles due to use of damaged / under capacity tools and tackles. 4. Hit by load due to swinging.	1. Cut injuries. 2. Serious injuries. 3. Property Damage.	1. Critical Lift Permit and Lifting plan shall be prepared if use more than one crane, 75% of capacity of crane or above 50 MT material. 2. Ensure experience and competent of foreman/Signalman/Riggers. 3. Ensure that workmen keep their hands / leg away from pinching points. Proper communication & co-ordination with coworker. 4.Ensure proper supervisoin. 5. Ensure to use of certified and tested lifting tools and tackles with proper capacity. 6. Softener or packing shall be provided in between slings and structural member. 7. While lifting ensure no one comes under suspended load. 7a. Safe working load should be displayed on all matl handling eqpt. 8. Ensure use of tag lines to control the load. 9.Lifting affected area to be cordon off & caution sign to be posted to avoid unauthorized entery. 10. Only authorized operatior with valid licence to operate the crane.Authorized signal man with wearing reflective jacket shall be engaged**.** 11.Normal Lift Permit and Lifting plan shall be preparediflifingAbove 5 MT. 12.Daily Inspection checklist of crane/hydra shall be ensured by users.	Safety shoes, Safety Helmet, Safety goggles, Safety vest, Hand gloves. Full body harness.

Job activities/Work	Potential Hazards	Risk/Hazard Effect	Safety Precautions	PPE
Erection/Dismantling of Scaffolding (Only for CMCS area)	1. Dropped objects 2. Slips, trips and falls 3. Striking against 4. Collapse 5.Fall of scaffold structure	1. Falling from height. 2. Head injuries. 3. serious injuries. 4. property Damage.	1.Performing group shall conduct check of tool box relevant to the job before the work start 2. Use tools belt for containment of loose objects 3. Secure the tubes, planks and other objects when lifting/lowering 4. Barricade the work area and place sign boards 5. Do not climb with components 6. All scaffold platforms shall be fully boarded, fixed with toe boards & handrails, boards to be secured/lashed 7. Ensure area is not congested. 8. Maintain safe distance from energized power lines and heat sources 9. Ensure that only authorized/certified personnel are engaged in erecting & dismantling scaffolding 10. Examine all scaffold components prior to use 11. Scaffold should be inspected & tagged by competent person prior to use 12. Only essential personnel are allowed to access on scaffold	Safety shoes, Safety Helmet, Safety goggles, Safety vest, Hand gloves, Full body harness and fall arrester
Work at height (Only for CMCS area)	1. Fall of person. 2. Fall of materials (hand tools, Nut, bolts etc.) 3. Slippery approach. 4. Fall of person.	1. Head injuries 2. Break bones fall from height 3. Fatality. 4. Property damage.	1. Safety Net shall be provided if required. 2. Ensure proper Access and Work platform. 3. All scaffolds must be checked before use by Civil works supervisor and cleared before use.	Safety shoes, Safety Helmet, Safety googols, Safety vest, Hand gloves. Full body harness.

Job activities/Work	Potential Hazards	Risk/Hazard Effect	Safety Precautions	PPE
Gas cutting and Welding work	1.Fire and Explosion 2. Burn injury due to fire spatters. 3.Eye injury to nearby workers 4.Welding fumes 5.Person injury due to fall of gas cylinders while transporting	1. Property damage due to cylinder blast 2. Burn injuries due to fire.	1.Ensure flash back arrester /NRV on cylinder and torch side & fire blanket. 2. The combustible material shall be removed from site before starting the job. 3. No welding cable shall pass over the combustible materials/cylinders. 4. Provide fire extinguisher. 5. Check the leakage of cylinder with soap solution. 6. Hot work permit should be taken and Fire watch person should be identified & only authorized person allow to work. 7. Fire blanket must be provided to protect falling of hot spatters at height or barricaded the area. 8. Ensure safety goggles to all workers. 9. Especially Black goggles for Welder's helper. 10. Provide suitable face protection mask for welders. 11. Use gas cylinders trolley for internal shifting of gas cylinders. 12. Fixed the valve caps while shifting/storing the gas cylinders. 13. O2 and LPG Gas cylinders shall be stored separately chained and secured. 14. Cylinders must be stored in shed to avoid direct sun light exposure. 15. Ensure safe storage of diesel fuel if any	Safety shoes, safety helmet, gloves, goggles. Face shield.
Electrical work	1.Electrical Shock 2.Electrocution 3.Fire	1. Shock due to improper insulation. 2. Property damage. 3. Fatality.	1. Electric supply should be taken through ELCB of 30mA sensitivity. 2. All power cables should be protected from damage by improper laying. 3. All m/c and panel board should be protected against rain. 4. Proper Earthing shall be provided to all electrical equipment. 5. Ensure all portable power tools are tested and inspected by concern electrical engineer. 6. D.B Should not be overloaded.	Safety shoes, safety helmet, Rubber gloves, goggles.

Job activities/Work	Potential Hazards	Risk/Hazard Effect	Safety Precautions	PPE
Removal Of Lifting Arrangement	1. Cut injury. 2. Fall of materials/objects from height.	1. cut injuries 2. serious damage. 3. property damage. 4.vertical reinforcement collapse may cause.	1. Trained and Authorized person only allow to perform the job. 2. All tools & tackles should be tightening by rope to prevent fall from height. 3. Safe lowering procedure should be ensured. 4 The area must be cordon off. 5. Life line must be provided for anchoring safety harness.	Full body harness, Safety shoes, safety helmet, gloves, goggles
Excavation Work by JCB/manually	1. Excavated depth greater than1.5 mtr. 2. Failure of breaks. 3. Dumper moving. 4. Soil collapse.	1. Serious head, hand or eye injuries. 2. Workers falling in to the depth. 3. Heavy earth mover heat by person, 4. Unknown person heat by dumper.	1. Install hard barricade around the excavated area. 2. No person allowed in during the excavation by JCB. 3. Work area clearance certificate and excavation permit must be taken before starting the work. 4. JCB inspection should be carried out before the job commencement 5. Use barrier tapes or safety net at edges in excavation area.	Safety shoes, safety helmet, goggles, hand gloves, vest.
Civil work	1. Slippery approach. 2. While work at height, fall hazard. 3. Electrical hazard for electric line/equipment's. 4. Sharp edges of construction materials.	1. Slip trip fall injuries requiring first aid. 2. Eye injuries. 3. Head injuries. 4. Property damage.	1. Preparation proper approach with proper slope, steps, hand railing. 2. Barricading the area. 3. Place safety posters in work area. 4. Inspection of all hand tools before use. 5. Working platform should be proper (board/proper ladder)	Safety shoes, safety helmet, goggles, gloves, full body harness, nose masks.
	5. Chemical component of cement.	5. Eye injuries, skin irritation		

Job activities/Work	Potential Hazards	Risk/Hazard Effect	Safety Precautions	PPE
Work on Water body (NTPC KAYAL)	1. Trip slip and fall hazard on floats 2. Chance of fall into water 3. Electrical hazard. 4. Effect of extreme weather condition such as Sun burn and heat stress.	1. Physical fall shock - chance of injury or fatality. 2. Fall from the work area in to the water resulting in suffocation or drowning. 3. Chance of fatality for over work and sun burn effect.	1. Before start the work check all documents (such as work permit, TPI certificates of all tools and tackles and test certificates of life saving boat. 2. Ensure all work men working in or very near to water to wear Life jackets 3. Ensure availability of rescue boat in water with spare life jackets and floatation air tubes 4. Make a proper approach into the water body with proper slope or steps 5. In case of emergency, rescue team consisting of expert swimmers and above rescue boat to be always prepared. 6. In case of underwater work such as diving related work, an expert for checking diving equipment prior to commencement of work and also he shall be present for observing and monitoring diving activity during dive sessions. 7. Arrangement to be in place to summon Ambulance on Call to site for emergency shifting of any injured person to the nearest hospital. 8. Ensure drinking water to avoid de-hydration 9. Ensure Wireless / mobile/ walky-talky arrangement between site to control room/office 10. Ensure non-contamination of water body during the activities	Safety shoes, safety helmet, goggles, hand gloves, Reflective life jackets. Certified and compliant Diving gear to be used by divers if required One dedicated Rescue boat with life jackets

Date	**Reviewed By sub-contractor and or their authorized competent person**		**Is any additional precautions to be taken for the day**
	Job Supervisor / Engineer	**Safety Coordinator**	

FORMATS USED IN SITE

SL. No.	Format Name	Format No.
01	Safety Check list cum compliance report	01
02	Inspection of First Aid Box	02
03	Health Check Up	03
04	Monthly Site Safety Report	04
05	Safety Induction Training	05
06	Tool Box Talk	06
07	Inspection of PPE	07
08	Inspection of T&Ps	08
09	Status of T&Ps	09
10	Inspection of Cranes and Winches	10
11	Inspection on Height Working	11
12	Inspection on Electrical installation.	12
13	Safe Work- Permit (For External Agency)	13
14	Mock Drill Format (Fire)	14
15	Mock Drill Format (Water Accident)	15

SAFETY CHECKLIST CUM COMPLIANCE REPORT

PROJECT:_____ CONTRACTOR:_ DATE:_____

OWNER :_____

INSPECTION BY:_____

Note : write 'NA' wherever the items is not applicable. Inspection to be completed once in a month.

Item	Yes	No	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Passageways and walkways clear				
General neatness of working area				
PERSONNEL PROTECTIVE EQUIPMENTS				
Goggles; shields				
Face protection				
Hearing protection				
masks etc.				
Safety harness/belts				
EXCAVATIONS / OPENINGS				
Openings properly covered or barricaded, cordoned				
Excavations shored				
Excavations barricaded/ cordoned				
Overnight lighting provided				
SCAFFOLDING				
Fully secured and fastened				
Guard and intermediate rails in place				
Adequate shoring				
Adequate access				
LADDER				
Extension side rails 1 m above of landing				
Properly secured				
HOISTS, CRANES AND JCB				
Condition of cables and sheaf OK				
Condition of slings, chains, hooks OK				
Inspection & maintenance log maintained				
Outriggers used				
Signals observed and understood				
Qualified operators				
MACHINERY, TOOLS & EQUIPMENT				
Proper instruction				
Safety devices				
Proper cords				
Inspection and maintenance				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				

				FORMAT 01 (Page 2 of 2)
TEMPORARY FACILITIES				
Emergency instructions posted				
Fire extinguishers provided				
Fire-aid equipment available				
General neatness				
Others				
FIRE PREVENTION				
Personnel instructed				
Fire extinguishers checked				
No smoking in prohibited areas.				
ELECTRICAL				
Proper wiring				
ELCB's provided				
HANDLING & STORAGE OF MATERIALS				
Properly stored or stacked				
Passageways clear				
FLAMMABLE GASES AND LIQUIDS	NA			
Containers clearly identified				
Proper storage				
Fire extinguisher nearby				
WORKING AT HEIGHT				
Safety belts				
Safety helmets				
Anchoring of safety belt to the life line rope				
ENVIRONMENT				
Lubricant waste/engine oils properly dispose.				
Waste from Canteen, offices, sanitation etc. disposed properly.				
Disposal of surplus earth, stripping materials, expired batteries, oily rag sand combustible materials done properly.				
HEALTH CHECKS				
Hygienic conditions at labor camps O.K.	NA			
Availability of first-aid Facilities				
Proper sanitation at site, office				
Arrangement of medical facilities.				
Measures for dealing with illness.				
Availability of potable drinking water for workmen & staff.				

RECORD OF REVISION

Page No.	Rev No.	Brief of Revision	Date
All	00	New procedure introduced	

FORMAT – 02 (Page 1of2)

INSPECTION OF FIRST AID BOX
(Check with KFR 1969)

Name of Site :	
Name of Sub-Contractor:	
Inspected by :	
Date of Inspection:	

Number of employees on the site:-____

Sl.No.	**Item**	**No. Available**	**Remarks**
1	No. of small sterilized dressings		
2	No of medium sized sterilized dressings		
3	No of large sized sterilized dressings.		
4	No of Larg sized sterilized burn dressinge s		
5	No of (15 grams) packets sterilized cotton wool		
6	No of pieces of sterilized eye pads in separate sealed packets.		
7	No of roller bandages 10 cm wide.		
8	No of roller bandages 5 cm wide.		
9	Whether tourniquet available		
10	Whether supply of suitable splints available.		
11	No of packets of safety pins.		
12	Whether kidney tray available		
13	Whether 4%-xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops available.		
14	Whether (60ml) bottle containing a two percent alcoholic solution of iodine available		
15	Whether (two hundred ml) bottle of mercurochrome (2 per cent) solution in water available.		

FORMAT – 02 (Page 2of2)

INSPECTION OF FIRST AID BOX

Sl.No.	Item	No. Available	Remarks
16	Whether 120ml bottle containing Sal volatile having the dose and mode of administration indicated on the label, available.		
17	Whether roll of adhesive plaster (6 cmX1 meter) available		
18	No of rolls of adhesive plaster (2 cmX1 meter)		
19	Whether snake bite lancet available.		
20	Whether (30 grams) bottle of potassium permanganate crystals available.		
21	Whether a pair scissors available		
22	Whether copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labour Institutes, Government of India available.		
23	Whether bottle containing 100 tablets (each of 5 grains) of aspirin available		
24	Whether Ointment for burns available		
25	Whether bottle of a suitable surgical anti septic solution available		

Signature of SAFETY Coordinator

FORMAT – 03(Page 1 of 1)

HEALTH CHECK UP: AS PER CERTIFICATE OF MEDICAL EXAMINATION

FORM-XI
Certificate of Medical Examination

Certificate No.:
Date:

1. Name:

Identification Marks:
1……..

2. ……

2. Father's name: ……

3. Sex: ……

4. Date of Birth, if available certificate age: ……

5. Physical Fitness:
I hereby certify that I have personally examined (name)…….
son/daughter/wife of …… residing at ……
Who is desirous of being employed in building and construction work and his/her age as nearly as can be ascertained from my examination ……. years and he/she is fit for employment in ……as an adult/adolescent.

BP: Height: Sugar:

Pulse: Weight:

Eye Vision Test:

Left:

Signature/Left hand Thumb Impression of Building worker

Signature & Seal of Medical Inspector/CMO

……
……

Note: 1. Exact details of cause of physical disability should be clearly stated.

2. Functional/productive abilities should also be stated, if disability is stated.

FORMAT -04 (1 of 4)

MONTHLY SITE SAFETY REPORT

				Report Month:			
A) Accidents/Incidents Details:-							
a	**Lost time in Accidents**	**No. of incidents**	**Man Hours Lost**	**No.of People Involved**	**No. of contractors involved**	**Client persons if any**	**No.of persons reporting to Govt.**
	For the Month						
	Cumulative						
b	**Minor Injuries**						
	For the Month						
	Cumulative						
c	**Fires**	**No. of Near-Misses**	**No. of First-Aid cases**	**No. of persons injured**	**No. of equipment's damaged**	**No. of Fire reporting Outside**	
	For the Month						
	Cumulative						
d	**Other mishaps not covered in a, b, c.**	**No. of Near-Misses**	**No. of First-Aid cases**	**No. of persons injured**	**No. of equipment's damaged**	**Total near misses and First-Aid**	
	For the Month						
	Cumulative						

Signature of Head (Site office)

Signature of Site safety Coordinator

FORMAT -04 (2 of 4)

MONTHLY SITE SAFETY REPORT

A) Status of Deployment of Safety Coordinators & electricians by Agencies:

Description	Name	Qualification & Experience
Safety Coordinators		
Electricians		

B) Lifting Tools, Tackles, Equipment and Pressure Vessels:

Item	Nos. Deployed	Identification No.	Nos. Tested by competent person	Validity of Test Certificate
Winches				
Chain Blocks				
Wire Rope Slings				
D-Shackles				
Air Compressors				
Crawler Cranes				
Mobile Cranes				
Hydra Cranes				
Others				

C) Reverse Horns in Construction Vehicles:

Item	Nos. Deployed	Nos. Having Functional reverse horns	Inspection Dates
Transit Mixers			
Hydra Cranes			
Dumpers/Trippers			
Backhoes			
Other Vehicles			

D) ELCBs:

No. Of ELCBs provided	Nos. Functional	When They were last Tested

Signature of Head (Site office)

Signature of Site safety -Coordinator

FORMAT – 04 (3 of 4)

MONTHLY SITE SAFETY REPORT

E) Electrical Earthing:

No. Of Earth resources	Whether Earthing provided to all equipment's	When they were last tested

F) Fire Extinguishers:

Name & designation of person responsible for maintenance of Extinguishers at different locations:(Individual Contractor's Safety Coordinators/Authorized executive).

FIRE EXITINGUISHERS AT ERECTION SITE & STORES:

TYPE	SIZE	QTY	HEALTHINESS	LOCATIONS
MECHANICAL FOAM				
WATER CO2				
DRY CHEMICAL POWDER (DCP)				
CARBON DIOXIDE				

G) Implementation of checklist, Work permits:

Item	During the Month	Major Deviations
Note:-Please attach photocopies of all filled Checklists & Work permits for that month.		

H) Personal Protective Equipment's Issued:

Item	Issued this Month	Nos. Issued up to the Month	Percentage of usage at site
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor/Safety rope			
Other PPEs			

Signature of Head (Site office)

Signature of Site safety -Coordinator

MONTHLY SITE SAFETY REPORT	**FORMAT – 04 (4 of 4)**

No. of Observations received in the month	No of points complied	Cumulative no. of non-complied Points

I) Training programs on safety during the month:

1)Tool-Box talks/ Pep-talks on Safety:

Date	Tool Box Talk - No of Participants	Safety Induction - No. of Participants	Topic
Date	**Tool Box Talk No of Participants**	**Safety Induction No. of Participants**	**Topic**

k) Other Safety initiatives / Safety Activities conducted at sites:

Signature of Head (Site office)

Signature of Site safety -Coordinator

FORMAT -05 (Page 1 of 1)

SAFETY INDUCTION TRAINING

Name of Site :	
Name of Sub-Contractor :	
Date :	
Name of Training coordinator: NTPC/BHEL	

Sl No.	Name	Designation	Organisation	Signature

Signature of safety Coordinator:

FORMAT -06(Page 1 of 1)

TOOL-BOX TALK

Sub-Contractors Name :	
Date :	

Topic	**Name of person delivered Tool Box Talk**	**No. of Participants attended**	**Remarks**

Signature of safety Coordinator:

FORMAT -07(Page 1 of 1)

PERSONAL PROTECTIVE EQUIPMENTS

Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Item	Issued this Month	Nos. Issued up to the Month	Percentage of usage at site
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor/Safety rope			
Life jackets			
Other PPEs			

Signature of safety coordinator:

FORMAT -08(Page 1 of 1)

INSPECTION OF T&Ps

Name of Sub-Contractor :	
Date of Inspection :	

Sl.No.	Description	Remarks	
1.0	Name of equipment		
2.0	Basic Information of equipment		
2.1	Specification		
2.2	Sr. No. of equipment		
2.3	Make		
2.4	Year of manufacture		
3.0	Major repairs / overhauls(Furnish details of work carried out)		Date(s) of major repair/overhaul
3.1	Repairs carried out at site		
4.0	Any performance test conducted	Yes/No	
5.0	Document Submitted	Yes/No	
6.0	Manufacturer's test / guarantee certificate	Available/ Not available	
7.0	Performance test	Done/ Not Done	
8.0	Acceptance Norms		
9.0	Committee Observations		
10.0	Date of next review (if accepted)		

Signature-Site Safety Coordinator	**Signature-Subcontractor/ Subcontractor's Safety Coordinator**

FORMAT - 09(Page 1 of 1)

STATUS OF T&Ps

Name of Site :	
Name of Sub-Contractor :	
Date of Inspection :	

Item	Nos. Deployed	Identification No.	Nos. Tested by competent person	Validity of Test Certificate
Winches				
Chain Blocks				
Wire Rope Slings				
Man Cages				
D-Shackles				
Air Compressors				
Crawler Cranes				
Mobile Cranes				
Hydra Cranes				
Others				

Signature of safety Coordinator: **Signature-Subcontractor/ Subcontractor's Safety Coordinator**

Signature of BHEL Site Supervisor

INSPECTION OF CRANES AND WINCHES

Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Crane Reg. No(Make/Model) _____

Name of Driver/Operator _____

Sl.no.	Description	Observation	Measures
1	Valid Driving license		
2	Hook & Hook Latch		
3	Over Hoist limit switch		
4	Boom limit switch		
5	Boom Angle Indicator		
6	Boom limit cutoff switch		
7	Condition of Boom		
8	Condition of ropes		
9	Number of load lines		
10	Size and condition of the slings		
11	Stability of the cranes		
12	Soil Condition		
13	Swing Break And Lock		
14	Proper Break And Lock		
15	Hoist Break And Lock		
16	Boom Break And Lock		
17	Main Clutch		
18	Leakage in Hydraulic Cylinders		
19	Out riggers filly extendable		
20	Tire pressure		
21	Condition of Battery And Lamps		
22	Guards of moving and rotating parts		

23	Load chart provided		
24	Number and position of pedant ropes		
25	Reverse Horn		
26	Load Test Details		
27	Operator's fitness		
28	Pollution under control certificate		
29	Fire extinguisher of appropriate type.		
30	Training of the operator		

WINCH

Sl. No.	Description	YES	NO	NA
1	Has the copy of Third Party Inspection certificate been provided in winch machine shed?			
2	Is winch machine operator experienced enough to operate the winch machine?			
3	Is the winch machine operated by someone other than the winch machine operator?			
4	Is there guard provided in all moving parts like wheel and motor's shaft?			
5	Will it protect against unforeseen operational contingencies?			
6	Are brakes, clutch and locking arrangement working properly?			
7	Has it been ensured that the guard does not constitute a hazard by itself?			
8	Are the cranks and the connecting rods protected by guardrails?			
9	Is there provision for fully covered shed with wooden plank roof?			
10	Is wire rope free from any kind of damage or wear and tear?			
11	Is split pin provided for the protection of clutch and brake locking arrangement?			
12	Is pulley inspected by competent person and certified before use?			
13	Is pulley free from any wear and tear visually?			
	FORMAT -10(Page 1 of 3)			

14	Is winch rope barricaded with clipsheet for the protection of rope and person?			
15	Is the wire rope lubricated by cardium oil?			
16	Is there any friction in wire rope which may damage the wire rope rather than the rolling parts?			
17	Is there any oil leakage in the hydraulic system of the winch machine?			
18	Has it been ensured that the guard will not cause discomfort or inconvenience to operator?			
	Total Number of NO:			
	Total Number of NA:			
	% Compliance :			

Signature of safety Coordinator: **Signature-Subcontractor/ Subcontractor's Safety Coordinator**

Signature of BHEL Site Supervisor

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INSPECTION OF HEIGHT WORKING

Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Sl. No.	Descriptions	Observation (Yes/No)
1	All the workers have been explained safe work method?	
2	An established communication system has been established and explained to the workers.	
3	Adequate illumination has been ensured.	
4	Work area inspected prior to the start of the work.	
5	Area below the work place barricaded, particularly below hot work.	
6	Workers provided with bags /box to carry bolts, nuts and hand tools	
7	Arrangement for fastening hand tools made.	
8	All work platforms ensured to be of adequate strength and ergonomically suitable.	
9	Fabricated makeshift arrangements are checked for quality and type of material welding, anchoring etc.	
10.	Work at more than one elevation at the same segment is restricted.	
	ACCESS/EGRESS	
1	Walkways provided with handrail?	
2	All checkered plates, gratings properly welded/ bolted?	
3	Are ladders inspected and they are in good condition?	
4	Are ladders spliced?	
5	Are ladders properly secured to prevent slipping, sliding or falling?	
6	Do side rails extend 36” above top landing?	
7	Are built up ladders constructed of sound materials?	
8	Are rugs and cleats not over 12” on center?	
9	Metal ladders not used around electrical hazards.	
10	Proper maintenance and storage.	
11	Ladders placed at right slope.	
12	Ladders / staircases welded/ bolted properly.	

		FORMAT - 11(Page 1 0f 2)
13	Any obstruction in the stairs.	
14	Are landing provided with handrails, knee rails, toe boards etc.?	
15	Whether ramp is provided with proper slope.	
16	Proper hand rails / guards provided in ramps.	
	Housekeeping	
1	Walkways, aisles & all overhead workplaces cleared of loose material.	
2	Flammable materials, if any, are cleared.	
3	All the de shuttering materials are removed after de shuttering is done.	
4	Platforms and walkways free from oil/grease or other slippery material.	
5	Collected scrap are brought down or lowered down and not dropped from height.	
	PPE And Safety Devices	
1	Use of safety helmet, safety belts ensured for all workers	
2	Anchoring points provided at all places of work.	
3	Common lifeline provided wherever linear movement at height is required.	
4	Safety nets are use wherever required.	
5	Proper fall arrest system is deployed at critical workplaces.	

Signature of safety Coordinator **Signature-Subcontractor/ Subcontractor's Safety Coordinator**

Signature of BHEL Site Supervisor

FORMAT -12

INSPECTION OF ELECTRICAL INSTALLATION

Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sr. No.	Contents	Yes/No	Remarks
A	**Cable**		
1.	Whether the condition of cable is checked?		
2.	Are cables received from other sites checked for insulation resistance before putting them into use?		
3.	Are all main cables taken either underground / overhead?		
4.	Are welding cables routed properly above the ground?		
5.	Are welding and electrical cables overlapping?		
6.	Is any improper joining of cables/wires prevailing at site?		
B	**DBs/SDBs**		
1.	Is earth conductor continued upto DB / SDB?		
2.	Whether DBs and extension boards are protected from rain / water?		
3.	Is there any overloading of DBs / SDBs?		
4.	Are correct / proper fuses & CBs provided at main boards and sub-boards?		
5.	Is energized wiring in junction boxes, CB panels & similar places covered all times?		
C	**ELCB**		
1.	Whether the connections are routed through ELCB?		
2.	Is ELCB sensitivity maintained at 30 mA?		
3.	Are the ELCB numbered and tested periodically & test results recorded in a logbook countersigned by a competent person?		
D	**Grounding**		

1.	Is natural earthing ensured at the source of power (main DB at Generator or Transformer)?		
2.	Whether the continuity and tightness of the earth conductor are checked?		
3.	Mention the gauge of the earth conductor used at the site.		
4.	Mention the value of Earth Resistance.		
E	**Electrically operated Machines or Accessories**.		
1.	Whether the plug top is provided everywhere.		
2.	Are all metal parts of electrical equipment and light fittings / accessories grounded?		
3.	Is there any shed or cover for welding machines?		
4.	Are halogen lamps fixed at proper places?		
5.	Are portable power tools maintained as per norms?		
6.	Any other information:		

Signature of safety Coordinator : **Signature-Subcontractor/ Subcontractor's Safety Coordinator**

Signature of BHEL Site Supervisor

Safe Work- -Permit (For External Agency)

Type of permit	Tick whichever is applicable
Height working of 3.3 metre and above at FSPV Site (Applicable for erection of communication towers/Electrical Towers, if any)	
Excavation more than 1.5 meter depth	
Heavy lifting by machinery (only on land)	
Works on Floating Platforms in Water	

Permit initiation

Permit no: _____ Date: _____

The following persons are here by engaged to undertake the above work (tick whichever is applicable) in the areas indicated below. The contractor and the workers will strictly adhere to the safety instructions contained in the annexure, as applicable.

Name of the work :-

Brief description of work:

Area/Location of work:

Period of work From _____ to _____

Time of work From _____ to _____

Name and Address of the contractor :

Work Order No. & Date

Details of Persons Engaged

Sl. No.	Name	Age	ESI No.	Id No.
1				
2				
3				
4				
5				

*The persons engaged are possessing certificate against Vertigo in their medical clearance certificate.

_____ _____

Signature of Contractor with contact no. Signature of BHEL Sup/Executive

Permit Clearance:

1.0 Clearance from – In-charge/ Services (BHEL)

_____
(Signature)

2.0 Clearance from Safety

_____
(Signature)

3.0 The above work is permitted subject to above clearance.

_____
(Signature of Site Incharge)/Authorised executive)

4.0 Permit Withdrawal / closure

4.1 The work has been completed, Men and Materials withdrawn. Intimation is given to Services Department and Concerned Supervisor / Area-Incharge

_____
(Signature of Executing Dept. Sup./Executive)

5.0 Withdrawal of Permit/Closure recordings

_____
(Signature of Safety Coordinator)

Note: Wherever Clearance Is Not Required, Write ‘Not Applicable’ (NA)

Annexure- Checklist for Work permit

Work Permit Checklist

A. Height working of 3.3 metre and above at FSPV Site (Applicable for erection of communication towers/Electrical Towers, if any)

Sl. No.	Criteria	Yes	No	NA	Remark
1	Have scaffolding/lacers/working platform been checked and provided.				
2	Is roof ladder /crawling board provided?				
3	Have safety belts and helmets inspected and provided.				
4	Is adequate illumination provided?				
5	Are safety nets erected at site to arrest falls when climbing up/down or moving at heights?				
6	Is barricading provided to avert fall of material down below.				
7	Is the work area clear and safe from overhead electrical lines/other protecting structures?				
8	Surrounding area checked.				
9	Have all combustibles within 35 ft. are removed and protected.				
10	Fire Fighting system readiness.				
11	Precautionary tags/ boards provided.				
12	Nearby working area, pipes checked for leakage and effectively protected against falling sparks.				
13	Condition of Hoses and Cylinders.				
14	Is he having phobia (Vertigo)				
15	All Employees involved have been informed of precautions.				
16	Work shall be closed before sunset.				
17	Ensure that continuous supervision				
18	Ensure that persons working at height should anchor harness to rigid support.				

B. Excavation more than 1.5 meter depth

Sl. No.	Criteria	Yes	No	NA	Remark
1	Cable route detection done at the place of excavation				
2	Free from water, hydrant, sprinkler pipes; telephone & sewer lines.				
3	Excavation work does not affect surrounding structures.				
4	Piling, shoring, bracing, walers and runners provided and of adequate strength to prevent cave in				
5	Excavated materials are placed >2 feet from edges of trench.				
6	Open sides of trench are barricaded to prevent fall .				

7	Warning signs are posted.				
	Annexures to Format-13 (Page 2 of 3)				
8	No person is working in trench during excavation.				
9	Suitable access to and egress from trench of 1.2 m and above is arranged.				
10	Banksman arranged				

C. Heavy lifting by machinery (only on land)

Sl. No.	Criteria	Observations	Measures
Readiness of Lifting Equipment:			
1	Over-Hoist Limit Switch		
2	Boom-Limit Switch		
3	Boom Angle indicator		
4	Boom-Limit cut-off switch		
5	Safe Load Indicator available		
6	Condition of boom		
7	Condition of Ropes		
8	Size and condition of the sling		
9	Stability of crane		
10	Soil Condition		
11	Swing Brake & Lock		
12	Propel Brake & Lock		
13	Hoist Brake & Lock		
14	Boom Brake & Lock		
15	Main clutch		
16	Leakage in hydraulic cylinders		
17	Out riggers fully extendible		
18	Tyre pressure		
19	Condition of Battery and Lamps		
20	Guards of moving and rotating parts		
21	Load chart provided		
22	Automatic Reverse horn/Swing Alarm (With nominal sound frequency)		
23	Load test details		
24	Fire Extinguisher in operators cabin		
Readiness of Lifting Slings:			
1	Tag number/ Identification number(with SWL marked)		
2	Validity		
3	Capacity & length of the Sling		
4	Check for any visual damaged outer sheath		
5	Check for any damages at the cuts/ threading		
6	Check for any damages at the eye portion of the sling		
7	Check the overall condition of the sling.		
8	Check for any twisted/ knotted condition		
9	Check the overall surface contour of the sling.		
10	Any Other Observations		

Readiness of Manpower/Area of work:					
	Annexures to Format-13 (Page 3 of 3)				
1	Operator Fitness and Licence				
2	Dedicated helper availability				
3	Work area to be cordoned off & caution sign to be posted to avoid unauthorized entry.				
4	PPEs availability for Manpower				
D.	**Works on Floating Platforms in Water**				
Sl. No.	**Criteria**	**Yes**	**No**	**NA**	**Remark**
1	Availability of life Jackets to all manpower going on water				
2	Availability of rescue boat in water with spare life jackets and floatation air tubes				
3	Safe access to floating platform from ground				
4	Availability of rescue team of expert swimmer, helper				
5	Arrangement of Emergency vehicle for quick shifting of any injured person to the nearest hospital.				
6	Availability of drinking water to avoid de-hydration				
7	Availability of communication sources such as Wireless / mobile/ walky-talky arrangement between site to control room/office				
8	For underwater work such as diving related work, Fitness of diving equipment				
9	Diver fitness and skill				
10	Training imparted to manpower for working on floating platform				

Signature of safety Coordinator : Signature-Subcontractor/ Subcontractor's Safety Coordinator

Signature of BHEL Site Supervisor

Format-14

MOCK DRILL FORMAT (FIRE)

VENUE/SITE: Date:

Time:

'FIRE MOCK-DRILL ON EMERGENCY SITE'

OBSERVATION SHEET

SL. NO.	PARTICULARS	DESIRED TIME (min.)	RECORDED TIME (min.)
A	INFORMATION TO IMPORTANT AGENCIES		
	Inform Emergency Main control room (NTPC-Security)	Immediate	
	Inform incident controller (BHEL Site In-Charge)		
	Inform Fire Pump House (by NTPC-Security)		
	Inform NTPC Safety (by BHEL Safety Coordinator)		
	Inform First Aid (by BHEL Safety)		
B	ARRIVAL OF THE SERVICE PERSONAL / ACTION		
	Incident controller reaching the site	5	
	Assembly of work teams at identified Assembly point at site	5	
	Safety personnel reaching the site/coordinating	5	
	NTPC-Security personnel reaching the site	5	
	Fire Guard/Engine reaching the site	5	
	Medical team reaching the site	5	
C	CLOSURE OF OPERATIONS		
	Rescue operation over (rescuing persons)	5	
	Fire-fighting operation over	5	

General Remarks:

Observation Name:

Designation:

Sign:

Format-15

MOCK DRILL FORMAT (WATER ACCIDENT)

VENUE/SITE: Date:
Time:

'WATER ACCIDENT MOCK-DRILL ON EMERGENCY SITE'

OBSERVATION SHEET

SL. NO.	PARTICULARS	DESIRED TIME (min.)	RECORDED TIME (min.)
A	INFORMATION TO IMPORTANT AGENCIES		
	Inform Emergency Main control room (NTPC-Security)	Immediate	
	Inform incident controller (BHEL Site In-Charge)		
	Inform Rescue Team (by work supervisor)		
	Inform BHEL Safety Coordinator (by work supervisor)		
	Inform NTPC Safety (by BHEL Safety Coordinator)		
	Inform First Aid (by NTPC-Security)		
B	ARRIVAL OF THE SERVICE PERSONAL / ACTION		
	Incident controller reaching the site	5	
	Safety personnel reaching the site/coordinating	5	
	NTPC-Security personnel reaching the site	5	
	Rescue team reaching the site	5	
	Medical team reaching the site	5	
C	CLOSURE OF OPERATIONS		
	Rescue operation over (rescuing persons)	5	

General Remarks:

Observation Name:

Designation:

Sign:

GENERAL CONDITIONS

OF

CONTRACT

2019

ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್, ವಿದ್ಯುನ್ಮಾನ ವಿಭಾಗ, ಬೆಂಗಳೂರು

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, इलेक्ट्रानिक्स डिवीज़न, बेंगलुरु

Bharat Heavy Electricals Limited, Electronics Division, Bengaluru

CONTENTS

Chapter-1

2. Chapter-2

CHAPTER -1

1. GENERAL INSTRUCTION TO TENDERERS

1.1. DESPATCH INSTRUCTION

i) The General Conditions of Contract form part of the Tender specifications. All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof. The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages

ii) Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any aspects, the scope of work etc., he shall contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The tender specifications and terms and conditions shall be deemed to have been accepted by the tenderer in the offer. Pre requirements and conditions shall be liable for rejection.

iii) Integrity pact (IP): If NIT calls for Integrity Pact, the same shall be duly signed & stamped by the authorised signatory & submitted along with tender document.

1.2. SUBMISSION OF TENDERS

1.2.1 The tenderers must submit their tenders as per instructions in the NIT

1.2.2 BHEL takes no responsibility for delay, loss or non-receipt of tenders sent by post/courier. The tenders received after the specified time of their submission are treated as 'Late Tenders' and shall not be considered under any circumstances. Offers received by Fax/Email/Internet shall be considered as per terms of NIT.

1.2.3 Tenders shall be opened by authorised Officer of BHEL at his office at the time and date as specified in the NIT, in the presence of such of those tenderers or their authorised representatives who may be present

1.2.4 Tenderers whose bids are found techno commercially qualified shall be informed the date and time of opening of the Price Bids and such Tenderers may depute their representatives to witness the opening of the price bids. BHEL's decision in this regard shall be final and binding.

1.2.5 Before submission of Offer, the tenderers are advised to inspect the site of work and the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour, means of transport and access to Site, accommodation, etc. No claim will be entertained later on the grounds of lack of knowledge of any of these conditions.

1.3. ***LANGUAGE***

1.3.1 The tenderer shall quote the rates in English language and international numerals. These rates shall be entered in figures as well as in words. For the purpose of the tenders, the metric system of units shall be used.

1.3.2 All entries in the tender shall either be typed or written legibly in ink. Erasing and over-writing is not permitted and may render such tenders liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.

1.4 ***PRICE DISCREPANCY:***

1.4.1 Conventional (Manual) Price Bid opening:

i) If, in the price structure quoted for the required goods/services/works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of BHEL there is obvious misplacement of decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly

ii) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected;

iii) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject of (i) and (ii) above.

iv) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date up to which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of BHEL, the bid is liable to be ignored.

v) In case of lump sum price, if there is any difference between the amount in figures and in words, the amount quoted by the bidder in words shall be taken as correct.

vi) In case of omission in quoting any rate for one or more items, the evaluation shall be done considering the highest quoted rate obtained against the respective items by other tenderers for the subject tender. If the tenderer becomes L-1, the notional rates for the omission items shall be the lowest rates quoted for the respective items by the other tenderers against the respective omission items for the subject job and the 'Total quoted price (loaded for omissions)' shall be arrived at. However the overall price remaining the same as quoted originally, the rates for all the items in the 'Total quoted price (loaded for omissions)' shall be reduced item wise in proportion to the ratio of 'Original' total price and the 'Total quoted price (loaded for omissions)".

1.4.2 Reverse Auction: In case of Reverse Auction, the successful bidder shall undertake to execute the work as per overall price offered by him during the Reverse Auction process. In case of omission of rates, the procedure shall be as per 'Guidelines for Reverse Auction' enclosed.
i) Offers from tenderers who are under suspension (banned) by any Unit/Region/Division of BHEL shall not be considered.
ii) Offers from tenderers who do not comply with the latest guidelines of Ministry/ Commissions of Govt of India shall not be considered.

1.5. ***EVALUATION OF BIDS***

i) Technical Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre-Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer, BHEL reserves the right to ask for proofs/documents, clarification in relation to Technical/commercial data during tender evaluation

ii) Price Bids of shortlisted bidders shall only be opened either through the conventional price bid opening or through electronic Reverse Auction, at the discretion of BHEL

iii) Price Bids of unqualified bidders shall not be opened. Reasons for rejection shall be intimated to the vendor before the opening of Price bid.

1.6. ***DATA TO BE ENCLOSED***

The following information in full shall be furnished by the tenderer. Non-submission of this information may lead to rejection of the offer.

i) INCOME TAX PERMANENT ACCOUNT NUMBER, GSTIN, SAC, HSN Certified copies of PAN, GSTIN shall be furnished along with tender. The names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.

ii) An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor.

iii) IN CASE OF INDIVIDUAL TENDERER:

His / her full name, address, PAN, GSTIN and place & nature of business to be furnished.

iv) IN CASE OF PARTNERSHIP FIRM

The names of all the partners and their addresses, a copy of the partnership deed/instrument of partnership shall be enclosed.

v) IN CASE OF COMPANIES:

Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished). Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.

*1.7. **AUTHORISATION AND ATTESTATION***

Tenders shall be signed by a person duly authorised/empowered to do so. An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor shall be submitted along with the tenders

*1.8. **EARNEST MONEY DEPOSIT***

1.8.1 Every tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described herein.

The EMD may be accepted only in the following forms:
(i) Electronic Fund Transfer credited in BHEL account (before tender opening)
(ii) Banker's cheque/ Pay order/ Demand draft, in favor of BHEL (along with offer)In case total EMD amount is more than Rs 20 Lakh, the amount in excess of Rs 20 lakh maybe accepted in the form of Bank Guarantee from scheduled bank. The Bank Guarantee in such cases shall be valid for at-least six months.
(iii) Through SBI collect (before tender opening)
(iv) No other form of EMD remittance shall be acceptable to BHEL

1.8.2 EMD by the bidder will be forfeited as per Tender Documents if

i) After opening the tender and within the offer validity period, the tenderer revokes his/her tender or makes any modification in his tender which is not acceptable to BHEL.
ii) The Contractor fails to deposit the required Security deposit or commence the work within the period as per LOI/ Contract.
iii) EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged in derailing the tender process by unlawful means

1.8.3 EMD shall not carry any interest.

1.8.4 In the case of unsuccessful bidders, the Earnest Money will be refunded to them within a reasonable time after acceptance of award by successful tenderer.

1.8.5 EMD of successful tenderer will be converted as part of Security Deposit

1.9. SECURITY DEPOSIT

The total amount of Security Deposit will be 5% of the contract value (including all applicable taxes) EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.

1.9.1 Modes of Security deposit:

The balance amount to make up the required Security Deposit of 5% of the contract value may be accepted in the following forms:
i) Cash (as permissible under the extant Income Tax Act)
ii) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL
iii) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL
iv) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL)
v) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL) (Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)
vi) 50% of the required Security Deposit, including the EMD, should be paid before start of the work. Balance of the Security Deposit can be collected by deducting10% of the gross amount progressively from each of the running bills of the Contractor till the total amount of the required Security Deposit is collected. If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor. Security Deposit shall be released to the Contractor upon fulfilment of contractual obligations as per terms of the contract.

1.9.2 The Security Deposit shall not carry any interest.

1.9.3 The validity of Bank Guarantees towards Security Deposit shall be initially up to the completion period as stipulated in the Letter of Intent/Award (plus maintenance period if applicable), and 03 months claim period. The same shall be kept valid by proper renewal till the acceptance of Final Bills of the Contractor, by BHEL

1.9.4 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.

*1.10. **REFUND OF SECURITY DEPOSIT***

50% of the security deposit may be refunded on completion of the work after payment of the final bill and the balance 50% of the security deposit is refunded only after the expiry of the maintenance period from date of completion of work as stipulated in the contract concerned.

***1.10.1** DEFECTS LIABILITY PERIOD:*

The contractor shall be responsible to make good and remedy at his own expenses within such period as may be stipulated by the Engineer-in-charge, any defect which may develop or may be noticed before the expiry of the maintenance period of six months or as stipulated in NIT hereto from the certified date of completion and intimation of which has been sent to the contractor within seven days of the expiry of the said period by a letter sent by hand delivery or by registered post or Email. If contractor fails to attend to the above, defect will be rectified at contractor's risk & cost and same will be deducted from the security deposit/payable amounts available with BHEL.

*1.11. **BANK GUARANTEES***

Where ever Bank Guarantees are to be furnished/submitted by the contractor, the following shall be complied with

i) Bank Guarantees shall be from Scheduled Banks / Public Financial Institutions as defined in the Companies Act.

ii) The Bank Guarantees shall be as per prescribed BHEL formats.

iii) It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period (subject to a minimum period of six months), as per the advice of BHEL. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.

iv) In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly endorsed by BHEL

v) In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.

vi) Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.

vii) The Original Bank Guarantee shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due).

1.12. VALIDITY OF OFFER

The rates in the Tender shall be kept open for acceptance for a minimum period of Ninety (90) DAYS from latest due date of offer submission (including extension, if any). In case BHEL calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.

1.13 EXECUTION OF CONTRACT AGREEMENT

The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Intent by BHEL. The Tenderer shall submit an unqualified acceptance to the Letter of Intent/Award within the period stipulated therein.

The successful tenderer shall be required to execute an agreement in the prescribed form, with BHEL, within fifteen days (15 days) after the acceptance of the Letter of Intent/Award, and in any case before releasing the first running bill. The contract agreement shall be signed by a person duly authorized/empowered by the tenderer. The expenses for preparation of agreement document shall be borne by Tenderer.

1.14. REJECTION OF TENDER AND OTHER CONDITIONS

1.14.1 The acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever:-

a. To reject any or all of the tenders.

b. To split up the work amongst two or more tenderers as per NIT

c. To award the work in part if specified in NIT

d. In case of either of the contingencies stated in (b) and (c) above, the time for completion as stipulated in the tender shall be applicable.

1.14.2 Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc., are liable to be rejected.

1.14.3 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL, or tenderer under suspension (hold/banning /delisted) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt of India. BHEL reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job. The decision of BHEL will be final in this regard.

1.14.4 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character.

1.14.5 BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. They may, however, recognize such power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.

1.14.6 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money/Security Deposit/any other money due.

1.14.7 Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.

1.14.8 In case the Proprietor, Partner or Director of the Company/Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting the Tender shall be informed, along with the Offer. Failing to do so, BHEL may, at its sole discretion, reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.

1.14.9 The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of BHEL's Construction Manager/Site Incharge. The tenderer is solely responsible to BHEL for the work awarded to him.

1.14.10 The Tender submitted by a techno commercially qualified tenderer shall become the property of BHEL who shall be under no obligation to return the same to the bidder. However unopened price bids and late tenders shall be returned to the bidders after finalization of contract.

1.14.11 Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-I party, then the awarded price i.e contract value shall be worked out after considering the discount so offered.

1.14.12 BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

1.15 ***BHEL Fraud Prevention Policy :***

The bidder along with its associate/ collaborators/sub-contractors/ Sub-Vendors/ Consultants/service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice. Fraud prevention policy and list of Nodal officers shall be hosted on BHEL website, vendor portals of Units/Regions Internet.

CHAPTER-2

2.1 DEFINITION: The following terms shall have the meaning hereby assigned to them except where the context otherwise requires

i) BHEL shall mean Bharat Heavy Electricals Limited, a company registered under Companies Act 1956, with its Registered Office at BHEL HOUSE, SIRI FORT, NEW DELHI – 110 049, or its Authorised Officers or its Site Engineers or other employees authorised to deal with any matters with which these persons are concerned on its behalf.

ii) "EXECUTIVE DIRECTOR" or 'GROUP GENERAL MANAGER' or "GENERAL MANAGER (Incharge)" or "GENERAL MANAGER" shall mean the Officer in Electronics Division, Mysore road, Bengaluru-560026

iii) "COMPETENT AUTHORITY" shall mean Executive Director or Group General Manager or General Manager (In-charge) or General Manager or BHEL Officers who are empowered to act on behalf of the Executive Director or General Manager (In-charge) or General Manager of BHEL.

iv) "ENGINEER" or "ENGINEER IN CHARGE" shall mean an Officer of BHEL as may be duly appointed and authorized by BHEL to act as "Engineer" on his behalf for the purpose of the Contract, to perform the duty set forth in this General Conditions of Contract and other Contract documents. The term also includes 'CONSTRUCTION MANAGER' or 'SITE INCHARGE' as well as Officers

v) "SITE" shall mean the places or place at which the plants/equipment are to be erected and services are to be performed as per the specification of this Tender.

vi) "CLIENT OF BHEL" or "CUSTOMER" shall mean the project authorities with whom BHEL has entered into a contract for supply of equipment or provision of services.

vii) "CONTRACTOR" shall mean the successful Bidder/Tenderer who is awarded the Contract and shall include the Contractor's successors, heirs, executors, administrators and permitted assigns.

viii) "CONTRACT" or "CONTRACT DOCUMENT" shall mean and include the Work Order, Contract Agreement, the accepted appendices of Rates, Schedules, Quantities if any, General Conditions of Contract, Special Conditions of Contract, Instructions to the Tenderers, Drawings, Technical Specifications, the Special Specifications if any, the Tender documents, subsequent amendments mutually agreed upon and the Letter of Intent/Acceptance issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents or subsequent letters shall not form part of the contract unless, specifically accepted in writing by BHEL in the Letter of Intent/Award and incorporated in the agreement.

ix) "GENERAL CONDITIONS OF CONTRACT" shall mean the 'Instructions to Tenderers' and 'General Conditions of Contract' pertaining to the work for which above tenders have been called for.

x) "TENDER SPECIFICATION" or "TENDER" or "TENDER DOCUMENTS" shall mean General Conditions, Common Conditions, Special Conditions, Price Bid, Rate Schedule, Technical Specifications, Appendices, Annexures, Corrigendum's, Amendments, Forms, procedures, Site information, etc and drawings/documents pertaining to the work for which the tenderers are required to submit their offers. Individual specification number will be assigned to each Tender Specification.

xi) "LETTER OF INTENT" shall mean the intimation by a Post/Fax/email to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all terms and conditions of the contract are applicable from this date.

xii) "COMPLETION TIME" shall mean the period by 'date/month' specified in the 'Letter of Intent/Award' or date mutually agreed upon for handing over of the intended scope of work, the erected equipment/plant which are found acceptable by the Engineer, being of required standard and conforming to the specifications of the Contract.

xiii) "PLANT" shall mean and connote the entire assembly of the plant and equipment's covered by the contract.

xiv) "EQUIPMENT" shall mean equipment, machineries, materials, structural, electrical and other components of the plant covered by the contract.

xv) "TESTS" shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL, in order to ascertain the quality, workmanship, performance and efficiency of the contractor or part thereof.

xvi) "APPROVED", "DIRECTED" or "INSTRUCTED" shall mean approved, directed or instructed by BHEL.

xvii) "WORK or CONTRACT WORK" shall mean and include supply of all categories of labour, specified consumables, tools and tackles and Plants required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipment's to the entire satisfaction of BHEL.

xviii) "SINGULAR AND PLURALS ETC" words carrying singular number shall also include plural and vice versa, where the context so requires. Words imparting the masculine Gender shall be taken to include the feminine Gender and words imparting persons shall include any Company or Associations or Body of Individuals, whether incorporated or not.

xix) "HEADING" – The heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken as instructions thereof or of the contract.

xx) "MONTH" shall mean calendar month unless otherwise specified in the Tender.

xxi) Day' or 'Days' unless herein otherwise expressly defined shall mean calendar day or days of twenty four (24) hours each. A week shall mean continuous period of seven (7) days.

xxii) "COMMISSIONING" shall mean the synchronization testing and achieving functional operation of the Equipment with associated system after all initial adjustments, trials, cleaning, re-assembly required at site if any, have been completed and Equipment with associated system is ready for taking into service.

xxiii) "WRITING" shall include any manuscript type written or hand written or printed statement or electronically transmitted messages, under the signature or seal or transmittal of BHEL.

xxiv) "TEMPORARY WORK" shall mean all temporary works for every kind required in or for the execution, completion, maintenance of the work.

xxv) 'CONTRACT PRICE' or 'CONTRACT VALUE' shall mean the sum including applicable taxes mentioned in the LOI/LOA/Contract Agreement subject to such additions thereto or deductions there from as may be made under provisions hereinafter contained

xxvi) "COMMENCEMENT DATE" or "START DATE" shall mean the commencement/start of work at Site as per terms defined in the Tender

xxvii) "SHORT CLOSING" or "FORE CLOSING" of Contract shall mean the premature closing of Contract, for reasons not attributable to the contractor and mutually agreed between BHEL and the contractor

xxviii) "TERMINATION" of Contract shall mean the pre mature closing of contract due to reasons as mentioned in the contract

2.2 LAW GOVERNING THE CONTRACT AND COURT JURISDICTION

The contract shall be governed by the Law for the time being in force in the Republic of India. The Civil Court having original Civil Jurisdiction at Bengaluru, shall alone have exclusive jurisdiction in regard to all claims in respect of the Contract. No other Civil Court shall have jurisdiction in case of any dispute, under this contract

2.3 ISSUE OF NOTICE

2.3.1 Service of notice on contractor: Any notice to be given to the Contractor under the terms of the contract shall be served by sending the same by Registered Post / Speed Post / FAX / Email to or leaving the same at the Contractor's last known address of the principal place of business (or in the event of the contractor being a company, to or at its Registered Office). In case of change of address, the notice shall be served at changed address as notified in writing by the Contractor to BHEL. Such posting or leaving of the notice shall be deemed to be good service of such notice and the time mentioned to the condition for doing any act after notice shall be reckoned from the date so mentioned in such notice.

2.3.2 Service of notice on BHEL Any notice to be given to BHEL in-charge under the terms of the Contract shall be served by sending the same by post or Email or leaving the same at BHEL address or changed address as notified in writing by BHEL to the Contractor.

2.4 USE OF LAND

No land belonging to BHEL or their Customer under temporary possession of BHEL shall be occupied by the contractor without written permission of BHEL.

2.4.1 STORES AND MATERIALS:

The contractor shall, at his own expense, supply all stores and materials required for the contract, other than those which may be provided by BHEL at the rates detailed therein subject to their availability at the place of issue indicated therein. All stores and materials to be supplied by the Contractor shall be of the best kind as described in the Specifications and the Contractor shall, if required by the Engineer –in- charge furnish him with proof to his satisfaction that the store and materials so comply with the specifications.

The contractor shall, at his own expense and without delay, supply samples of stores and materials proposed to be used in the execution of the work for the approval of the Engineer-in charge, who may reject all stores and materials not corresponding either in quality or character to the approved samples.

In the case of stores provided by BHEL, the Contractor shall bear the cost of loading, transporting to site, unloading, storing under cover as required, assembling & jointing the several parts together as necessary and incorporating & fixing these stores & materials in the work, including all preparatory work of whatever description that may be required, and closing, preparing, loading and returning empty cases or containers to the place of issue without any extra charges.
Contractor is responsible for safe & secure storage of above material.

2.4.2 PATENT RIGHTS:

The contractor shall fully indemnify BHEL, or the agent, servant, or employee of BHEL, against any action, claim or proceeding relating to infringement or the use of any patent or design or any alleged patent or design rights, and shall pay any royalties which may be payable in respect of any article/ or part thereof included in the contract.

In the event of any claims being made or action brought against BHEL, or any agent, or servant or employee of BHEL., in respect of any of the matters aforesaid, the contractor shall not apply when such increment has taken place in complying with the specific directions issued by the BHEL but the contractor shall pay any royalties payable in respect of any such use.

2.4.3 WATER :

The contractor shall allow in his tender and provide at his cost all water required for the work or his employees on the work, together with all pipes and fittings or other means that may be necessary or required to ensure a proper and ample supply of water for all purpose connected with the work.

In the event of a provision existing in the Tender documents for supply of water on payment by BHEL, water will be supplied from the BHEL supply System, or other sources at any points fixed by the Site Engineer/ Engineer-in-charge on the site of work. The contractor shall make necessary arrangement for lifting, pumping, carrying or conveying the water as required at his own cost. The levy of water charges to be borne by the Contractor in such case shall be specifically mentioned in the Tender documents.

2.4.4 TEMPORARY WORKSHOPS, STORES ETC :

The Contractor shall, during the progress of the work provide, erect and maintain at his own expense all necessary temporary workshops, store, offices, toilets etc., required for the proper and efficient execution of the work. The planning, siting and erection of these building shall have the approval of the Engineer-in-charge and the Contractor shall at all times keep them in a clean and sanitized condition to the entire satisfaction of the Engineer-in-charge.

On completion of the work all such temporary buildings shall be cleared and the site restored to its original state in a clean and tidy condition to the entire satisfaction of the Engineer-in-charge.

2.5 COMMENCEMENT OF WORK

2.5.1 Time is essence of contract and is specified in the tender document or in each individual work order.

2.5.2 The contractor shall commence the work within seven(07) days from LOI/work order or as intimated by BHEL and shall proceed with the same with due expedition without delay.

2.5.3 If the contractor fails to start the work within stipulated time as per LOI or as intimated by BHEL, then BHEL at its sole discretion will have the right to cancel the contract. The Earnest Money and/or Security Deposit with BHEL will stand forfeited without any further reference to him without prejudice to any and all of BHEL's other rights and remedies in this regard.

2.5.4 All the work shall be carried out under the direction and to the satisfaction of BHEL.

2.6 ***MEASUREMENT OF WORK AND MODE OF PAYMENT:***

2.6.1 All payments due to the contractors shall be made by electronic mode only, unless otherwise found operationally difficult.

2.6.2 For progress running bill payments: - The Contractor shall present detailed measurement sheets in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per contract. The basis of arriving at the quantities, weights shall be relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.

2.6.3 These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book and signed by both the parties.

2.6.4 Based on the above quantities, contractor shall prepare the bills in prescribed format and work out the financial value. These will be entered in Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.

2.6.5 All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained to the contrary.

2.6.6 Measurement shall be restricted to that portion of work for which it is required to ascertain the financial liability of BHEL under this contract.

2.6.7 The measurement shall be taken jointly by persons duly authorized on the part of BHEL and by the Contractor.

2.6.8 The Contractor shall bear the expenditure involved if any, in making the measurements and testing of materials to be used/used in the work. The contractor shall, without extra charges, provide all the assistance with appliances and other things necessary for measurement.

2.6.9 If at any time due to any reason whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re measurements shall be borne by the contractor unless such re measurements are warranted solely for reasons not attributable to contractor.

2.6.10 Passing of bills covered by such measurements does not amount to acceptance of the completion of the work measured. Any left out work has to be completed, if pointed out at a later date by BHEL.

2.6.11 Final measurement bill shall be prepared in the final bill format prescribed for the purpose based on the certificate issued by BHEL Engineer that entire works as stipulated in tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractor shall give unqualified "No Claim" Certificate. All the tools and tackles loaned to him should be returned in satisfactory condition to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Books and signed by both parties to the contract. The Final Bill shall be prepared and paid within a reasonable time after completion of work.

*2.7 **RIGHTS OF BHEL***

BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any compensation.

2.7.1 To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons/ BHEL's obligation to its customer.

2.7.2 To terminate the contract or get any part of the work done through other agency or deploy BHEL's own/hired/otherwise arranged resources , at the risk and cost of the contractor after due notice of a period of two weeks by BHEL, in the event of:-

i) Contractor's continued poor progress

ii) Withdrawal from or abandonment of the work before completion of the work

iii) Contractor's inability to progress the work for completion as stipulated in the contract

iv) Poor quality of work

v) Corrupt act of Contractor

vi) Insolvency of the Contractor

vii) Persistent disregard to the instructions of BHEL

viii) Assignment, transfer, sub-letting of contract without BHEL's written permission

ix) Non fulfillment of any contractual obligations / non-compliance of statutory requirements

x) In the opinion of BHEL, the contractor is overloaded and is not in a position to execute the job as per required schedule

2.7.3 To meet the expenses including BHEL overheads of 35% & Liquidated damage/penalties arising out of "Risk & Cost" as explained above under Sl.No. 2.7.2. BHEL shall recover the amount from any money due from Contractor, from any money due to the Contractor including Security Deposit or by forfeiting any T&P or material of the contractor under this contract or any other contract of BHEL or by any other means or any combination thereof

2.7.4 To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, as per mutual agreement.

2.7.5 To effect recovery from any amounts due to the contractor under this or any other contract or in any other form, the moneys BHEL is statutorily forced to pay to anybody, due to contractor's failure to fulfill any of his obligations. BHEL shall levy overheads of 35% on all such payments.

2.7.6 While every endeavor will be made by BHEL to this end, they cannot guarantee uninterrupted work due to conditions beyond their control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract.

2.7.7 In case the execution of works comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than two months, due to reasons not attributable to the contractor and other than Force Majeure conditions, BHEL may consider permitting the contractor to de mobilize forthwith and re mobilize at an agreed future date. Cost of such demobilization/remobilization shall be mutually agreed. ORC (Over run Charges) in such cases shall not be applicable for the period between the period of demobilization and re mobilisation. The duration of contract/time extension shall accordingly get modified suitably. In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor.

2.7.8 In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts, etc, due to which inordinate discontinuity of work is anticipated, BHEL at its discretion may consider contractor's request to short close the contract, provided that the balance works are minor vis a vis the scope of work envisaged as per the contract. At the point of requesting for

short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work as mutually agreed, shall however be reduced from the final contract value.

2.7.9 ***LIQUIDATED DAMAGES/PENALTY***

COMPENSATION FOR DELAY:

If the contractor fails to maintain the required progress in terms of condition 2.10 or to complete the work and clear the site on or before the contracted or extended the period of completion, he shall, without prejudice to any other right or remedy of the BHEL on account of such breach, pay as agreed compensation an amount calculated as stipulated below

For unfinished anticipated value of work where finished portion is fit for use

Rate of compensation as follows:

- *Completion period (as originally stipulated)not exceeding 6 months. ……@ 1 percent per week*
- *Completion period (as originally stipulated) Exceeding 6 months and not exceeding 2 years…@ 0.5 percent per week*
- *Completion period (as originally stipulated) exceeding 2 years…… @ 0.25 percent per week*

Provided always that the total amount of compensation for delay to be paid under condition shall not exceed the under noted percentage of the anticipated contract value

- *Completion period (as originally stipulated) not exceeding 6 months. ……@ 10 percent of anticipated value of work*
- *Completion period (as originally stipulated)Exceeding 6 months and not exceeding 2 years…@ 7.5 percent of anticipated value of work*
- *Completion period (as originally stipulated)Exceeding 2 years……..@ 5 percent of anticipated value of work*

The amount of compensation may be adjusted or set off against any sum payable to the Contractor under this or any other contract with the BHEL.

2.7.10 ***POST TECHNICAL AUDIT OF WORK AND BILLS****: BHEL reserve the right to carry out a post-payment audit and technical examination of the work and final bill including all supporting vouchers, abstract etc., and to enforce recovery of any sums becoming due as a result thereof in the manner provided in the proceeding sub-paragraph's provided however that no such recovery shall be enforced after three years of passing the final bill*

2.8 RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC.

The following are the responsibilities of the contractor in respect of observance of local laws, employment of personnel, payment of taxes etc. The subcontractor shall fully indemnify BHEL against any claims of whatsoever nature arising due to the failure of the contractor in discharging any of his responsibilities hereunder:

2.8.1 The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religious and other customs.

2.8.2 The contractor shall comply with all applicable State and Central Laws, Statutory Rules, Maternity act, Regulations etc. such as contract labour(R&A) Act 1970, Minimum wage Act 19748, Payment of wages Act 1936,ESI Act 1948, EPF Act 1952, Employees' compensation Act 1923, Provision of Companies Act 1948 & rules thereof, The interstate Migrant Workmen 1979, The Karnataka Factories Rules 1969, Payment of Bonus Act 1965, Payment of Gratuity Act 1972. Child labour Prohibition act 1986, Karnataka Minimum Wage Act , Prevention of sexual harassment at work place Act 2013, Guidelines/notification related to Safai Karamchari Act , Equal Remuneration Act 1976, The company's instructions as issued from time to time in regard to working hours, wages, leaves, holidays etc. for labour as may be enacted by the Government during the tenure of the Contract and having force or jurisdiction at Site. The Contractor shall also give to the local Governing Body, Police and other relevant Authorities all such notices as may be required by the Law.

The contractor shall produce the following registers and forms:

- *Form XIII- Register of work men employed by contractor(Rule 75)*
- *Form XIV- Employment Card issued by contractor(Rule 76)*
- *Form XVI- Muster Roll (Rule 78(1) (a)(i))*
- *Form XVII- Register of Wages (Rule 78(1) (a)(i))*
- *Form XVIII- Register of wages cum Muster Roll(in case of weekly payment)*
- *Form XIX- Wage slip (Rule 78(b))*
- *Form XX- Register of deduction for damages Or Loss Rule 78(1) (a)(ii))*
- *Form XXI- Register of files Rule 78(1) (a)(ii))*
- *Form XXII- Register of Advance Rule 78(1) (a)(ii))*
- *Form XXIII- Register of Overtime Rule 78(1) (a)(iii))*
- *Form XXIV- Return to be sent by the contractor to the Licensing officer (Rule 82(1))*

2.8.3 The contractor shall obtain independent License under the Contract Labour (Regulations and Abolition Act)as required from the concerned Authorities based on the certificate (Form-V) issued by the Principal Employer/Customer

2.8.4 The contractor shall pay all taxes, fees, license charges, deposits, duties, tolls, royalties, commission or other charges which may be levied on account of his operations in executing the contract.

2.8.5 While BHEL would pay the inspection fees and Registration fees of Boiler & explosive/Electrical Inspectorate, all other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any payment to the Inspectorate in connection with contractor's Welders/Electricians qualification tests etc.

2.8.6 Contractor shall be responsible for provision of Health and Sanitary arrangements (more particularly described in Contract Labour Regulation & Abolition Act), Safety precautions etc. as may be required for safe and satisfactory execution of contract.

2.8.7 The contractor shall be responsible for proper accommodation including adequate medical facilities for personnel employed by him.

2.8.8 The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.

2.8.9 The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it is responsibility of the contractor to make good the losses or compensate for the same.

2.8.10 All the properties/equipment/components of BHEL/their Client loaned with or without deposit to the contractor in connection with the contract shall remain properties of BHEL/their Client.

2.8.11 The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipment/components shall be deemed to be in good condition when received by the contractor unless he notifies within 48 hours to the contrary. The contractor shall return them in good condition as and when required by BHEL/their Client. In case of non-return, loss, damage, repairs etc, the cost thereof as may be fixed by BHEL Engineer will be recovered from the contractor

2.8.12 Any delay in completion of works/or non-achievement of periodical targets due to the reasons attributable to the contractor, the same may have to be compensated by the contractor either by increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.

2.8.13 The contractor shall arrange, coordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.

2.8.14 All safety rules and codes applied by the Client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of Clerical staff, watch and ward, store keepers to take care of equipment/materials and construction tools and tackles shall be posted at site by the contractor till the completion of work under this contract. The contractor shall arrange for such safety devices as are necessary for such type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per prescribed standards and practices. Contractor has to ensure the implementation of Health, Safety and Environment (HSE) requirements as per directions given by BHEL/Customer. The contractor has to assist in HSE audit by BHEL/Customer and submit compliance Report. The contractor has to generate and submit record/reports as per HSE plan/activities as per instruction of BHEL/Customer. All tools, plant and equipment brought to the site shall become the property of BHEL and shall not be removed from the site without the prior written approval from BHEL. When the work is finally completed or the Contractor is determined for reasons other than the defaults of the contract, he shall forthwith remove from the site all tools, plants, equipment etc., (other than those as may have been provided by BHEL) and upon such removal, the same shall revert in, and become the property of the contractor.

2.8.15 The contractor will be directly responsible for payment of wages to his workmen on specified date of respective month declared as per applicable Labour Act. A pay roll sheet giving all the payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL site for record purpose.

2.8.16 In case of any class of work for which there is no such specification as laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.

2.8.17 Also, no idle charges will be admissible in the event of any stoppage caused in the work resulting in contractor's labour and Tools & Plants being rendered idle due to any reason at any time.

2.8.18 The contractor shall take all reasonable care to protect the materials and work till such time the plant/equipment has been taken over by BHEL or their Client whichever is earlier.

2.8.19 The contractor shall not stop the work or abandon the site for whatsoever reason of dispute, excepting force majeure conditions. All such problems/disputes shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly

2.8.20 The contractor shall keep the area of work clean and shall remove the debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of work, all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices, etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor. If the work is executed in Factory premises, no hutment will be allowed.

2.8.21 The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/ or as per the instructions of the Engineer.

2.8.22 The Contractor to note that some of BHEL's T&Ps/MMDs may not be insured. The Contractor will take necessary precautions and due care to protect the same while in his custody from any damage/ loss till the same is handed over back to BHEL. In case the damage / loss is due to carelessness/ negligence on the part of the contractor, the Contractor is liable to get them repair/ replaced immediately and in case of his failure to do so within a reasonable time, BHEL will reserve the right to recover the loss from the contractor.

2.8.23 The contractor shall provide all watchmen necessary, for the protection of the site, the work, the materials, the tools , plant, equipment and anything else lying on the site during the progress of the work. He shall solely be responsible for and shall take all reasonable and proper steps for protecting, securing , lighting and watching all places on or about the work and the site which may be dangerous to any person whom so ever.

2.8.24 SITE DRAINAGE: All water that may accumulate on the site during the process of the work, or in trenches and excavations shall be removed to the entire satisfaction of the Engineer-in-charge and at Contractors expense.

2.8.25 INSPECTION OF THE WORK: BHEL Officers concerned with the Contract shall have power at any time to inspect and examine any part of the work and the contractor shall give such facilities as may be required to given for such inspection and examination.

2.8.26 In case the contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon if the item rates are not mentioned in existing contract

i. For any item of wok required to be carried out after the contract has been awarded and which is not covered by Contractors Schedule but is covered by C.P.W.D. schedule of rates the rate payable for such a fresh item will be derived from updated C.P.W.D. schedule of rates by the method of proportion as follows:

ii. *Rate as per estimated updated C.P.W.D DSR and loading tender excess (plus or minus) on pro–rata basis for nearest analogous items. For other items rate as per estimated C.P.W.D DSR and loading tender excess(plus or minus)*

iii. *If rates are not available in C.P.W.D. DSR, deviated item rates will be derived from market rate with 15% profit and overheads.*

2.9 ***PROGRESS MONITORING, MONTHLY REVIEW AND PERFORMANCE EVALUATION***

2.9.1 A detailed plan/programme for completion of the contractual scope of work as per the time schedule given in the contract shall be jointly agreed between BHEL and Contractor, before commencement of work . The above programme shall be supported by month wise deployment of resources viz Manpower, T&P, Consumables, etc. Progress will be reviewed periodically (Daily/Weekly/Monthly) vis a vis this jointly agreed programme. The Contractor shall submit periodical progress reports (Daily/Weekly/Monthly) and other reports/information including manpower, consumables, T&P mobilization etc as desired by BHEL.

2.9.2 Monthly progress review between BHEL and Contractor shall be based on the agreed programme as above, availability of inputs/fronts etc, and constraints if any, as per prescribed formats. Manpower, T&P and consumable reports as per prescribed formats shall be submitted by contractor every month. Release of RA Bills shall be contingent upon certification by BHEL Site Engineer of the availability of the above prescribed formats duly filled in and signed.

2.9.3 The burden of proof that the causes leading to any shortfall is not due to any reasons attributable to the contractor is on the contractor himself. The monthly progress review shall record shortfalls attributable to (i) Contractor, (ii) Force Majeure Conditions, and (iii) BHEL

2.10 ***TIME OF COMPLETION***

2.10.1 Time is essence of the contract. The time schedule shall be as prescribed in the Contract. The time for completion shall be reckoned from the date of commencement of work at Site as certified by BHEL Engineers

2.10.2 The entire work shall be completed by the contractor within the time schedule or within such extended periods of time as may be allowed by BHEL under clause 2.11

2.11 ***EXTENSION OF TIME FOR COMPLETION***

2.11.1 If the completion of work as detailed in the scope of work gets delayed beyond the contract period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the Contract.

2.11.2 Based on the monthly reviews jointly signed, the works balance at the end of original contract period less the backlog attributable to the contractor shall be quantified, and the number of months of 'Time extension' required for completion of the same shall be jointly worked out. Within this period of 'Time extension', the contractor is bound to complete the portion of backlog attributable to the contractor. Any further 'Time extension' or 'Time extensions' at the end of the previous extension shall be worked out similarly.

2.11.3 However if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take at the risk and cost of contractor.

2.11.4 A joint programme shall be drawn for the balance amount of work to be completed during the period of 'Time Extension', along with matching resources (with weightages) to be deployed by the contractor as per specified format. Review of the programme and record of shortfall shall be done every month of the 'Time extension' period in the same manner as is done for the regular contract period.

2.11.5 During the period of 'Time extension', contractor shall maintain their resources as per mutually agreed program

2.11.6 At the end of total work completion as certified by BHEL Engineer, and upon analysis of the total delay, the portion of time extensions attributable to (i) Contractor, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out and shall be considered to be exhausted in the same order. The total period of time extensions shall be the sum of (i), (ii) and (iii) above and shall be equal to period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/levied for the portion of time extensions attributable to contractor and recoverable from the dues payable to the contractor.

2.12 ***OVERRUN COMPENSATION (THIS CLAUSE IS NOT APPLICABLE IN BHEL FACTORY & TOWNSHIP PREMISES)***

2.12.1 Over Run Compensation (ORC) is payable by way of rate revisions for periods beyond original, contract period subject to the following terms and conditions.

2.12.2 Rates shall be increased by 10% for the first twelve months of one or more extensions beyond original contract period. For the next twelve months of further extensions if any, rates shall be increased as above by 10% over the previous twelve months, and similarly for each subsequent twelve months extension.

2.12.3 Should there be any 'Time extension' for reasons attributable only to the contractor, then the work shall be executed by the contractor at the rates applicable for the period the work was planned

2.12.4 Payment of ORC shall be regulated as follows:

i) Contractor is entitled to Over Run Compensation (ORC) only for the portion of backlog attributable to BHEL.

ii) 50% of the compensation is allocated for deployment of resources agreed as per the joint programme drawn vide 2.11.4. Payment shall however be based on the actual deployment of resources for the month as certified by BHEL, as per weightages assigned therein

iii) 50% of the compensation, is allocated for achieving of planned progress agreed as per the joint programme drawn vide 2.11.4. Payment shall be on pro rata basis for actual achieved quantities

iv) Total Over Run Compensation shall be limited to 10% of the executed contract value as certified in Final Bill. For this purpose executed contract value excludes PVC, ORC, Supplementary/Additional Items and Extra Works done on Man-day rate basis

2.12.5 Contractor shall not be entitled for any Over Run Compensation (ORC) for the portion of backlog attributable to the contractor. Such works shall be executed at the rates applicable for the period the work was planned

2.13 ***QUANTITY VARIATION***

2.13.1 The quoted rates shall remain firm irrespective of any variations in the individual quantities.

2.14 ***EXTRA WORKS***

2.14.1 All rectifications/modifications, revamping, and reworks required for any reasons not attributable to the contractor, or needed due to any change in deviation from drawings and design of equipment, operation/maintenance requirements, mismatching, or due to damages in transit, storage and erection/commissioning, and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, will be considered as extra works.

2.14.2 Extra works arising on account of the contractor's fault, irrespective of time consumed in rectification of the damage/loss, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.

2.14.3 All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents i.e. daily log sheets. Signing of log sheets by BHEL engineer does not necessarily mean the acceptance of such works as extra works.

2.14.4 BHEL retains the right to award or not to award any of the major repair/ rework/modification/rectification/fabrication works to the contractor, at their discretion without assigning any reason for the same

2.14.5 After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

MAN-HOUR RATE FOR ELIGIBLE EXTRA WORKS: Single composite average labour man-hour rate, including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, consumables for carrying out any major rework/ repairs/ rectification/ modification/ fabrication as certified by site as may arise during the course of erection, testing, commissioning or extra works arising out of transit, storage and erection damages, payment , if found due will be as per applicable minimum wage act

2.14.6 The above composite labour man hour rate towards extra works shall remain firm and not subject to any variation during execution of the work. PVC will not be applicable for extra works. Rate revision, Over Run Charges/compensation etc will not be applicable due to extra works.

2.14.7 Extra Works for Civil Packages shall be regulated as follows

i) Rates for Extra Works arising due to (1) non availability of BOQ (Rate Schedule), OR (2) change in Specifications of materials/works (3) rectification/modification/dismantling & re erecting etc due to no fault of Contractor, shall be in the order of the following:

a) Item rates are to be derived from similar nature of items in the BOQ (Rate Schedule) with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities.

b) As per applicable updated CPWD-DSR (or latest edition) with applicable escalation derived, Notification issued by the office of CPWD for 'Cost Index' in that Region where the project is being executed,

c) Item rates are to be worked out on the basis of prevailing market rates mutually agreed between BHEL and Contractor, plus 15% towards Contractor's overheads and profit.

ii) PVC and ORC will not applicable be for (i) above.

2.15 ***SUPPLEMENTARY ITEMS***

2.15.1 For NON Civil Works

Supplementary items are items/works required for completion of entire work but not specified in the scope of work. Subject to certification of such items/works as supplementary items by BHEL Engineer, rates shall be derived on the basis of any one of the following on mutual agreement:

i) Based on percentage breakup/rates indicated for similar/nearby items

ii) In case (i) above does not exist, then BHEL/site may derive the percentage breakup/rates to suit the type of work

2.15.2 For Civil Works

i) Rates for Supplementary Works/Additional Works arising out due to additions/alterations in the original scope of works as per contract subject to certification of BHEL Engineer shall be worked out as under:

a) Item rates which are available in existing BOQ (Rate Schedule) shall be operated with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities

b) Items of works which are not available in existing BOQ shall be operated as an 'Extra Works' and rate shall be derived as per clause no 2.14

ii) Execution of Supplementary Works/Additional Works through the Contractor shall be at the sole discretion of BHEL, and shall be considered as part of executed contract value for the purpose of Quantity Variation as per clause 2.13

iii) BHEL Engineer's decision regarding fixing the rate as above is final and binding on the contractor.

iv) PVC and ORC will not be applicable for (i) above.

2.16 ***STRIKES & LOCKOUT***

2.16.1 The contractor will be fully responsible for all disputes and other issues connected with his labour/employee. In the event of the contractor's labour/employee resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of 15 days, BHEL shall have the right to get the work executed through any other

agencies and the cost so incurred by BHEL along with Overhead charges of 35% shall be deducted from the Contractor's bills along with overhead of 35%

2.16.2 For all purposes whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL

2.17 FORCE MAJEURE

The following shall amount to Force Majeure:-

2.17.1 Acts of God, act of any Government, War, Sabotage, Riots, Strike, Civil commotion, Police action, Revolution, Flood, Fire, Cyclones, Earth quake and Epidemic and other similar causes over which the contractor has no control.

2.17.2 If the contractor suffers delay in the due execution of the contractual obligation due to delays caused by force majeure as defined above, the agreed time of completion of the job covered by this contract or the obligations of the contractor shall be extended by a period of time equal to period of delay, provided that on the occurrence of any such contingency, the contractor immediately reports to BHEL in writing the causes of delay and the contractor shall not be eligible for any compensation.

2.18 ***ARBITRATION & RECONCILIATION***

2.18.1 In case amicable settlement is not reached in the event of any dispute or difference arising out of the execution of the Contract or the respective rights and liabilities of the parties or in relation to interpretation of any provision by the Contractor in any manner touching upon the Contract, such dispute or difference shall (except as to any matters, the decision of which is specifically provided for therein) be referred to the sole arbitration of the arbitrator appointed by BHEL/In charge.

The award of the Arbitrator shall be binding upon the parties to the dispute Subject as aforesaid, the provisions of Arbitration and Reconciliation Act 1996 (India) or statutory modifications or reenactments thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. The venue of the arbitration shall be the place from which the contract is issued or such other place as the Arbitrator at his discretion may determine

2.18.2 In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred to by either party to the arbitration of one of the arbitrators in the department of public enterprises. The award of the arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties hereto finally and conclusively.

2.18.3 The cost of arbitration shall be borne equally by the parties.

2.18.4 Work under the contract shall be continued during the arbitration proceedings

2.19 ***PAYMENTS***

Payments to Contractors are made in any one of the following forms

2.19.1 Running Account Bills (RA Bills)

i) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).

ii) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents along with relevant statutory documents applicable for the work.

iii) Recoveries on account of electricity, water, statutory deductions, etc are made as per terms of contract

iv) Full rates for the work done shall be allowed only if the quantum of work has been done as per the specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to re do the work according to the required specifications, without any extra cost. However, where this is not considered necessary 'OR' where the part work is done due to factors like non-availability of material to be supplied by BHEL 'OR' non availability of fronts 'OR' non availability of drawings, fraction payment against full rate, as is considered reasonable, may be allowed with due regard for the work remaining to be done. BHEL decision in this regard will be final and binding on the contractor.

v) In order to facilitate part payment, BHEL Site Engineer at his discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work

2.19.2 Final Bill

Final Bill' is used for final payment on closing of Running Account for works or for single payment after completion of works. 'Final Bill' shall be submitted as per prescribed format after completion of works as per scope and upon material reconciliation, along with the following.

i) 'No Claim Certificate' by contractor

ii) Clearance certificates where ever applicable viz Clearance Certificates from Customer, various Statutory Authorities like Labour department, PF Authorities, Commercial Tax Department, etc

iii) Indemnity bond as per prescribed format BHEL shall settle the final bills after deducting all liabilities of Contractor to BHEL

2.20 ***PERFORMANCE GUARANTEE FOR WORKMANSHIP***

2.20.1 Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of as mentioned in the contract/NIT from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works at the Contractor's risk and cost, without prejudice to any other rights and recover the same from the balance security deposit.

2.20.2 BHEL shall release the balance security deposit subject to the following

i) Contractor has submitted 'Final Bill'

ii) Guarantee period as per contract has expired

iii) Contractor has furnished 'No Claim Certificate' in specified format

iv) BHEL Site Engineer/Construction Manager has furnished the 'No Demand Certificate' in specified format

v) Contractor has carried out the works required to be carried out by him during the period of Guarantee and all expenses incurred by BHEL on carrying out such works is included for adjustment from the Guarantee money refundable.

2.21 ***CLOSING OF CONTRACTS***

The Contract shall be considered completed and closed upon completion of all contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a completion certificate as per standard format, based on specific request of Contractor.

2.22 ***REVERSE AUCTION/PRICE BID OPENING:***

- *BHEL reserves the right to go for reverse auction at any point of time before opening of Price Bid.*
- *Bids with non-acceptance of reverse auction will be liable for rejection.*
- *Opening of Price Bid at discretion of BHEL.*
- *BHEL shall be at liberty to cancel the tender at any time, before ordering, without assigning any reason.*

2.23 ***SUSPENSION OF BUSINESS DEALINGS***

BHEL reserves the right to take action against Contractors who either fail to perform or Tenderers/Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.

2.24 OTHER ISSUES

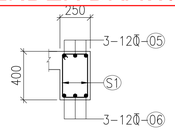
2.24.1 Value of Non judicial Stamp Paper for Bank Guarantees and for Contract Agreement shall be not less than Rs 200/- unless otherwise required under relevant statutes.

2.24.2 In case of any conflict between the General Conditions of Contract and Special Conditions of Contract, provisions contained in the Special Conditions of Contract shall prevail.

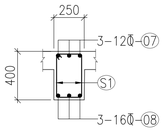
2.24.3 Unless otherwise specified in NIT, offers from consortium/JVs shall not be considered.

2.24.4 BHEL may not insist for signing of Contract Agreements in respect of low value and short time period contracts

TENTATIVE TENDER DRAWINGS



BEAM MKD B1(250X400)



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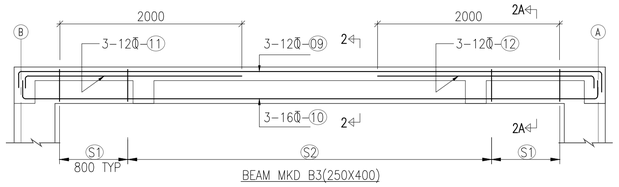

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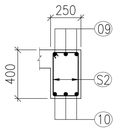
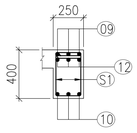
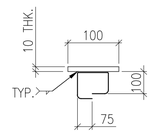


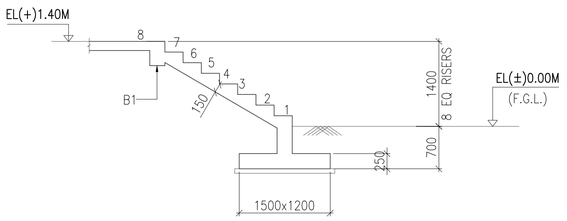
SECTION 2-2



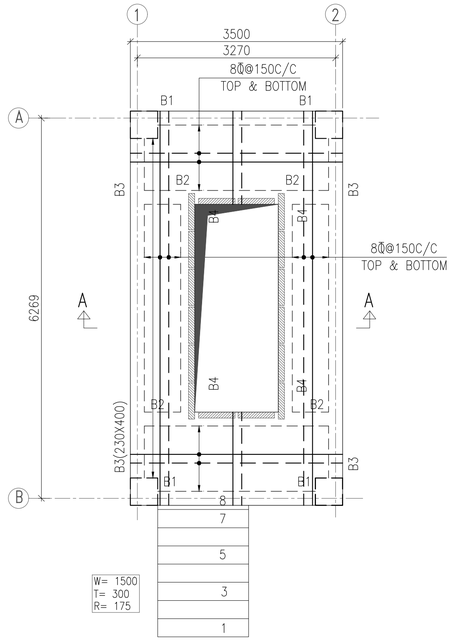
SECTION 2A-2A



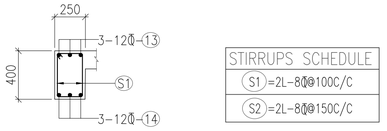
SECTION P-P



SECTION B-B
STAIR CASE

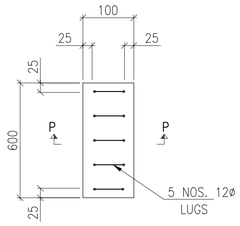


PLAN AT TOP EL(+)1.40M LVL.
FOR SHOWING SLAB R.F ONLY
BARS TO BE CUT SUITABLTY AROUND OPENING

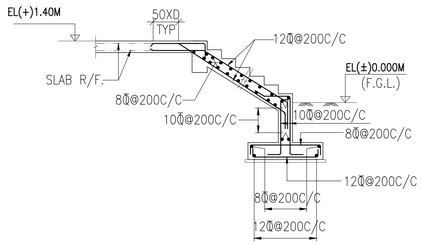


BEAM MKD B4(250X400)

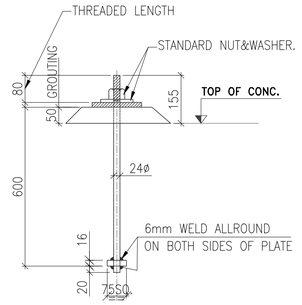
STIRRUPS SCHEDULE
S1 =2L-8Ø@100C/C
S2 =2L-8Ø@150C/C



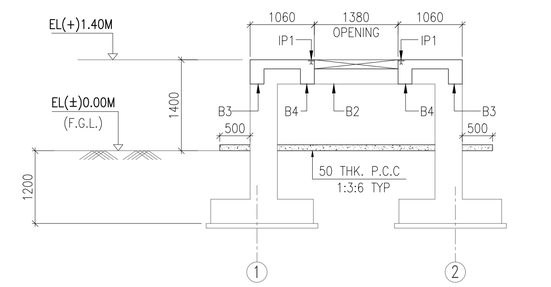
DETAIL OF INSERT PLATE
MKD. IP1 (100x600x10THK.)



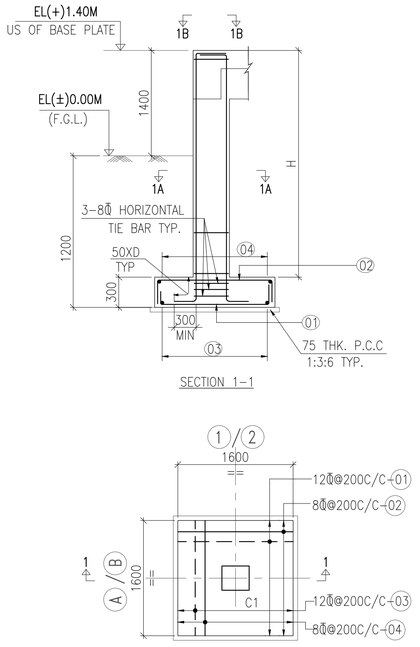
SECTION B-B
R/F. DETAIL OF STAIR CASE



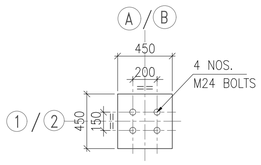
DET. OF M24 BOLTS.



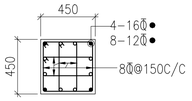
SECTION A-A



SECTION 1-1

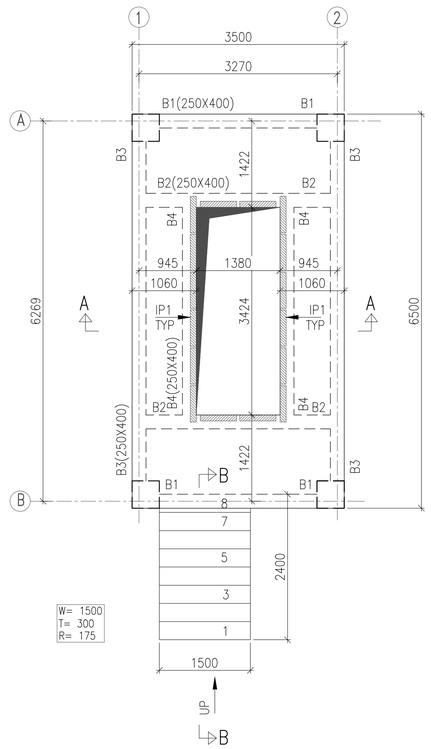


VIEW 1B-1B
COLUMN MKD C1

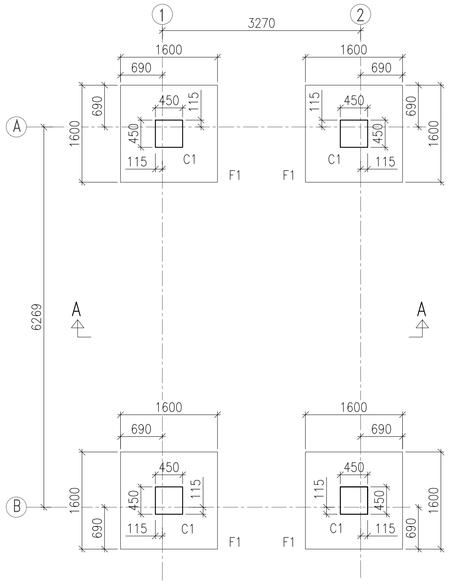


SECTION 1A-1A
COLUMN MKD C1
SHOWING R.F ONLY

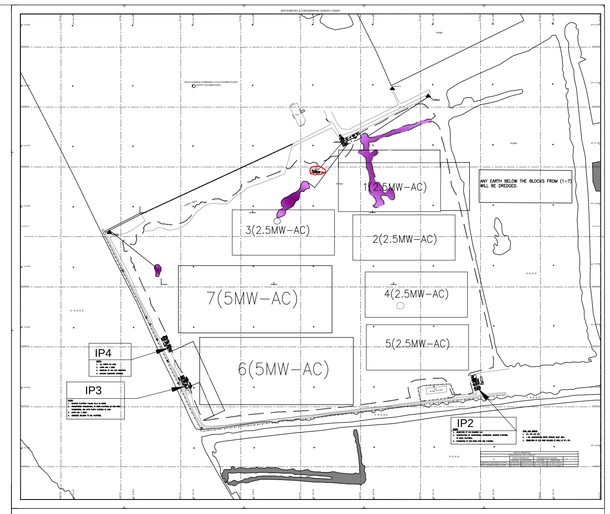
TYPICAL DETAIL OF FOOTING



PLAN AT TOP EL(+)1.40M LVL.
SLAB 125THK.



PLAN AT FOUNDATION LEVEL



KEY PLAN

NOTES:-

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES.
2. FIGURED DIMENSIONS ONLY SHALL BE FOLLOWED.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT ARCH./MECH DWG.
4. FINISHED FLOOR LEVEL CORRESPONDS TO EL(±)0.000M, WHICH IS AT 600MM ABOVE FGL/NGL. FGL/NGL SHALL BE CONSIDERED AT EXISTING ADJOINING ROAD CENTER
5. ALL R.C.C. SHALL BE MIX M-30
6. REINFORCEMENT STEEL SHALL BE OF HIGH STRENGTH DEFORMED TMT STEEL BARS WITH CORROSION INHIBITORS, CORROSION RESISTANT STEEL (CRS) RE-BARS, FUSION BONDED EPOXY COATED (FBEC) RE-BARS OR ZINC COATED RE-BARS OF GRADE MINIMUM FE-500 AND SHALL CONFORM TO IS: 1786. DUCTILE DETAILING IN ACCORDANCE WITH IS: 13920 SHALL BE ADOPTED FOR SUPERSTRUCTURE AND SUBSTRUCTURE OF ALL RCC BUILDINGS / STRUCTURES
7. CLEAR COVER TO REINF. INCLUDING LINKS FOR R.C.C MEMBERS SHALL BE AS UNDER:-COLUMN=40mm,FOOTING=50mm,BEAM=25mm,SLAB=20mm
8. STANDARD 'L' HOOKS SHALL BE PROVIDED AT THE ENDS OF ALL BARS.
9. PROVIDED LAP LENTH/DEVELOPMENT LENGTH 'Ld' FOR BOTH COMPRESSION AND TENSION MAIN R/F BAR SHALL BE=50XDIA OF BAR
10. LAPS SHALL BE STAGGERED AND AVOIDED AT THE SECTIONS OF MAX. BENDING MOMENT
11. NET SAFE BEARING CAPACITY HAS BEEN TAKEN AS 5 T/SQM AT 1.20M BELOW N.G.L
12. NO FOUNDATION SHALL BE REST ON FILLED UP SOIL.
13. BOTTOM BAR INDICATES :- ----------
14. TOP BAR INDICATES :- _____

FOR TENDERING PURPOSE ONLY

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	APPD	CHD
00	22.05.20	SUNIL	VIPIN	DKU										
	ISSUED FOR APPROVAL													

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

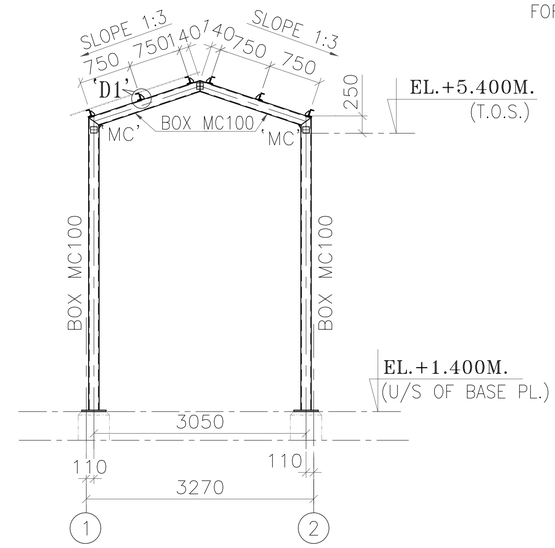
22MW FLOATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

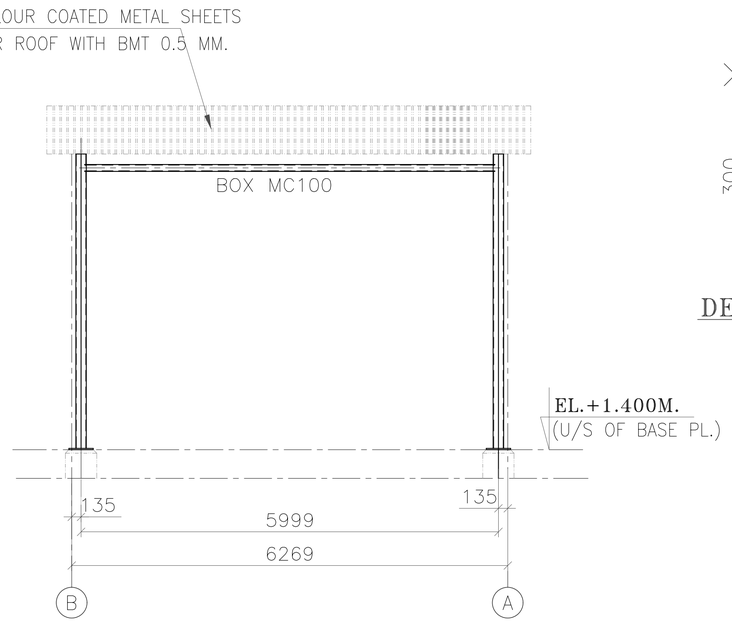
TITLE
GA AND RC DETAILS OF 33 KV SWBD PLATFORM & SHED
HT SINGLE PANEL (IP2 / IP3)

SCALE 1: 75 | DRAWING NO. 5742-004-PVC-F-006 | SHEET 1 OF 10 | REV. 00

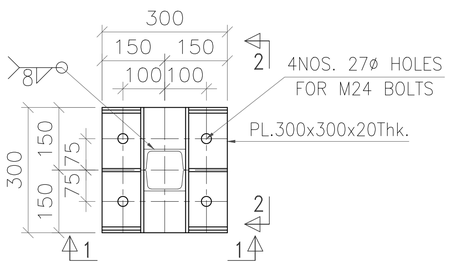
TENTATIVE TENDER DRAWINGS



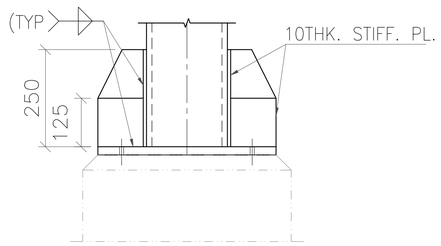
ELEVATION ALONG GRID A & B



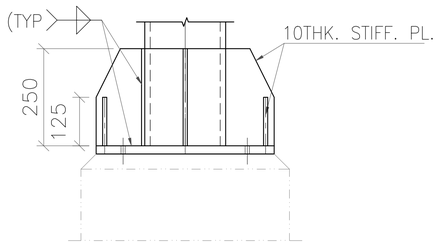
ELEVATION ALONG GRID 1 & 2



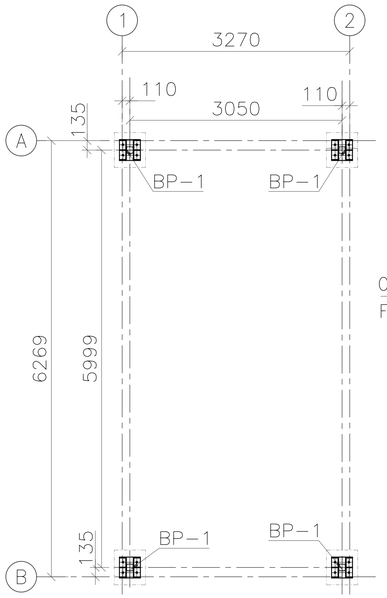
DETAIL OF BASE PLATE
(BP-1)



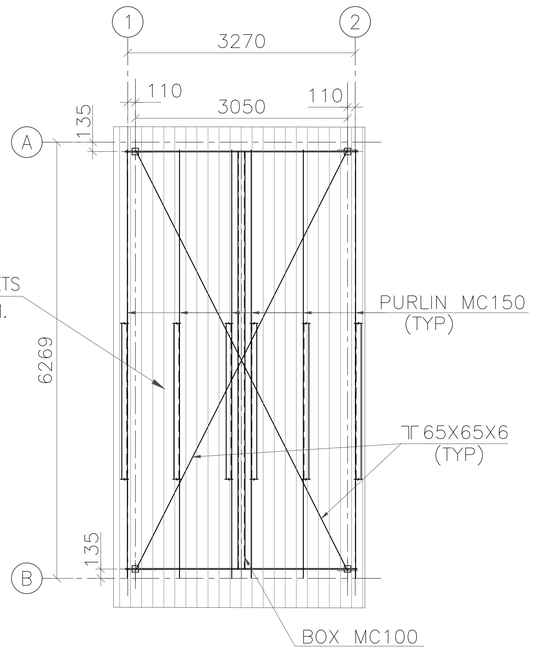
SECTION 1-1



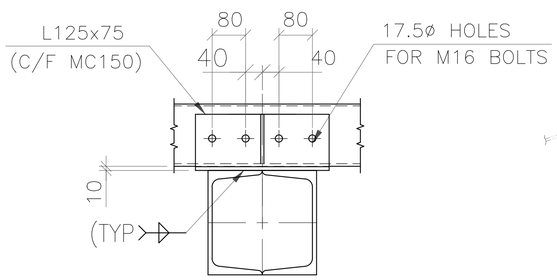
SECTION 2-2



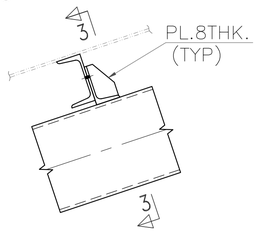
PLAN AT BASE PLATE LEVEL



PLAN AT PURLIN LEVEL



SECTION 3-3



DETAIL D1

NOTES:-

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE
2) THIS DRAWING IS NOT BE SCALED,ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3) ALL FILLET WELDS ARE 6mm FILLET WELDS U.N.O.
4) ALL BUTT WELDS SHALL BE PROVIDED WITH A SEALING RUN
5) ALL GUSSET PLATES SHALL BE 8mm THK U.N.O.
6) ALL INCLINED MEMBERS AND GUSSET PLATES ARE TO BE CHECKED BY FULL SHOP LAYOUT
7) ALL ERECTION HOLES ARE 18ø FOR 16ø ERECTION BOLTS(U.N.O.)
8) ALL PERMANENT HOLES ARE 22ø FOR 20ø PERMANENT BOLTS(U.N.O.)UNLESS OTHERWISE SPECIFIED
9) ALL CONTACT SURFACES OF GUSSET PLATES HAVING ERECTION BOLTS SHALL BE WELDED AFTER ERECTION AND ALIGNMENT.
10) STRUCTURAL STEEL SHALL CONFORM IS:2062/IS:1079 OR EQUIVALENT ,PIPE SHALL BE AS PER MEDIUM/HIGH GRADE OF IS:1161

* 'MC' – MOMENT CONNECTION

FOR TENDERING PURPOSE ONLY

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	APPD	CHD
00	22.05.20	B.S	VIPIN	DKU										
	ISSUED FOR APPROVAL													

22MW FLOATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

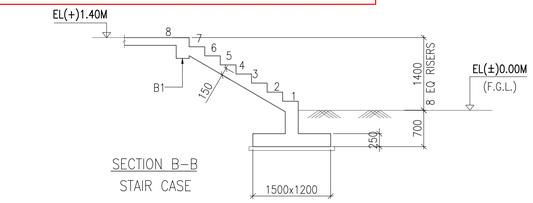
BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

TITLE
GA AND RC DETAILS OF 33 KV SWBD PLATFORM & SHED
HT SINGLE PANEL (IP2 / IP3)

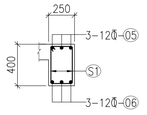
SCALE 1: 75 | DRAWING NO. 5742-004-PVC-F-006

SHEET 2 OF 10 | REV. 00

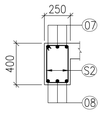
TENTATIVE TENDER DRAWINGS



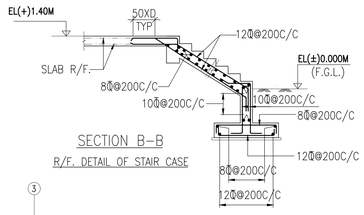
SECTION B–B
STAIR CASE



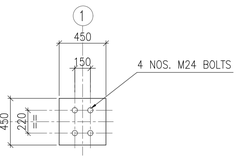
BEAM MKD B1(250X400)



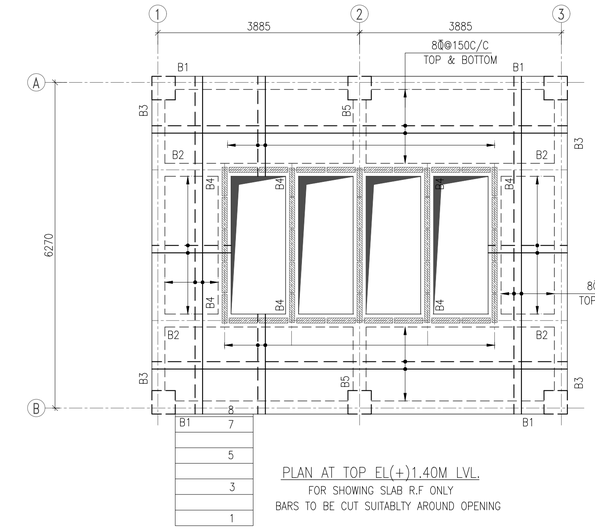
SECTION 2–2



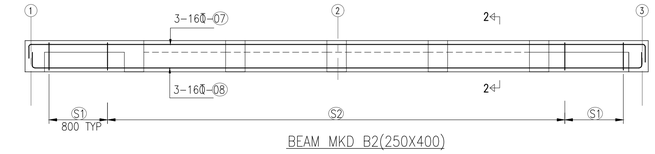
SECTION B–B
R/F. DETAIL OF STAIR CASE



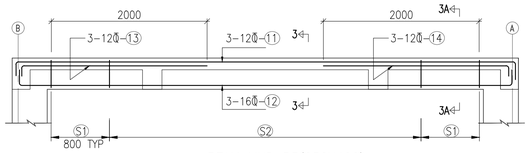
VIEW 1B–1B
COLUMN MKD C2



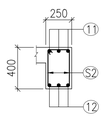
PLAN AT TOP EL(+)1.40M LVL.
FOR SHOWING SLAB R.F ONLY
BARS TO BE CUT SUITABLTY AROUND OPENING



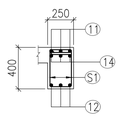
BEAM MKD B2(250X400)



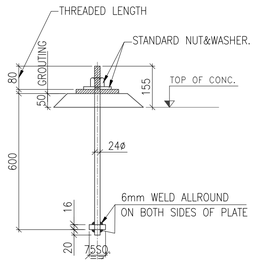
BEAM MKD B3(250X400)



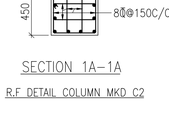
SECTION 3–3



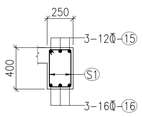
SECTION 3A–3A



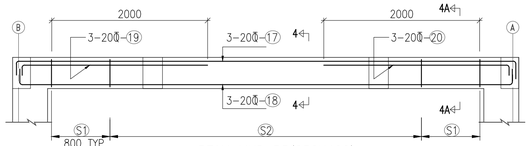
DET. OF M24 BOLTS.



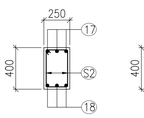
SECTION 1A–1A
R.F DETAIL COLUMN MKD C2



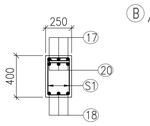
BEAM MKD B4(250X400)



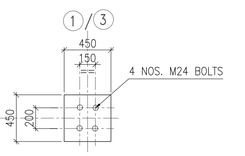
BEAM MKD B5(250X400)



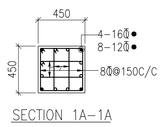
SECTION 4–4



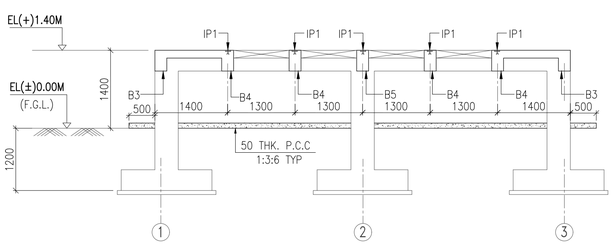
SECTION 4A–4A



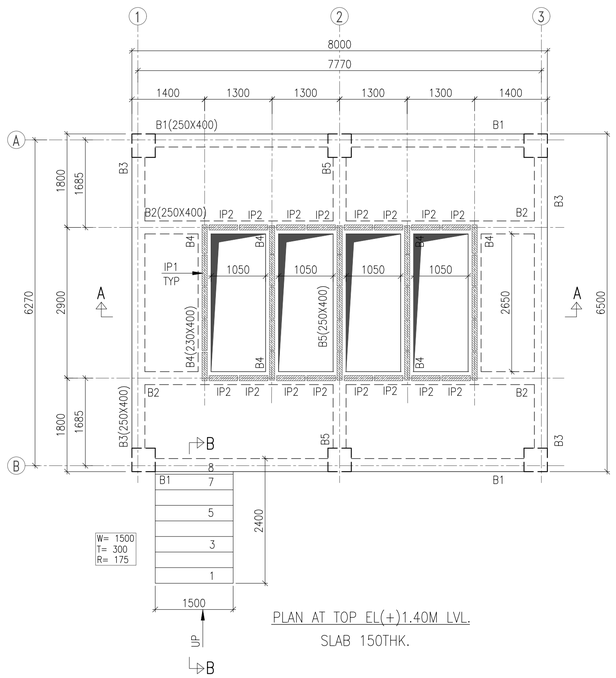
VIEW 1B–1B
COLUMN MKD C1



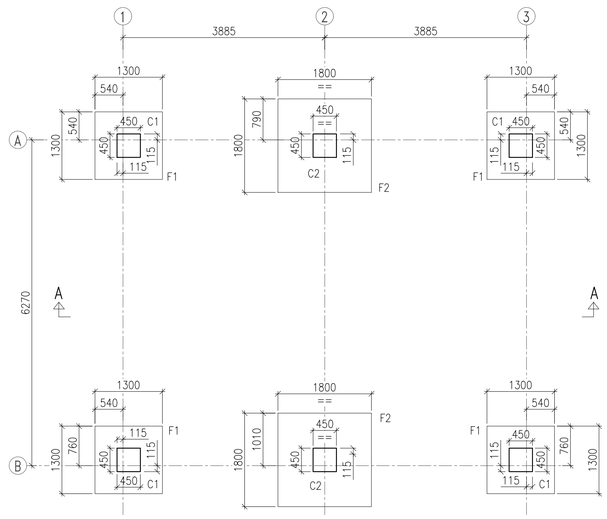
SECTION 1A–1A
R.F DETAIL COLUMN MKD C1



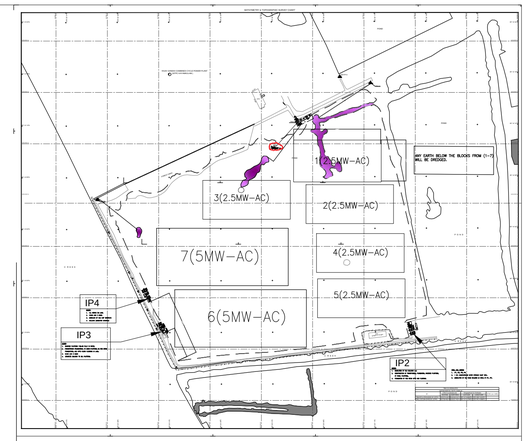
SECTION A–A



PLAN AT TOP EL(+)1.40M LVL.
SLAB 150THK.



PLAN AT FOUNDATION LEVEL



KEY PLAN

NOTES:–

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES.
2. FIGURED DIMENSIONS ONLY SHALL BE FOLLOWED.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT ARCH./MECH DWG.
4. FINISHED FLOOR LEVEL CORRESPONDS TO EL(±)0.000M, WHICH IS AT 600MM ABOVE FGL/NGL. FGL/NGL SHALL BE CONSIDERED AT EXISTING ADJOINING ROAD CENTER
5. ALL R.C.C. SHALL BE MIX M–30
6. REINFORCEMENT STEEL SHALL BE OF HIGH STRENGTH DEFORMED TMT STEEL BARS WITH CORROSION INHIBITORS, CORROSION RESISTANT STEEL (CRS) RE–BARS, FUSION BONDED EPOXY COATED (FBEC) RE–BARS OR ZINC COATED RE–BARS OF GRADE MINIMUM FE–500 AND SHALL CONFORM TO IS: 1786. DUCTILE DETAILING IN ACCORDANCE WITH IS: 13920 SHALL BE ADOPTED FOR SUPERSTRUCTURE AND SUBSTRUCTURE OF ALL RCC BUILDINGS / STRUCTURES
7. CLEAR COVER TO REINF. INCLUDING LINKS FOR R.C.C MEMBERS SHALL BE AS UNDER:–COLUMN=40mm,FOOTING=50mm,BEAM=25mm,SLAB=20mm
8. STANDARD 'L' HOOKS SHALL BE PROVIDED AT THE ENDS OF ALL BARS.
9. PROVIDED LAP LENTH/DEVELOPMENT LENGTH 'Ld' FOR BOTH COMPRESSION AND TENSION MAIN R/F BAR SHALL BE=50XDIA OF BAR
10. LAPS SHALL BE STAGGERED AND AVOIDED AT THE SECTIONS OF MAX. BENDING MOMENT
11. NET SAFE BEARING CAPACITY HAS BEEN TAKEN AS 7.5 T/SQM AT 1.20M BELOW N.G.L
12. NO FOUNDATION SHALL BE REST ON FILLED UP SOIL.
13. BOTTOM BAR INDICATES :- ----------
14. TOP BAR INDICATES :- ——————

REFRENCE DRAWING–

REFERENCE DRG.NO.–5742–004–PVC–F–002

FOR TENDERING PURPOSE ONLY

LEGEND:

F.G.L. – FINISHED GROUND LEVEL
F.F.L. – FINISHED FLOOR LEVEL
T.O.C. – TOP OF CONCRETE
THK. – THICKNESS
TYP. – TYPICAL
U.N.O. – UNLESS NOTED OTHERWISE
℄ – CENTER LINE
B.O.B. – BOTTOM OF BEAM
T.O.B. – TOP OF BEAM
A.L.T. – ALTERNATE

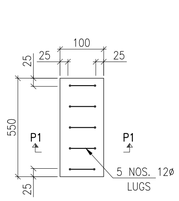
STIRRUPS SCHEDULE

S1	=2L–8Ø@100C/C
S2	=2L–8Ø@150C/C

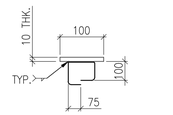
ISOLATED FOOTING SCHEDULE

FOOTING MKD.	SIZE			REINFORCEMENT			
	L	B	D	ALONG–L BOTTOM	ALONG–L TOP	ALONG–B BOTTOM	ALONG–B TOP
F1	1300	1300	300	12Ø@200C/C	8Ø@200C/C	12Ø@200C/C	8Ø@200C/C
F2	1800	1800	300	12Ø@200C/C	8Ø@200C/C	12Ø@200C/C	8Ø@200C/C

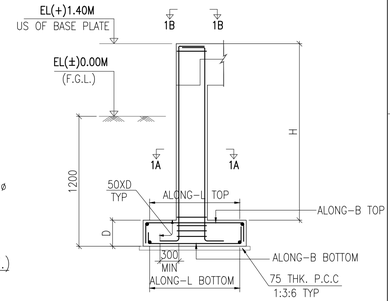
"L" & "B" IN THE SCHEDULE REFER TO LONGER & SHORTER DIMENSIONS OF THE FOOTING RESPECTIVELY, IRRESPECTIVE OF THE ORIENTATION FOR ORIENTATION OF FOOTINGS, REFER FOUNDATION LAYOUT PLAN



DETAIL OF INSERT PLATE
MKD. IP2 (100x550x10THK.)

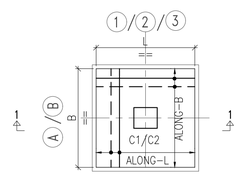


DETAIL OF INSERT PLATE
MKD. IP1 (100x600x10THK.)



SECTION 1–1

TYPICAL DETAIL OF COLUMN



TYPICAL DETAIL OF FOOTING

REV.	DATE	ALTD	CHD	APPD
00	23.05.20	SUNIL	VIPIN	DKU

ISSUED FOR APPROVAL

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

22MW FLO ATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

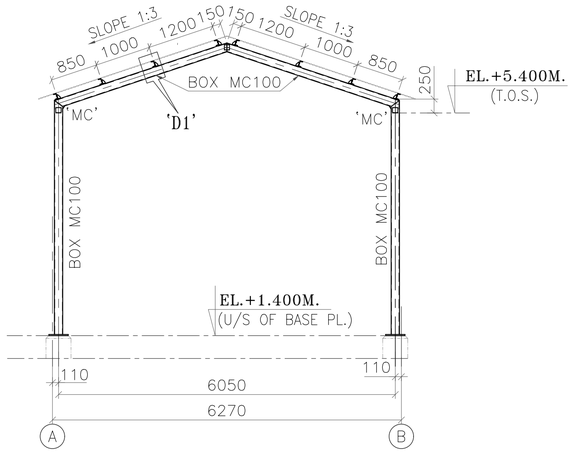
TITLE

GENERAL ARRANGEMENT & R.F DETAIL FOR 33 KV SWBD
HT 4 PANEL PLATFORM AND SHED (IP4)

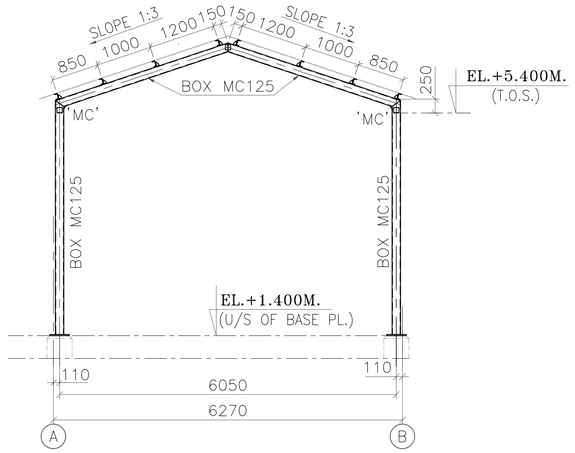
SCALE 1: 75 | DRAWING NO. 5742–004–PVC–F–006

SHEET 3 OF 10 | REV. 00

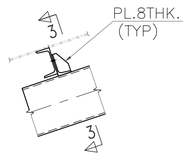
TENTATIVE TENDER DRAWINGS



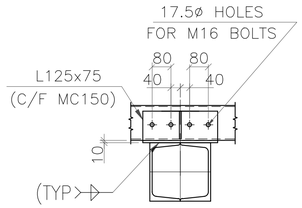
ELEVATION ALONG GRID 1 & 3



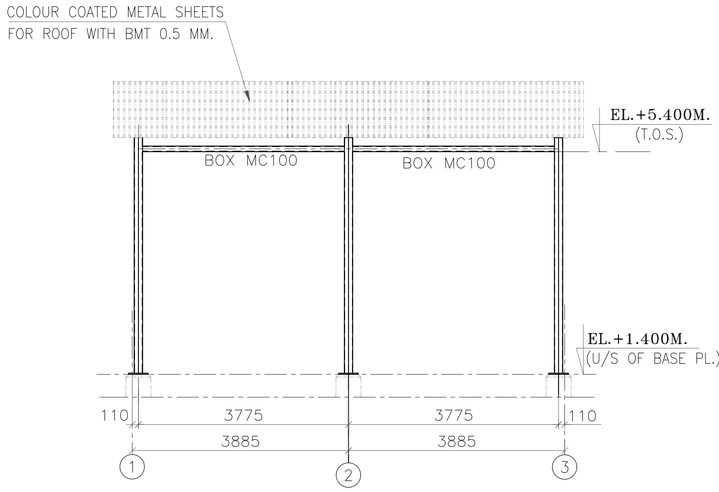
ELEVATION ALONG GRID 2



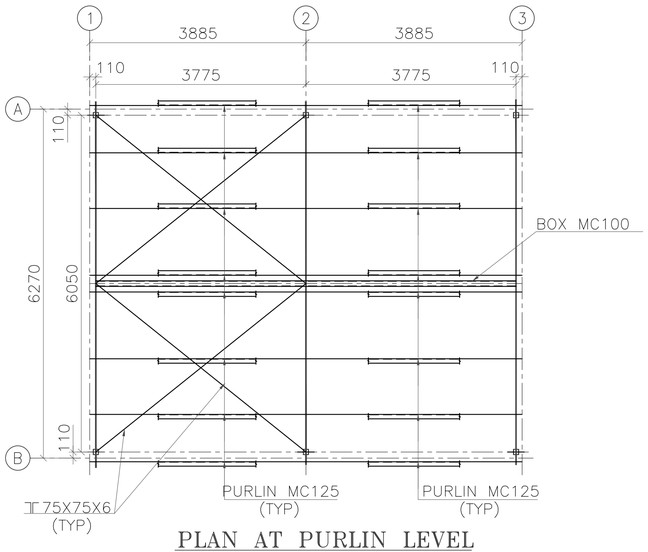
DETAIL D1



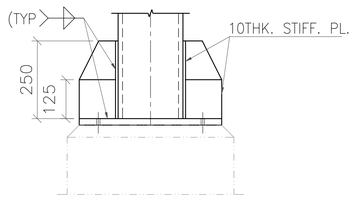
SECTION 3-3



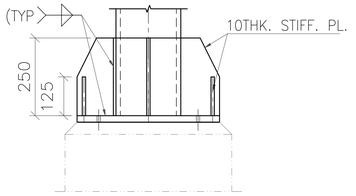
ELEVATION ALONG GRID A & B



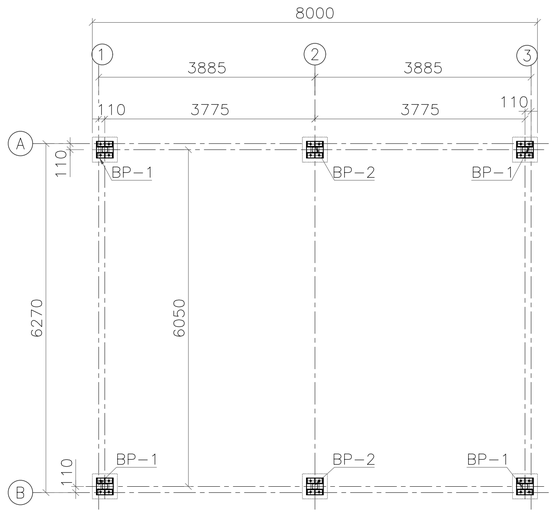
PLAN AT PURLIN LEVEL



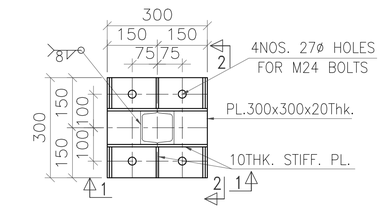
SECTION 2-2



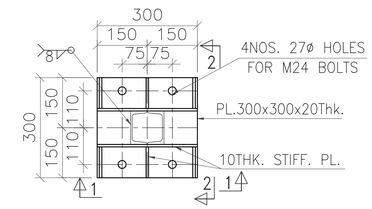
SECTION 1-1



PLAN AT BASE PLATE LEVEL



DETAIL OF BASE PLATE
(BP-1)



DETAIL OF BASE PLATE
(BP-2)

NOTES:-

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE
2) THIS DRAWING IS NOT BE SCALED,ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3) ALL FILLET WELDS ARE 6mm FILLET WELDS U.N.O.
4) ALL BUTT WELDS SHALL BE PROVIDED WITH A SEALING RUN
5) ALL GUSSET PLATES SHALL BE 8mm THK U.N.O.
6) ALL INCLINED MEMBERS AND GUSSET PLATES ARE TO BE CHECKED BY FULL SHOP LAYOUT
7) ALL ERECTION HOLES ARE 18ø FOR 16ø ERECTION BOLTS(U.N.O.)
8) ALL PERMANENT HOLES ARE 22ø FOR 20ø PERMANENT BOLTS(U.N.O.)UNLESS OTHERWISE SPECIFIED
9) ALL CONTACT SURFACES OF GUSSET PLATES HAVING ERECTION BOLTS SHALL BE WELDED AFTER ERECTION AND ALIGNMENT.
10) STRUCTURAL STEEL SHALL CONFORM IS:2062/IS:1079 OR EQUIVALENT ,PIPE SHALL BE AS PER MEDIUM/HIGH GRADE OF IS:1161

* 'MC' – MOMENT CONNECTION

FOR TENDERING PURPOSE ONLY

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	APPD	CHD
00	22.05.20	B.S	VIPIN	DKU										
	ISSUED FOR APPROVAL													

22MW FLOATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

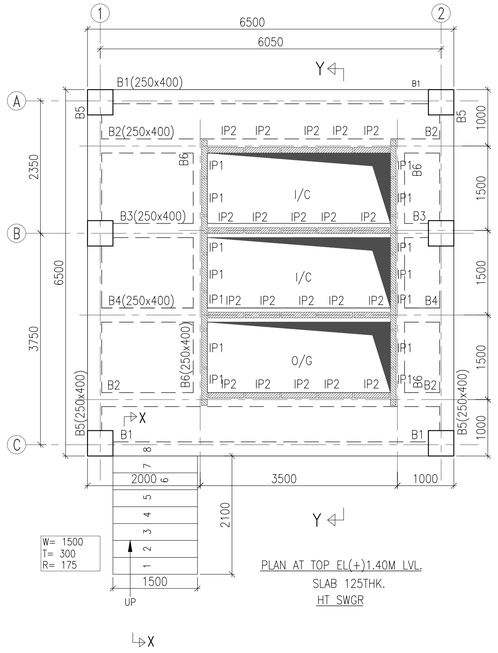
TITLE

GENERAL ARRANGEMENT & R.F DETAIL FOR 33 KV SWBD HT 4 PANEL PLATFORM AND SHED (IP4)

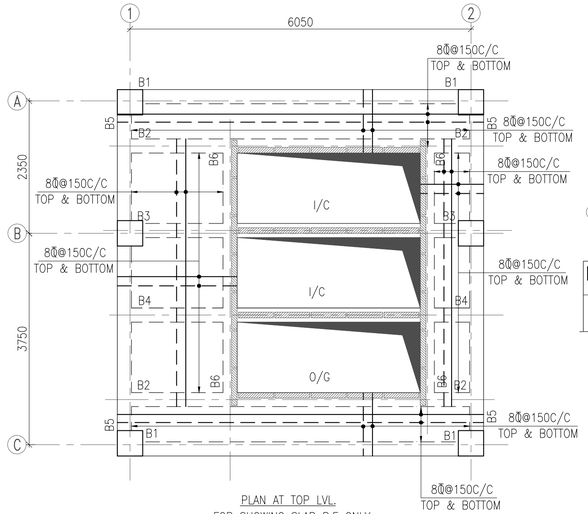
SCALE 1:75 | DRAWING NO. 5742-004-PVC-F-006

SHEET 4 OF 10 | REV. 00

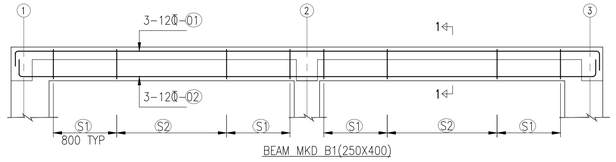
TENTATIVE TENDER DRAWINGS



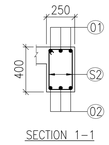
PLAN AT TOP EL(+)1.40M LVL.
SLAB 125THK.
HT SWGR



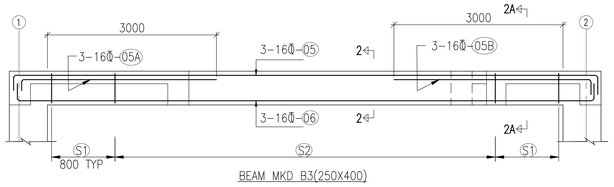
PLAN AT TOP LVL.
FOR SHOWING SLAB R.F ONLY
BARS TO BE CUT SUITABLTY AROUND OPENING
HT SWGR



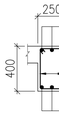
BEAM MKD B1(250X400)



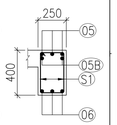
SECTION 1-1



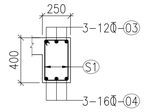
BEAM MKD B3(250X400)



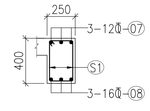
SECTION 2-2



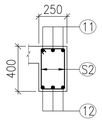
SECTION 2A-2A



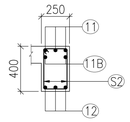
BEAM MKD B2(250X400)



BEAM MKD B4(250X400)

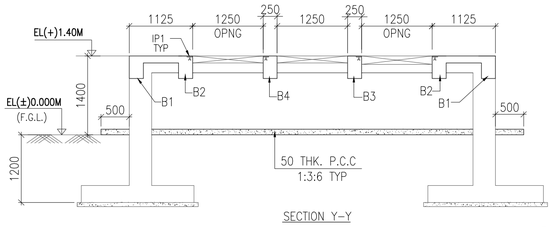


SECTION 4-4

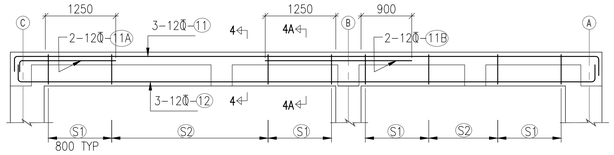


SECTION 4A-4A

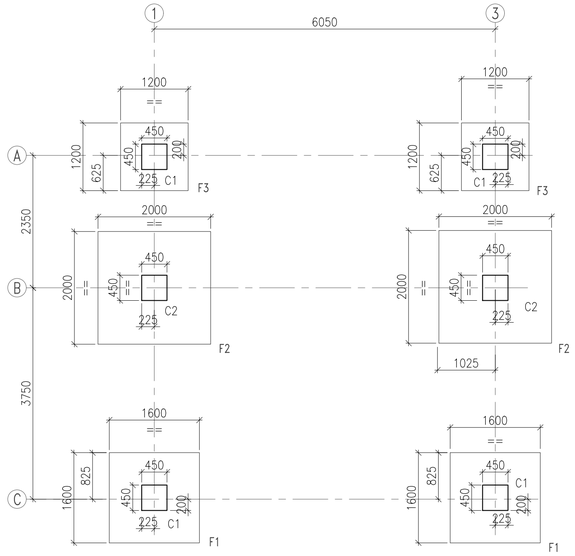
STIRRUPS SCHEDULE
S1 =2L-8Ø@100C/C
S2 =2L-8Ø@150C/C



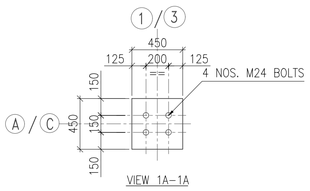
SECTION Y-Y



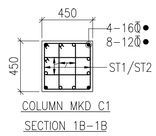
BEAM MKD B5(250X400)



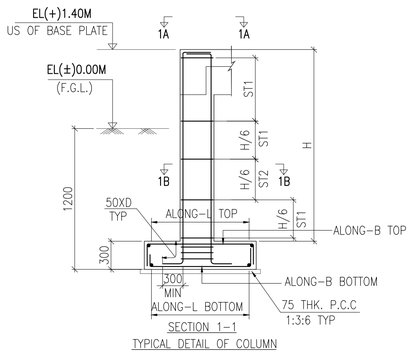
PLAN AT FOUNDATION LEVEL



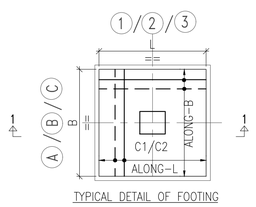
VIEW 1A-1A
COLUMN MKD C1



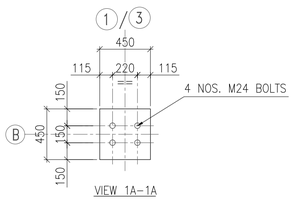
COLUMN MKD C1
SECTION 1B-1B



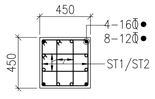
SECTION 1-1
TYPICAL DETAIL OF COLUMN



TYPICAL DETAIL OF FOOTING

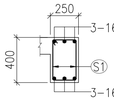


VIEW 1A-1A
COLUMN MKD C2

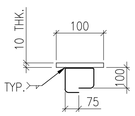


COLUMN MKD C2
SECTION 1B-1B

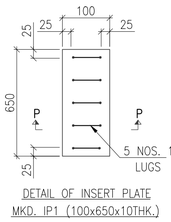
STIRRUPS SCHEDULE
ST1 =8Ø@100C/C
ST2 =8Ø@150C/C



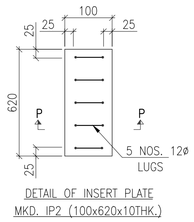
BEAM MKD B6(250X400)



SECTION P-P

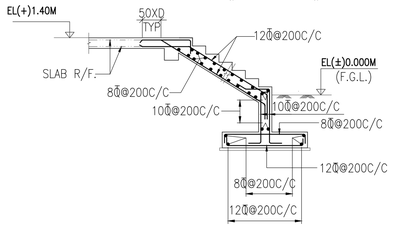


DETAIL OF INSERT PLATE
MKD. IP1 (100x650x10THK.)

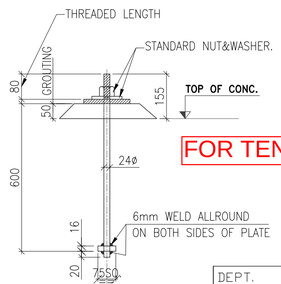


DETAIL OF INSERT PLATE
MKD. IP2 (100x620x10THK.)

SECTION X-X



SECTION X-X
R/F. DETAIL OF STAIR CASE

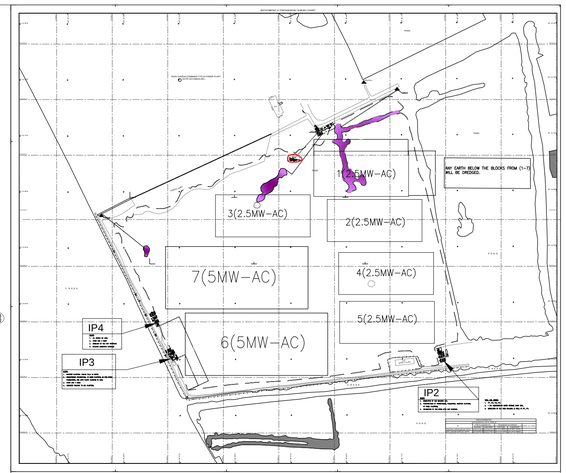


DET. OF M24 BOLTS.

ISOLATED FOOTING SCHEDULE

FOOTING MKD.	SIZE			REINFORCEMENT			
	L	B	D	ALONG-L BOTTOM	ALONG-L TOP	ALONG-B BOTTOM	ALONG-B TOP
F1	1600	1600	300	12Ø@200C/C	8Ø@200C/C	12Ø@200C/C	8Ø@200C/C
F2	2000	2000	300	12Ø@200C/C	8Ø@200C/C	12Ø@200C/C	8Ø@200C/C
F3	1200	1200	300	12Ø@200C/C	8Ø@200C/C	12Ø@200C/C	8Ø@200C/C

"L" & "B" IN THE SCHEDULE REFER TO LONGER & SHORTER DIMENSIONS OF THE FOOTING RESPECTIVELY, IRRESPECTIVE OF THE ORIENTATION FOR ORIENTATION OF FOOTINGS, REFER FOUNDATION LAYOUT PLAN



KEY PLAN

NOTES:-

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES.
2. FIGURED DIMENSIONS ONLY SHALL BE FOLLOWED.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT ARCH./MECH DWG.
4. FINISHED FLOOR LEVEL CORRESPONDS TO EL(±)0.000M, WHICH IS AT 600MM ABOVE FGL/NGL. FGL/NGL SHALL BE CONSIDERED AT EXISTING ADJOINING ROAD CENTER
5. ALL R.C.C. SHALL BE MIX M-30
6. REINFORCEMENT STEEL SHALL BE OF HIGH STRENGTH DEFORMED TMT STEEL BARS WITH CORROSION INHIBITORS, CORROSION RESISTANT STEEL (CRS) RE-BARS, FUSION BONDED EPOXY COATED (FBEC) RE-BARS OR ZINC COATED RE-BARS OF GRADE MINIMUM FE-500 AND SHALL CONFORM TO IS: 1786. DUCTILE DETAILING IN ACCORDANCE WITH IS: 13920 SHALL BE ADOPTED FOR SUPERSTRUCTURE AND SUBSTRUCTURE OF ALL RCC BUILDINGS / STRUCTURES
7. CLEAR COVER TO REINF. INCLUDING LINKS FOR R.C.C MEMBERS SHALL BE AS UNDER:-COLUMN=40mm,FOOTING=50mm,BEAM=25mm,SLAB=20mm
8. STANDARD 'L' HOOKS SHALL BE PROVIDED AT THE ENDS OF ALL BARS.
9. PROVIDED LAP LENTH/DEVELOPMENT LENGTH 'Ld' FOR BOTH COMPRESSION AND TENSION MAIN R/F BAR SHALL BE=50XDIA OF BAR
10. LAPS SHALL BE STAGGERED AND AVOIDED AT THE SECTIONS OF MAX. BENDING MOMENT
11. NET SAFE BEARING CAPACITY HAS BEEN TAKEN AS 5 T/SQM AT 1.20M BELOW N.G.L
12. NO FOUNDATION SHALL BE REST ON FILLED UP SOIL.
13. BOTTOM BAR INDICATES :- - - - - - - - - - - - - - -
14. TOP BAR INDICATES :- ———————

REFRENCE DRAWING-

REFERENCE DRG.NO.-5742-004-PVC-F-002

LEGEND:

F.G.L. - FINISHED GROUND LEVEL
F.F.L. - FINISHED FLOOR LEVEL
T.O.C. - TOP OF CONCRETE
THK. - THICKNESS
TYP. - TYPICAL
U.N.O. - UNLESS NOTED OTHERWISE
℄ - CENTER LINE
B.O.B. - BOTTOM OF BEAM
T.O.B. - TOP OF BEAM
ALT. - ALTERNATE

FOR TENDERING PURPOSE ONLY

22MW FLO ATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

OWNER'S CONSULTANT:

NATIONAL THERMAL POWER CORPORATION

BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

REV.	DATE	ALTD	CHD	APPD
00	21.05.20	SUNIL	VIPIN	DKU
	ISSUED FOR APPROVAL			

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

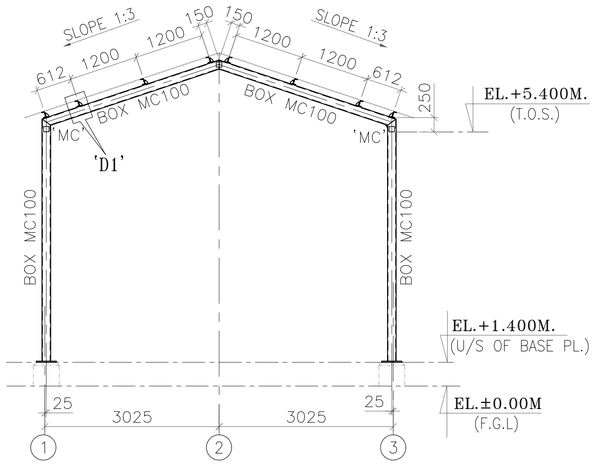
TITLE

G.A & RC DETAILS OF PLATFORM & SHED FOR HT SWGR PANEL(IP-1)

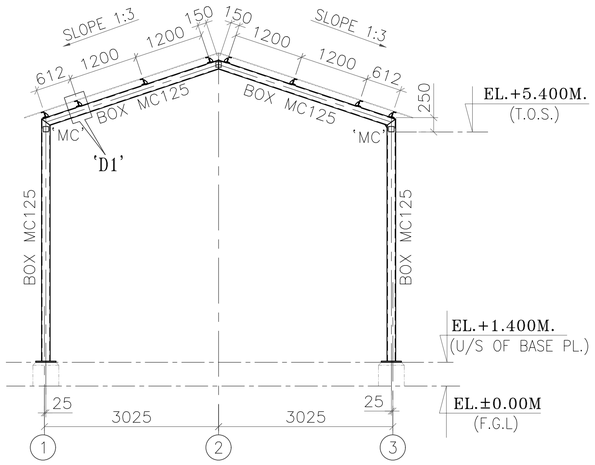
SCALE 1:75 | DRAWING NO. 5742-004-PVC-F-006 | SHEET 5 OF 10 | REV. 00

DRAWING NO. 5742-004-PVC-F-

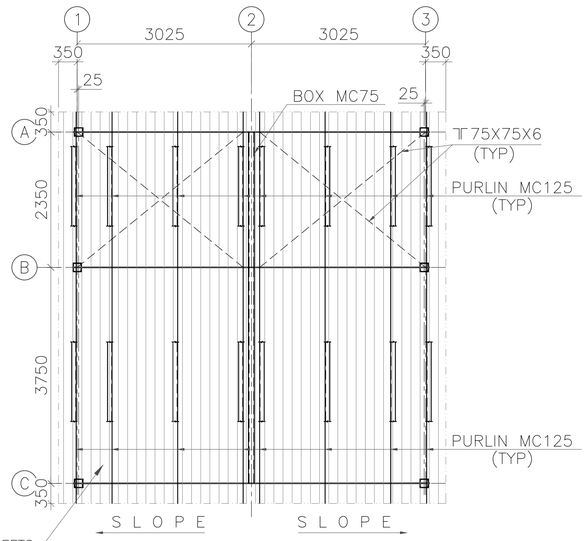
TENTATIVE TENDER DRAWINGS



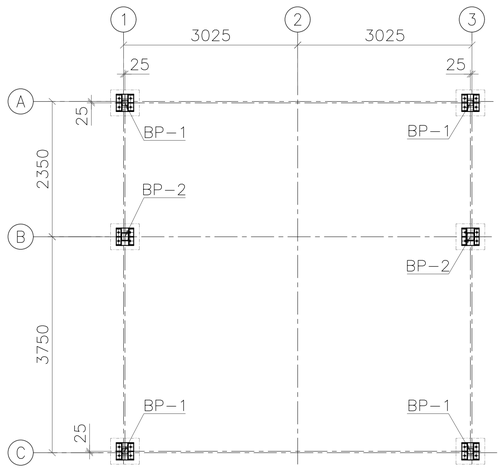
ELEVATION ALONG GRID A & C



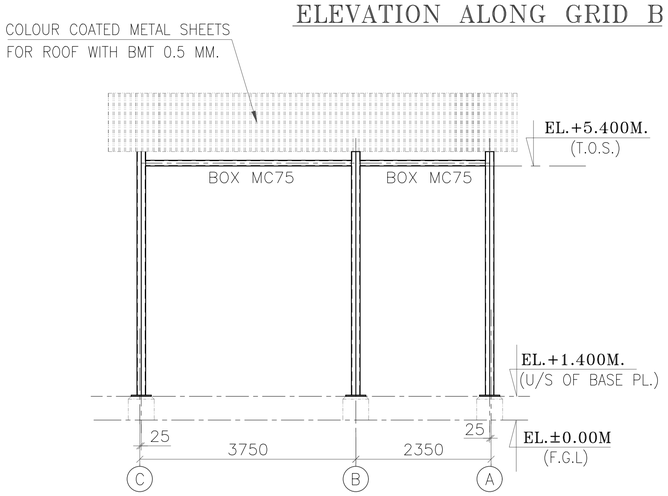
ELEVATION ALONG GRID B



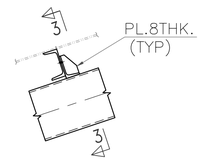
PLAN AT PURLIN LEVEL



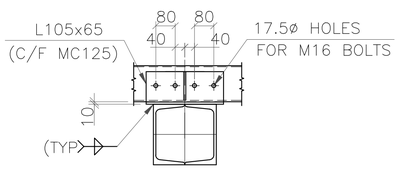
PLAN AT BASE PLATE LEVEL



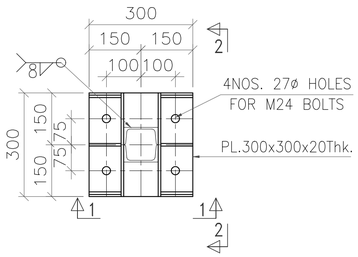
ELEVATION ALONG GRID 1 & 3



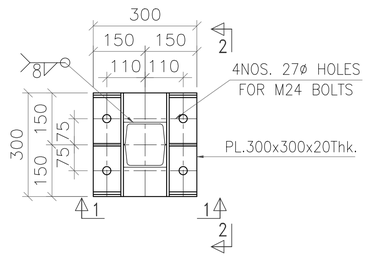
DETAIL D1



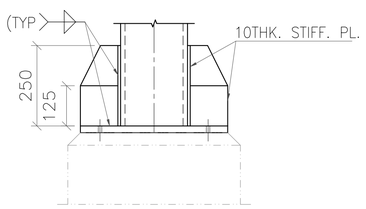
SECTION 3-3



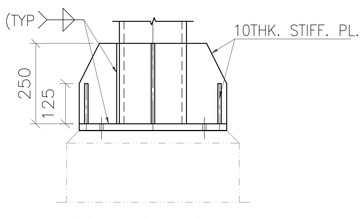
DETAIL OF BASE PLATE
(BP-1)



DETAIL OF BASE PLATE
(BP-2)



SECTION 1-1



SECTION 2-2

NOTES:-

PRINTING TO STRUCTURAL STEEL SHALL BE DONE AS PER CLAUSE 2.7 OF D2 OF TECHNICAL SPECIFICATION.

FOR TENDERING PURPOSE ONLY

* 'MC' - MOMENT CONNECTION

NOTES:-

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE
2) THIS DRAWING IS NOT BE SCALED,ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3) ALL FILLET WELDS ARE 6mm FILLET WELDS U.N.O.
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5) ALL GUSSET PLATES SHALL BE 8mm THK U.N.O.
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7) ALL ERECTION HOLES ARE 18ø FOR 16ø ERECTION BOLTS(U.N.O.)
8) ALL PERMANENT HOLES ARE 22ø FOR 20ø PERMANENT BOLTS(U.N.O.)UNLESS OTHERWISE SPECIFIED
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REV.	DATE	ALTD	CHD	APPD
0	13.05.20	GOPAL	NIRMALYA	DKU

ISSUED FOR APPROVAL

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

22MW FLO ATING PV PLANT AT KAYAKULAM
RGCC POWER PLANT

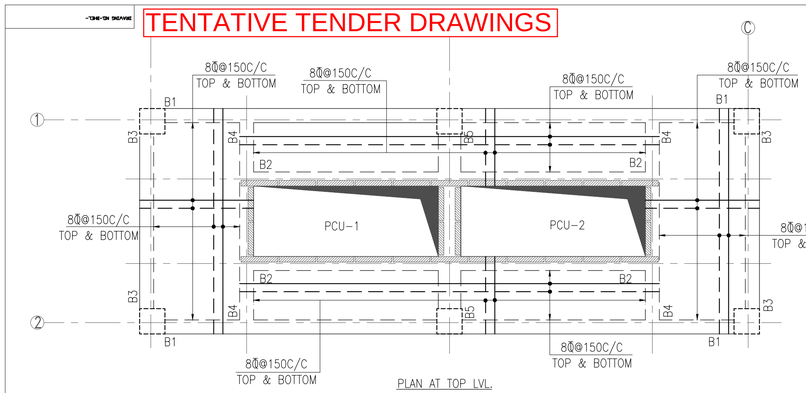
OWNER'S CONSULTANT:
NTPC NATIONAL THERMAL POWER CORPORATION

BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

TITLE
G.A & RC DETAILS OF PLATFORM & SHED FOR HT SWGR PANEL(IP-1)

SCALE 1:75 | DRAWING NO. 5742-004-PVC-F-006 | SHEET 6 OF 10 | REV. 00

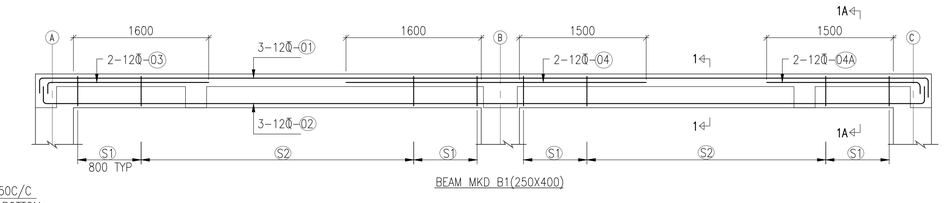
TENTATIVE TENDER DRAWINGS



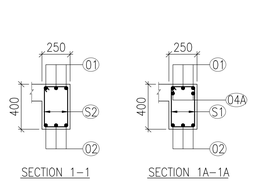
PLAN AT TOP LVL.

FOR SHOWING SLAB R.F ONLY

BARS TO BE CUT SUITABLTY AROUND OPENING

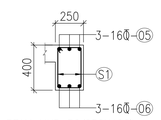


BEAM MKD B1(250X400)



SECTION 1-1

SECTION 1A-1A



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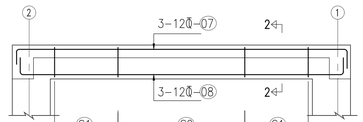
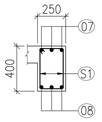
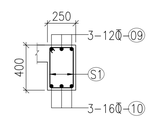


BEAM MKD B3(250X400)

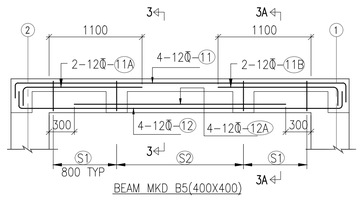


SECTION 2-2

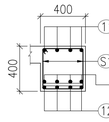


BEAM MKD B4(250X400)

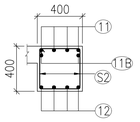
STIRRUPS SCHEDULE
S1 =2L-8Ø@100C/C
S2 =2L-8Ø@150C/C



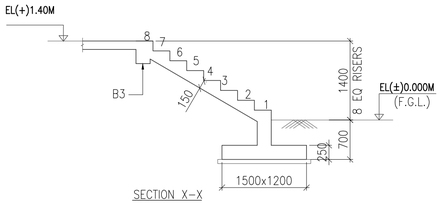
BEAM MKD B5(400X400)



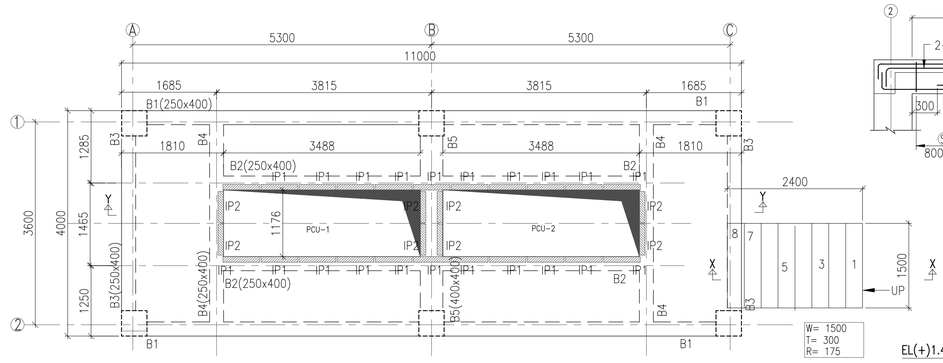
SECTION 3-3



SECTION 3A-3A



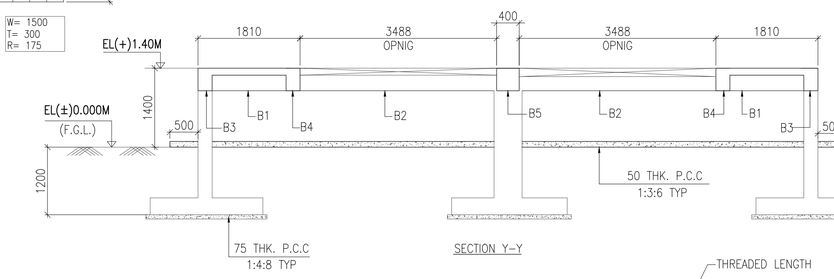
SECTION X-X



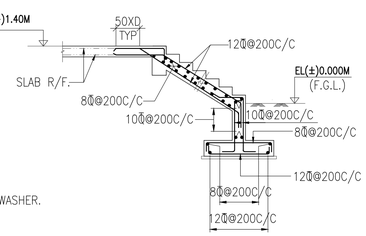
PLAN AT TOP EL(+)1.40M LVL.

SLAB 125THK.

W= 1500
T= 300
R= 175

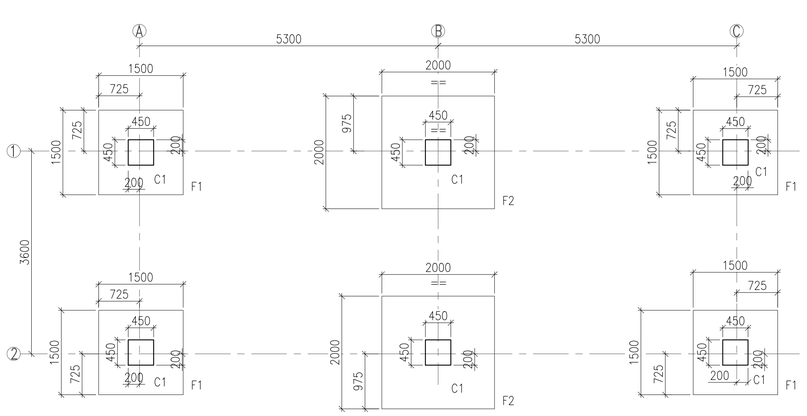


SECTION Y-Y



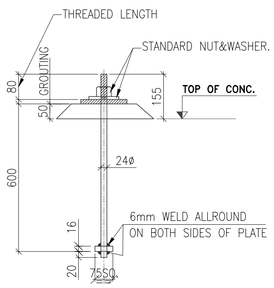
SECTION X-X

R/F. DETAIL OF STAIR CASE

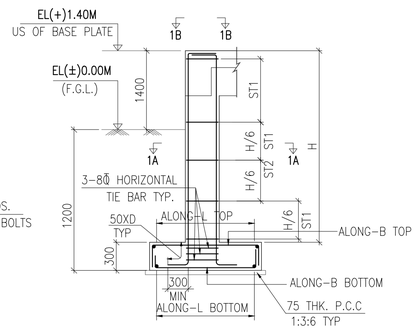


PLAN AT FOUNDATION LEVEL

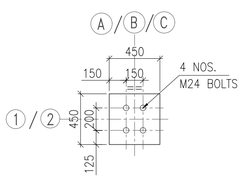
STIRRUPS SCHEDULE
ST1 =8Ø@100C/C
ST2 =8Ø@150C/C



DET. OF M24 BOLTS.

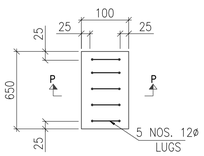


SECTION 1-1



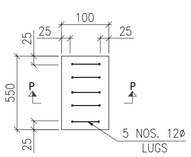
VIEW 1B-1B

COLUMN MKD C1



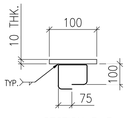
DETAIL OF INSERT PLATE

MKD. IP1 (100X650X10THK.)

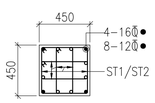


DETAIL OF INSERT PLATE

MKD. IP2 (100X550X10THK.)



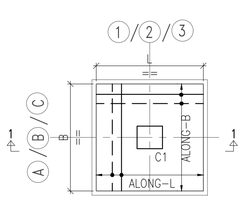
SECTION P-P



SECTION 1A-1A

COLUMN MKD C1

SHOWING R.F ONLY

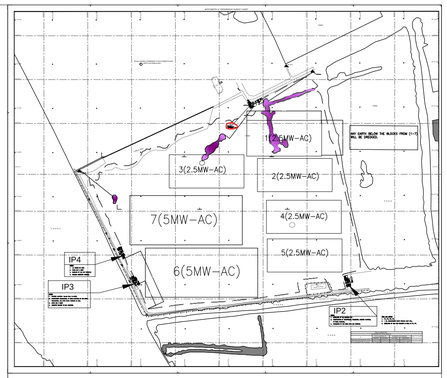


TYPICAL DETAIL OF FOOTING

ISOLATED FOOTING SCHEDULE

FOOTING MKD.	SIZE			REINFORCEMENT			
	L	B	D	ALONG-L BOTTOM	ALONG-L TOP	ALONG-B BOTTOM	ALONG-B TOP
F1	1500	1500	300	12Ø@200C/C	8Ø@200C/C	12Ø@200C/C	8Ø@200C/C
F2	2000	2000	300	12Ø@200C/C	8Ø@200C/C	12Ø@200C/C	8Ø@200C/C

"L" & "B" IN THE SCHEDULE REFER TO LONGER & SHORTER DIMENSIONS OF THE FOOTING RESPECTIVELY, IRRESPECTIVE OF THE ORIENTATION FOR ORIENTATION OF FOOTINGS, REFER FOUNDATION LAYOUT PLAN



KEY PLAN

NOTES:-

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES.
2. FIGURED DIMENSIONS ONLY SHALL BE FOLLOWED.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT ARCH./MECH DWG.
4. FINISHED FLOOR LEVEL CORRESPONDS TO EL(±)0.000M, WHICH IS AT 600MM ABOVE FGL/NGL. FGL/NGL SHALL BE CONSIDERED AT EXISTING ADJOINING ROAD CENTER
5. ALL R.C.C. SHALL BE MIX M-30
6. REINFORCEMENT STEEL SHALL BE OF HIGH STRENGTH DEFORMED TMT STEEL BARS WITH CORROSION INHIBITORS, CORROSION RESISTANT STEEL (CRS) RE-BARS, FUSION BONDED EPOXY COATED (FBEC) RE-BARS OR ZINC COATED RE-BARS OF GRADE MINIMUM FE-500 AND SHALL CONFORM TO IS: 1786. DUCTILE DETAILING IN ACCORDANCE WITH IS: 13920 SHALL BE ADOPTED FOR SUPERSTRUCTURE AND SUBSTRUCTURE OF ALL RCC BUILDINGS / STRUCTURES
7. CLEAR COVER TO REINF. INCLUDING LINKS FOR R.C.C MEMBERS SHALL BE AS UNDER:-COLUMN=40mm,FOOTING=50mm,BEAM=25mm,SLAB=20mm
8. STANDARD 'L' HOOKS SHALL BE PROVIDED AT THE ENDS OF ALL BARS.
9. PROVIDED LAP LENTH/DEVELOPMENT LENGTH 'Ld' FOR BOTH COMPRESSION AND TENSION MAIN R/F BAR SHALL BE=50XDIA OF BAR
10. LAPS SHALL BE STAGGERED AND AVOIDED AT THE SECTIONS OF MAX. BENDING MOMENT
11. NET SAFE BEARING CAPACITY HAS BEEN TAKEN AS 5 T/SQM AT 1.20M BELOW N.G.L
12. NO FOUNDATION SHALL BE REST ON FILLED UP SOIL.
13. BOTTOM BAR INDICATES :- ----------
14. TOP BAR INDICATES :- _____

FOR TENDERING PURPOSE ONLY

LEGEND:

F.G.L. – FINISHED GROUND LEVEL
F.F.L. – FINISHED FLOOR LEVEL
T.O.C. – TOP OF CONCRETE
THK. – THICKNESS
TYP. – TYPICAL
U.N.O. – UNLESS NOTED OTHERWISE
℄ – CENTER LINE
B.O.B. – BOTTOM OF BEAM
T.O.B. – TOP OF BEAM
A.L.T. – ALTERNATE

REFRENCE DRAWING-

REFERENCE DRG.NO.-5742-004-PVC-F-002

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD
00	21.05.20	SUNIL	VIPIN	DKU	00									
	ISSUED FOR APPROVAL													

DEPT. SC&PV
STATUS CONTRACT
DISTRIBUTION

22MW FLO ATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

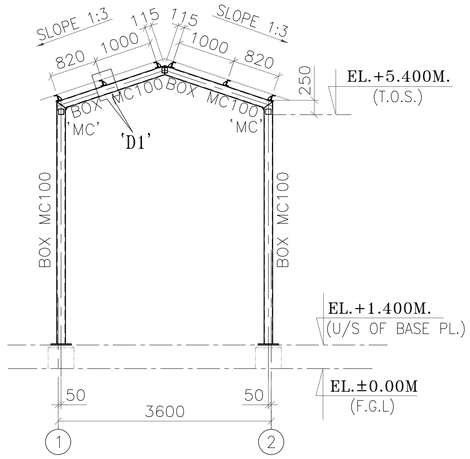
OWNER'S CONSULTANT:
NTPC NATIONAL THERMAL POWER CORPORATION

BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

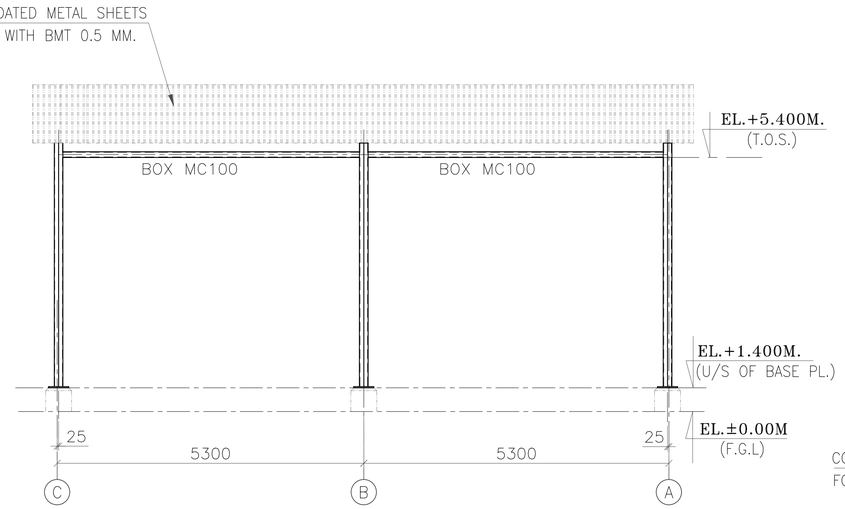
TITLE
G.A & RC DETAILS OF PCU-1 & 2 PLATFORM AND SHED (IP1/IP2/IP4)

SCALE 1:75 | DRAWING NO. 5742-004-PVC-F-006 | SHEET 7 OF 10 | REV. 00

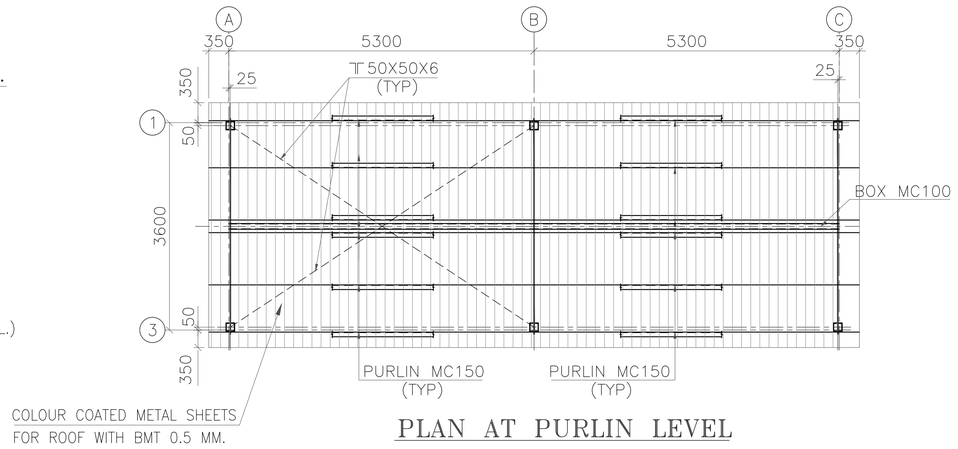
TENTATIVE TENDER DRAWINGS



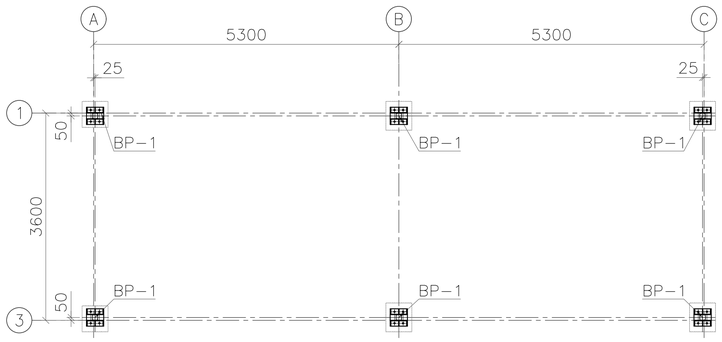
ELEVATION ALONG GRID A TO C



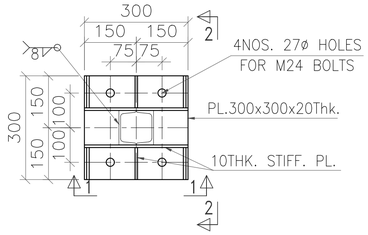
ELEVATION ALONG GRID 1 & 2



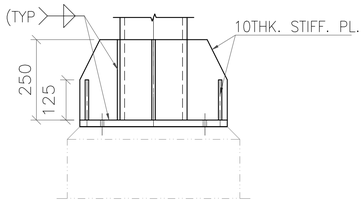
PLAN AT PURLIN LEVEL



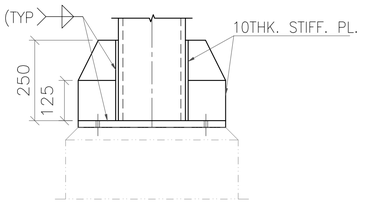
PLAN AT BASE PLATE LEVEL



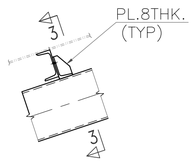
DETAIL OF BASE PLATE
(BP-1)



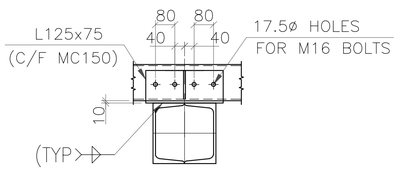
SECTION 1-1



SECTION 2-2



DETAIL D1



SECTION 3-3

* 'MC' – MOMENT CONNECTION

REFERENCE MECHANICAL DRAWINGS NO.
-5742-004-PVC-F-002

NOTES:-
PRINTING TO STRUCTURAL STEEL SHALL BE DONE AS PER CLAUSE 2.7 OF D2 OF TECHNICAL SPECIFICATION.

FOR TENDERING PURPOSE ONLY

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5) ALL GUSSET PLATES SHALL BE 8mm THK U.N.O.
6) ALL INCLINED MEMBERS AND GUSSET PLATES ARE TO BE CHECKED BY FULL SHOP LAYOUT
7) ALL ERECTION HOLES ARE 18ø FOR 16ø ERECTION BOLTS(U.N.O.)
8) ALL PERMANENT HOLES ARE 22ø FOR 20ø PERMANENT BOLTS(U.N.O.)UNLESS OTHERWISE SPECIFIED
9) ALL CONTACT SURFACES OF GUSSET PLATES HAVING ERECTION BOLTS SHALL BE WELDED AFTER ERECTION AND ALIGNMENT.
10) STRUCTURAL STEEL SHALL CONFORM IS:2062/IS:1079 OR EQUIVALENT ,PIPE SHALL BE AS PER MEDIUM/HIGH GRADE OF IS:1161

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD
00	20.05.20	B.S	VIPIN	DKU	00									
	ISSUED FOR APPROVAL													

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

22MW FLO ATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

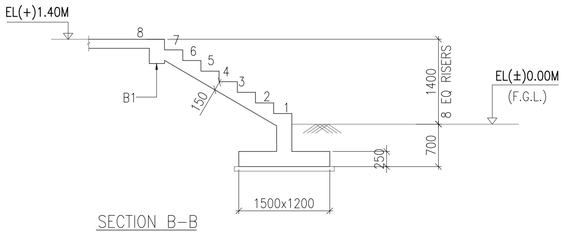
OWNER'S CONSULTANT:
NTPC NATIONAL THERMAL POWER CORPORATION

BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

TITLE
G.A & RC DETAILS OF PCU-1 & 2 PLATFORM AND SHED (IP1/IP2/IP4)

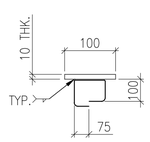
SCALE 1:75 | DRAWING NO. 5742-004-PVC-F-006
SHEET 8 OF 10 | REV. 00

TENTATIVE TENDER DRAWINGS

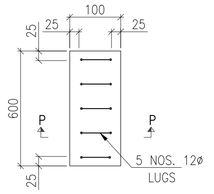


SECTION B–B

STAIR CASE

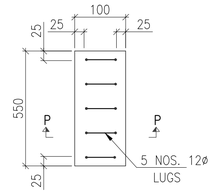


SECTION P–P



DETAIL OF INSERT PLATE

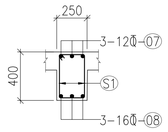
MKD. IP1 (100x600x10THK.)



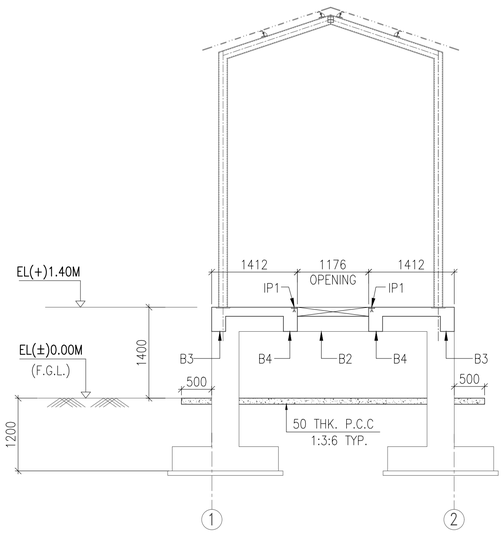
DETAIL OF INSERT PLATE

MKD. IP2 (100x550x10THK.)

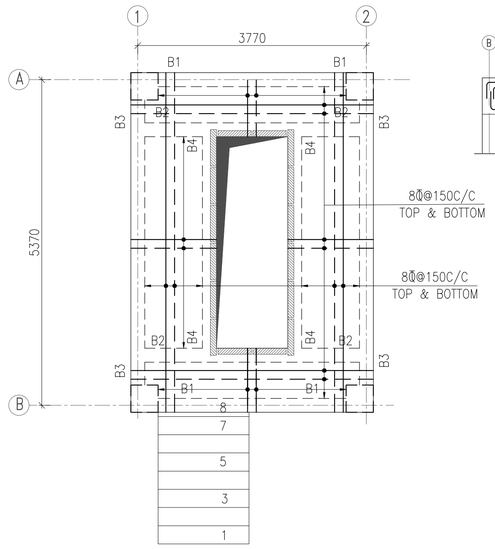
BEAM MKD B1(250X400)



BEAM MKD B2(250X400)



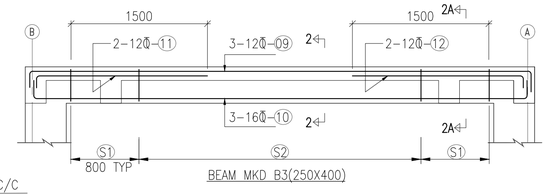
SECTION A–A



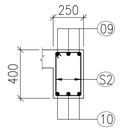
PLAN AT TOP EL(+)1.40M LVL.

FOR SHOWING SLAB R.F ONLY

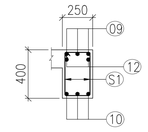
BARS TO BE CUT SUITABLTY AROUND OPENING



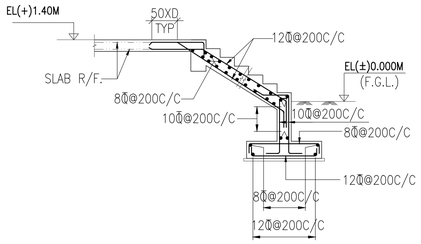
BEAM MKD B3(250X400)



SECTION 2–2

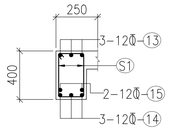


SECTION 2A–2A



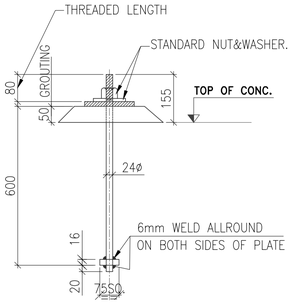
SECTION B–B

R/F. DETAIL OF STAIR CASE

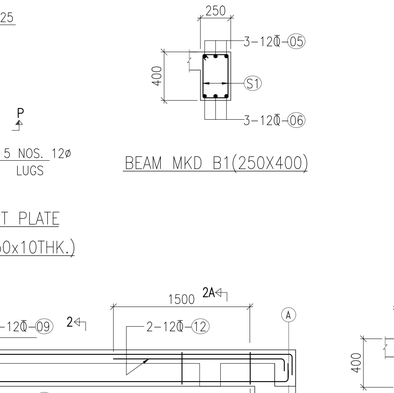


BEAM MKD B4(250X400)

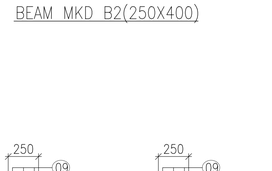
STIRRUPS SCHEDULE
S1 =2L–8Ø@100C/C
S2 =2L–8Ø@150C/C



DET. OF M24 BOLTS.

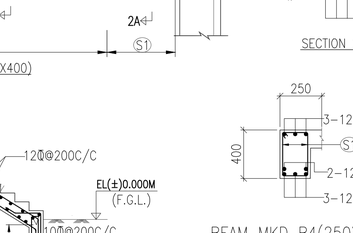


SECTION 1–1

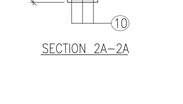


VIEW 1B–1B

COLUMN MKD C1



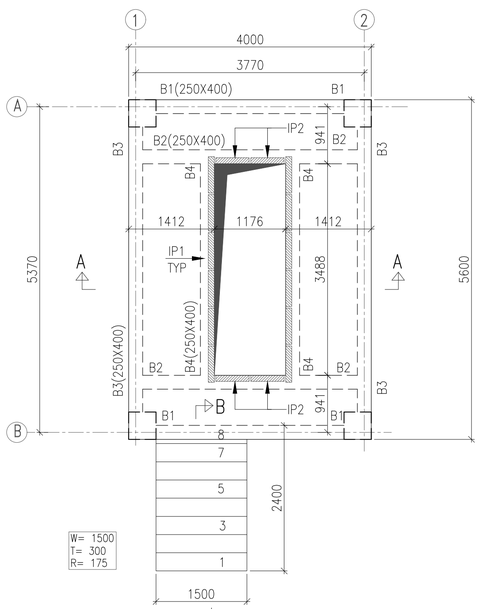
TYPICAL DETAIL OF FOOTING



SECTION 1A–1A

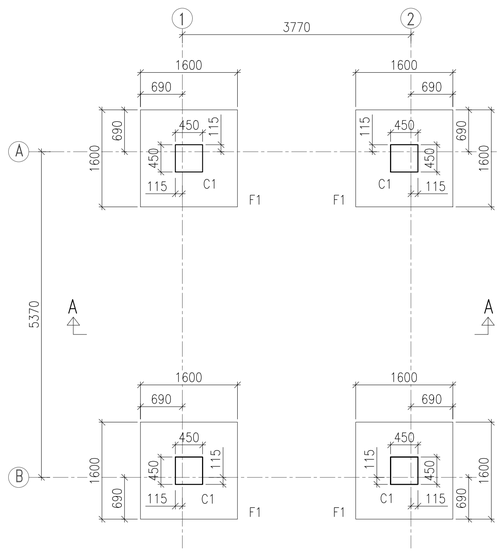
COLUMN MKD C1

SHOWING R.F ONLY

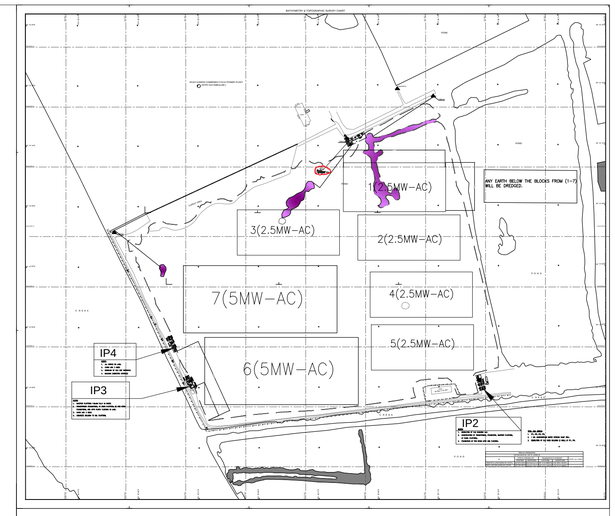


PLAN AT TOP EL(+)1.40M LVL.

SLAB 125THK.



PLAN AT FOUNDATION LEVEL



KEY PLAN

NOTES:–

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES.
2. FIGURED DIMENSIONS ONLY SHALL BE FOLLOWED.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT ARCH./MECH DWG.
4. FINISHED FLOOR LEVEL CORRESPONDS TO EL(±)0.000M, WHICH IS AT 600MM ABOVE FGL/NGL. FGL/NGL SHALL BE CONSIDERED AT EXISTING ADJOINING ROAD CENTER
5. ALL R.C.C. SHALL BE MIX M–30
6. REINFORCEMENT STEEL SHALL BE OF HIGH STRENGTH DEFORMED TMT STEEL BARS WITH CORROSION INHIBITORS, CORROSION RESISTANT STEEL (CRS) RE–BARS, FUSION BONDED EPOXY COATED (FBEC) RE–BARS OR ZINC COATED RE–BARS OF GRADE MINIMUM FE–500 AND SHALL CONFORM TO IS: 1786. DUCTILE DETAILING IN ACCORDANCE WITH IS: 13920 SHALL BE ADOPTED FOR SUPERSTRUCTURE AND SUBSTRUCTURE OF ALL RCC BUILDINGS / STRUCTURES
7. CLEAR COVER TO REINF. INCLUDING LINKS FOR R.C.C MEMBERS SHALL BE AS UNDER:–COLUMN=40mm,FOOTING=50mm,BEAM=25mm,SLAB=20mm
8. STANDARD 'L' HOOKS SHALL BE PROVIDED AT THE ENDS OF ALL BARS.
9. PROVIDED LAP LENTH/DEVELOPMENT LENGTH 'Ld' FOR BOTH COMPRESSION AND TENSION MAIN R/F BAR SHALL BE=50XDIA OF BAR
10. LAPS SHALL BE STAGGERED AND AVOIDED AT THE SECTIONS OF MAX. BENDING MOMENT
11. NET SAFE BEARING CAPACITY HAS BEEN TAKEN AS 5 T/SQM AT 1.20M BELOW N.G.L
12. NO FOUNDATION SHALL BE REST ON FILLED UP SOIL.
13. BOTTOM BAR INDICATES :– - - - - - - - - - - - - - -
14. TOP BAR INDICATES :– ———————

FOR TENDERING PURPOSE ONLY

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	APPD	CHD
00	21.05.20	SUNIL	VIPIN	DKU										
	ISSUED FOR APPROVAL													

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

22MW FLO ATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

TITLE

GA AND RC DETAILS FOR DELCEN 2625 HV CENTRAL INVERTER PCU – 3 PLATFORM AND SHED (IP1)

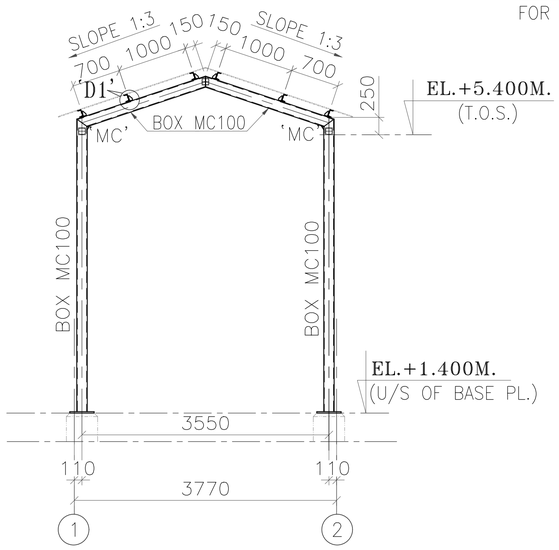
SCALE 1:75

DRAWING NO. 5742–004–PVC–F–006

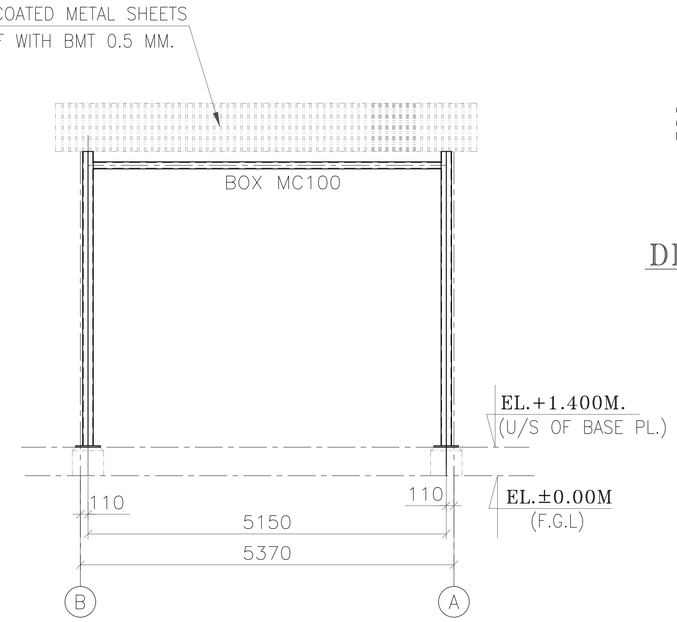
SHEET 9 OF 10

REV. 00

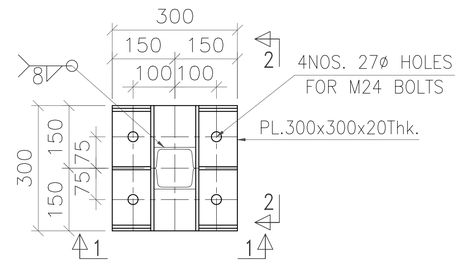
TENTATIVE TENDER DRAWINGS



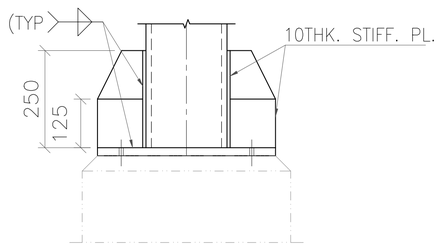
ELEVATION ALONG GRID A & B



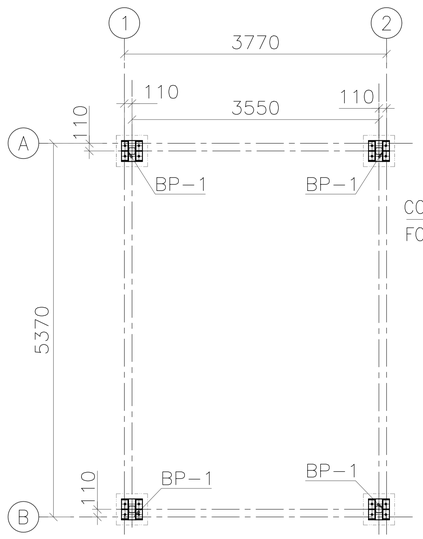
ELEVATION ALONG GRID 1 & 2



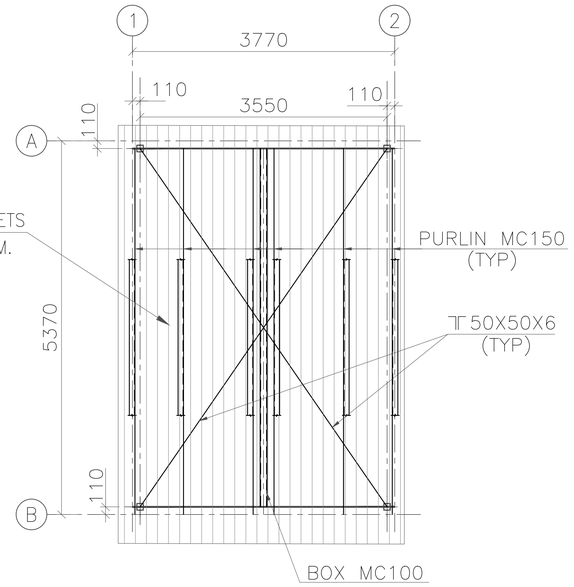
DETAIL OF BASE PLATE
(BP-1)



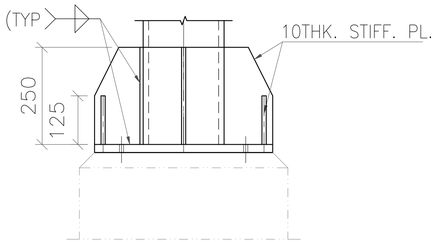
SECTION 1-1



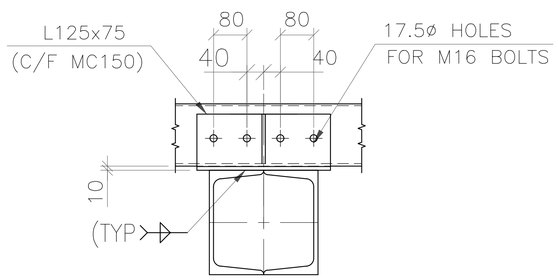
PLAN AT BASE PLATE LEVEL



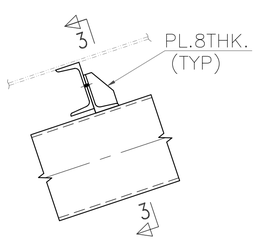
PLAN AT PURLIN LEVEL



SECTION 2-2



SECTION 3-3



DETAIL D1

NOTES:-

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE
2) THIS DRAWING IS NOT BE SCALED,ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3) ALL FILLET WELDS ARE 6mm FILLET WELDS U.N.O.
4) ALL BUTT WELDS SHALL BE PROVIDED WITH A SEALING RUN
5) ALL GUSSET PLATES SHALL BE 8mm THK U.N.O.
6) ALL INCLINED MEMBERS AND GUSSET PLATES ARE TO BE CHECKED BY FULL SHOP LAYOUT
7) ALL ERECTION HOLES ARE 18ø FOR 16ø ERECTION BOLTS(U.N.O.)
8) ALL PERMANENT HOLES ARE 22ø FOR 20ø PERMANENT BOLTS(U.N.O.)UNLESS OTHERWISE SPECIFIED
9) ALL CONTACT SURFACES OF GUSSET PLATES HAVING ERECTION BOLTS SHALL BE WELDED AFTER ERECTION AND ALIGNMENT.
10) STRUCTURAL STEEL SHALL CONFORM IS:2062/IS:1079 OR EQUIVALENT ,PIPE SHALL BE AS PER MEDIUM/HIGH GRADE OF IS:1161

* 'MC' – MOMENT CONNECTION

REFERENCE MECHANICAL DRAWINGS NO.

FOR TENDERING PURPOSE ONLY

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	APPD	CHD
00	20.05.20	B.S	VIPIN	DKU										
	ISSUED FOR APPROVAL													

DEPT.	SC&PV
STATUS	CONTRACT
DISTRIBUTION	

22MW FLOATING PV PLANT AT KAYAKULAM RGCC POWER PLANT

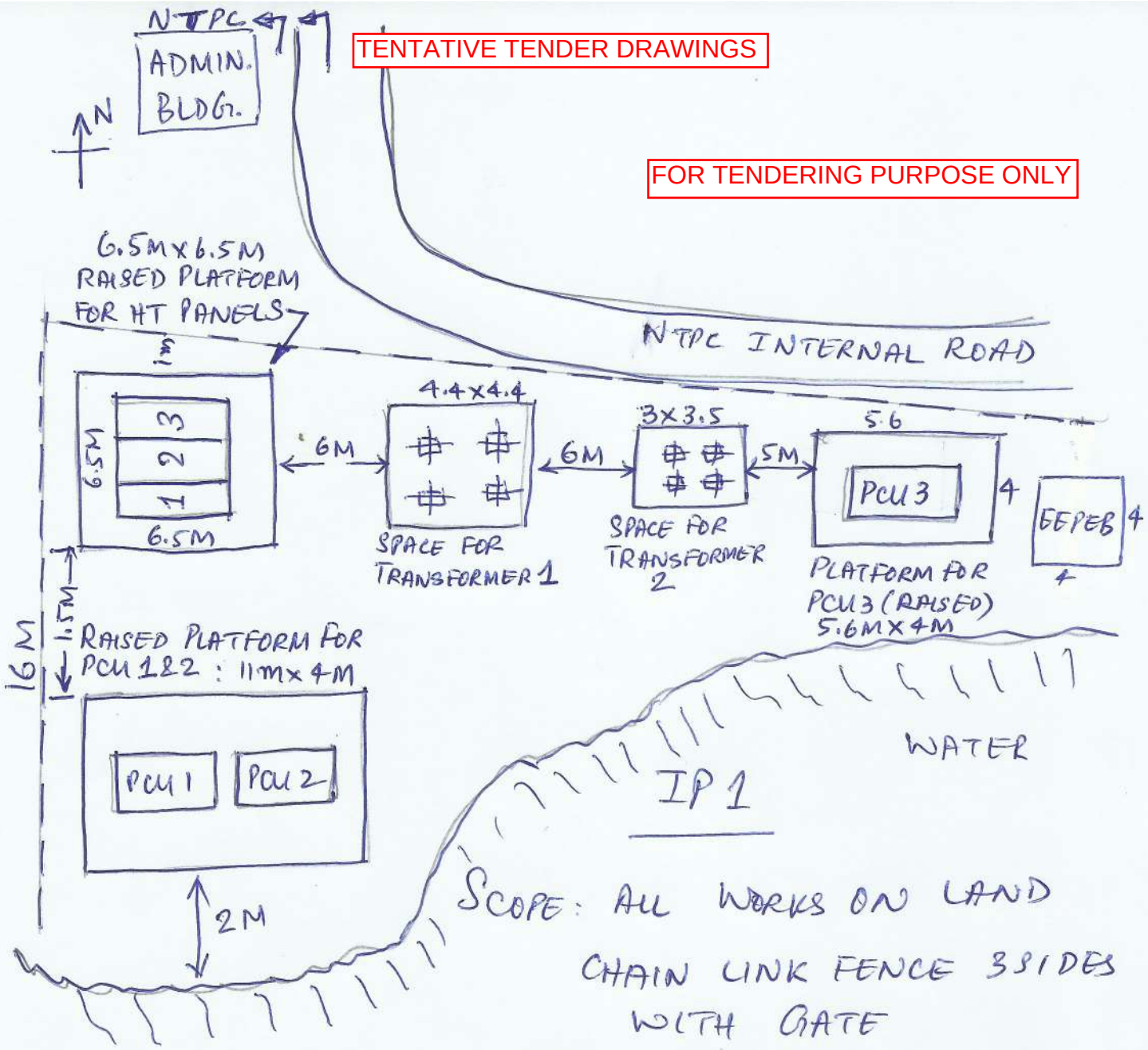
BHARAT HEAVY ELECTRICALS LTD
ELECTRONICS DIVISION, BANGALORE

TITLE
GA AND RC DETAILS FOR DELCEN 2625 HV CENTRAL INVERTER PCU – 3 PLATFORM AND SHED (IP1)

SCALE 1:75 | DRAWING NO. 5742-004-PVC-F-006 | SHEET 10 OF 10 | REV. 00

TENTATIVE TENDER DRAWINGS

FOR TENDERING PURPOSE ONLY



IP 1

SCOPE: ALL WORKS ON LAND

CHAIN LINK FENCE 3 SIDES WITH GATE

2 PCU, 1 HT SWGR RAISED PLATFORM,
2 TRANSFORMER FOUNDATION, 1 EEPEB FOUNDATIO

NTPC KAYAMKULAM

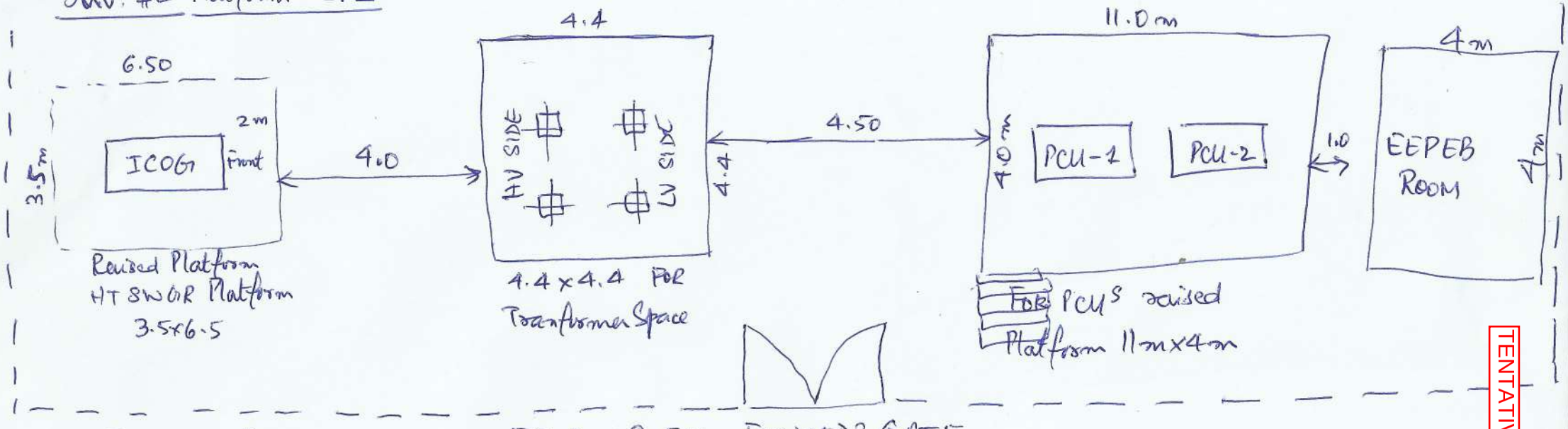
TOTAL CIVIL WORKS

1) IP 1, IP 2, IP 3, IP 4

2) 1 NO. UNDERGROUND WATER STORAGE SUMP 30KL.

3) DEMOLITION OF OLD SHED BUILDINGS (2 NOS.) at IP1, IP4

Inv. #2 Platform IP2

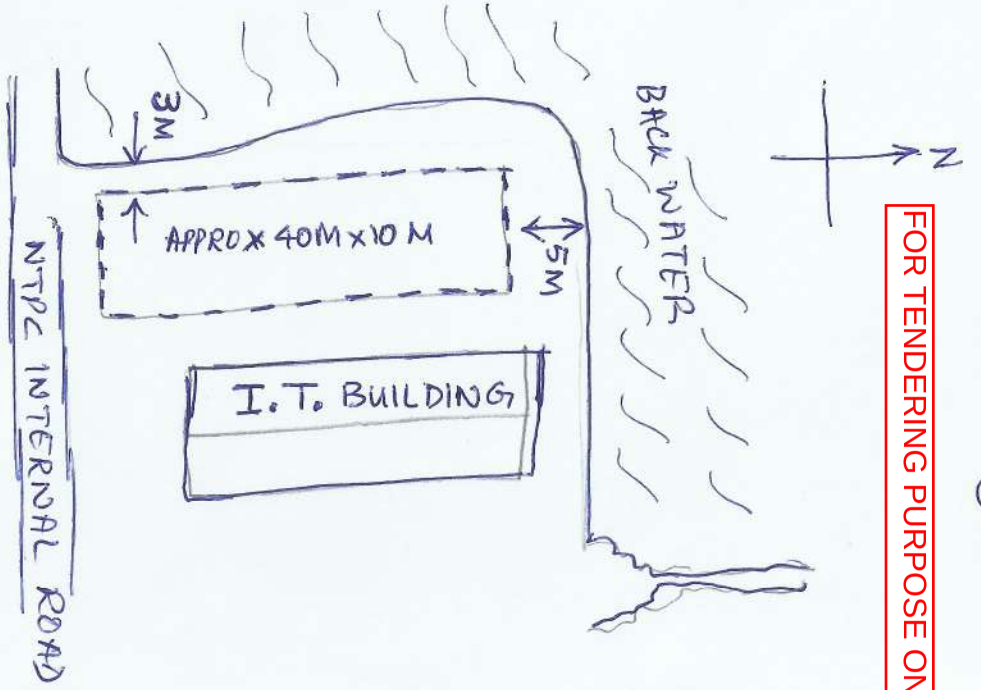


INVERTER PLATFORM-2 : 37.4 x 8.5M FENCED & GATE

NTPC KAYAMKULAM

Key Plan

IP2



ALL FOUNDATIONS ON LAND

TENTATIVE TENDER DRAWINGS

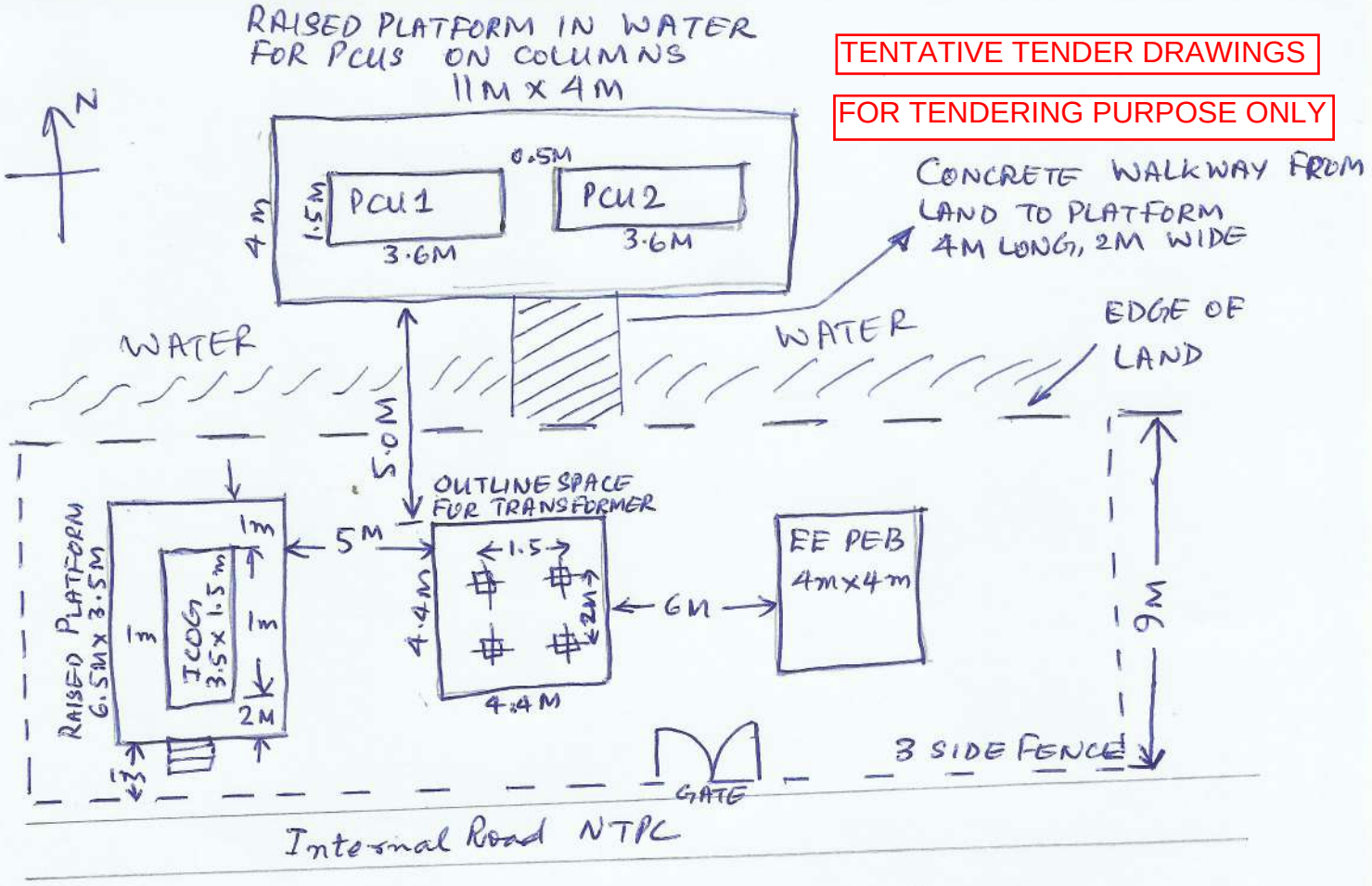
FOR TENDERING PURPOSE ONLY

Scope:

1. Demolition of old building 3x3
2. Construction of Transformer, foundation, Inverter Platform, HT Panel Platform, Foundation of PEB room upto & flooring.

TENTATIVE TENDER DRAWINGS

FOR TENDERING PURPOSE ONLY



IP3 NTPC KAYAMKULAM

SCOPE: 1) INVERTER PLATFOR 11Mx4M FULLY IN WATER

2) TRANSFORMER FOUNDATIONS, HT SWGR PLATFORM, EE PEB ROOM FOUNDATION & UPTO PLINTH/FLOORING IN LAND

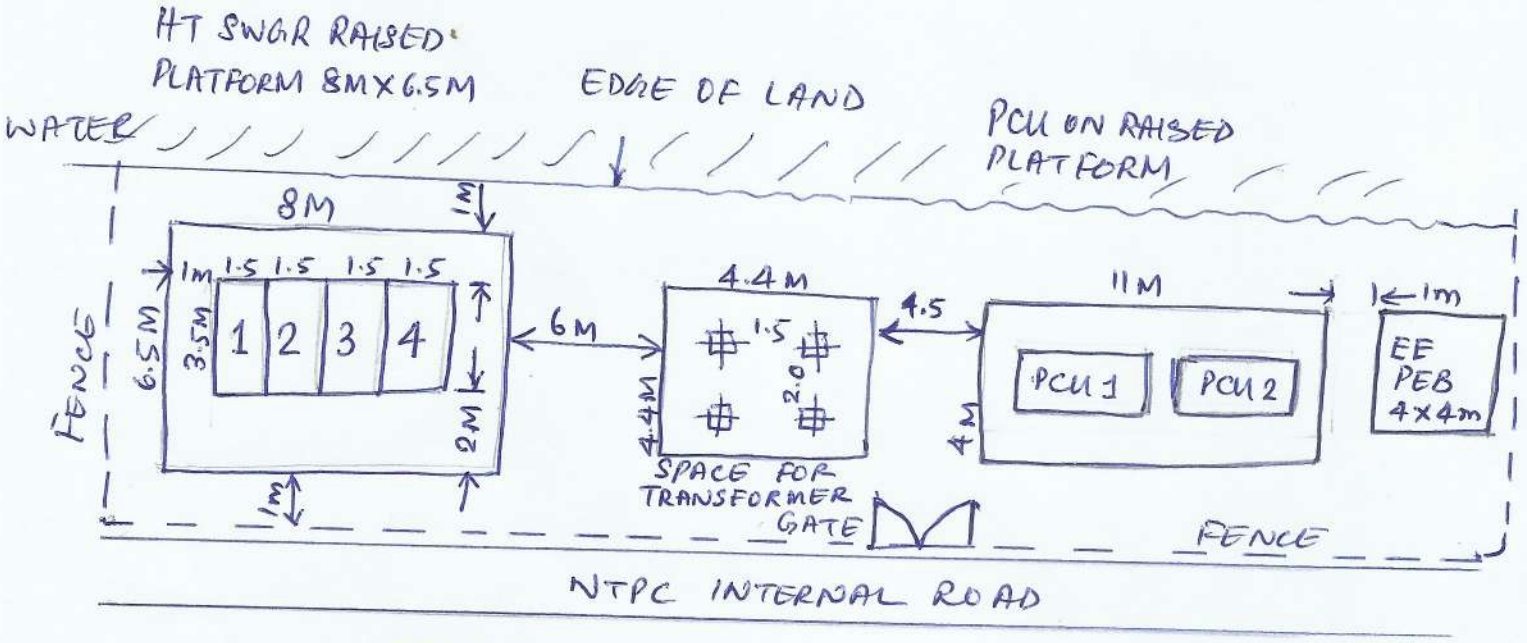
3) CHAIN LINK FENCE 3 SIDES.

4) CONCRETE WALKWAY TO INV. PLATFORM

TENTATIVE TENDER DRAWINGS

FOR TENDERING PURPOSE ONLY

NTPC KAYAMKULAM



IP4

SCOPE: ALL WORKS ON LAND

CHAIN LINK 3 SIDES

DEMOLITION OF OLD CISF BARRACKS BUILDING (ASBESTOS COVERED)

FOR TENDER PURPOSE ONLY

		FIELD QUALITY PLAN									
		ITEM: CIVIL WORK		QP No.:		1	PROJECT:	22MW FSPV Project at NTPC Kayamkulam			
		SUB- SYSTEM : FOUNDATION, EXCAVATION & FILL, SITE LEVELLING, CONCRETE, ROAD, BUILDING ETC.		REV. NO :		00	PACKAGE:	22MW KAYAMKULAM FQP CIVIL			
				DATE:		06-Apr-20	DOCUMENT NO:	5742-004-QVC-Q-001			
				PAGE:		Page 1	EPC CONTRACTOR	Bharat Heavy Electrical Limited			
Sl. No	Components/ Materials & Operation	Characteristics / instruments		Class of Check	Type of Check	Quantum Of check	Reference Document	Accpatence Norms	Format of Record		Remarks
1	2	3		4	5	6	7	8	9	D*	10
1	**General Requirement-**										
A	Site Survey	Initial & final level layouts, lines, alignments TOC level, RL Transfer, development of benchmark pillar	As per PO & BOM, IQC Plan.	B	Physical	As per engineering approval at test locations			TR/SR	√	
B	Seting up of field QA&QC Laboratory & Availabilty of QA & QC Manpower		As agreed / required	B	Physical	Once Prior to start of work and thereof monthly	Tech Spec.		SR	√	Functioning of laboratory equipment in proper working condition to be verified on monthly basic
C	Sampling for testing of building materials, concrete mix design etc.		As agreed / required	A	Physical	Once per each source	Tech. Specs & Const. Drawings		SR/TR	√	Test report along with the recommendations from specalist agency to be submitted to Employer
D	Stacking and storage of construction materials and components at site		As per IS :4082	B	Physical	Random	Tech Specs & Const. Drawings & IS : 4082		SR		
2	**Excavation & Filling in Foundation Works**										
2.1	**Excavations**										
i		Initial ground level before start of excavations, Final excavation levels, side slope of final excavations	As agreed/ required	B	Measurement	100%	Tech Specs or Const. Drawings		SR	√	
2.2	**Fill/Backfill**										
i	Standard proctor Test	Optimum moisture content & max. dry density before fill	As per IS: 2720, Proctor needle apparatus,etc.	A	Physical	One in every 10000 Cum for each type and source of fill material	IS 2720 (Pt.VII), Tech Specs and Const. Drawings		SR/TR	√	
2.3	**Degree Of Compaction Of Fill/backfill**										
i		Dry density by core cutter method --OR-- Dry density in place by sand replacement method --OR-- any other method as per IS2720	As per IS: 2720	A	Physical	(i) For foundation back fill one for everry 10 foundations for each compacted layer. (ii) For area filling, one every 1000 SOM area for each compacted layer.	IS 2720 (Pt. XXIX)/, IS 2720 (Pt. XXVIII)/, IS 2720 Relavant Part/ Tech Specs and Const. Drawings		SR/TR	√	
ii		Relative density (Density index)	As per IS:2720	B	Physical	……DO…….. (i) & (ii) above	IS 2720(XIV). Tech Specs and Const. Drawings		SR/TR	√	
3.0	**Pile Auguring**	Pile load tets -lateral & pull out as per IS 2911 /Specification	As per Drg/ Spec/ IS 2911	A	Physical	As per engineering approval at test locations			SR/TR	√	
		Diameter & Depth of auguring/ hole (lot concreting)	IS2720 (Pl XXVIII). Tech specs	B	Physical	As per Drg plot locations	IS 2911 / IS2720 (Pt XXVIII). Tech specs		SR/TR	√	

		Depth before placement of reinforcement (Stabilising sides of bore for loose soil)	As per Drg / Spec	B	Physical	As per Drg plot locations		SR / TR	√	
3.1	**Cement**									
i		Retesting of cement	As per IS 4031	A	Review of MTC/ test reports	Each lot/Week No. received at site.	As per relevant IS codes	MTC/TR	√	Each consignment of cement shall be duly correlated with manufacturers TC. One sample from each lot shall be tested for setting time and compressive strength . If cement is stored more than 90 days in godown of contractor same shall be retested for comp. Strength & setting time.
3.2	**Coarse Aggregate**									
i		Specific gravity, water absorption, Soundness, Deleterious materials (coal & lignite, clay lumps, material finer than 75 micron sieve, soft fragment, shale)	As per IS 2386	B	Physical	Once for each source or every change of source	IS 2386 Part III, Part II, Part V, IS 456, IS 383/Tech Spec	SR/TR	√	
ii		Sieve analysis, flakiness index, elongation index	As per IS 2386	B	Physical	One for 100 cum or part thereof	IS 2386,Part I, IS 383/ Tech Spec	SR/TR	√	
iii		Crushing value, abrasive value & impact value	As per IS 2386	B	Physical	Once for each source or every change of source	IS 2386,Part IV, IS 383/ Tech Spec	SR/TR	√	
3.3	**Fine Aggregate**									
i		Silt content	IS 2386	B	Physical	One for 100 cum or part thereof	IS 2386, IS 383	SR/TR	√	
ii		All other tests similar to coarse aggregates as mentioned above.					IS 2386, IS 383	SR/TR	√	Except test for flakiness index, elongation index, water absorption value, impact value, abrasion, crushing value.
3.4	**Water**									
i		Complete test as per IS 456	Burette, conical flask, pipette etc.	B	Testing/Review of Test Report	Once for each source and thereafter yearly in case of bore well. If water is used from open source like river, stream, canal etc., then water testing is to be done quarterly.	IS 3025 Part 22 & 23 for test procedure, IS 456 for acceptance criteria	TR	√	
3.5	**Concrete**									
i		4 Trial mixes to ascertain the workability and cube strength	After receiving the recommended mix design from specialist agency.	A	Physical	each mix proportion	Tech. Spec.,IS 456	SR/TR	√	
ii		Concrete Cube Strength Test	IS:516	A	Physical	One set of 6 cubes per 50 Cum or part thereof for each grade of concrete per shift whichever is earlier.	IS:516, IS:456, Tech. Spec.	SR/TR	√	Min. of 6 cubes for each mix, 3 specimen shall be tested at 7 days remaining 3 shall be for 28 days comp. Strength.
iii		Workability slump test	As per IS 1119	B	Physical	At the time of concrete pouring and thereafter at every 2 hours	IS 456/Tech Specs	SR/TR	√	
iv		Compaction and Curing of concrete	IS 456	B	Physical	Random	IS 456	SR		
3.5.1	Admixture for concrete	Type of admixture	As per IS 9103	B	Review of MTC	For each lot received at site	Designed mix and IS 9103	MTC	√	3.5.1 is only applicable when admixture is recommended in Concrete mix design

3.6	**Batching Plant (if applicable)**									
i		Calibration of Batching plant		A	Physical	To be calibrated at the time of starting and subsequently once in three month in house.	Review of calibration chart / Certificate/ IS 4925	Calibration Report	√	Batching Plant shall be calibrated regularly at least once in a 3 months in-house. The weights for batching plant calibration to be calibrated once in year by NPL/NABL accredited lab./Weights & Measures Dept.
3.7	**Test/Checks on RCC Structure in Hardened Condition**									
i		Dimensional check on finished structure, insert steel column post & dimensional tolerance	As required	B	Measurement	Approved drawing	As per IS 456/tech spec/construction drawing	SR	√	
ii		Core Test	IS:516	A	Physical	As required by EIC.	As per IS:456, IS 516	SR/TR	√	Compressive strength based on core test is required to be carried out in case of doubt regarding the grade of concrete used, either due to poor workmanship or based on the results of cube strength test as per sl. No. 3.5 ii) above / discretion of EIC.
iii		Rebound Hammer test	IS:13311	A	physical	As required by EIC.	As per relevant / tech. Specification.	SR/TR	√	This test may be carried out to assess the strength of concrete in case of non-critical and lightly loaded structures as per discretions of EIC.
3.8	**Reinforcement Steel and Placement of Reinforcement Steel**									
i	Material	Physical and chemical properties as per relevant IS codes	As agreed/required	A	Review of MTC	Each batch/lot of delivery	As per IS 1786, IS 432, IS 1566, tech spec and cont. drawing	MTC	√	To be procured from owner approved source.
ii		Acceptance – cover, spacing of bars, spacers and chairs after the reinforcement cage is put inside the framework	As agreed/required	B	Visual & measurement	Random in each shift	Tech spec and cons drawings, IS 2502	SR	√	
3.9	**PRE-CAST CONCRETE**									
i		Crushing strength	compression testing machine		Physical		IS:516 & IS: 456	SR/TR	√	If pre cast member manufactured at site then Sl.NO. 3.5 shall be applicable. If it is manufactured at manufacturing unit/factory, then random periodic surveillance shall be carried out by Regional QA/SSC-QA/CQA.
3.10	**Grouting**									
i		Compressive strength	As agreed/required	B	Physical	Random in each shift	Tech spec and const dwg	SR/TR	√	
4	**Brick Masonry**									
i	Test on bricks	Dimensions, shape, compressive strength, water absorption, warpage, efflorescence	As agreed/required	B	Measurement/ Physical test	As per relevant IS code/one sample for 30000 nos or part thereof	As per IS 1077, IS 13757,IS 2691, IS 12894/tech spec and const dwg	SR/TR		Warpage test is applicable for facing bricks only as per IS:2691
5	**Painting System --on Concrete works, steel works and plastered masonry surfaces**									
i	Materials - oil bound, acrylic emulsion, chemical resistant, oil resistant paint etc.	Shade, type approved by EIC	As agreed/required	B	Review of MTC/ test reports	Each batch of delivery	Tech spec and const dwg	MTC/TR	√	
ii	Acceptance of painted surfaces	As required	As agreed/required	B	Visual/physical	Each surface at random	Tech spec and const dwg	SR	√	

6	**Fencing and Gates**									
i	GI Chain link fence (IS 2721) & reinforced twisted barbed (IS 2629) etc. as per Tech. Spec.	Materials	As agreed/required	B	Review of MTC/ test reports	Each batch of delivery	Tech spec and const dwg	MTC/TR	√	MTC shall contain all the parameters specified in the technical specifications/ relevant IS codes
ii	Structural steel column post	Materials	As agreed/required	B	Review of MTC/test reports	Each batch of delivery	Tech spec and const dwg	MTC/TR	√	MTC shall contain all the parameters specified in the technical specifications/ relevant IS codes
iii		Acceptance of the materials and works	As agreed/required	B	Physical/measurement	Each installation	Tech spec and const dwg	SR		
7	**Earthing Mat (Grounding System)**									
i		DP tests	DP test kit	B	Physical	10% at random of the offered lot	Tech spec and const dwg	TR	√	
ii		Earth tests	Earthing test kit	A	Physical	100%	Tech spec and const dwg	SR	√	
8	**All other Bought Out items (BOIs)**									
i	Materials for Damp Proof Course, Grouting, Insulation Works, False Ceiling, Water Proofing works, Roof/Basement Treatment, Floor Finishes and Allied Works, Water Supply and sanitary Fittings and Fixtures, RCC Pipes, Water storage tank, Earthing Mat etc.	Materials	As agreed/required	B	Review of MTC/ test reports	Each Lot/Batch of delivery at site	Tech Spec./Const Drawings/Relevant IS Codes	MTC/TR	√	
ii		Acceptance of the materials and installation work	As agreed/required	B	Physical/measurement	Each installation/type/portion of works	Tech spec and const dwg	SR	√	
9	**Road Works**									
9.1	**Construction of Sub-Grade and Earthen/Hard Shoulders**									
i		Standard proctor Test	As per IS: 2720	A	Physical	One in every 2000 cum for each type and source of fill materials	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification, IS 2720 (Pt.VII)	SR/TR	√	
ii		Dry density by core cutter method ---- OR---- Dry density in place by sand displacement method ---- OR---- any other method as per IS 2720	As per IS: 2720	A	Physical	One in every 2000 SQM area for each compacted layer.	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification, IS 2720 (Pt. XXIX)/ IS 2720 (Pt. XXVIII),IS 2720 Relevant part	SR/TR	√	
9.2	**Granular Sub-Base (GSB) (if applicable)**									
i		Grading of aggregate and Atterberg limits	Set of IS Sieves	B	Physical	One test per 400 cum of test aggregate	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	
ii		Density of compacted Layer	As required / agreed	A	Physical	one test per 1000 sqm.	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	
iii		Deleterious Constituents	As required / agreed	B	Physical	As required	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	
iv		CBR	As required / agreed	B	Physical	As required	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	
9.3	**Water Bound Macadam (WBM) &/ Wet Mix Macadam (WMM)**									
i		Aggregate Impact Value	Aggregate Impact value Test Apparatus	B	Physical	One test per 1000 cum of aggregate	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	

ii		Grading of aggregate	Set of IS Sieves	B	Physical	One test per 250 cum	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	
iii		combined Flakiness and Elongation Index	Flakiness & Elongation test gauge	B	Physical	One test per 500 cum of aggregate	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	
iv		Atterberg limits of binding material	Atterberg limits determination	B	Physical	One test per 50 cum of binding material	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	
v		Atterberg limits of screenings	Atterberg limits determination	B	Physical	One test per 100 cum of aggregate	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	
vi		Density of compacted layer	As required / agreed	A	Physical	one test per 1000 sqm.	Tech spec and const dwg, section 900 of MORTH specification	SR/TR	√	only applicable when WMM is used at site
9.4	**Premix surfacing , Seal coat and Tack Coat/ Prime coat**									
i		Quality of binder	Penetrometer with St. needle	A	Physical/MTC	Number of samples per lot and tests as per IS:73, IS:217 and IS:8887 as applicable	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification, IS 73	SR/TR/MTC	√	
ii		Aggregate Impact Value / Los Angeles Abrasion value	Aggregate Impact Value/Los Angeles Test apparatus	B	Physical	One test per 200 cum of each source and whenever there is change in the quality of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR/TR	√	
iii		Combined Flakiness Index and elongation index of aggregates	Flakiness & Elongation test gauge	B	Physical	One test per 100 cum of aggregate for each source and whenever there is change in the quality of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR/TR	√	
iv		Grading of aggregates	Set of Sieves	B	Physical	Two test per day per plant both on individual constituents and mixed aggregate from dryer	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR/TR	√	
v		Soundness (Magnesium and Sodium Sulphate)	As required as per IS:2386	B	Physical	one test of each source and whenever there is change in the quality of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR/TR	√	
vi		Temperature of binder at application	Thermometer	B	Physical	At regular interval	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR/TR	√	
vii		Binder Content	Bitumen extractor	A	Physical	Two tests per day per plant	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR/TR	√	
9.5	**Alignment, Level, Surface Regularity and Rectification**									
i		Horizontal alignment, surface levels and surface regularity	As required/agreed	B	Physical	As per section 900 of MORTH specification	Tech spec and const dwg, section 900 of MORTH specification	SR		
ii		Rectification	As required/agreed	B	Physical	Earth rectification	Tech spec and const dwg, section 900 of MORTH specification	SR	√	
10	**Geo Technical Investigation Work(If Applicable)**									
		Deployment of NTPC approved agency, Equipments, Manpower etc.,	As required/agreed	B	Physical	Engineering to finalise location / field test / sampling Once before commencement of work		SR	√	
		Execution of geotechnical investigation - Locations, type etc as per scheme	As required/agreed	B	Physical			SR	√	
		Collection of distributed & undistributed samples, their packing & storage.	As required/agreed	B	Physical			SR		
		Conducting field tests as per investigating scheme such as SPT/ERT/SCPT/PLT/PMT etc.	As required/agreed	B	Physical			SR		

		Submission of field bore log, lab test schedule & selection of samples for laboratory testing	As required/agreed	B	Review & acceptance		SR/TR	√	
		Submission of field bore log, lab test schedule & selection of samples for laboratory testing	As required/agreed	B	Physical		SR	√	

			LEGEND : *RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTSATION.		**Doc. No. 5742-004-QVC-Q-001**		**Rev. 00**
	Manufacturer/ Sub-supplier	**Main-supplier**	LEGEND TO BE USED: CLASS: #: A=CRITICAL, B=MAJOR, C=MINOR; Witnessing & Accepting Authority for 'A' CLASS CHECKS SHALL BE Executing Engineer AND FOR 'C' CLASS CHECKS SHALL BE MAIN CONTRACTOR (A & B CHECK SHALL BE NTPC CHP STAGE);				
	Signature		SR = Site Register , TR= Test Report, MTC= Manufacturer's Test Certificate (MTC shall contain all the paramrters in the technical specifications)		**REVIEWED BY**	**APPROVED BY**	**APPROVAL SEAL**
			This document shall be read in conjunction with SECI-BEL Tech. Specifications, BOQ, Drawings				

Note; Where FQA manpowr is not in place at site, these tests shall be witnessed by Execution Department. Random periodic surveillance shall be carried out by Regional QA/SSC-QA / CQA.

ANNEXURE A

PROFORMA OF BANK GUARANTEE FOR EARNEST MONEY

(On non-Judicial paper of appropriate value)

Bank Guarantee No……..

Date……..

To

(Employer's Name and Address)

……..

Dear Sirs,

In accordance with the terms and conditions of Invitation for Bids/Notice Inviting Tender No……1(Tender Conditions), M/s. …….. having its registered office at ……2 (hereinafter referred to as the 'Tenderer'), is submitting its bid for the work of**……..3** invited by ……4.(name of the Employer) through its Unit at ……(

The Tender Conditions provide that the Tenderer shall pay a sum of Rs …… as Earnest Money Deposit in the form therein mentioned. The form of payment of Earnest Money Deposit includes Bank Guarantee executed by a Scheduled Bank.

In lieu of the stipulations contained in the aforesaid Tender Conditions that an irrevocable and unconditional Bank Guarantee against Earnest Money Deposit for an amount of .....5 ..... is required to be submitted by the Tenderer as a condition precedent for participation in the said Tender and the Tenderer having approached us for giving the said Guarantee,

we, the .....[Name & address of the Bank] ..... having our Registered Office at …….(hereinafter referred to as the Bank) being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer without any demur, merely on your first demand any sum or sums of Rs. 5 .....(in words Rupees.....) without any reservation, protest, and recourse and without the beneficiary needing to prove or demonstrate reasons for its such demand.

Any such demand 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. _____ _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor/Contractor/Vendors in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the Tenderer shall have no claim against us for making such payment.

We …….. Bank further agree that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Tender or to extend the time of submission of from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Tenderer and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Tenderer or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Tenderer 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.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Tenderer and notwithstanding any security or other guarantee that the Employer may have in relation to the Tenderer's liabilities.

This Guarantee shall be irrevocable and shall remain in force upto and including……..6 and shall be extended from time to time for such period as may be desired by the Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Tenderer but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms hereof. However, unless a demand or claim under this Guarantee is made on us in writing on or before the ……. [7] we shall be discharged from all liabilities under this Guarantee.

We, ……. Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed……..5…..
b) This Guarantee shall be valid up to ……6
c) Unless the Bank is served a written claim or demand on or before _____7 all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of

(Name of the Bank)

Date……

Place of Issue……..

PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
1	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 5km and lift upto 1.5m, disposed earth to be levelled and neatly dressed at location shown by BHEL/NTPC.all type of soil as per direction of Engineer in charge.	Cum	1910.00	149.12	284820.00
2	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 5km and lift upto 1.5m, disposed earth to be levelled and neatly dressed at location shown by BHEL/NTPC.in soft rock complete as per direction of Engineer in charge.	Cum	75.00	289.01	21676.00
3	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 5km and lift upto 1.5m, disposed earth to be levelled and neatly dressed at location shown by BHEL/NTPC.in Hard rock complete as per direction of Engineer in charge.	Cum	75.00	833.28	62496.00
4	Filling available excavated earth/murram (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 2 km and lift upto 1.5 m complete as per direction of Engineer in charge.	Cum	1585.00	180.11	285475.00
5	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III) : 6 graded stone aggregate 20 mm nominal size).	Cum	239.00	5132.46	1226658.00
6	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work upto floor V level : 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20/10mm mm nominal size) complete as per direction of Engineer in charge.	Cum	12.00	5566.65	66800.00
7	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level : 1:1½:3 (M20) (1 Cement: 1½ coarse sand (zone-III) : 3 graded stone aggregate 20 mm nominal size).	Cum	15.00	5912.65	88690.00
8	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. All works upto floor level	Cum	448.00	6614.98	2963512.00
9	Providing and mixing integral crystalline admixture for waterproofing treatment to RCC structures like basement raft, retaining walls, reservior, sewage & water treatment plant, water storage tank, tunnels / subway and bridge deck etc. at the time of transporting of concrete into the drum of the ready-mix truck, using integral crystalline admixture @0.80% (minimum) to the weight of cement content per cubic meter of concrete) or higher as recommended by the manufacturer's specification in reinforced cement concrete at site of work. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90%,compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure. The crystalline admixture shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the Engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage. water proofing by FOSROC or PIDILITE, SIKA	Kg	91.00	317.50	28893.00
10	Centering and shuttering including strutting, propping etc. and removal of form for :Foundations, footings, pedestal, bases of columns etc. for mass complete as per direction of Engineer in charge.	sqm	926.00	233.58	216296.00

CONTACTOR (SIGN AND SEAL)

PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
11	Centering and shuttering including strutting, propping etc. and removal of form for all heights : plinth beams, Tie/Lintel beams, girders, bressumers and cantilevers FOR ANY HEIGHT	sqm	303.00	452.68	137163.00
12	Centering and shuttering including strutting, propping etc. and removal of form for Suspended floors, roofs, landings, balconies and access platform complete as per direction of Engineer in charge. FOR ANY HEIGHT	sqm	416.00	568.30	236413.00
13	Centering and shuttering including strutting, propping etc. and removal of form for all heights : Walls (any thickness)/cable trench wall including attached pilasters, butteresses, plinth and string courses etc.	sqm	518.00	499.63	258809.00
14	Supplying and filling in plinth with sand/murrum under floors, including watering,ramming, consolidating and dressing complete.	Cum	50.00	1601.50	80075.00
15	Dry stone filling for Soak pit AVERAGE 40mm down graded stones including supply of stones, filling and preparing surface complete.	sqm	125.00	598.76	74845.00
16	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure upto plinth level in all shapes and sizes in : Cement mortar 1:6 (1 cement : 6 coarse sand)	cum	29.00	4348.13	126096.00
17	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in : Cement mortar 1:6 (1 cement : 6 coarse sand)	cum	42.00	6224.17	261416.00
18	Half brick masonry with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 up to floor V level. Cement mortar 1:4 (1 cement :4 coarse sand)	sqm	10.00	764.32	7644.00
19	Random rubble masonry with hard stone in foundation, below fencing and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20mm nominal size) upto plinth level for fencing work with :Cement mortar 1:6 (1 cement : 6 coarse sand). Complete as per direction of Engineer-in-charge.	cum	90.00	5019.06	451716.00
20	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) and finishing with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 coarse sand) finished rough with sponge. EXTERNAL PLASTER	sqm	180.00	341.57	61483.00
21	12 mm cement plaster of mix : 1:4 (1 cement: 4 coarse sand) FENCING AND WATER TANK	sqm	391.00	226.44	88539.00
22	Cement concrete flooring (with ironite hardener) 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) finished with a floating coat of neat cement, including cement slurry, etc. complete. 50 mm thick with 10 mm nominal size stone aggregate IS 2571	sqm	311.00	645.75	200829.00
23	Finishing with acid and or alkali resistant Epoxy paint/COATING, 2mm thk heavy duty industrial grade (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete. On concrete work	sqm	311.00	155.31	48302.00
24	Cement plaster skirting up to 30 cm height, with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement. 18 mm thick	sqm	47.00	427.34	20085.00
25	Finishing walls with Acrylic Smooth exterior weather proof paint of required shade : New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior weather proof primer applied @ 2.20 kg/10 sqm) EXTERNAL	sqm	180.00	135.05	24309.00
26	Distempering with 1st quality acrylic distemper (ready mixed) having VOC content less than 50 gms/litre (for Internal walls and ceiling), of approved manufacturer, of required shade and colour complete, as per manufacturer's specification: Two or more coats on new work INTERNAL WALLS AND CEILING	sqm	10.00	71.46	715.00
27	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface : Water thinnable cement primer	sqm	391.00	49.20	19238.00
28	Finishing walls with water proofing cement paint of required shade : New work (Two or more coats applied @ 3.84 kg/10 sqm all complete as per direction of Engineer-in -charge	sqm	391.00	74.83	29259.00

CONTACTOR (SIGN AND SEAL)

PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
29	Painting with black anti-corrosive bitumastic paint of approved brand and manufacture to give an even shade : Two or more coats on new work Make Berger/Asian paints	sqm	42.00	86.96	3653.00
30	Diluting and injecting chemical emulsion for POST- CONSTRUCTIONAL anti-termite treatment (including the cost of chemical emulsion) :Treatment of soil under existing floors using chemical emulsion @ one litre per hole, 300 mm apart including drilling 12 mm diameter holes and plugging with cement mortar 1 :2 (1 cement : 2 Coarse sand) to match the existing floor: With Chlorpyriphos/Lindane E.C. 20% with 1% concentration	sqm	144.00	844.97	121676.00
31	Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	sqm	66.00	1484.24	97960.00
32	Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building, all complete as per the architectural drawings, with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand), laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade, including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge. Polished Granite stone slab, colour as approved by Engineer In-charge.	sqm	10.00	2891.81	28919.00
33	Providing & fixing Acid and alkali resistant tile in flooring on a bed of 30 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand). Tile thickness should be 20mm.	sqm	65.00	1225.90	79684.00
34	Providing & fixing dado/skirting Acid and alkali resistant tile on 12 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand). Tile thickness should be 12mm.	sqm	134.00	1318.31	176654.00
35	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto all level. High strength deformed Thermo-Mechanically Treated bars with corrosion inhibitors corrosion resistant steel CRS re-bars of grade minimum Fe-500 or more and shall conform to IS: 1786.	kg	38129.00	68.47	2610693.00
36	Providing and fixing G.I. chain link mesh fabric fencing of required width in mesh size 25 X25 mm /40X40MM made of G.I. wire of dia 4 mm including strengthening with 2 mm dia wire or nuts, bolts and washers as required both ends twisted conforming to IS 2721 complete as per the direction of Engineer-in-charge.	sqm	672.00	653.70	439287.00
37	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	kg	16345.00	83.44	1363827.00
38	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.Hot finished welded type tubes	kg	14440.00	117.63	1698578.00
39	Hot dip galvanisation of fencing column post, fencing Flat, fencing Stay post and other structure steel works. thickness 86 micron	kg	3505.00	27.22	95407.00
40	Steel work welded in built up sections/ framed work (such as supply & fixing of CI rung work & puddle pipe work req. dia), including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required. In stringers, treads, landings etc. of stair cases, including use of chequered plate wherever required, all complete	kg	400.00	76.79	30716.00
41	Fencing with R.C.C./Steel post placed at required distance, embedded in cement concrete, corner post shall be strutted on both sides and end post one side only, provided with horizontal lines and two diagonals of **barbed wire** weighing 9.38 kg per 100 metres (minimum), between the two posts fitted and fixed with G.I. staples on wooden plugs or G.I. binding wire tied to 6 mm bar nibs fixed while casting the post (cost of R.C.C. posts, struts, earth work and concrete to be paid for separately) :- Payment will be made as per metre cost of total length of barbed wire used.	meter	840.00	9.84	8266.00

CONTACTOR (SIGN AND SEAL)

PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
42	Painting with synthetic enamel paint of approved brand and manufacture/paint treatment to be suitable for Coastal corrosion to give an even shade : Two or more coats on new work	sqm	300.00	99.67	29901.00
43	Pointing on stone work with cement mortar 1:3 (1 cement : 3 fine sand) Flush/ Ruled pointing	sqm	10.00	234.03	2341.00
44	Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete : Serrated with central bulb (225 mm wide, 8-11 mm thick).	meter	100.00	232.22	23222.00
45	Water supply for tank leakage test. Filling the tank with 50000 Litre water and keep it for 24 hrs	5000L	10.00	738.00	7380.00
46	Hire charges of Pump set of capacity 4000 litres/hour for draining out the water after leakage test	day	10.00	574.00	5740.00
47	Providing and applying of swellable type water stop tape, 19mm x 25mm thick in linear meter (expansive nature) for construction joints treatment of RCC structure, such as raft slab, retaining walls, water storage tank and at the junctions of raft slab with the retaining walls etc.. After cleaning the surface, one coat of required primer for swellable water stop tape shall be applied throughout the length of the joint @3.78 litre per 240 running meter. Over the primed surface swellable type water stop tape shall be placed. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guaranteed for 10 years against any leakage	meter	100.00	452.80	45280.00
48	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge: 40 mm nominal outer dia Pipes.	meter	10.00	440.14	4402.00
49	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge: 100 mm nominal outer dia Pipes.	meter	10.00	2279.23	22793.00
50	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge: 150 mm nominal outer dia Pipes.	meter	10.00	4773.92	47740.00
51	Providing and fixing precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm + 0.05 %, total coated thickness with zinc coating 120 gsm as per IS: 277 in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches while transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x 55mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.	sqm	514.00	514.59	264500.00
52	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 1.5km lead as per direction of Engineer-in-charge In cement mortar	Cum	92.00	1205.32	110890.00

CONTACTOR (SIGN AND SEAL)

PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
53	Demolishing cement concrete manually/ by mechanical means including disposal of material within 1.5km lead as per direction of Engineer - in - charge with Nominal concrete 1:3:6 or richer mix (i/c equivalent design mix)	Cum	143.00	1424.71	203734.00
54	Demolishing stone rubble masonry manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge In cement mortar	Cum	55.00	1438.53	79120.00
55	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 1.5km lead as per direction of Engineer - in- charge.	Cum	242.00	2078.45	502985.00
56	Extra for cutting reinforcement bars manually/ by mechanical means in R.C.C. or R.B. work (Payment shall be made on the cross sectional area of R.C.C. or R.B. work) as per direction of Engineerin-in-charge.	sqm	330.00	707.95	233624.00
57	Dismantling doors, windows and clerestory windows (steel or wood) shutter including chowkhats, architrave, holdfasts etc. complete and stacking within 1.5km lead Of area 3 sq. metres and below	each	10.00	225.09	2251.00
58	Clearing jungle including uprooting of rank vegetation, grass, brush wood,trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 1.5km outside the periphery of the area cleared	sqm	1733.00	10.29	17833.00
59	Felling trees of the girth Beyond 30 cm girth upto and including 60 cm girth (measured at a height of 1 m above ground level), including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material	each	200.00	312.09	62418.00
60	Preparation and consolidation of sub grade with power road roller of 8 to 12 tonne capacity after excavating earth to an average of 22.5 cm. depth, dressing to camber and consolidating with road roller **to achieve 95% or more of standard proctor's MDD**, including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earth with lead upto 50 metres.	sqm	16.00	128.54	2057.00
61	Laying, spreading and compacting stone aggregate of specified sizes to WBM specifications in uniform thickness, hand picking, rolling with 3 wheeled road/vibratory roller 8-10 tonne capacity in stages to proper grade and camber, applying and brooming requisite type of screening / binding material to fill up interstices of coarse aggregate, watering and compacting to the required density.	Cum	5.00	629.15	3146.00
62	Supplying and stacking at site. 63 mm to 45 mm size stone aggregate (WBM Grade-II)	Cum	7.00	1259.23	8815.00
63	Supplying and stacking at site. Stone screening 11.2 mm nominal size (Type B)	Cum	2.00	1622.37	3245.00
64	Supplying and stacking at site. Moorum	Cum	2.00	662.40	1325.00
65	Providing & Grouting of dowel tubes / Shear keys / Joints of precast members / Joints of base plates with M-60 grade cementitious grout (Non Shrink) of approved make by suitable means (Free flowing / pump),curing etc. Complete as per directions of Engineer-incharge. (The payment shall be made on the basis of actual weight of approved grout injected.) Stirrer mixed cementitious grout (non shrink) of approved make in dowel tubes / Shear keys / Joints of precast members.	kg	419.00	60.89	25513.00
66	Making plinth protection 75mm thick of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, levelling & dressing & finishing the top smooth.	sqm	53.00	503.52	26687.00

CONTACTOR (SIGN AND SEAL)

PRICE BID (22MWp FSPV KAYAMKULAM)

CONSTRUCTION OF PEB EQUIPMENT ROOM FOUNDATIONS, RCC UNDERGROUND WATER TANK AND CIVIL WORKS FOR POOLING STATION INCLUDES INVERTER TRANSFORMER FOUNDATIONS, PLATFORMS FOR PCU, HT PANELS AND OTHER ELECTRICAL EQUIPMENT'S, GROUND IMPROVEMENT WORKS AND OTHER ASSOCIATED WORKS FOR 22 MWP (AC) FLOATING SOLAR PV POWER PLANT FOR NTPC AT KAYAMKULAM, KERALA.

SL. NO.	DESCRIPTION	UNIT	QTY	ITEM RATE (Excluding GST)	AMOUNT
67	Providing, driving (with vibrating pile driving hammer complete with power units & accessories) and installing driven Pre-cast reinforced cement concrete piles of specified diameter and length below the pile cap in **M-30** cement concrete to carry safe working load not less than specified, with a central through preformed hole with M.S. black pipe of dia, 40 mm for grouting with cement sand grouting of mix 1:2 (1cement : 2 coarse sand) under sufficient positive pressure to ensure complete filling including centring, shuttering, driving and removing the steel casing pipe and lifting casing etc. complete but excluding the cost of steel reinforcement. (Length of pile for payment shall be measured from top of the shoe to the bottom of pile cap). **450 mm** dia piles	meter	180.00	3160.12	568822.00
68	Boring (with DTH/drilling machine) in any kind of soil/rock, providing and installing bored cast-in-situ reinforced/Plain cement concrete piles of grade **M-30** of specified diameter and length below the pile cap, to carry a safe working load not less than specified, excluding the cost of steel reinforcement but including the cost of concrete, marking of pile location as per approved drawing with total station machine, boring, with bentonite solution and temporary casing of appropriate length for setting out and removal of same and the length of the pile to be embedded in the pile cap etc. all complete, (Cement Content shall be as per approved MIX DESIGN by BHEL/Owner) including removal of excavated earth with all lifts and leads (Length of pile for payment shall be measured upto bottom of pile cap).**300 mm** dia piles	meter	10.00	1255.82	12559.00
69	Providing & installing dry Stone column by vibro compaction/ramming method using vibroflot/or any suitable arrangement with filling material of well graded crushed stone, as per relevant IS and as directed by Engineer in-charge, etc., complete in all respect. Design and complete methodology to be submitted before executing the ground improvement work for approval of BHEL/NTPC and Liquefaction analysis to be carried out post ground improvement work to guarantee the ground improvement work. Dry Stone column diameter: 300mm	meter	13600.00	1936.80	26340480.00
				TOTAL AMOUNT:	**Rs. 42,786,375.00**
QUOTE PERCENTAGE (%) ABOVE/BELOW (+/-) (OR) AT PAR TO TOTAL AMOUNT					
QUOTED PERCENTAGE (%) IN WORDS ABOVE/BELOW (OR) AT PAR TO TOTAL AMOUNT					
Plus applicable GST					

NOTE:
1. CONTRACTOR SHOULD QUOTE PERCENTAGE (%) ABOVE/BELOW (OR) AT PAR TO TOTAL AMOUNT
2. QUOTED PERCENTAGE (%) IS APPLICABLE ON ALL ITEM RATES UNIFORMLY.

CONTACTOR (SIGN AND SEAL)