

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

## **Tender Document**

### **CONSTRUCTION OF ROADS,DRAINS,PATHWAYS AND SECURITY ROOM FOR 10 MWp GRID CONNECTED SPV POWER PLANT AT NTPC-UNCHAHAR,RAEBARELI,UP**

**DATE OF OPENING : 19-11-2014**

**Part-I of this tender document contains:**

1. Technical-cum-commercial bid (to be filled-up by tenderer)
2. Notice Inviting Tenders
3. Instructions to Tenderer
4. General conditions of contract
5. Special conditions of contract
6. List of Indian standards
7. Road and Pathways drawing
8. Security room drawings
9. Drainage drawings
10. Field quality plan
11. NTPC approved vendor list.

**Part – II Price Bid:**

1. Bill of quantities (BOQ) for total scope of work (to be filled up by tenderer).

**Note:**

1. Part –I: To be submitted in a separate sealed cover.
2. Part – II: To be submitted in a separate sealed cover.
3. Earnest Money Deposit of Rs. 2.00 Lakhs in the form of DD in favour of BHEL-EDN should be submitted in a separate sealed cover.
4. Tenders will be liable for rejection if the above DD is not submitted.
5. Part-I, Part-II, Tender EMD sealed covers should be put in outer envelope and super scribing the Name of work, RFQ number and Name & Address of the Tenderer.

**Bharat Heavy Electricals Limited  
ELECTRONICS DIVISION  
Mysore Road, Bangalore – 560026**

Phone No.080-26989024,  
26998552

SC&PV-SYS. ENGG. DEPT.

**NOTICE INVITING TENDERS**

1. TENDER NUMBER /RFQ NUMBER: **SLR50000** dt: **28-10-2014.**
2. NAME OF WORK : CONSTRUCTION OF ROADS, DRAINS, PATHWAYS AND SECURITY ROOM FOR 10MW<sub>p</sub> SOLAR PV POWER PLANT PROJECT AT NTPC UNCHA HAR SITE,RAEBARELI DIST,UP.
3. ESTIMATED COST : Rs.271 Lakhs (APPROX.)
4. EARNEST MONEY DEPOSIT : Rs.2.00 Lakhs
5. COMPLETION TIME : 15 WEEKS FROM THE DATE OF ISSUE OF LOA FOR ALL ACTIVITIES PUT TOGETHER.
6. LAST DATE AND TIME FOR THE SUBMISSION OF DULY FILLED IN TENDER DOCUMENT : BEFORE 01:00 P.M ON 19-11-2014
7. PLACE OF SUBMISSION : AT THE RECEPTION TENDER BOX MARKED AS "CE,SC&PV,DEFENCE-WEDNESDAY" BHEL - ELECTRONICS DIVISION, MYSORE ROAD, BANGALORE -560 026.
8. DATE AND TIME OF TECHNICAL BID OPENING : ON 19-11-2014 AT 01:30 PM.

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NOTE: The Tenderer shall return the duly filled in Tender document after affixing Signatures on all pages and submit.

ISSUED TO CONTRACTOR:

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EMPLOYER

**BHARAT HEAVY ELECTRICALS LTD,ELECTRONICS DIVN,BANGALORE-26**

DEPT/SECTION:SC&PV/SYSTEM. ENGINEERING.  
TENDER ENQ.NO/RFQ.NO:SLR50000, Dt: 28-10-2014.

**PART-I TECHNICAL-CUM-COMMERCIAL BID**

(To be furnished by the Bidders)

- 01. NAME OF THE WORK : CONSTRUCTION OF ROADS, DRAINS, PATHWAYS AND SECURITY ROOM AT 10MW SOLAR PV PLANT AT NTPC-UNCHAHAHAR, RAEBARELI DIST, UP.
- 02. APPROXIMATE ESTT.COST RS. : **Rs. 271** Lakhs
- 03. COMPLETION PERIOD : **15 WEEKS** (FROM DATE OF LOA)
- 04. NAME OF THE CONTRACTOR : .....
- 05. ADDRESS : .....

  - (A) OFFICE : .....
  - E-mail : .....
  - TEL. PH. NO. : .....
  - (B) RESIDENCE : .....
  - TEL.PH NO : .....

- 06. QUALIFICATION : .....
- 07. STAFF STRENGTH : .....

  - (A) TECHNICAL : .....
  - (B) GENERAL : .....

- 08. PLANT/EQUIPMENTS : List enclosed/not enclosed
- 09. a) SCOPE OF WORK : UNDERSTOOD/ NOT UNDERSTOOD  
(As per schedule of items)
- b) ACCEPT TO EXECUTE IN TOTAL : YES/ NO
- 10. EMD PARTICULARS : .....

  - (A) CASH :
  - (B) DEMAND DRAFT :

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11. ACCEPTANCE  
(A) DRAWINGS : Acceptable/ Not acceptable  
(B) DESIGNS : Acceptable/ Not acceptable
12. BHEL'S PAYMENT TERMS : ACCEPTABLE / NOT ACCEPTABLE
13. Whether agreeable to make necessary Statutory payments as per BHEL EDN terms : YES/NO
14. Constitution of Firm : Individual / Sole Proprietorship Concern / Partnership Firm / Public Ltd. Company/ Private Ltd. Company
15. Electronic Funds Transfer (EFT) form enclosed : Please fill up the form in ANNEXURE-III

ESSENTIAL CRITERIAS :

1. Experience of having successfully completed similar works during last 7 years from the date of tender notice should be either of the following:

**Note:** Similar works means bidder's should have executed civil works such as buildings or roads or pathways or drains or culverts or other infrastructural works.

a) Three similar completed works each costing not less than an amount equal to 40% of estimated value mentioned against each work in the tender notice

OR

b) Two similar completed works each costing not less than an amount equal to 50% estimated value mentioned against each work in the tender notice.

OR

c) One similar completed work each costing not less than an amount equal to 80% estimated value mentioned against each work in the tender notice.

2. Latest Bankers Solvency Certificate from Nationalized/ Scheduled Bank issued not earlier than 12 months from the final date of Tender submission for value not less than 30% of the estimated cost mentioned in the notice.

3. Average annual financial turn over during the last 3 years, ending 31<sup>st</sup> March of the previous financial year, should be 30% of the estimated cost as mentioned against each work in this notice.

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

Documents required to be submitted

- 1) Copy of PAN/GIR No. Registration Certificate issued by Income Tax Authority
- 2) Certificate of TIN Number
- 3) Service Tax Registration Certificate
- 4) Registration Certificate with ESI/PF Authority
- 5) Income Tax Returns for last Three years
- 6) Bank Statement for last Six months
- 7) Overdraft facilities available with the agencies
- 8) Balance Sheet and Profit & Loss Account for the last Five years
- 9) Annual Turnover for the last THREE years duly certified by auditor
- 10) Details of works carried out during the last 7 years in any Government/ Public Sector Unit/Large Private Organizations with Certificate
- 11) Work on hand (Required for bid capacity also)
- 12) Availability of Technical personnel.
- 13) Registration with BHEL/NTPC/CPWD/other Govt. organization if any

**Special Conditions :**

- (i) Successful Bidder should establish their Site office at Construction site, including common facilities such as toilet, water, electricity etc. in consultation with BHEL's customer.
- (ii) The bidders should furnish "Site Inspection Certificate" in Annexure-IV enclosed herewith.
- (iii) Bidders should require to study the prevailing Market trend of Construction materials/labourers/other relevant requirement before quote and submit the competitive price.
- (iv) 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.

**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 works of similar kind and magnitude.
2. Tenders should be addressed to DGM /SC&PV-PVSE, NEB 5<sup>th</sup> Floor, Electronics Division, Bharat Heavy Electricals Limited, Mysore road, Bangalore – 560 026. In three separate sealed cover for “Technical cum Commercial Bid”, Price Bid and EMD duly super scribed and put in an outer envelope, super scribing the Name of work and Name and address of the Tenderer.
3. 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).
4. 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.
5. 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.
6. Unit rate should be quoted in figures as well as in words in Indian Currency only i.e. Rupees and Paise 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., and also expenses towards PF and ESI contributions (see clauses 8, 40 and Enclosure ‘A’). Amount of each item and total on each sheet as also the grand total amount of the whole contract shall be filled by the tenderers.
7. 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.
8. The rate to be quoted by the tenderer shall be firm and shall cover and include all statutory levies such as “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. The tenderer shall note that claim for variation of rates, on the ground that existing statutory levies have been increased/decreased or those new statutory levies have come into effect after tender, or on any other ground, will be entertained as applicable.
9. (a) The rate quoted in the tender shall remain valid for a period of ‘THREE MONTHS’ from the date of opening tender.

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- (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) 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), service tax 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.
10. 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.
  11. 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.
  12. 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.
  13. 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 later case, a copy of the power of Attorney duly attested by the Gazetted Officer must accompany the tender.
  14. If in any case, the date of Tender Opening falls on holiday, the Tender will be opened on the next working day.
  15. A. 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.

**B. MSE suppliers can avail the intended benefits** only if they submit along with the offer, attested copies of either EM II certificate having deemed validity (Five years from the date of issue of acknowledgement in EM II) or valid NSIC certificate or EM II certificate along with attested copy of a CA certificate (Format enclosed at Annexure -1 where deemed validity of EM II certificate of five years has expired) applicable for the relevant financial year(latest audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefits shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer.

16. The Earnest money deposit may be furnished in any of the following forms:
  - a) Cash.
  - b) Pay order.
  - c) Demand Draft in favour of BHEL EDN, Bangalore – 560026.
17. 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.
18. Unless the bidder whose tender is accepted signs contract agreement 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.
19. 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.
20. 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.
21. 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.

22. Tenderer shall submit Solvency Certificate for the value specified from a Bank of standing regarding the tenderer's financial position.
23. The tenderers should enclose relevant documents regarding constitution of firm i.e. Individual / Sole Proprietorship Concern / Partnership Firm / Public Limited Company / Private Limited Company.
24. 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.
25. a) The filled in tender sealed cover should be dropped in the Tender box kept in the reception of BHEL-EDN, in case the sealed tender document is large and not possible to drop the same in the Tender box, it should be handed over to DGM /SC&PV-PVSE ,NEB 5<sup>th</sup> FLOOR before the time fixed for submission of tender.
  - b) Tenders received after the due date & time of opening of tenders will be rejected.
26. The Contractors responsibility under this contract shall commence from date of receipt of the order or acceptance of tender.
27. 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.
28. 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.
29. 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.
30. 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.
31. Words imparting the singular number shall also be deemed to include the plural number and vice-versa where the context so require.
32. The General and Special Conditions are complementary to each other and where they are in conflict, the special condition shall prevail.
33. The expenses for completing the stamping agreement shall be paid by the contractor.

34. Unless or otherwise stated above tendered work includes supply, erection, testing and commissioning of equipments as agreed to in the contract.
35. After completing of the job, the contractor has to furnish actual drawings of work done in consultation with Engineer-in-charge.
36. Any covering letter and comments of the tenderer should be submitted along with the offer.
37. 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.
38. Contractor are required to refer to Field Quality Plan (FQP) for Civil construction as approved by BHEL/NTPC in respect of Tests to be carried out and reports and documents to be furnished.
39. Should a tenderer or a contractor has a relative or in the case of firm or company, any of its share holders 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.
40. 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).
41. 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 equipments to be brought by the tenderer.
42. 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".
43. 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

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work and produce the challans/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.

42. 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.
43. 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.
44. 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.
45. 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.
46. Contractor shall produce necessary records, documents; explanation whenever he is called upon to do by any Government Agencies.
47. Contractor should obtain "Workmen Compensation Policy" for their Employees.
48. 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.
49. 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. The schedule of rates to be followed in this case will be CPWD schedule of rates.
50. REVERSE AUCTION
  - 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.

**BHARAT HEAVY ELECTRICALS LIMITED**

(ELECTRONICS DIVISION)

MYSORE ROAD- BANGALORE-26

GENERAL CONDITIONS OF CONTRACT/TECHNICAL SPECIFICATION

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 Civil works which has been read and accepted by me/us.

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ENCLOSURE: A

**CLAUSE 20 OF GENERAL CONDITIONS OF CONTRACT LABOUR**

The Contractor shall employ labour in sufficient numbers either directly or through sub-contractors to maintain the required date of progress and of quality to ensure workmanship of the degree specified in the contract and to the satisfaction of the Engineer-in-charge. The contractor shall not employ in connection with the works any person who has not completed his eighteen years of age.

The contractor shall furnish to the Engineer-in-charge at the intervals specified by him. A distribution return of the number and description by trades of the work people employed on the works. The Contractor shall also submit on the 4th and 19th or every month to the Engineer-in-charge a true statement showing in respect of the second half of the preceding month and the first half of the current month (i) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them and (ii) the number of female workers who have been allowed maternity benefits as provided in the maternity benefit Act, 1961 or Rules made there under and the amount paid to them.

The contractor shall pay to labour employed by him either directly or through sub-contractors wages not less than fair wages as defined in the contractors Labour Regulations.

The Contractor shall in respect of labour employed by him either directly or through sub- contractors complies with or causes to be complied with contractors labour Regulations in regard to all matters provided therein.

The Contractors shall comply with the provisions of the payment of wages Act, 1936, Minimu Wages Act, 1948, Workmen's Compensation Act 1923, Industrial Disputes Act, 1947, Maternity Benefit Act 1961 or any modifications there of or any other law relating thereto and rules made there under from time to time.

The Contractors shall be liable to pay his contribution and the employees' contribution of the State Insurance Scheme in respect of all labour employed by him for the execution of the contract, in accordance with the provision of "The Employees', State Insurance Act, 1948", as amended from time to time. The Contractors shall apply to the ESI Authorities, get himself registered with them and obtain a code Number. He shall pay the remittances under his code Number only.

The Contractor shall be liable to pay his contribution and the Employees' contribution towards PF as per Provident Fund Rules and Regulations in respect of all labour employed by him for the execution of the contract. The contractor shall apply to the PF Authorities, get himself registered and obtain a code number from them. He shall pay the remittances towards PF under his code Number only.

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The Engineer-in-charge shall on a report having been made by an Inspecting Officer as defined in the Contractors Labour Regulations have the power to deduct from the moneys due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non fulfillment of the conditions of the contract for the benefit of workers, non - payment of wages or of deductions made from him or their wages which are not justified by the terms of the contract of non observance of the said contractor's Labour Regulations.

The Contractors shall indemnify the BHEL against any payment to be made under and for observance of the regulation aforesaid without prejudice to his right to claim indemnity from these sub-contractors.

### **MODEL RULES FOR LABOUR WELFARE**

The Contractor shall at his own expense comply with or cause to be complied with model Rules for Labour Welfare as appended to these conditions or rules framed by Government from time to time for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the works, In case the Contractors fails to make arrangements as aforesaid the Engineer-in-charge shall be entitled do so and recover the cost thereof from the contractor.

ENCLOSURE: B

**CLAUSE 38 OF BHEL GENERAL CONDITIONS OF CONTRACT**

**INSURANCE OF WORKS AGAINST DAMAGE AND LOSS DUE TO FIRE, STRIKE, TEMPEST, FLOODS, EARTHQUAKE, RIOT AND AGAINST DAMAGE BY AIRCRAFT**

The Contractor shall, within one month after the date of acceptance of the contract, insure the work against loss and damage by fire, tempest, floods, earthquake, riots, strike & against damage by aircraft with an insurance office approved by the Accepting officer from the date of acceptance of work or actual commencement of work whichever is earlier. Such insurance shall be effected in the name of BHEL and shall be for the full value of the contract sum. The contractor shall lodge with the BHEL the policies and receipts of the premiums for such insurance and shall maintain such policies in force until the entire completion of the work as certified by the Engineer-in-charge.

If the contractor fails to comply with the terms of this condition the Accepting Officer may insure the work and may deduct. The amount of premium from any money that may become payable to the contractor or may at his discretion refuse payment of any advance to the contractor until the contractor shall have complied with the terms of this condition.

Such insurance whether effected by the Accepting Officer or the Contractor shall not be a limit or bar to the liability and obligation of the contractor to complete the entire work in all respects as certified by the Senior Engineer.

In case of such a loss or damage as aforesaid, the money payable under any such insurance shall be received and may be retained by the BHEL until the work is finally completed and shall then be credited to the contractor in the final statement of accounts in the event of the contract not having been previously cancelled under these conditions after taking into account the delay in completion, settlement to his workers for damages, damage to BHEL property etc.

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

1. Before commencing the work, contractor 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 of all Civil Engineering works as detailed in specifications and drawings, which forms part of this Contract. The scope of work also includes cleaning/removing all debris beyond 200 mtrs or as stipulated in the item schedule from building location and leveling the areas as per direction of the 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 contractor 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 risk and expense . Necessary distribution box, extension board points duly

earthed, and with armored safe power cables to be laid across the field which shall be in the scope of the tenderer. Further, laying of water intake and distribution pipes across the Site to various points of work shall be in the scope of the tenderer. 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. No. P.O.L. can be supplied by the Employer.

- a) The 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.
- b) All technical documents regarding the construction of works are given in the metric system and work should be carried out according to metric system.
- c) The work shall be carried out as per detailed drawings supplied by the employer. Only two copies of the working drawings shall be supplied 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. In case the contractor desires to obtain additional copies of drawings, the same shall be supplied by the Employer on payment of charges as fixed by the Engineer-in-charge.
- 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.

**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 till completion of the work is 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 revise payable on the transactions. Watching and lighting arrangements as required for satisfactory performances.

- 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 desludging 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**

No labour camp will under any circumstance be permitted within the site 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 for deviation subject to minimum of (-) 20% and maximum (+) 20% of the total value of work awarded. Deviation beyond the above limits is subject to the standard terms and conditions of BHEL.

**13. MATERIALS**

BHEL will not supply any materials unless otherwise specified.

**14. SUPPLY OF MATERIALS IS TO BE MADE BY CONTRACTOR**

Makes of supply of cement, steel, painting materials etc shall be as per approved material list indicated in ANNEXURE-5.

**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 and 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. INTERRUPTION TO THE WORKS**

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. EXTENSION OF TIME OR PENALTY/LIQUIDATED DAMAGES**

Extension of time or penalty/liquidated damages as the case may be will be determined as stipulated in clause 7, 9 and 41 of BHEL General Conditions of Contract.

## **18. COMPLETION OF WORK AND MEASUREMENT**

- 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 thereon 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 handed 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 as below:

Up to Rs.10 Lakhs	-	10%
Above Rs.10 Lakhs up to Rs.50 Lakhs	-	Rs .1 Lakhs + 7.5% of the amount exceeding Rs. 10 Lakhs
Above Rs.50 Lakhs	-	Rs. 4 Lakhs + 5% of the amount exceeding Rs. 50 Lakhs

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 EDN, BANGALORE-.560026.
- 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 clause 16(IV) of GCC.

## **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 and certification/approval of works by BHEL site in-charge/NTPC site in respect of items executed but no claim on the account will be entertained, if for any reason payments are not so made.

### **22.1 MOBILIZATION ADVANCE**

Mobilization advance not exceeding 5% of work order value excluding taxes & duties or 5% of the estimated cost put to tender whichever is less will be given, if requested by the contractor in writing within one month of the order to commence the work. The advance will be released against executing a bank Guarantee Bond by the contractor from a Scheduled Nationalized Bank as specified by the Engineer-in-charge for the full amount of such advance is released. The contractor has to furnish a proof of the satisfactory utilization of the advance released by the company.

## **22.2 INTEREST & RECOVERY**

The mobilization advance above bear simple interest at the prime lending rate of SBI plus 2% per annum and shall be calculated from the date of payment to the date of recovery, both days inclusive, on the outstanding amount of advance. Recovery of such sums advanced will be recovered by installments through deduction from the contractor's bills at 10% of the bill value till the full advance is recovered.

The said bank guarantee for advances shall initially shall be made for the full amount and valid for the contract period, and be kept renewed from time to time to cover the balance amount and likely period of complete recovery together with interest.

### **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, 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 clause 20 of BHEL GCC.

## **26. TIME OF COMPLETION**

The date of commencement of work shall be counted from the date of issue of LOA. The contractor shall plan the work in such a manner that all roofs are laid before the start of the rainy season and the work is not hampered due to rain. 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.

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

28. 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 non compliance 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.

**29. SPECIAL CONDITIONS OF TENDER**

- i) 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.

**30. 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 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

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### **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 laying of flexible P.V.C. sheet & tiles flooring.



d) PLASTING EMULSION PAINT:		
2 COATS OF PLASTIC EMULSION	....	0.09 Litre/Sq.m
1 COAT OF PLASTIC EMULSION	....	0.073 Litre/Sq.m
<u>ON NEW SURFACE</u>		
1 COAT PLASTIC FIX PRIMER	...	0.081 Litre/Sq.m
2 COATS PLASTIC EMULSION	...	0.09 Litre/Sq.m

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 else wherein 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.

ENCLOSURE: C

**CLAUSE 58 OF GENERAL CONDITIONS OF CONTRACT**

**ARBITRATION:**

Except where otherwise provided for in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions herein before mentioned and as to the quality of workmanship or materials used on the work or has been other questions, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works, of the execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the sole arbitration of the Executive Director/General Manager of BHEL and if the Executive Director/General Manager is unable or unwilling to act, as the sole arbitration of some other person appointed by the Executive Director / General Manager, willing to act as such Arbitrator. There will be no objection if the arbitrator so appointed is an employee of BHEL EDN or an employee of any other unit of BHEL and that he had to deal with the matters to which the contract relates and that in the course of his duties as such he had expressed views on all or any of the matters in dispute or difference. The Arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reason, such Executive Director / General Manager as aforesaid at the time of such transfer, vacation of office or inability to act, shall appoint another person to act as arbitrator in accordance with the terms of the contract, such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is also a term of this contract that no person other than a person appointed by such Executive Director/General Manager or an employee appointed as arbitrator as aforesaid should act as arbitrator and the arbitrator shall give reasons for the award.

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

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

CONTRACTOR

EMPLOYER

The arbitrator(s) may from time to time with consent of the parties extend the time, for making the publishing the awards.

The work under the contract shall, if reasonably possible, continue during the arbitration proceeding and no payment due or payable to the contractor shall be withheld on account of such proceedings.

The arbitrator shall be deemed to have entered on the reference on the date he issued notice to both the parties fixing the date of the hearing.

The arbitrator shall give a separate award in respect of each dispute or difference referred to him.

The venue of arbitration shall be such place as may be fixed by the arbitrator in his sole discretion.

The award of the arbitrator shall be final, conclusive and binding on all parties to this contract.

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

### GUIDELINES FOR REVERSE AUCTION PROCEDURE

Against this enquiry for the subject items/system with detailed scope of supply as per enquiry specifications, BHEL-EDN proposes to resort to “REVERSE AUCTION PROCEDURE” i.e., ONLINE BIDDING ON NETWORK, before finalizing the purchase order on technically competent bidders as per the guidelines given below:

1. Reverse auction procedure shall be applicable for 2 part bid tenders only.
2. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate, BHEL will engage the services of a service provider, having network all over the world. The online bidding can be done from the vendor’s respective offices on their computers with internet facility or at any of the cyber café, for which services provider’s representative will provide all necessary training and assistance before commencement of on line bidding. Training is free of cost.
3. Vendors have to fax the compliance form in the prescribed format (provided by Service provider) before start of reverse auction. Without this, Reverse Auction will not be started. Delay in fixing the above will lead to disqualification.
4. BHEL will send the Auto formulated EXCEL sheet which will help to arrive at “Total Cost to BHEL” like Basic Materials Cost, Packing & forwarding charges, Excise duty, Sales tax/VAT, Freight charges, Insurance (by BHEL), Service Tax for Service,(-) ED disclaimer if any, loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the vendor to enable them to fill-in the price and keep it ready for keying in during the auction.
5. Reverse Auction will be conducted on mutually agreed schedule and time.
6. After Reverse Auction is conducted, successful bidder has to FAX the filled- in Excel sheet showing the final value accepted in Reverse Auction with breakup of each element as indicated in SI No.4 above to the service provider within 48 hours of auction without fail.

**Note: No Charges are allowed in rate of excise Duty, Sales Tax, Freight, Insurance, Service Tax and Loading factors after auction is completed.**

7. After the reverse auction is conducted, the bidder whose price is lowest (total cost to BHEL, after considering all factors as per enquiry including loading factors for deviations to BHEL standard Commercial Terms & conditions), BHEL will process the tender as per BHEL purchase norms. Purchase order will be issued without loading factors for deviations.

**Note: BHEL will also reserve the right to open the sealed price offer submitted by the vendors for comparison purpose, if deemed necessary, without any intimation to the technically and commercially accepted bidders.**

8. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price Bids and Price impacts (if any) already submitted and available with BHEL shall only be opened as per BHEL’s standard practice without seeking anymore price impacts on account of BHEL not going for Reverse Auction. Hence please quote your best lowest price in first instant itself.

9. Training by service provider will be given only for the subsequent reverse auction. Training will not be given for a company which has already taken training for the FIRST REVERSE AUCTION conducted by BHEL-EDN, Bangalore.

**10. Activities involved in Reverse Auction:**

- a) BHEL will inform the vendor in writing, the Service provider's information to enable them to contact & get trained. Along with above information Business rules/policy also will be sent.
- b) Vendors have to contact Service provider and send Compliance form for having understood Reverse Auction procedure and ready for auction.
- c) BHEL will sent the Auto formulated Excel sheet (blank format without prices) as mentioned in SI No.4 above to the respective vendors.
- d) Vendors have to fill-in the Excel sheet (provided by BHEL) including loading factors and get ready for reverse auction.
- e) Date & Time of reverse Auction and Website address will be intimated by Service provider.
- f) Bid decrement will be indicated in the website after the Sealed bid is over and before start of Reverse auction.
- g) Vendors will have to key-in the "Total cost to BHEL" (as worked out in the Excel sheet mentioned in SI No.4 above) in the "Sealed Bid" of the Reverse Auction within specified time duration of 20 to 30 minutes. After "Sealed Bid" auction, the lowest bidders value or BHEL's start bid price will be the starting bid value for the commencement of Reverse auction(English Reverse).
- h) At the end of Reverse auction time (English Reverse), the lowest bidder will be known on the network.
- i) Successful bidder has to fax filled-in EXCEL sheet showing the final value accepted in the Reverse auction with breakup of each component within 48 hours of completion of the Reverse Auction without altering any of the terms to the service provider. Any alterations will be taken as sabotaging the tender process and will invite disqualification of vendor to conduct business with BHEL for the period of 2 Years.
- j) The loading factors for non-conformance to BHEL standard commercial terms are only for arriving at lowest bidder. In the event of purchase order, same will be issued without Loading factor values indicated in EXCEL sheet. We repeat PO, will be issued for scope of Supply + Packing & Forwarding charges if any, Excise duty, Sales tax, Service tax for service and Freight Insurance. Insurance will be to BHEL account.

11. This tender BHEL-EDN Proposes to resort to (Reverse Auction Procedure) that is online bidding on network to finalize the tender on technically and commercially Competent Vendor.

**ANNEXURE -III**

**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: Saving/Cash Credit
- 6.9Digit Code Number of Bank and  
Appearing on MICR cheque issued by
- 7.Bank Swift Code (applicable for EFT
- 8.Bank IFSC Code(applicable for
- 9.Bank IFSC Code (applicable for


branch  
Bank  
only)  
RTGS)  
NEFT)

I here certify that the particulars given above are true, correct and complete and that I, as a representative for the above named Company, hereby authorize BHEL,EDN, Bangalore to electronically deposit payments to the designated bank account. If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL/Transferring Bank responsible. This authority remains in full force until BHEL - EDN Bangalore receives written notification requesting a change or cancellation. I have read the contents of the covering letter and agree to discharge the responsibility expected of me as a participant under ECS/EFT.

Date:

Authorized 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:  
Bharat Heavy Electricals Ltd.,  
Attn:  
Electronics Division, Mysore Road,  
BANGALORE -560026

**ANNEXURE-IV**

Ref.

Date:

**SITE INSPECTION CERTIFICATE**

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 desires by BHEL.

Agreeable to all Terms & Conditions of Contract and assure to complete the work within the stipulation time frame.

Signature of the contractor

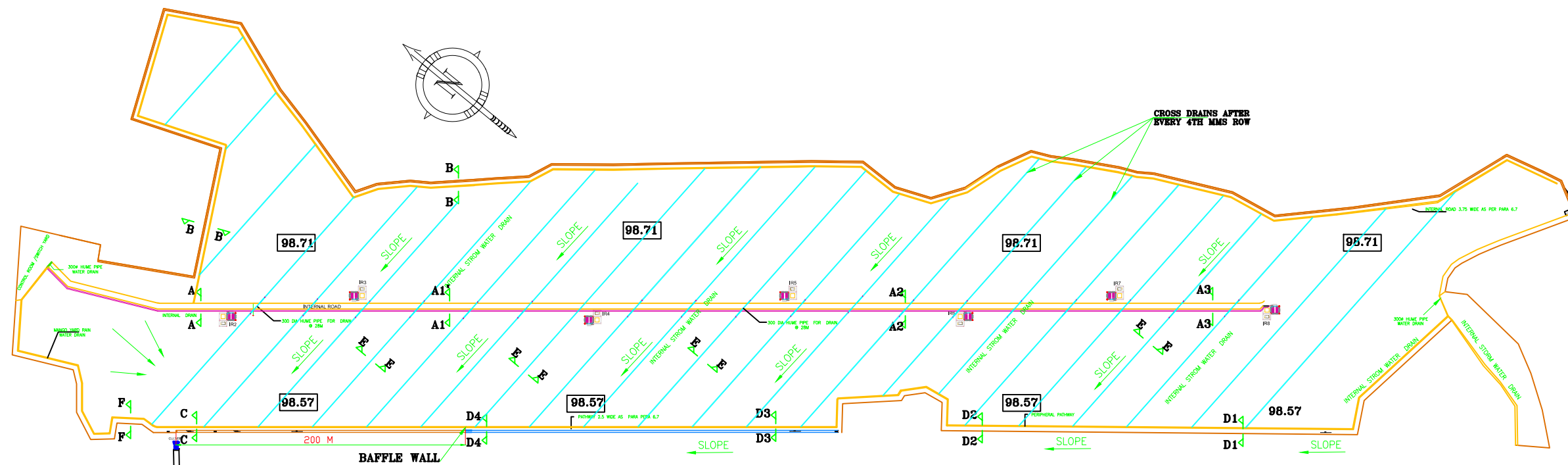
Name :

Seal

CONTRACTOR

EMPLOYER

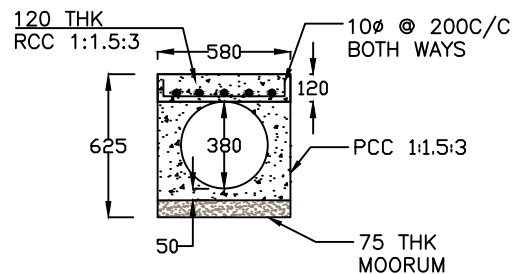
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**LAYOUT OF MAIN DRAIN & INTERNAL STROM WATER DRAIN**

**NOTES:**

1. LEVEL AT RAILWAY CULVERT IS 97.85; LEVEL AT ESCAPE CHANNEL IS 96.67
2. HUME PIPES SHALL BE 300-ID, CLASS NP-3 AS PER IS 458, AND SHALL BE PROVIDED WHERE CROSS DRAINS PASS THE CENTRAL AND PERIPHERAL PATHWAYS AND AS PER SITE CONDITIONS.
3. LEVELING/DRESSING WORKS SHALL BE CARRIED OUT AFTER INSTALLATION OF PANELS BETWEEN MODULE ROWS TO PREVENT WATER STAGNATION, WITH PROPER SLOPE TOWARDS NEAREST CROSS DRAIN.
4. PUMP SHALL BE PROVIDED WITH SUITABLE SHED TO PROTECT FROM WEATHER.
5. CLEANING OF DRAIN AT RAILWAY CULVERT SHALL BE CARRIED OUT DURING DRAIN CONSTRUCTION FOR EFFECTIVE DRAINAGE OF WATER FROM SOLAR SITE.
6. DIMENSIONS UNLESS SPECIFIED ARE IN MM.



**HUME PIPE SECTION  
300(ID), 380(OD)  
TYPICAL**

PROJECT	10MW SOLAR PHOTO VOLTAIC PLANT, UNCHAHAR
CUSTOMER	NTPC-FGUPS, UNCHAHAR, RAIBARELI (U.P)
CONTRACTOR	M/S REFEX ENERGY LTD.

**BHARAT HEAVY ELECTRICALS LIMITED.  
ELECTRONICS DIVISION, BANGALORE**

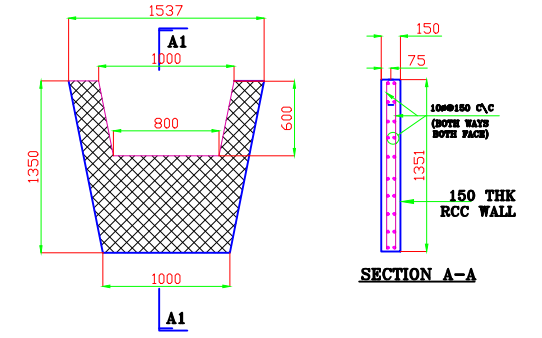
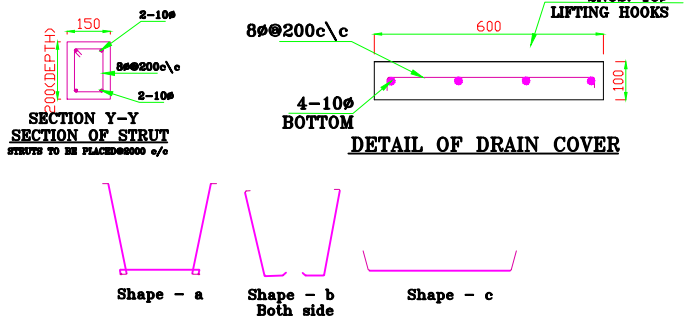
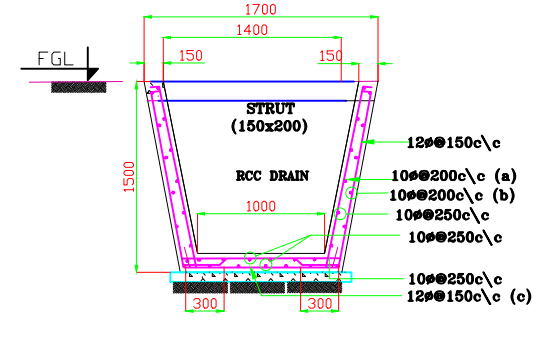
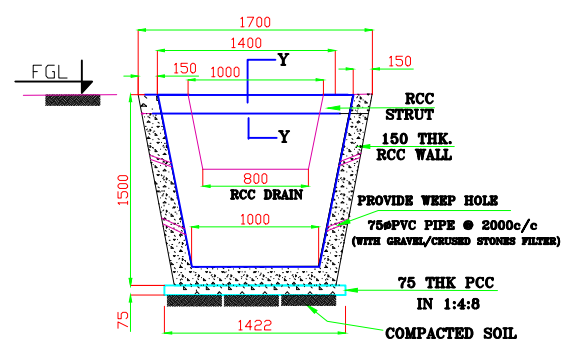
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		CHECKED				CHECKED				
		APPROVED				APPROVED				

		TITLE: <b>PLANT DRAINS-LAYOUT AND CROSS SECTIONAL DETAILS</b>	No. OF SHEETS	2
DEPT.	CODE		SHEET No.	1
SC&PV	439	NTPC DRG. NO.	5708-004-PVC-C-020	REV
		BHEL DRG. No.	BH-NT-UN-DG-020	00

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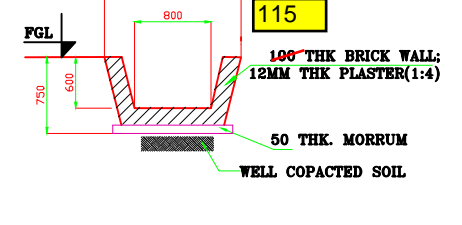
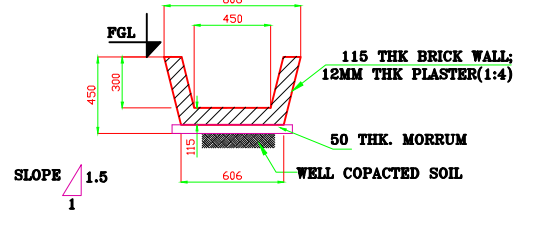
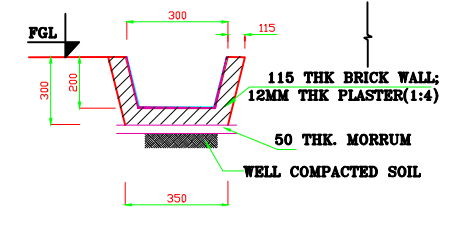
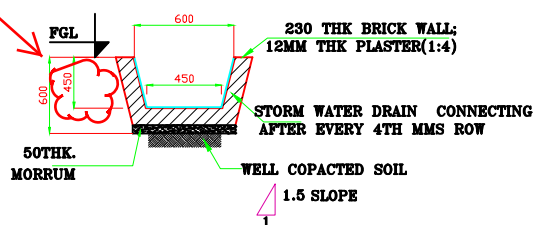
FIRST ANGLE PROJECTION  
5708-004-PVC-C-020  
DRG. No.



TYPICAL CROSS SECTION OF MAIN DRAIN 200M LONG  
(SECTION OF RCC DRAIN) SECTION C-C

BAFFLE WALL DETAILS

The invert level of the drain shall match with connecting drains. The depth of the drain shall be modified accordingly as per site conditions. The depth of drain shall not be less than 300mm in any case.



DRAIN ALONG INTERNAL ROAD  
SECTION A-A TO A3-A3

DRAIN ALONG MAIN APPROACH AND PATHWAY  
SECTION B-B

INTERNAL DRAIN ALONG BETWEEN MODULE  
SECTION - E-E

DRAIN ALONG MANGO ORCHARD  
SECTION F-F

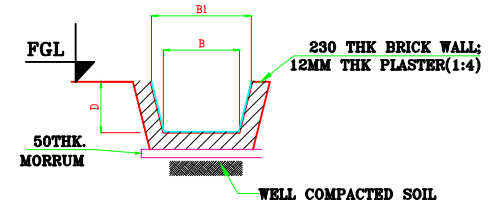
Section B-B drain shall be ensured/provided throughout the main bituminous road for quick runoff of water from the road.

Bed width shall be min. 600mm instead of 500mm in all locations. The top width also to be adjusted accordingly.

DRAIN SCHEDULE :-

S.NO	SECTION MKD.	CLEAR DEPTH (D)	BED WIDTH (B)	TOP WIDTH (B1)	INVERT LEVEL	MATERIAL
1.	D1	450	500	1100	-98.12	BRICK-CL-II
2.	D2	475	500	1150	-98.095	BRICK-CL-II
3.	D3	500	500	1250	-98.07	BRICK-CL-II
4.	D4	600	500	1500	-97.97	BRICK-CL-II

NOTE :- ALL INVERTED LEVEL ARE AVERAGE LEVEL MAY VARY AS PER SITE CONDITION.



DRAIN ALONG MAIN DRAIN D-D  
D1-D1 TO D4-D4

NOTES:

- BRICK MASONRY SHALL BE WITH CLASS II BRICKS IN CM 1:6.
- INTERNAL FACE OF DRAINS SHALL BE PROVIDED WITH 12MM THK PLASTER IN CM 1:4.
- THE SIZE AND LAYOUT FOR DRAINS IN SECTION D1-D1:D4-D4 AND SECTION F-F IS SUBJECT TO MODIFICATION AS PER SITE CONDITIONS.
- RCC FOR SUMP SHALL BE 1:1.5:3, REINFORCEMENT OF GRADE FE-415 OR ABOVE.
- THIS DRAWING SHALL BE READ ALONG WITH DRG. NO. 5708-004-PVC-C-019

The design mix batching ratio are measured in weight, however the nominal mix batching is done in volume. This change does not account for bulking in sand and issues related with the reduction in quality for shift from design mix to nominal mix. Therefore for M-25 garde concrete, equivalent nominal mix shall be taken as 1:1:2 instead of 1:1.5:3 (as mentioned in note no. 4).

PROJECT	10MW SOLAR PHOTO VOLTAIC PLANT, UNCHAHAR
CUSTOMER	NTPC-FGUPS, UNCHAHAR, RAIBARELI (U.P)
CONTRACTOR	REFEX ENERGY M/S REFEX ENERGY LTD.

BHARAT HEAVY ELECTRICALS LIMITED.  
ELECTRONICS DIVISION, BANGALORE

REV.	DATE	ALTERED CHECKED APPROVED	REFEX	REV.	DATE	ALTERED CHECKED APPROVED	REFEX	NAME	SIGN	DATE

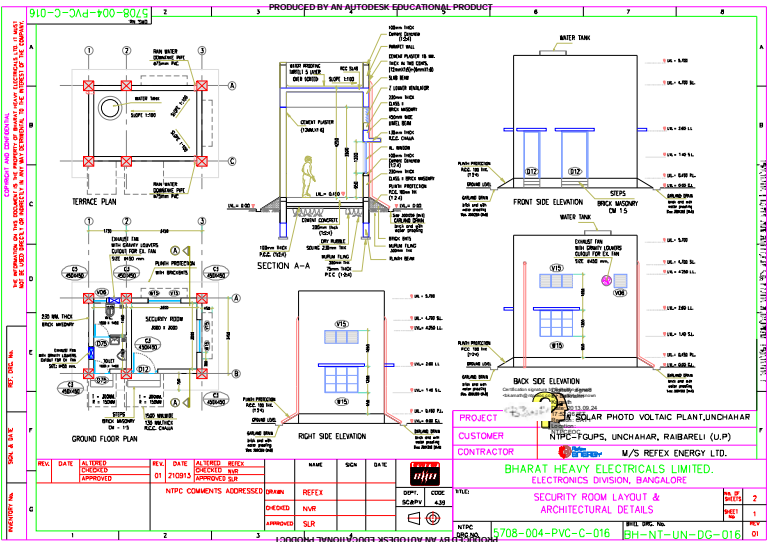
TITLE:	PLANT DRAINS-LAYOUT AND CROSS SECTIONAL DETAILS	No. OF SHEETS	2
NTPC DRG.NO.	5708-004-PVC-C-020	SHEET No.	2
BHEL DRG. No.	BH-NT-UN-DG-020	REV	00

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INSTRUCTIONS FOR SECURITY ROOM (DWG:5708-004-PVC-C-016)

SL	ACTIVITY
1	THE SECURITY POST ROOM PLINTH, CEILING AND PARAPET HEIGHT MAY BE CHANGED FROM 0.45m, 4.25m AND 1m TO 0.3m, 3.0m AND 0.3M TO AVOID SHADOW ON NEARBY SOLAR PANELS



910-C-04d-P00-80Z/S

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TYPE	SIZE	DESCRIPTIONS
W15	1500X1200	WINDOWS SHALL BE METAL STEEL FRAMED AND MANUFACTURED FROM LOW CARBON, HOT ROLLED 7-BAR STEEL SECTIONS AND 25 MM WIDE AND OF 3 MM THICK, DRILLED AND TAPPED FOR HARDWARE. THE TOP OF WINDOW UNIT WILL HAVE SMOOTH POLISHED, CAN LOCKING HANDLE AND STRIKE. WINDOW WILL BE PAINTED AFTER FABRICATION AS PER IS:1381 & IS:1038
V15	1500X900	ALUMINIUM BLACK POWDER COATED ALUMINIUM BLACK POWDER COATED 2 SECTION LOVERS MOD - ALUMINIUM SHEET 16 G THK, POWDER COATED FINISH AS PER IS:1381 & IS:1038

TYPE	SIZE	DESCRIPTIONS
D12	1200X2150	STEEL FAB. DOOR, MS PAINTED, SINGLE LEAF METAL DOOR FRAME FAB. 1/8 MM MS SHEET, (MS SHEET, FASTENERS, HINGES, JAMBS, LOCK STRIKE PLATE ETC.) AS PER IS:4511
D75	750X12150	STEEL FRAMED SOLID CORE FLUSH SHUTTER

TYPE	DESCRIPTION
INSIDE PORTION OF BUILDING	OIL BOND WASHABLE DISTEMPER ON SMOOTH SURFACE APPLIED WITH 2 MM THICK PLASTER OF PARIS PUTTY. THE FINISH WILL BE FUNGAL QUALITY FOR MASONRY SURFACES FOR HIGH RAINFALL ALL PAINTING PREFERABLY APPLIED BY ROLLER, AS PER IS:2385 WILL BE FOLLOWED 2 FINISHING COATS OF PAINT WILL BE APPLIED OVER A COAT OF PRIMER
EXTERNAL WALL	WATER PROOF CEMENT PAINT /SNOONEX, AS PER IS:5410
CEILING	ALL ROOM CEILING EXCEPT BATTERY ROOM WILL BE WHITE WASHED, BATTERY ROOM CEILING WILL BE ACID RESISTANT PAINT
DOORS, WINDOWS, & VENTILATORS.	OIL PAINT

TYPE	DESCRIPTION
SECURITY ROOM	WITHEED CERAMIC TILES OF SIZE 600X600MM. & 5 MM THICKNESS, Laid WITH 3 MM GROUND JOINT
STEPS FINISH	GRANITE STONE

TYPE	DESCRIPTION
INTERNAL	CEMENT PLASTER 18 MM THICK IN TWO COATS, (12 MM X 15) + (6MM X 16)
EXTERNAL	WATER PROOFING CEMENT WHITE CEMENT PRIMER CEMENT PLASTER (12MM X 16), PLASTERING COMPLY TO IS:1942.

DESCRIPTION
CAST IN SITU RCC SLAB TREATED WITH A WATER PROOFING SYSTEM, INTEGRAL CEMENT BASED TREATMENT CONFORMING TO CPWD SPECIFICATION. ROOF OF BUILDING WILL BE WATER PROOF WITH TARPEL 5 LAYER OVER SCREEDING

NOTES :-  
1) BE CARLUM DRAIN AROUND THE BUILDING WILL BE SUITABLY CONNECTED TO LOCAL DRAIN TO ENSURE NO STOPPAGE / FLOODING OF WATER NEAR / ANY SIDE OF THE B. BUILDING

PROJECT: 10MW SOLAR PHOTO VOLTAGE PLANT, UNCHAHAR

CUSTOMER: NTPC-FGUPS, UNCHAHAR, RAIBARELI (U.P.)

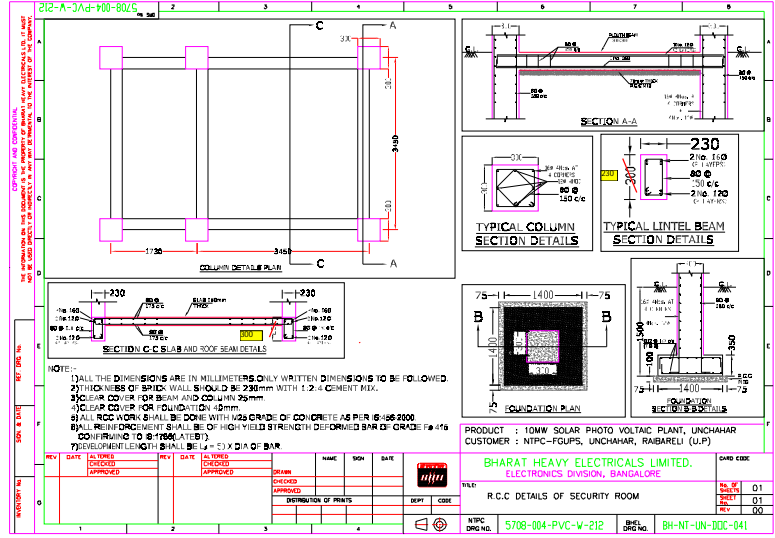
CONTRACTOR: M/S REFEX ENERGY LTD.

REV	DATE	ALTERED BY	REASON	CHKD	DATE
01	21/09/11		ISSUED FOR PERMIT		

BHARAT HEAVY ELECTRICALS LIMITED.  
ELECTRONICS DIVISION, BANGALORE

SECURITY ROOM LAYOUT & ARCHITECTURAL DETAILS

7708-004-PVC-C-016 BH-NT-UN-DG-016



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REV.	DATE	BY	CHKD.	APPROVED	REASON	ISSUE NO.	DATE

DESIGNED	
CHECKED	
APPROVED	
DISTRIBUTION OF PRINTS	
DEPT.	CODE

PRODUCT : 10MW SOLAR PHOTO VOLTAIC PLANT, UNCHAHAR  
 CUSTOMER : NTPC-FGUPS, UNCHAHAR, RAIBARELI (U.P.)

**BHARAT HEAVY ELECTRICALS LIMITED.**  
 ELECTRONICS DIVISION, BANGALORE

TITL: R.C.C. DETAILS OF SECURITY ROOM

NO. OF SHEETS	01
TOTAL NO. OF SHEETS	01
SCALE	1:100

NTPC DRG NO. 5708-004-PVC-V-212      SHEET NO. BH-NT-UN-BDC-041

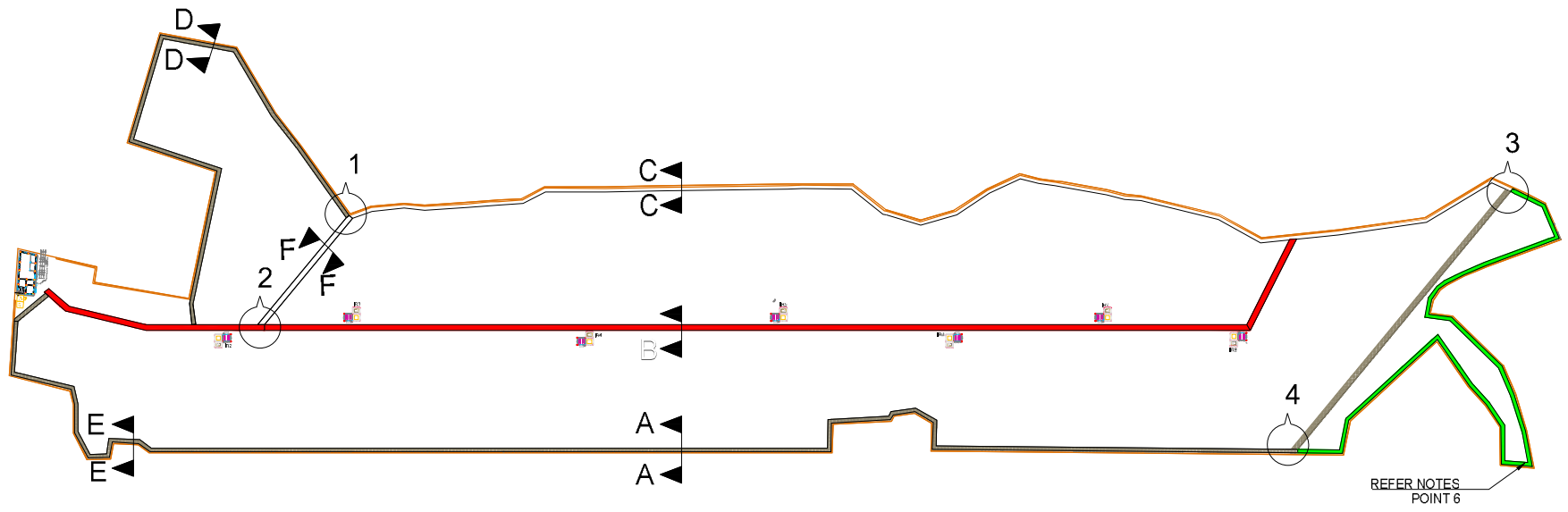
INSTRUCTIONS FOR ROADS AND PATHWAYS(REFER DWG:5708-004-PVC-C-019)

SL NO	ACTIVITY
1	The road covered in clouded area shall have a main road bituminous type.
2	RCC shall be 1:1:2
3	Clarity/addition to section B-B
	A)Bricklining (on edge)with pointing in CM 1:4(Brick of minimum Class-2)
	B)Dry mortar to be spread in the gaps of brick and water sprinkling to be done for setting of mortar. After the settling of the mortar the joint pointing shall be performed.
	c)The bricks are laid over compacted rubble soling 200mm thick.
	d) The rubble soiling is laid over compacted earth
	e) RCC 1:1.5:3 as mentioned shall be taken as 1:1:2 Nominal mix (nominal mix by volume equivalent to M-25 grade).
4	Main approach section C-C, road top minimum 250 mm above GL.
5	Main approach section C-C, proper drainage to be provided for trapped area between fencing and road.
6	Main Approach section F-F. shoulders shall be 1000 mm wide on both side
7	Main approach section F-F, road top minimum 250 mm above GL.

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PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

DRG. No. 5708-004-PVC-C-019



**NOTES:**

1. THE LOCATIONS MARKED 1,2,3 AND 4 SHALL BE CHOSEN SUITABLY AT SITE TO PROVIDE COMFORTABLE TURNING RADIUS.
2. LOCATIONS WHERE PERIPHERAL PATHWAY (2.5 WIDTH) CANNOT BE ACCOMMODATED DUE TO SPACE CONSTRAINT SHALL BE PROVIDED WITH MINIMUM 1.25M WIDTH PATHWAY
3. WIDTH OF THE PERIPHERAL PATHWAY MAY VARY AS PER SITE CONDITION. THE PATHWAY WIDTH HOWEVER, SHALL BE LIMITED TO 2.5M
4. RCC SHALL BE M25 AND REINFORCEMENT STEEL FE-415 AND ABOVE.
5. INTER ROW PATHWAYS BETWEEN ARRAYS SHALL BE 1.25M WIDE. SUITABLE RAIN CUTS SHALL BE GIVEN ACROSS THE PATHWAY TO FACILITATE RUN-OFF FOR STORM WATER TO NEAREST DRAIN.
6. THE PERIPHERAL PATHWAY AROUND GRAVEYARD (WHEREVER POSSIBLE), SHALL BE 1.25m WIDE AND SECTION OF INTER-ROW PATHWAY SHALL BE FOLLOWED.

- CENTRAL PATHWAY
- PERIPHERAL PATHWAY
- MAIN APPROACH ROAD (BITUMINOUS)
- PATHWAY

PROJECT	10MW SOLAR PHOTO VOLTAIC PLANT, UNCHAHAR
CUSTOMER	NTPC-FGUPS, UNCHAHAR, RAIBARELI (U.P)
CONTRACTOR	M/S REFEX ENERGY LTD.

**BHARAT HEAVY ELECTRICALS LIMITED.**  
ELECTRONICS DIVISION, BANGALORE

REV.	DATE	ALTERED	REFEX	REV.	DATE	ALTERED	REFEX	NAME	SIGN	DATE	 DEPT. SC&PV CODE 439	
07	120714	CHECKED				CHECKED						
		APPROVED				APPROVED						
MAIN APPROACH SECTION F-F WIDTH CHANGED FROM 2.5M TO 3.75 M												
		DRAWN		REFEX								
		CHECKED										
		APPROVED										

<b>TITLE:</b>		ROADS AND PATHWAYS-LAYOUT AND SECTIONAL DETAILS	No. OF SHEETS	2
			SHEET No.	1

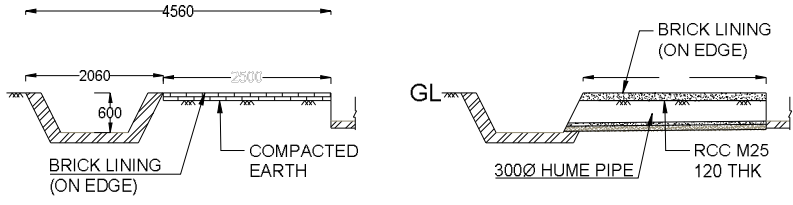
NTPC DRG. No.	5708-004-PVC-C-019	BHEL DRG. No.	BH-NT-UN-DG-019	REV	05
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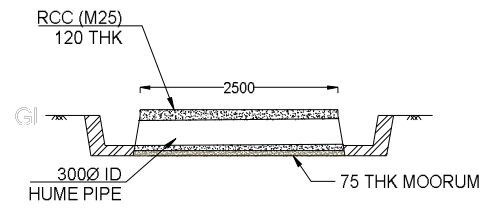
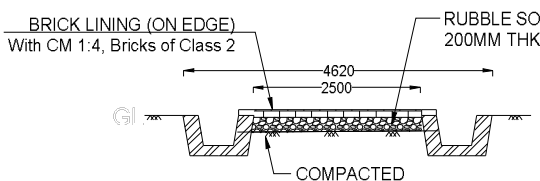
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 REF. DRG. No.  
 SIGN. & DATE  
 INVENTORY No.

DRG. No. 5708-004-PVC-C-019

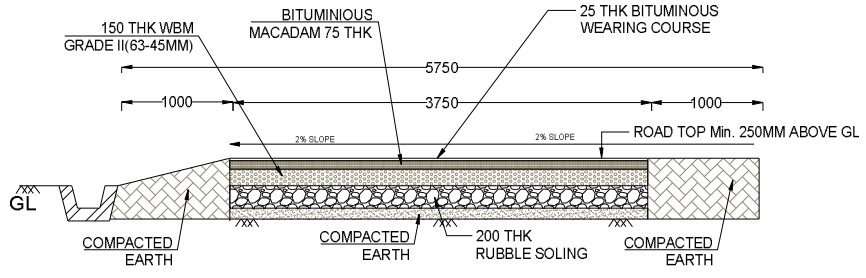
- Following clarity/addition to the section B-B.
- 1) Brick lining (On Edge) with pointing in CM 1:4 (Brick of minimum Class -II)
  - 2) Dry mortar to be spread in the gaps of brick and watersprinkling to be done for setting of mortar. After the settling of the mortar the joint pointing shall be performed.
  - 3) The bricks are laid over well compacted rubble soling 200mm thick
  - 4) The rubble soling is laid over compacted earth
  - 5) RCC of M-25 grade shall be used.



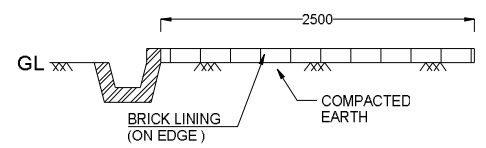
PERIPHERAL PATHWAY SECTION A-A (ALONG RAILWAY TRACK) TYP. AND WITH HUME PIPE CROSSING



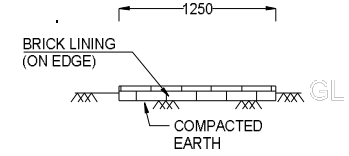
CENTRAL PATHWAY SECTION B-B TYP. AND WITH HUME PIPE CROSSING



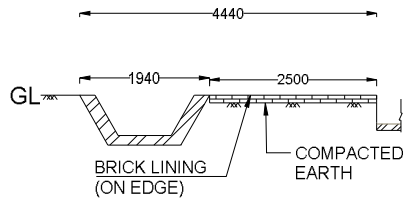
MAIN APPROACH SECTION C-C



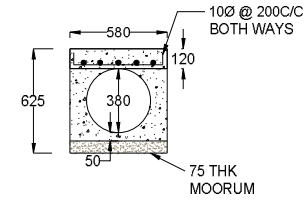
PERIPHERAL PATHWAY SECTION D-D



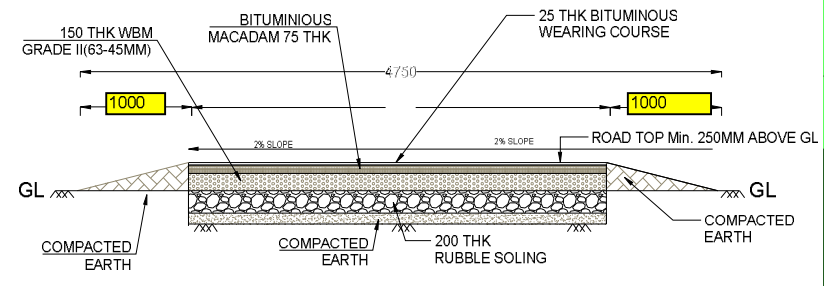
INTER-ROW PATHWAY



PERIPHERAL PATHWAY SECTION E-E (ALONG MANGO ORCHARD)



HUME PIPE SECTION (TYPICAL)



MAIN APPROACH SECTION F-F

PROJECT	10MW SOLAR PHOTO VOLTAIC PLANT, UNCHAHAR
CUSTOMER	NTPC-FGUPS, UNCHAHAR, RAIBARELI (U.P)
CONTRACTOR	M/S REFEX ENERGY LTD.

BHARAT HEAVY ELECTRICALS LIMITED.  
ELECTRONICS DIVISION, BANGALORE

REV.	DATE	ALTERED	REFEX	REV.	DATE	ALTERED	REFEX	NAME	SIGN	DATE
07	120714	CHECKED	REFEX			CHECKED	REFEX			
		APPROVED	REFEX			APPROVED	REFEX			

DRAWN	REFEX				
CHECKED					
APPROVED					

		TITLE: ROADS AND PATHWAYS-LAYOUT AND SECTIONAL DETAILS	No. OF SHEETS	2
DEPT. SC&PV	CODE 439		SHEET No.	2
NTPC DRG. No.	5708-004-PVC-C-019	BHEL DRG. No.	BH-NT-UN-DG-019	REV 05

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

BHEL	ITEM : CIVIL WORK	REV. NO. : 1				1 Page 1		PROJECT:	10 MW SOLAR PV PROJECT AT UNCHAHAHAR		
		SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS				DATE : 17.06.2013	PACKAGE:	CONTRACT NO.	NOA#01/CS-S708-004.9.F.C. NOA-5889		
Sl. No	Activity and operation	Characteristics / Instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Former of Record	Remarks	
1	2	3		4	5	6	7	8	9	10	11
<b>1 GENERAL REQUIREMENTS</b>											
A	Availability of QA & QC manpower and laboratory			A	Physical	Once prior to start of work and thereafter monthly	Tech Specs and Const. Drawings		SR	√	
B	Sampling for testing of building materials, concrete mix design etc.		As agreed / required	A	Physical	As specified in FQP for various materials	Tech Specs and Const. Drawings		SR/TR	√	Test report along with the recommendations from specialist agency to be submitted to NTPC.
C	Submission of schedule of tests to be done monthly / quarterly			A	Physical	Once prior to start of work and thereafter monthly	Tech Specs and Const. Drawings		SR	√	
D	Stacking and storage of construction materials and components at site		As per IS:4082	A	Physical	Random	Tech Specs and Const. Drawings and IS: 4082		SR	√	
E	All bought out items to be procured from the approved vendor and on approval of Quality plans by NTPC as per inspection Category			A	Verification of TC and/or Testing	100%	NTPC Tech. Spec. /BOQ		SR/LB	√	The TC submitted should bear proper identification or correlation with the batch of material supplied and same shall be brought out in the challan/ consignment note.
F	Submission of list of Bought out items and their vendors for each of the bought out item identified for approval within the period agreed in LoA			A	Physical	One time	NTPC Tech. Spec. /BOQ		SR/LB		To be submitted to CQA for approval with a copy to site.
<b>2 EXCAVATION AND FILLING IN FOUNDATION WORKS</b>											
<b>Excavations:-</b>											
2.1	Nature, type of soil/rock before and during excavations		As agreed / required	C	Visual	Random in each shift	Tech Specs and Const. Drawings		SR		
2.2	Initial ground level before start of excavations		As agreed / required	C	Measurement	100%	Tech Specs and Const. Drawings		SR	√	
2.3	Final shape and Dimensions of excavations		As agreed / required	C	Measurement	100%	Tech Specs and Const. Drawings		SR		
2.4	Final excavation levels		As agreed / required	B	Measurement	100%	Tech Specs and Const. Drawings		SR	√	
2.5	Side slope of final excavation		As agreed / required	B	Measurement	Random in each shift	Tech Specs and Const. Drawings		SR		
<b>Fill/ Backfill :-</b>											
2.6	Standard proctor Test	Optimum moisture content and max. dry density before fill	As per IS: 2720, Proctor needle apparatus etc.	B	Physical	One for each type and source of fill materials	IS 2720 (Pt.VII), Tech Specs and Const. Drawings		SR/TR	√	
2.7	Moisture content	Moisture content of fill before compaction	As per IS: 2720, balance, oven, rapid moisture meter etc.	B	Physical	One for each type and source of fill materials	IS 2720 (Pt.II), Tech Specs and Const. Drawings		SR/TR	√	APPLICABLE IN CASE OF BORROWED EARTH
<b>2.8 Degree Of Compaction Of Fill / Backfill</b>											
i	Dry density by core cutter method --- OR --- Dry density in place by sand displacement method	As per IS: 2720 compaction test (core cutter), balance, rapid moisture meter etc.	A	Physical	ii) For foundation fill/ backfill one for every 10 foundations for each compacted layer.	IS 2720 (Pt. XXIX), Tech Specs and Const. Drawings OR IS 2720 (Pt. XXVIII), Tech Specs and Const. Drawings	SR/TR	√			
									iii) For area filling, one every 1000 SQM area for each compacted layer.		
ii	Relative density (Density Index)	As per IS: 2720, balance oven, rapid moisture meter etc.	B	Physical	---do--- (i) & (ii) above	IS 2720 (Pr. XIV), Tech Specs and Const. Drawings		SR/TR	√		

एन.वी. राजेश कुमार एम., इंजीनियर/एससी एवं पीवी-सिस्टम टी.टी.  
N.V. RAJESH KUMAR M., ENGINEER/SC&PV.SYS ENGG  
BHBL-EDN, MYSORE ROAD, BANGALORE-560 026

BHEL	BHEL	FIELD QUALITY PLAN								1 Page 2	
		ITEM : CIVIL WORK		QP NO. :	PROJECT:		10 MW SOLAR PV PROJECT AT UNCHAHAHAR		PACKAGE:		
SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		REV. NO. : 1		DATE : 17.06.2013		CONTRACT NO.		NOA#01/CS-5708-004-9-FC-NOA-5899			
PAGE :		MAIN CONTRACTOR		Reference Document		Acceptance Norms		Format of Record		Remarks	
Sl. No	Activity and operation	Characteristics / Instruments		Class of check	Type of Check	Quantum Of check	Reference Document		Acceptance Norms	Format of Record	Remarks
1	2	3		4	5	6	7		8	9	10
3.0 MATERIALS											
Expert opinion regarding suitability of construction materials shall be taken from Specialist Institute (Identified during pre award)											
3.1 CEMENT											
	Retesting of cement	as per IS:4031	A	Testing	At Random	As per relevant IS Codes		TR	√	Each consignment of cement shall be duly correlated with manufacturer's TC. In case the cement is supplied by the contractor one sample from each lot shall be tested for setting time and compressive strength. Acceptance norms shall be as per relevant IS. If cement is stored more than 60 days in godown of contractor same shall be retested for comp. Strength & setting time.	
3.2	Coarse Aggregate	Moisture content	as per IS:2386	B	Physical	Once for each stack of 100 CuM, or part thereof	IS : 456 ; 383/Tech Spec	IS	SR/LB	√	during monsoon when this has to be done every day before start of concreting
	ii	Specific gravity, water absorption	IS:2386	A	Physical	Once for each source & for every change of source	IS: 2386 Part-III, IS:383/Tech Spec	IS:456.	SR/LB/ TR	√	
	iii	Sieve analysis, flakiness index, elongation index.	IS:2386	B	Physical	One per 100 cum., or part thereof	IS: 2386 Part-I, Spec	IS:383/Tech	SR/LB	√	
	iv	Deleterious materials (coal & lignite, clay lumps, material finer than 75 micron sieve, soft fragment, shale)	IS:2386	A	Physical	Once per source/ on every change of source	IS: 2386 Part-II, Spec	IS:383/Tech	SR/LB/ TR	√	
	v	Soundness	IS:2386	A	Physical	-do-	IS: 2386 Part-V, IS:383		SR/LB/ TR	√	
	vi	Crushing value abrasion value and impact value	IS:2386	A	Physical	-do-	IS:383, IS-2386 Part IV/Tech Spec		SR/LB/ TR	√	
3.3 Fine Aggregate											
i		Moisture content, water absorption	balance, oven, rapid moisture meter etc	B	Physical	To be done every day before start of work	IS: 2386 Part-III	IS:383	SR/LB/TR	√	
	ii	Deleterious materials (coal & lignite, clay lumps, material finer than 75 micron sieve, soft fragment, shale)	IS:2386	A	Physical	Once per source & for on every change of source	IS: 2386 Part-II, IS:383		SR/LB/TR	√	
	iii	All other tests similar to coarse aggregates as mentioned above.					IS-2386, IS-383		SR/LB/TR	√	except test for flakiness index, elongation index, abrasion value, impact value
3.4 Water											
i		Complete tests as per IS:456	Buret, conical flask, pipette etc	B	Testing	One for each source.	IS:3025 part 22 and 23 (for test procedure), IS:456(for acceptance criteria)		SR/LB/TR	√	
3.5 CONCRETE											
i		Crushing strength (works Tests cubes)	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, NTPC Tech Spec.		SR/LB/ 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.
	ii	Workability - slump test	IS:1199	B	Physical	At the time of concrete pouring at site every two hrs	IS:456/NTPC Tech. Spec.		SR/LB/TR	√	
3.5.1	Admixtures for Concrete	Type of admixture	As per IS:9103	B	EIC Approved source and review of MTC/ test reports	For each lot received at site	Designed mix and IS:9103		TR	√	Admixture of appd. Brand and tested quality shall be used (each lot of admixture will included with brochure in which the type of admixture and its properties shall be clearly indicated)

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एन.वी. राजेश कुमार एम्., इंजीनियरिंग एंड आर्किटेक्चर  
 N.V. RAJESH KUMAR M., ENGINEERING & ARCHITECTURE  
 BHEL-EDN, MYSORE ROAD, BANGALORE-560 026



BHEL		FIELD QUALITY PLAN									
BHEL	ITEM : CIVIL WORK		QP NO. :	1		Page 4	PROJECT:	10 MW SOLAR PV PROJECT AT UNCHAHAHAR			
	SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		REV. NO. : 1	DATE : 17.06.2013		PACKAGE:	CONTRACT NO.	NOA#01/CS-5708-004-9-FC-NOA-5899			
			PAGE :			MAIN CONTRACTOR					
Sl. No	Activity and operation	Characteristics / instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks	
1	2	3		4	5	6	7	8	9	D'	10
i		Material - Hot bitumen and water proofing materials etc	As agreed / required	B	EIC Approved source and review of MTC/ test reports	Each batch of delivery at site	Tech Specs and Const. Drawings, IS 702	SR	√		
ii		Acceptance of damp proof course	As agreed / required	B	Acceptance	100%	Tech Specs and Const. Drawings	SR			
<b>3.12 GROUTING</b>											
i		Material	As agreed / required	B	EIC Approved source and review of MTC/ test reports	Each batch of delivery	Tech Specs and Const. Drawings	SR	√		
ii		Type of mix - fluid mix, plastic mix, stiff mix etc.	As agreed / required	C	Physical	Prior to start of work	Tech Specs and Const. Drawings	SR	√		
iii		Mixing, placement, application and grout pressure	As agreed / required	C	Physical	Random in each shift	Tech Specs and Const. Drawings	SR			
iv		Compressive strength	As agreed / required	C	Physical	Random in each shift	Tech Specs and Const. Drawings	SR	√		
v		Acceptance of the grouts	As agreed / required	B	Physical	Each grout section	Tech Specs and Const. Drawings	SR			
<b>4.00 BRICK MASONRY</b>											
<b>4.1 Test on Bricks</b>											
		Dimensions, shape, compressive strength, water absorption, warpage, efflorescence	As agreed / required	B	Measurement/ Physical Test	As per relevant IS Code/ One Sample for 30,000 nos. or part thereof	IS 1077, IS:13757, IS: 12894 / Tech Specs and const. Drawings	Inspection Report	√		Efflorescence shall be checked at each source
4.2	Masonry construction	Workmanship, vertically and alignment	As agreed / required	B	Visual/ Physical	100%	IS 2212, IS 1905, Tech Specs and Const. Drawings	SR/LB			
<b>5.00 FINISHING AND ALLIED WORKS</b>											
<b>5.1 PLASTERING - WORKMANSHIP</b>											
i		Curing	As agreed / required	C	Physical	100%	Tech specifications, construction drawings and agreed methodology	SR			
ii		Thickness and finishing of plaster, grooves etc	As agreed / required	B	Visual/ Measurement	Random in each shift	Tech Specs and Const. Drawings	SR/LB			
iii		Truthness of plastering system	As agreed / required	B	Visual/ Physical	Random in each shift	Tech Specs and Const. Drawings	SR			
<b>5.2 STONE GRIT PLASTER/ GRANULAR TEXTURED COAT FINISH</b>											
i		Material	As agreed / required	B	Approved source and review of MTC	For each lot received at site	Tech Specs and Const. Drawings	SR	√		
ii		Thickness, finishing and grooves etc	As agreed / required	C	Visual/ Measurement	Random in each shift	Tech Specs and Const. Drawings	SR	√		
<b>6.00 SHEETING AND OTHER WORKS</b>											
<b>6.1 PAINTING SYSTEM - CONCRETE WORKS AND PLASTERED MASONRY SURFACES</b>											
i	Materials and accessories- Oil Bound, Acrylic Emulsion, Chemical Resistant, Oil Resistant Paint etc.	Shade, type from brand and manufacturer as approved by NTPC EIC	As agreed / required	B	EIC Approved source and review of MTC/ test reports	Each batch of delivery	Tech Specs and Const. Drawings	SR/MTC	√		
ii	Surface preparation	As required	As agreed / required	C	Physical/visual	Random in each shift	Tech Specs and Const. Drawings	SR			
iii	Acceptance of painted surfaces	As required	As agreed / required	B	Physical	Each surface at random	Tech Specs and Const. Drawings	SR			
<b>6.1.1 PAINTING SYSTEM - STEEL WORKS (OTHER THAN STRUCTURAL STEEL WORKS)</b>											

ಎನ್.ವಿ. ರಾಜೇಶ್ ಕುಮಾರ್ ಎಂ., ಎಂಜಿನಿಯರ್/ಎಸ್ಸಿಸಿ-ಎಂ.ಇ.  
 एन.वी. राजेश कुमार एम., इंजीनियर/एससी एवं पीवी-सिस्टम इंजी.  
 N.V. RAJESH KUMAR M., ENGINEER/SC&PV-SYS ENGG  
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BHEL	BHEL	FIELD QUALITY PLAN				1	Page 5	PROJECT:	10 MW SOLAR PV PROJECT AT UNCHAHAAR	
		ITEM : CIVIL WORK	Q.P. NO. :	REV. NO. : 1	DATE : 17.06.2013					PACKAGE:
Sl. No	Activity and operation	Characteristics / Instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks
1	2	3		4	5	6	7	8	9	10
i		Paining Materials and accessories		B	EIC Approved source and review of MTC/test reports	Each batch of delivery	Tech Specs and Const. Drawings	SR/MTC	✓	Mfr.'s T.C. shall be correlated with the consignment received.
ii		Surface prepration	As agreed / required	C	Physical /visual	Each Erection Mark	Tech Specs and Const. Drawings. Relevant code/ standards	SR	✓	
iii		Primer Thickness	Elcometer	C	Measurement	Each Erection Mark	Tech Specs and Const. Drawings	SR	✓	
iv		DFT of paint	Elcometer	C	Measurement	Each Erection Mark	Tech Specs and Const. Drawings	SR	✓	
v		Acceptance of painted surfaces	Elcometer	B	Visual and measurement	Each Erection Mark	Tech Specs and Const. Drawings	SR		
<b>6.2 INSULATION WORKS</b>										
i	Material	Insulation material, galvanised wire net, aluminium foil, fasteners	As agreed / required	B	EIC Approved source and review of MTC/test reports	For each lot received at site	Tech Specs and Const. Drawings	SR / LB	✓	All tests as per specification
ii		Acceptance of each type of installation	As agreed / required	B	Visual/ Physical	Each installation	Tech Specs and Const. Drawings	SR/LB		
<b>7.00 DOORS, WINDOWS VENTILATORS &amp; GRILL</b>										
<b>7.1 Steel doors</b>										
i		Materials (MS sheet, fasteners, hinges, jambs, lock strike plate etc	As agreed / required	B	Visual/ Physical / test report	For each lot received at site	Tech Specs and Const. Drawings	SR / LB	✓	Review of test report / MTC
ii		Flush Door shutters, teak beading	As agreed / required	B	EIC Approved source and review of test reports	For each lot received at site	IS 2202, Tech Specs and Const Drawings	SR	✓	Review of test report / MTC
iii		Hollow metal doors (material and dimensions)	As agreed / required	B	Visual/ Physical/Test report	For each lot received at site	Tech Specs and Const. Drawings		✓	Review of test report / MTC
iv		Acceptance	As agreed / required	B	Visual/ Physical	Random	Tech Specs and Const. Drawings	SR/LB		
<b>7.2 Anodised aluminium works</b>										
i		Materials- Aluminium sections, alkali resistant paint	As agreed / required	B	Visual/ Physical / test report	For each lot received at site	IS: 1948, IS: 1949, IS:733, IS1285, IS-1868, IS:11857/ Tech Specs and Const. Drawings	SR / LB	✓	Review of test report For aluminium door/windows, check for anodisation as per Tech. Spec
ii		Particle Door	As agreed / required	B	EIC Approved source and / test reports	For each lot received at site	IS:12823 (phenol formaldehyde sythetic resin, BWP type), Tech Specs and Const. Drawings	SR	✓	Review of test report / MTC
iii		Acceptance	As agreed / required	B	Visual/ Physical	Random	Tech Specs and Const. Drawings	SR		
<b>7.3 Fire proof doors</b>										
i		Source of supply	As agreed / required	A	Review of purchase order (unprcd copy) / drawings of suppliers / certificate of CBRI	For each source	Tech Specs and Const. Drawings	SR	✓	Procured from Approved parties as per relevant IS/Tech. The door drawing proposed for supply should have been tested and approved by CBRI Roorkee for the similar dimensions for minimum 2 hours fire rating.
ii		Receipt inspection	As agreed / required	B	Visual/ Physical/ Review of MTC	For each lot received at site	Tech Specs and Const. Drawings	SR	✓	
iii		Finishing and acceptance	As agreed / required	B	Visual/ physical	Random	Tech Specs and Const. Drawings	SR		
<b>7.4 Steel windows / Grills/ Louver</b>										

एन.वी. राजेश कुमार एम., इंजीनियर/एससी एवं पीवा-सिस्टम इंजीनियर  
 N.V. RAJESH KUMAR M., ENGINEER/SC&PV-SYS ENGG  
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BHEL	BHEL	FIELD QUALITY PLAN								
		ITEM : CIVIL WORK		OP NO. :	1	Page 6	PROJECT :	19 MW SOLAR PV PROJECT AT UNCHAHAH		
SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		REV. NO. : 1		DATE : 17.06.2013		PACKAGE :				
		PAGE :				CONTRACT NO.	NOA#01/CS-5708-004-9-FC-NOA-5899			
		MAIN CONTRACTOR								
Sl. No	Activity and operation	Characteristics / Instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks
1	2	3		4	5	6	7	8	9	10
i		Material fabrication and fixture	As agreed / required	C	EIC Approved source and review of MTC/ test reports	Each lot of delivery	IS: 1038 / IS 1361, IS. 7452 and Tech Specs and Const. Drawings	SR	✓	
ii		Finishing and acceptance	As agreed / required	C	Visual / physical	Random	IS: 1038 / IS 1361, IS: 7452 and Tech Specs and Const. Drawings	SR	✓	
<b>7.5 Glass and glazing</b>										
i	Clear float glass, tinted glass, curtain glass, hermetically sealed glass	Material	As agreed / required	C	EIC Approved source and review of MTC/ test reports	For each lot received at site	IS: 14900 IS 1081, IS: 3548, IS 5437 Tech Specs and Const. Drawings	SR	✓	
ii		Installation finishing and acceptance	As agreed / required	C	Visual / Physical	Random	Tech Specs and Const. Drawings	SR		Leak proof installation with neoprene gasket
<b>7.6 False Ceiling</b>										
i		Materials ( gypsum glass, glass fibre membrane, fibre board acoustical tiles etc)	As agreed / required	B	EIC Approved source and review of MTC/ test reports	For each lot received at site	Tech Specs and Const. Drawings	SR	✓	Compare MTC with technical specification and requirement
ii		Installation finishing and acceptance	As agreed / required	B	Visual / physical	Random	Tech Specs and Const. Drawings	SR		
<b>7.7 WATER PROOFING</b>										
		Methodology for the application of water proofing system	As required	B	Review	for each type of treatment	Tech Specs and Const. Drawings	SR	✓	
<b>7.7.1 General Requirement- Water Proofing</b>										
i	Polyurethane based coating, polyester scrim cloth, extruded HD dimpled polyurethane	Material	As agreed / required	B	EIC Approved source and review of MTC	For each lot received at site	Tech Specs /Const. Drawings	SR	✓	MTC shall contain all the parameters specified in the technical specifications
ii		Acceptance of water proofing work	As agreed / required	B	Physical	100%	Tech Specs and Const. Drawings			
<b>7.7.2 Roof / Basement Treatment</b>										
i	Graded under bed	Levels / slopes	As required	C	Physical	100%	Tech Specs and Const. Drawings			
ii	Elastomeric coatings	Material- Primer coat, finishing coat	As required	B	EIC Approved source and review of MTC	Each lot of delivery	Tech Specs and Const. Drawings	SR	✓	
iii	Wearing course	Materials - PCC, chicken wire mesh, elastomeric sealant	As required	B	Review of MTC	Each lot of delivery	Tech Specs and Const. Drawings	SR	✓	
iv		Acceptance of water proofing work	As agreed / required	B	Physical	100%	Tech Specs and Const. Drawings			
<b>7.8 Fencing and Gates</b>										
i	PVC coated/ metallic chain link fencing (IS 2721), Welded wire mesh (IS 1566), Reinforced barbed tape galvanised (IS 2629) etc.	Materials	As agreed / required	B	EIC Approved source and review of MTC/ test reports	Each batch of delivery	Tech Specs and Const. Drawings	SR/MTC	✓	MTC shall contain all the parameters specified in the technical specifications / relevant IS Codes
ii		Acceptance of the installation	As agreed / required	B	Physical / measurements	Each installation	Tech Specs and Const. Drawings	SR		
<b>7.9 FLOOR FINISHES AND ALIED WORKS</b>										
<b>7.9.1 Cement Concrete Flooring</b>										

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ಎನ್.ವಿ. ರಾಜೇಶ್ ಕುಮಾರ್ ಎಂ.ಎ., ಎಂಜಿನಿಯರ್/ಎಸ್ಸೆಂಟ್-ಎಸ್ಸೆಂಟ್  
 ಎನ್.ವಿ. ರಾಜೇಶ್ ಕುಮಾರ್ ಎಂ., ಇಂಜಿನಿಯರ್/ಎಸ್ಸೆಂಟ್ ಎಸ್ಸೆಂಟ್-ಎಸ್ಸೆಂಟ್  
 N.V. RAJESH KUMAR M., ENGINEER/SC&PV-SC&PV-SC&PV  
 BHEL-EDN, MYSORE ROAD, BANGALORE-560 025

BHEL	BHEL	FIELD QUALITY PLAN				1	Page	PROJECT: PACKAGE:	10 MW SOLAR PV PROJECT AT UNCHAHAHAR	
		ITEM : CIVIL WORK		OP NO. :					CONTRACT NO.	NOA#01/CS-5708-004-9-FC-NOA-5899
SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		DATE : 17.06.2013		PAGE :		MAIN CONTRACTOR				
Sl. No	Activity and operation	Characteristics / instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks
1	2	3		4	5	6	7	8	9	10
i		Glass/ PVC strips in joints	As agreed / required	C	Physical	Random in each shift	Tech Specs and Const. Drawings	SR		
ii		Finishing and acceptance	As agreed / required	B	Physical	100%	Tech Specs and Const. Drawings	SR		
<b>7.9.2 Tiles</b>										
i	Ceramic, vitrified, glass mosaic, acid alkali resistant, heavy duty cement concrete tiles	Materials	As agreed / required	B	EIC Approved source and review of MTC	Each lot of delivery	Tech Specs and Const. Drawings	SR	√	MTC shall contain all the parameters specified in the technical specifications / relevant IS Codes
ii		Finishing and acceptance	As agreed / required	B	Physical	100%	Tech Specs and Const. Drawings	SR		
<b>7.9.3 Interlocking Blocks</b>										
i		Materials	As agreed / required	B	EIC Approved source and review of test reports	Each lot of delivery	Tech Specs and Const. Drawings	SR	√	
ii		Finishing and acceptance	As agreed / required	B	Physical	100%	Tech Specs and Const. Drawings	SR		
<b>7.9.4 Kota Stone, Granite and Marble</b>										
i		Quality, texture, thickness, colour for each lot of delivery from approved source	As agreed / required	C	Physical	Each batch of delivery	Tech Specs and Const. Drawings	SR	√	
ii		Finishing and acceptance	As agreed / required	B	Physical	100%	Tech Specs and Const. Drawings	SR		
<b>7.10.6 Acid / alkali and oil resistant high built seamless epoxy based resin and treatment</b>										
i	Material	Bricks, vitreous tiles, mortar, sealing, paints, coatings, sheets, fillers etc	As agreed / required	B	EIC Approved source and review of MTC/ test reports	Each batch of delivery	Tech Specs and Const. Drawings	SR	√	Experienced workers under supervisors recommended/ appointed by manufacturer to be deployed
ii		Surface preparation	As agreed / required	C	Physical	Random in each shift	Tech Specs and Const. Drawings, IS 2395			
iii		Finishing and acceptance	As agreed / required	B	Physical	100%	Tech Specs and Const. Drawings	SR		
<b>8.0 WATER SUPPLY / SANITARY INSTALLATIONS</b>										
<b>8.1 Water supply fittings and fixtures</b>										
i	Materials	GI/ MS pipes and fittings	As agreed / required	B	EIC Approved source and review of MTC/ test reports	Each lot of delivery as per Specifications	Tech Specs and Const. Drawings	SR	√	
ii	Disinfection	Before use	As agreed / required	C	Physical	Each installation	Tech Specs and Const. Drawings	SR		
iii	Hydraulic test	Before use / leakage	As agreed / required	B	Physical	Each installation	Tech specs and const drawings	SR	√	
iv		Acceptance and working	As agreed / required	A	Acceptance	Random	Tech Specs and Const. Drawings	SR		
<b>8.2 Sand cast iron / cast iron pipes</b>										
i	Material	SCI/ CI pipes and fittings / joints	As agreed / required	B	EIC Approved source and review of MTC	Each lot of delivery as per Specifications	Tech Specs and Const. Drawings	SR	√	
ii		Acceptance and leakage	As agreed / required	B	Physical	Random	Tech Specs and Const. Drawings	SR		
<b>8.3 Sanitary fittings and fixtures</b>										

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 ಎನ್.ವಿ. ರಾಜೇಶ್ ಕುಮಾರ್ ಎಂ., ಇಂಜಿನಿಯರ್/ಆರ್.ಸಿ.ಎಂ.ಸಿ.ಎಂ.ಎಂ.  
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 BHEL-EDN, MYSORE ROAD, BANGALORE-560 086

BHEL	BHEL	FIELD QUALITY PLAN				1	Page 8	PROJECT:	10 MW SOLAR PV PROJECT AT UNCHAHAR		
		ITEM : CIVIL WORK		SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		REV. NO. : 1	DATE : 17.06.2013	PACKAGE:	CONTRACT NO.	NOA#01/CS-5709-004-9-FC-NOA-5899	
Sl. No	Activity and operation	Characteristics / instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks	
1	2	3		4	5	6	7	8	9	D*	10
i	Material	Sanitary items and fixtures i.e. water closets, urinals, wash basins, sinks, mirrors, shelves, towel rail, soap containers, geyser, water cooler, etc, water supply / sanitation pipes, manhole cover and frames etc	As agreed / required	B	EIC Approved source	Each lot of delivery as per Specifications	Tech Specs and Const. Drawings	SR	√		
ii		Acceptance of installations of all sanitary items and fixtures	As agreed / required	B	Acceptance	100%	Tech Specs and Const. Drawings	SR			
<b>8.4 RCC Pipes</b>											
i	Material	RCC pipes	As agreed / required	B	EIC Approved source and review of MTC/ test reports	Each lot of delivery as per Specifications	Tech Specs and Const. Drawings /S 458	SR	√		
ii		Acceptance and leakage	As agreed / required	B	Physical	Random	Tech Specs and Const. Drawings	SR			
<b>8.5 Water Storage Tanks</b>											
i	Material	Over head / loft type	As agreed / required	B	EIC Approved source and review of MTC	Each lot of delivery as per Specifications	Tech Specs and Const. Drawings	SR	√		
ii		Acceptance and leakage	As agreed / required	B	Acceptance	Random	Tech Specs and Const. Drawings	SR			
<b>9.0 SPECIAL ITEMS</b>											
<b>9.1 Earthing Mat (Grounding System)</b>											
i	Material	Earthing mat	As agreed / required	B	EIC Approved source and review of MTC/ test reports	Each lot of delivery as per Specifications	As per relevant IS and Tech. Specs / Manufacturers, IS 3043	SR/MTC	√		
ii		Weld sizes & length	Visual/Tape	B	Visual/ Measurement	100%	Tech Specs and Const. Drawings				NTPC approved electrodes shall be used
iii		D P test	DP test Kit	B	Physical	10% at random of the offered lot	Tech Specs and Const. Drawings	TR	√		
iv		Earth test	Earthing test kit	A	Physical	100%	Tech Specs and Const. Drawings,	SR	√		
<b>10.00 STRUCTURAL STEEL MATERIAL (For Site Fabrication)</b>											
i	Procured by contractor	Structural steel procured from NTPC approved sources- Mechanical (YS, UTS, Elg, UT if specified),and Chemical properties (CE as per IS)		A	Review	For each batch of each section delivered at site	Technical Specification and Construction Drawings, IS 2062, 8500	SR	√		Correlated MTC shall be verified. In the event of non submission of MTC , sample shall be selected by FQA for testing
<b>10.1 PRE-WELDING REQUIREMENTS</b>											
i		Welding Procedure Specification (WPS*)		A	Review	Each Welding Process	Technical Specification and Construction Drawings, ASME-IX/ AWS D 1.1	WPS	√		*To be approved by COA
ii		PQR and Welder's Qualification		A	Physical	Each welder	PQR/ WQR, AWS-D1 1/ASME-IX	TR	√		
iii		Welding consumables		B	Physical	Random in each shift	Approved WPS, Latest NTPC	SR	√		
<b>10.2 FIT-UP</b>											
i		Marking and Cutting	Tape, ruler etc	B	Visual & Measurement	Each plate/ Section	Technical Specification and Construction Drawings/ Approved cutting plan	SR			
ii		Match markings for trial assembled components		B	Physical	Each fit-up	Technical Specification and Construction Drawings	SR			

*(Handwritten Signature)*

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BHEL	BHEL	FIELD QUALITY PLAN								
		ITEM : CIVIL WORK		QP NO. :	1	Page 9	PROJECT :	10 MW SOLAR PV PROJECT AT UNCHAHAHAR		
SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		REV. NO. : 1		DATE : 17.05.2013		PACKAGE :				
PAGE :		CONTRACT NO.		NOA#01/CS-5708-004-9-FC-NOA-5899						
MAIN CONTRACTOR										
Sl. No	Activity and operation	Characteristics / instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks
1	2	3		4	5	6	7	8	9	10
iii		Weld Fit Up- Edge Preparation/ Gap/ Alignment	Tape, ruler etc	B	Physical	Each fit-up	Technical Specification and Construction Drawings, IS 7215	SR	✓	If required suitable stiffeners shall be provided to prevent deflection
10.3	<b>PRE HEATING (wherever applicable)</b>									
i		Pre-Heating Temperature	Thermal chalk	B	Measurement	Each pre-heating	Technical Specification and Construction Drawings, Approved WPS	SR	✓	
ii		Post Weld Heat Treatment (PWHT), if required	Thermo couple with time temperature recorder	A	Time & Temperature	Each PWHT	Technical Specification and Construction Drawings, Approved WPS	SR	✓	
10.4	<b>WELDING REQUIREMENTS</b>									
i		Sequence of welding		B	Physical	Random in each shift	Technical Specification and Construction Drawings, Agreed scheme	SR		
ii		Removal/ grinding of temporary attachments		B	Measurement	All cleats/ attachments	Technical Specification and Construction Drawings, Approved Drg.	SR		
iii		Completeness after welding- Dimensions/ distortion	Weld gauge	B	Visual	Each structure component	Technical Specification and Construction Drawings, IS 822	SR	✓	
iv		Completeness of welding (each butt & fillet weld)		B	Visual	Each structure component	Technical Specification and Construction Drawings, Approved Drg.	SR	✓	
10.50	<b>NON DESTRUCTIVE AND DESTRUCTIVE TESTING</b>									
10.5.1	<b>FILLET WELDS</b>									
i		size and visual examination	As required/ agreed	B	Visual/ Measurement	100%	As per technical specifications and construction drawings, IS 822, AWS D 1.1	SR		As per requirement of NTPC Engineer
ii		Dye Penetration Test	As required/ agreed	B	Physical	5% of Weld length with min. 300mm at each location	As per technical specifications and construction drawings, IS 822, AWS D 1.1	SR		
10.5.2	<b>BUTT WELDS</b>									
i		Visual examination	As required/ agreed	B	Visual	Random in each shift	As per technical specifications and construction drawings, IS 822, AWS D 1.1	SR		As per requirement of NTPC Engineer
ii		DPT	As required/ agreed	B	Physical	100% on all butt welds after back gouging on root run and 10% on final 10%	As per technical specifications and construction drawings, IS 822, AWS D 1.1	IR		All butt welds to be back gouged before DPT
iii		Radiography Test	As required/ agreed	A	Physical		As per technical specifications and construction drawings, IS 822, AWS D 1.1	IR	✓	Wherever RT is not feasible UT to be carried out. In case of failure of any welds in SPOT/RT or UT the % of retesting shall be doubled at that particular location. Acceptance criteria of NDT on welds shall be as per AWS D1.1.
10.60	<b>FOUNDATION CHECKS</b>									
i		Dimensions and levels- Shape, lines (including diagonal checks)	Theodolite, Tape etc	B	Physical/ Measurement	Each Foundation	Tech Specs and Const. Drawings	SR	✓	
ii		Foundation Bolts and Embedments- Verticality, Levels, pitch distance	Theodolite, Tape, Piano wires etc	B	Physical/ Measurement	Each Foundation	Tech Specs and Const. Drawings	SR	✓	
10.70	<b>PAINTING SYSTEM</b>									

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BHEL	BHEL	FIELD QUALITY PLAN				1	Page 10	PROJECT:	10 MW SOLAR PV PROJECT AT UNCHAHAR	
		ITEM : CIVIL WORK	REV. NO. : 1	PACKAGE:	CONTRACT NO.			NOA#01/CS-5708-004-9-FC-NOA-5899		
SI. No	Activity and operation	Characteristics / instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks
1	2	3		4	5	6	7	8	9	10
i		Paining Materials and accessories	-	A	Review of MTC	Each batch of delivery	Tech Specs and Const. Drawings	SR/MTC	√	Mfr.'s T.C. shall be correlated with the consignment received
ii		Submission of painting methodology	-	B	For Review of painting system	Before start of painting work	Tech Specs and Const. Drawings			
iii		Surface preparation	As agreed / required	B	Physical /visual	Each Erection Mark	Tech Specs and Const. Drawings.	SR	√	
iv		Primer Thickness	Elcometer	B	Measurement	Each Erection Mark	Tech Specs and Const. Drawings	SR	√	
v		DFT of paint	Elcometer	B	Measurement	Each Erection Mark	Tech Specs and Const. Drawings	SR	√	
vi		Acceptance of painted surfaces	Elcometer	B	Visual and measurement	Each Erection Mark	Tech Specs and Const. Drawings	SR		
<b>10.80</b>	<b>PRE-ASSEMBLY CHECKS</b>									
i		Punch Erection marks and match marks on members	-	B	Visual/ Physical	Each structural member	Tech Specs and Const. Drawings			Markings for - Assembly designation, Part number, etc. Any other important
ii		Pre-assembly as per match mark	-	B	Visual/ Physical	Each structural member	Tech Specs and Const. Drawings			
iii		Camber, sweep and total length after trial assembly of structure	Theodolite, Tape, plumb, piano wires etc	B	Visual/ Physical	Each structural member	Tech Specs and Const. Drawings	SR	√	
iv		Control assembly check at shop	Theodolite, Tape, plumb, piano wires etc	B	Visual/ Physical	Every first and tenth set of identical structure	Tech Specs and Const. Drawings			
v		Completion of primer & intermediate coat of paint	-	B	Visual / Physical	Random	Tech Specs and Const. Drawings	SR		
<b>10.90</b>	<b>ERECTION CHECKS</b>									
i		Alignment, slopes, level, tolerances of erected member	Theodolite, Tape, plumb, piano wires etc	B	Measurement	Each structural member	Tech Specs and Const. Drawings	SR	√	
ii		Tightening of bolts/ Torque including foundation bolts with lock nuts	Wrench/ Torque wrench if specified	B	Visual/ Physical	Each structural member	Tech Specs and Const. Drawings	SR	√	
iii		Completion of all erection fillet & butt welds	-	B	Visual	Each structural member	Tech Specs and Const. Drawings	SR	√	
iv		Acceptance of erected structure	Theodolite, Tape, plumb, piano wires etc	B	Visual/ Physical	Each erected structure	Tech Specs and Const. Drawings, IS 7215 and IS 12843	SR	√	
<b>10.10</b>	<b>PERMANENT BOLTS AND NUTS AND WASHERS</b>									
i		Material- Permanent miki steel Bolts, mild steel Nuts, High strength structural Bolts, Washers-Dimensions, properties, Class, storage along with MTC	Screw gauge, Vernier, Tape etc.	A	Physical and MTC Review	Once for each lot of delivery	Tech Specs and Const. Drawings	SR/MTC	√	
ii		Contact surfaces before bolting	-	B	Physical	Random before assembly for bolting	Tech Specs and Const. Drawings, IS 4000	SR		
iii		Inspection of the assembled bolts	-	B	Physical	Randomly in each shift for assembled bolts	Tech Specs and Const. Drawings, IS 4000	SR		
iv		Tensioning	As agreed / required	B	Physical	Randomly during snug tight test and after full tensioning	Tech Specs and Const. Drawings, IS 4000	SR	√	
v		Acceptance of installed bolts	-	B	Physical	Each bolt	Tech Specs and Const. Drawings	SR		
<b>13.0</b>	<b>ROAD WORKS</b>									
<b>13.1</b>	<b>Construction of Sub-Grade and earthen/hard soulders</b>									
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	√	In cutting or existing levelled ground - quantum of check shall be one per 1000 SQM

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BHEL	BHEL	FIELD QUALITY PLAN				Page 1	PROJECT: 10 MW SOLAR PV PROJECT AT UNCHAHAHAR			
		ITEM : CIVIL WORK		QP NO. :	REV. NO. : 1		PACKAGE:	CONTRACT NO. NOA#01/CS-5708-004-9-FC-NOA-5899		
SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		PAGE :		MAIN CONTRACTOR						
Sl. No	Activity and operation	Characteristics / instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks
1	2	3		4	5	6	7	8	9	10
ii		Moisture content of fill before compaction	As per IS: 2720	B	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.II)	SR/TR	✓	In cutting or existing levelled ground - quantum of check shall be one per 1000 SQM
iii		Dry density by core cutter method ---- OR---- Dry density in place by sand displacement method	As per IS: 2720	A	Physical	One in every 500 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).	SR/TR	✓	Both for embankment and cut formation quantum of check - One in every 1000 SQM area for each compacted layer.
iv		Lines, grade and cross section	As required / agreed	B	Physical	One in every 500 SQM area	As per Tech Specs and Const. Drawings	SR		Template, straight edge
13.2	Water Bound Macadam (Non-Bituminous) for base course and sub-base course									
i		Aggregate Impact value	Aggregate Impact value Test Apparatus	A	Physical	One test per 200 cum of Test aggregate	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification,	SR	✓	
ii		Grading	Set of IS Sieves	B	Physical	One test per 100 cum of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification,	SR		
iii		Flakiness index and elongation index	Flakiness test gauge	B	Physical	One test per 200 cum of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification,	SR		
iv		Atterberg Limits of binding material	Atterberg limits determination	A	Physical	One test per 25 cum of binding material	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification,	SR	✓	
v		Atterberg Limits of portion of aggregate passing 425 micron sieve	Atterberg limits determination	A	Physical	One test per 100 cum of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification,	SR	✓	
vi		Camber, surface, slope	As required / agreed	B	Physical	One in every 500 SQM area	As per Tech Specs and Const. Drawings	SR		Template, straight edge
13.3	Bituminous Macadam for base and binder course									
i		Quality of binder	Penetrometre with St. needle	A	Physical	No. of samples per Lot & tests as per IS: 73, IS:217, IS- 8887 as applicable	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification, IS 73	SR	✓	
ii		Aggregate Impact Value / Los angeles abrasion value	Aggregate Impact Value Test apparatus	A	Physical	Once per source	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR	✓	
iii		Flakiness Index and elongation index of aggregates	Flakiness test gauge	B	Physical	One test per 50 cum of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		
iv		Stripping value of aggregate (Immersion tray test)	As required / agreed	B	Physical	Initially one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		
v		Water sensitivity of mix	As required / agreed	A	Physical	Initially one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR	✓	
vi		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		
vii		Water absorption of aggregate	As required / agreed			Initially one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		
viii		Soundness ( Magnesium and Sodium Sulphate)	As required as per IS:2386	A	Physical	Once per source by each method and on every change of source	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR	✓	

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BHEL	BHEL	FIELD QUALITY PLAN				1	Page 12	PROJECT: 10 MW SOLAR PV PROJECT AT UNCHAHAHAR		
		ITEM : CIVIL WORK		QP NO. :	PACKAGE:			CONTRACT NO.	NOA#01/CS-5708-004-9-FC-NOA-5899	
SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		REV. NO. : 1		DATE : 17.06.2013	MAIN CONTRACTOR					
PAGE :										
Sl. No	Activity and operation	Characteristics / instruments		Class of check	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record	Remarks
1	2	3		4	5	6	7	8	9	10
ix		Percentage of fractured faces	As required / agreed	B	Physical	When gravel is used one test per 50cum of aggregates	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR		
x		Binder content and aggregate grading	Bitumen extractor	A	Physical	Periodic, subject to a min of two tests per day per plant	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR	√	
xi		Control of Temperature of binder and aggregate for mixing and of the mix at the time of laying and rolling	Thermometer	B	Physical	At regular close intervals	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR		
xii		Rate of spread of mixed materials	As required / agreed	B	Physical	Regular control through checks of layer thickness	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR		
xiii		Density of compacted Layer	As required / agreed	A	Physical	One test per 250 sqm of area	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR	√	
<b>13.4 Bituminous Surfacing - Open graded premix carpet and Seal coat</b>										
i		Quality of binder	Penetrometre with Si needle	A	Physical	No. of samples per Lot & tests as per IS:73, IS:217, IS.8887 as applicable	IS 73, Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR	√	
ii		Aggregate Impact Value / Los angeles abrasion value	Aggregate Impact Value Test apparatus	A	Physical	One test per 50 cum of aggregate	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR	√	
iii		Flakiness Index and elongation index of aggregates	Flakiness test gauge	B	Physical	One test per 50 cum of aggregate	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR		
iv		Stripping value of aggregate (Immersion tray test)	As required / agreed	B	Physical	Initially one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR		
v		Water absorption test	As required / agreed	A	Physical	Initially one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR	√	
vi		Water sensitivity of mix	As required / agreed	A	Physical	Initially one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR	√	
vii		Grading of aggregates	Set of Sieves	B	Physical	One test per 25 cum of aggregates	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR		
viii		Soundness ( Magnesium and Sodium Sulphate)	As required as per IS:2386	A	Physical	Once per source by each method and on every change of source	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR	√	
ix		Polished stone value	As required as per BS 812(Part 114)	B	Physical	As required	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR		
x		Temperature of binder at application	Thermometer	B	Physical	At regular close intervals	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR		
xi		Binder content	Bitumen extractor	A	Physical	One test per 500 cum & not less than two tests per day	As per Tech Specs and Const. Drawings. Section 900 of MOSRTH specification	SR	√	

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BHEL		FIELD QUALITY PLAN				1 Page 1		PROJECT: 10 MW SOLAR PV PROJECT AT UNCHAHAAR		
BHEL	ITEM : CIVIL WORK	SUB-SYSTEM : CIVIL AND STRUCTURAL STEEL WORKS		QP NO. :	1	PACKAGE:	NOA#01/CS-5708-004-9-FC-NOA-5899			
				REV. NO. : 1		CONTRACT NO.				
				DATE : 17.06.2013		MAIN CONTRACTOR				
				PAGE :		Reference Document	Acceptance Norms	Format of Record	Remarks	
Sl. No	Activity and operation	Characteristics / instruments		Class of check	Type of Check	Quantum Of check				
1	2	3		4	5	6	7	8	9	10
xii		Rate of spread of materials	As required / agreed	B	Physical	One test per 500 cum and not less than 2 tests per day	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		
xiii		Percentage of fractured faces	Bitumen extractor	A	Physical	When gravel is used one test per 50cum of aggregates	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR	✓	
<b>13.5 Tack Coat/ Prime coat/ fog coat</b>										
i		Quality of binder	Penetrometre with Standard needle	A	Physical	No. of samples per Lot & tests as per IS:73, IS:217, IS:8887 as applicable	IS 73, Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR	✓	
ii		Temperature of binder at application	Thermometer	B	Physical	At regular close intervals	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		
iii		Rate of spread of binder	As required / agreed	B	Physical	One test per 500 cum and not less than 2 tests per day	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		
13.6	RCC Pavements	Concrete - Material, Mix design, Trial Mixes, Production, Transportation, Placement, Compaction, Curing, Test on green concrete, Test on hardened concrete etc.	As required / agreed	-	-	Refer FQP for concrete Works	Refer FQP for concrete Works, Tech Specs and Const. Drawings, IRC & MOST	-	-	FQP for Concrete Works shall be application for all concrete works
<b>13.7 Alignment, Level, Surface regularity and rectification</b>										
i		Horizontal alignment, Surface levels and Surface regularity	As required / agreed	B	Physical	As per section 900 of MOSRTH specification	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		
ii		Rectification	As required / agreed	B	Physical	Each rectification	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR	✓	
Legend to be used: Class # : A = Critical, B=Major, C=Minor; SR, TR, MTC, LB										
Manufacturer/ Sub supplier	Main-supplier	Categorization Witnessing & Accepting (As per NTPC QA&I System) Category 'A' FQA Engineer in association with Executing Engineer, Category 'B' Executing Engineer, Category 'C' Executing Engineer .SR = Site Register , TR= Test Report, MfrTC = Manufacturer's Test Certificate				For NTPC USE 				
	Signature	This document shall be read in conjunction with NTPC Tech. Specifications, BOQ, Drawings					REVIEWED BY	APPROVED BY	APPROVAL SEAL	

*(Handwritten Signature)*

एन.वी. राजेश कुमार एम., इंजीनियर/एम्प्लॉय  
**N.V. RAJESH KUMAR M., ENGINEER/SC&PVS**  
 BHEL-EDN, MYSORE ROAD, BANGALORE-560 028

SUB NO	ITEM	QP NO	PROPOSED MANUFACTURER	PLACE	APPROVAL STATUS	REMARKS
Project : 10 MW Solar PV Plant at Unchahar		LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL			Doc. No.:	5705-004-9
Package : EPC					Rev. No.:	0
Supplier : M/S BHEL		SUB-SYSTEM : CIVIL WORKS			Date :	12.12.2012
Contract No. : 5705-004-9					Page :	
18	SANITARY ITEMS	-	KITPLY	-	N	
		-	GREEN PLY	-	N	
		-	CENTURY	-	N	
		-	DUROPLY	-	N	
		-	MERINO	-	N	
		-	PARRYWARE	-	N	
		-	HINDWARE	-	N	
		-	CERA	-	N	
		-	SEABIRD	-	N	
		-	ORIENT (CORAL)	-	N	
19	CP BRASS TAP AND OTHER SANITARY FITTINGS	-	GEM	-	N	
		-	TECHNO	-	N	
		-	PARKO	-	N	
		-	JAGUAR	-	N	
		-	MARC	-	N	
		-	DRIPLESS (AQUA PLUS)	-	N	
20	ALUMINUM SECTIONS	-	HINDALCO	-	N	
		-	INDALCO	-	N	
		-	STERLITE (BALCO)	-	N	
		-	JINDAL	-	N	
21	GLASS AND GLAZINGS	-	SAINT GOBIAN GLASS INDIA LTD	CHENNAI	N	
		-	MODI GUARD	-	N	
		-	TRIVENI GLASS	ALLAHABAD	N	
		-	INDO ASAHI	-	N	
		-	TATA FLOAT	-	N	
		-	ASAHI INDIA GLASS LTD	-	N	
22	ROOF WATER PROOFING	-	STP	-	N	
		-	IWL INDIA LTD	CHENNAI	N	
		-	LLOYDS	-	N	
		-	CICO TECHNOLOGIES LTD	-	N	
		-	BECK INDIA LTD, PUNE	-	N	
		-	MK PETRO	-	N	
		-	STRUCTURAL WATERPROOFING CO LTD	-	N	
23	RESIN BOUNDED GRANULAR TEXTURE	-	SPECTRUM	-	N	
		-	HERITAGE	-	N	
		-	LUXTURE	AJMER	N	
		-	TECHNO INDIA	-	N	
		-	ARCOPAN	-	N	
		-	SNOWCEN	-	N	
		-	VINERATEX	-	N	
24	POLYTHENE WATER STORAGE TANKS - IS 12701 (WITH BIS LICENSE NUMBER)	-	BIS APPROVED SOURCES	-	N	
26	RCC PIPES	-	BIS APPROVED SOURCES	-	N	
27	ANCHOR FASTENER	-	Fisher	-	N	

SUB NO	ITEM	QP NO	PROPOSED MANUFACTURER	PLACE	APPROVAL STATUS	REMARKS
Project : 10 MW Solar PV Plant at Unchahar		LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL			Doc. No.:	5708-004-9
Package : EPC					Rev. No.:	0
Supplier : M/S BHEL		SUB-SYSTEM : CIVIL WORKS			Date :	12.12.2012
Contract No. : 5705-004-9					Page :	
SUB NO	ITEM	QP NO	PROPOSED MANUFACTURER	PLACE	APPROVAL STATUS	REMARKS
		-	HILTI	-	N	
		-	Cannon	-	N	
		-	Avon Cranes, Gurgaon	-	N	
28	GALVANISED STEEL STRUCTURES FOR TRANSMISSION LINE*	5708-004-QVC-Q-001	L&T	PITAMPUR	A	
			NAMPA STEEL	HOWRAH	A	
			UNISTAR GALVANISERS	JAMSHEDPUR	A	
			L&T	PONDICHERRY	A	
			ASSOCIATED POWER STRUCTURES	VADODARA	A	
			GOOD LUCK STEEL TUBES	SIKANDRABAD	A	
			R.S. INFRAPROJECTS PVT. LTD	SURAJPUR	A	
			PIONEER FABRICATOR	MEERUT	A*	*Galvanising to be done by M/s Vinayak Transco Ltd, Modinagar
29	GALVANISED STEEL STRUCTURE (LATTICE & PIPE)*	5708-004-QVC-Q-002	GOOD LUCK STEEL TUBES	SIKANDRABAD	A	
			RICHARDSON & CRUDDAS	NAGPUR	A	
			L&T	PONDICHERRY	A	
			L&T	PITAMPUR	A	
			NAMPA STEEL	HOWRAH	A	
			R.S. INFRAPROJECTS PVT. LTD	GHAZIABAD	A	
			PIONEER FABRICATOR	MEERUT	A*	*Galvanising to be done by M/s Vinayak Transco Ltd, Modinagar
30	HEXAGONAL BOLTS, NUTS, SPRING WASHERS, PLAIN WASHERS		MAIN CONTRACTOR APPROVED SOURCES		N	
31	FOUNDATION BOLTS		MAIN CONTRACTOR APPROVED SOURCES		N	
32	MODULE MOUNTING STRUCTURE*	5708-004-QVC-Q-003	ACCORD	VADODARA	DR	
			ASSOCIATED POWER STRUCTURES	VADODARA	A	
			JAMNA METALS	DELHI	A	
			PASSIVE INFRA	ROHTAK	A	

## LEGENDS:

1. SYSTEM SUPPLIER/SUB-SUPPLIER APPROVAL STATUS CATEGORY (SHALL BE FILLED BY NTPC)

A - For these items proposed vendor is acceptable to NTPC. To be indicated with letter "A" in the list along with the condition of approval, if any.

DR - For these items "Details required" for NTPC review. To be identified with letter "DR" in the list.

'N' NOTED - For these items vendors are approved by Main Supplier and accepted by NTPC without specific vendor approval from NTPC. To be identified with 'NOTED.'

## 2. QP/INSPN CATEGORY:

\*CAT-I : For these items the Quality Plans are approved by NTPC and the final acceptance will be on physical inspection witness by NTPC.

\*\*CAT-II : For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved

\*\*\*CAT-III : For these items Main Supplier approves the Quality Plans. The final acceptance by NTPC shall be on the basis certificate of conformance by the main supplier.

UNITS/WORKS : Place of manufacturing Place of Main Supplier of multi units/works.

NOTE: For the items placed in CAT-III for Civil Works, the review and final acceptance shall be done by NTPC-EIC/ FQA on the basis of certificate of conformance submitted by the main supplier/ main contractor.

SUB NO	ITEM	QP NO	PROPOSED MANUFACTURER	PLACE	APPROVAL STATUS	REMARKS		
Project : 10 MW Solar PV Plant at Unchahar		LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL			Doc. No.:	5708-004-9		
Package : EPC					Rev. No.:	0		
Supplier : M/S BHEL		SUB-SYSTEM : CIVIL WORKS			Date :	12.12.2012		
Contract No. : 5705-004-9					Page :			
1	FQP FOR - CIVIL WORKS & STRUCTURAL STEEL	5708-004-QVC-G-001	MAIN CONTRACTOR	-	-			
2	CEMENT	-	CCI	-	N			
		-	GUJARAT AMBUJA	-	N			
		-	JK LAXMI	-	N			
		-	JAYPEE	-	N			
		-	GRASIM	-	N			
		-	BIRLA	-	N			
		-	LAFARGE	-	N			
		-	ACC	-	N			
		-	SHREE CEMENT	-	N			
		-	INDIA CEMENT	-	N			
3	REINFORCEMENT AND STRUCTURAL STEEL ( If procured by Contractor)	-	ULTRATECH	-	N			
		-	STEEL AUTHORITY OF INDIA LTD	-	N			
		-	TATA IRON & STEEL CO LTD	-	N			
		-	RASHITRYA ISPAT NIGAM LTD	-	N			
		-	ESSAR STEEL LTD	-	N			
		-	ISPAT INDUSTRIES LTD	-	N			
		-	JSW STEEL LTD	-	N			
		-	LLOYDS STEEL LTD	-	N			
		-	JAI BALAJI INDUSTRIES	DURGAPUR (WB)	N	Only TMT 8 to 40 mm size		
		-	JINDAL STEEL AND POWER LTD	-	N			
4	CONSTRUCTION CHEMICALS - ADMIXTURES, PLASTISIZERS, RETARDERS, WATER PROOFING COMPOUNDS, GROUTS, RESINS, EPOXY ETC.	-	SIKA INDIA LTD	KOLKATA	N			
		-	CICO TECHNOLOGIES LTD	GURGAON	N			
		-	FOSROC CHEMICALS (I) PVT LTD	ANKELESHWAR	N			
		-	BASF	MUMBAI	N			
5	PAINT AND PAINTING SYSTEM	-	BERGER	MUMBAI	N			
		-	ICI	-	N			
		-	SHALIMAR PAINTS	MUMBAI	N			
		-	JENSON AND NICHOLSON	-	N			
		-	KANSAI NEROLAC	MUMBAI	N			
		-	SNOWCEM INDIA LTD	-	N			
		-	AKZO NOBEL	BANGALORE	N			
		-	ASIAN PAINTS	-	N			
		6	FALSE CEILING - GLASS REINFORCED GYPSUM SYSTEM, MINERAL FIBRE BOARD SYSTEM, PREPAINTED COIL COATED STEEL SYSTEM	-	SAINT GOBIAN	NEW DELHI	N	GYPSUM FALSE CEILING
				-	HUNTER DOUGLOUS	MUMBAI	N	
-	TIGER STEEL			PUNE/MUMBAI	N			
-	KIRBEY			HYDERABAD	N			
-	INTERARCH			NOIDA	N			
-	LLOYD INSULATION			-	N			
-	INDIA GYPSUM			-	N			
-	MG INDUSTRIES			-	N			
-	ARM STRONG			NEW DELHI	N			
7	GI PIPES			-	JINDAL	-	N	
		-	PRAKASH	-	N			
		-	SURYA	-	N			

SUB NO	ITEM	QP NO	PROPOSED MANUFACTURER	PLACE	APPROVAL STATUS	REMARKS
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Package : EPC					Rev. No.:	0
Supplier : M/S BHEL		SUB-SYSTEM : CIVIL WORKS			Date :	12.12.2012
Contract No. : 5705-004-9					Page :	
						5705-004-9
8	INSULATION WOOL	-	APOLLO	SECUNDRABAD	N	
		-	SAIL	-	N	
		-	TATA	-	N	
		-	LLOYD INSULATION INDIA LIMITED	-	A	
		-	MINWOOL, RAJNANDA GAON	RAJNANDA GAON	A	
		-	UP TWIGA	SIKANDARABAD	A	
		-	ROCKWOOL INDIA LIMITED, HYDERABAD	HYDERABAD	A	
9	PVC WATER STOP	-	DURON	GURGAON	N	
		-	KANTA RUBBER	HYDERABAD	N	
		-	MARUTI RUBBER	NOIDA	N	
		-	JYOTI POLYVINYL	VADODARA	N	
		-	DEEP-JYOTI	-	N	
10	BITUMEN/ ASPHALT	-	ALL GOVT REFINARIES	-	N	
11	BITUMEN IMPREGNATED FIBER BOARD JOINT FILLER,	-	BIS APPROVED SOURCES	-	N	
12	PLASTIC/ PVC PIPES	-	BIS APPROVED SOURCES	-	N	
13	FLOOR TILES	-	KAJARIA	-	N	
		-	SOMANY	-	N	
		-	BELL	-	N	
		-	SPARTEK INDIA	-	N	
		-	NITCO	-	N	
		-	ORIENT	-	N	
		-	JOHNSON	-	N	
14	AR Bricks(IS 4860), AR Cement (Potassium silicate based Cement Mortar-IS 4832 part I, Phenolic based Resin Cement-IS 4832 Part II) and AR Bitumastic (IS 702)	-	PRODORITE ANTI CORROSIVE	-	N	
		-	PELICAN	BHIWADI	N	
		-	CAMBRIAN	ALWAR	N	
		-	SUNSHINE CERAMICS	CHAMPA	N	
		-	VIDHATA CERAMICS	RAJKOT	N	
		-	CHAMPION CERAMICS	CHAMPA	N	
		-	MAHAKOSHAL POTTRIES	KATNI	N	
		-	PERFECT ACID WARE, JABALPUR	JABALPUR	N	
15	FIRE PROOF DOORS	-	NAVAIR INTERNATIONAL LTD.	-	N	
		-	GODREJ	-	N	
		-	SHAKTI MET DOOR	HYDERABAD	N	
		-	SUPER STEEL	DELHI	N	FOR SINGLE LEAF ONLY
		-	SIGNUM FIRE PROTECTION	NAGPUR	N	
		-	RADIANT SAFE DOORS	-	N	
16	RESIN BASED ADHESIVE	-	ARALDITE	-	N	
		-	FEVICOL	-	N	
		-	VAMICOL	-	N	
17	PARTICLE BOARDS, PLYWOOD, MDF	-	NOVAPAN	-	N	
		-	ECOBOARD	-	N	
		-	BHUTAN BOARD	-	N	

**BOQ FOR ROAD, PATHWAYS & SECURITY ROOM AT 10MW SPV POWER PLANT  
AT NTPC-UNCHAHR,DIST,RAEBARELI,(U.P)**

**Activity - 1**

**(1A) Roads and Pathway Works**

S.NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1	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 including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earth with lead upto 50 metres.	Sqm	12900		
2	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations , roads ,embakment etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.	Cum	370		
3	Supplying and stacking of hard stone for (stone pitching) /soling -22.5 cm thick at site.	Cum	1300		
4	Supplying and stacking of 53 mm to 22.4 mm size stone aggregate. Grade-III ( To filling for Soling material ) at site	Cum	125		
5	Supplying and stacking of 63 mm to 45 mm size stone aggregate.-GRADE II at site	Cum	760		
6	Supplying and stacking of Moorum @ site	Cum	100		
7	Supplying and stacking at site: (Stone screening 11.2 mm nominal size (Type B).)	Cum	100		
8	Laying, spreading and compacting stone aggregate of specified sizes to WBM & soling work 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	1900		
9	Providing and applying tack coat using bitumen emulsion conforming to IS: 8887, using emulsion pressure distributor including preparing the surface & cleaning with	Sqm	3950		
10	Providing and applying tack coat using bitumen emulsion conforming to IS: 8887, using emulsion pressure distributor including preparing the surface & cleaning with	Sqm	7850		
11	Providing and laying bituminous macadam using crushed stone aggregates of specified grading premixed with bituminous binder, transported to site by tippers, laid over a previously prepared surface with paver finisher equipped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers as per specifications to achieve the desired compaction and density, complete as per specificatons and directions of Engineer-in-Charge.50 to 100 mm average compacted thickness with bitumen of grade VG-30 @3.50% (percentage by weight of total mix) prepared in Drum Type Hot Mix Plant of 60-90 TPH capacity.	cum	300		
12	2.5 cm premix carpet surfacing with 3 cum of stone chippings 10 mm nominal size per 100 sqm and bitumen emulsion (medium setting min. 65% bitumen contents) complying with IS : 8887 using 96 kg per cum of chippings of road surface including consolidation with road roller etc complete .	sqm	3920		
13	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed. All kinds of soil	cum	1920		
14	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and Road in Cement mortar 1:4 (1 cement : 4 coarse sand)	cum	400		
15	Providing & laying of Brick with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation , Road etc.(exluding Mortor Qty 1:4)	Cum	930		
<b>TOTAL AMOUNT OF ACTIVITY (1A) (inclusive of all taxes) (Rs)</b>					

CONTRACTOR

EMPLOYER

(With Seal)

**Activity - 1**

**1(B) Security room civil work:**

S.NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1	Earth work in excavation by mechanical means (Hydraulic excavator) / manual	Cum	5		
2	...do--- earth work in hard rock	Cum	3		
3	Diluting and injecting chemical emulsion for POST-CONSTRUCTIONAL anti-termite	Sqm	20		
4	Providing and laying in position cement concrete of specified grade excluding the	Cum	3		
5	Providing and laying in position cement concrete of specified grade excluding the	Cum	18		
6	Providing and laying in position machine batched and machine mixed design mix M-				
20a	M 25 grade RCC footings,septic tank,cable trench, soak pit etc,	Cum	5		
20b	M 25 grade RCC Columns	Cum	7		
21	Providing and laying in position machine batched and machine mixed design mix M-				
6a	M 25 grade RCC Columns	Cum	3		
6b	M 25 grade RCC Beams , Lintel plinth beam, cantilevers etc	Cum	4		
6c	M 25 grade RCC Roof Slab, chajja and fascia fins	Cum	5		
7	Centering and shuttering including strutting, propping etc., and removal of form for				
7a	Footing, foundations, septic tank, soak pit, bases of columns etc for mass concrete	sqm	15		
7b	Columns, pillars, piers, abutments, posts and struts	sqm	15		
7c	Lintels, Beams, plinth beams, girders, bressumers and cantilevers	sqm	70		
7d	Roofs, Suspended floors, landings, balconies & access platform	sqm	20		
8	Providing and laying in position reinforcementfor RCC work including straightening,	Kg	2550		
9	Providing and constructing 230 mm thick brickwork with bricks of class designation	Cum	20		
10	Providing Half brick masonry 115 thick brickwork in CM (1:4) with bricks of class	Sqm	20		
11	Preparing the surface with Cleaning & hacking . Providing surface with 12mm	Sqm	100		
12	Providing surfaces of External walls such other members with plaster of cement	Sqm	120		
13	Providing surfaces of walls outside periphery of chajja etc., with plaster of CM ( 1:4	sqm	10		
14	Providing and applying plaster of paris putty of two coats over plastered surface	sqm	20		
15	Distemping with oil bound washable distemper of approved brand and	sqm	120		
16	Finishing walls with water proofing cement paint of required shade : New work	sqm	120		
17	Providing surfaces and ceiling, portico etc., with 6 mm cement plaster 1:3 (1	sqm	10		
18	Vitrified tile Flooring of 600mmX600mm of min 9mm thickness,confirming to	Sqm	12		
19	Providing and laying rectified Glazed Ceramic floor tiles 300x300 mm or more	Sqm	6		
20	Providing and fixing 1st quality ceramic glazed wall tiles conforming to IS : 15622	Sqm	10		
21	Providing & laying Kota stone slabs 20 mm thick in risers of steps, skirting, laid on	Sqm	5		
22	Providing and laying pressed clay tiles (as per approved pattern 20 mm nominal	Sqm	24		
23	Providing lime concrete terracing on roof average thickness 10 cms laid to fall with	Sqm	24		
24	Providing and fixing Granite slab table rubbed, edges rounded and polished of size	Sqm	1		
25	Providing and fixing pressed steel door frames conforming to IS: 4351	Rm	20		
26	35 mm thick factory made Solid panel PVC Door shutter made out of single piece	Sqm	7		
27	Providing and fixing glazing in aluminium door, window, ventilator shutters and				
27a	With tinted glass panes of 4.00 mm thickness	Sqm	2		
27b	With tinted glass panes of 6 mm thick for partition and Aluminium Doors.	Sqm	2		
28	Providing and fixing aluminium die cast body tubular type universal hydraulic door	Each	1		
29	Providing and fixing aluminium I S I marked anodised (anodic coating not less than	Each	4		
30	Providing and fixing GI pipes complete with GI fittings including trenching refilling,	RM	10		
31	Providing and fixing aluminium I S I marked anodised (anodic coating not less than	Each	1		
32	Providing and fixing bright finished brass 100 mm mortice latch and lock ISI marked	Each	1		
33	Providing structural steel work in built up sections, framed work, window grill,	Kg	100		
34	Providing and laying integral cement based water proofing treatment including	Sqm	15		
35	Providing and fixing on wall face un plasticised rigid PVC rain water pipe 110 mm dia	RM	12		
36	Providing and fixing GI pipes complete with GI fittings and clamps, including	RM	10		
37	Providing and fixing GI pipes complete with GI fittings including trenching refilling,	RM	10		
38	Providing and fixing CP brass long body bib cock of approved quality conforming to	Each	1		
39	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps,32	Each	1		
40	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of	Each	1		
41	Providing and fixing white vitreous china pedasal type water closet ( european type	Each	1		
42	Providing and fixing white vitreous china flat back half stall urinal of	Each	1		
43	Providing and fixing constructing road gully chamber 50 x 45 x 60 cm with bricks of	Each	3		
44	Providing and fixing approved brands of PVC Sintex water tanks including,lifting,	Ltr	500		
45	Providing and fixing approved quality soap holder fix on wall with rawl plugs all	Each	1		
46	Supplying and stacking at site. 90 mm to 45 mm size stone aggregate.	Cum	7		
46a	Laying, spreading and compacting stone aggregate of specified sizes to WBM	Cum	7		
<b>TOTAL AMOUNT OF ACTIVITY (1B) (inclusive of all taxes) (Rs)</b>					

CONTRACTOR

EMPLOYER

(With Seal)

**Activity - 1****1(C) Security room Electrical Works**

S.NO.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1	Philips make TCS 398 2x36 D6 EBT LIGHT FITTING	Nos	2		
2	Ceiling fans	Nos	1		
3	Exhaust fans	Nos	2		
4	5A switch controlled by a 5A universal shuttered socket with box	Nos	1		
5	3.5Cx25Sq.mm AL cable	RM	20		
6	3.5Cx25Sq.mm AL cable termination	Nos	5		
7	point wire for ceiling fans	Nos	1		
8	3/4" PVC pipe	RM	10		
9	1" PVC pipe	RM	20		
10	8 SWG GI EARTH WIRE	RM	10		
11	25 x 6 mm GI Earth Flat Strip for Internal earth grid	RM	8		
12	Earth station	Nos.	1		
13	1.5" PVC casing N capping	RM	20		
14	4 WAY double door	Nos	1		
15	10/16A, SP&N MCB (O/G)	Nos	1		
16	Modular base and cover plate for 2 module	Nos	1		
17	Modular base and cover plate for 6 module	Nos	4		
<b>TOTAL AMOUNT OF ACTIVITY (1C) (inclusive of all taxes) (Rs)</b>					
<b>TOTAL AMOUNT OF ACTIVITY (1A+1B+1C) (inclusive of all taxes) (Rs) : in figures</b>					

NOTE: Rate quoted is inclusive of testing of all materials as per the NTPC/BHEL approved field quality plan (FQP) and

**CONTRACTOR**  
(With Seal)

**EMPLOYER**

**Activity : 2****Drain Works :**

Sl no	Description of Item	Unit	Qty	RATE	AMOUNT
1	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed. All kinds of soil	Cum	5300		
2	50 mm thick back filling for pitching including supplying of required materials and consolidation etc. complete with : Moorum.	sqm	6400		
3	75 mm thick back filling for pitching including supplying of required materials and consolidation etc. complete with : Moorum.	sqm	80		
4	Filling available excavated earth (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 50 m and lift upto 1.5 m.	Cum	1100		
5	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in: Cement mortar 1:6 (1 cement : 6 coarse sand)	cum	2100		
6	12 mm cement plaster of mix : 1:4 (1 cement: 4 coarse sand)	sqm	14500		
7	Centering and shuttering including strutting, propping etc. and removal of form for : Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.	sqm	1400		
8	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level. Thermo-Mechanically Treated bars.	kilogram	18450		
9	Providing and laying in position specified grade of reinforced cement concrete excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level : 1:1:2 (1 cement : 1 coarse sand : 2 graded stone aggregate 20 mm nominal size).	cum	175		
10	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level : 1:4:8 (1 Cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size).	cum	35		
11	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 (1 Cement: 1½ coarse sand: 3 graded stone aggregate 20 mm nominal size).	cum	30		
12	Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete : 300 mm dia. R.C.C. pipe	metre	60		
<b>TOTAL AMOUNT OF ACTIVITY (2) (inclusive of all taxes) (Rs) : in figures</b>					

<b>TOTAL AMOUNT OF ACTIVITY (1+2) (inclusive of all taxes) (Rs) : in figures</b>	
<b>TOTAL AMOUNT OF ACTIVITY (1) (inclusive of all taxes) (Rs) : in words</b>	

NOTE: Rate quoted is inclusive of testing of all materials as per the NTPC/BHEL approved field quality plan (FQP) and

CONTRACTOR  
(With Seal)

EMPLOYER