1. **Clause no. 1.2 of BHEL/TBG/GTC/2016 Rev.01–** (Offer Submission/ Opening Time)
   Offer Submission Time: **14:00 Hrs IST**,
   Offer Opening Time: **16:00 Hrs IST**
   The critical Dates of tendering activities shall be provided separately during tendering processes.
   Address of tender Issuing Authority: -
   BHARAT HEAVY ELECTRICALS LIMITED (TRANSMISSION BUSINESS GROUP),
   10TH Floor, Plot no.: - C-20, 1A/1, Joy towers, C Block, Phase 2, Industrial Area, Sector-62, Noida, Distt. Gautambudh Nagar, UP-201309

2. **Clause No. 1.3 of BHEL/TBG/GTC/2016 Rev.01**– Tender is invited through e-Procurement System only. The bidder shall submit their bid through e-Procurement platform only at (https://eprocurebhel.co.in/).
   Bidders participating through e-procurement portal for this tender should have Class-III Digital Signature Certificate (DSC) for Signing & Encryption of bids issued by any of the valid Certifying Authorities (approved by Controller of Certifying Authorities) in India.

3. **Clause No. 1.7 of BHEL/TBG/GTC/2016 Rev.01**– For any technical clarification, please contact Mr. Jai Kr Soni, Sr. Manager (TBEM); Contact No. 0120-6748534; e-mail: jaik@bhel.in

4. **Clause No. 1.8 of BHEL/TBG/GTC/2016 Rev.01**- For any commercial clarification, please contact Ms. Shipra Gupta, Sr. Engineer (TBMM); Contact No.0120- 6748509; e-mail: shipra@bhel.in

5. **Clause No. 2.1 of BHEL/TBG/GTC/2016 Rev.01**- The prices as quoted in price schedule shall be on **Firm basis**.

6. **Clause No. 2.2 of BHEL/TBG/GTC/2016 Rev.01**- Price shall be quoted in INR inclusive of all taxes, duties, Levies, Octroi, all other taxes /duties etc. in India except GST. GST as applicable shall be extra.

7. **Clause No. 2.3 of BHEL/TBG/GTC/2016 Rev.01**–
   The prices are to be quoted on FOR (Site / Destination) basis.
   a) Ex-works Price: Ex-works price including packing & forwarding charges.
   b) Freight & Insurance: Freight & Insurance for door delivery up to destination / site / store are to be quoted separately.
   c) Charges for Visit and Supervision of Erection, Testing & Commissioning (ETC) at Site: To be quoted separately.

   Note:
   Custom duty, custom's clearance, unloading at BHEL's destination in Nepal etc. of supply portion shall be in scope of BHEL. Bidder should ensure that proper documents are provided to BHEL in advance.

8. **Clause No. 3 of BHEL/TBG/GTC/2016 Rev.01** –
   [A] Payment Terms (Supply): Supplier to submit bills along with billing checklist as per Annexure-III
   a) 95% of payment along with 100% GST & F&I within 90 days (45 days for MSE, 60 Days for Medium Enterprises) from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows:

·LR / GR duly endorsed by BHEL Site Official.
·Material Receipt Certificate issued by BHEL Site Official.
·GST Compliant Tax Invoice
·Packing List (Case-wise)
. Copy of Transit Insurance Certificate from underwriters.
·Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management
·Guarantee Certificate
·Copy of Performance Bank Guarantee (PBG)
·Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management (if applicable)

b) Balance 5% payment within 90 days (45 days for MSE, 60 Days for Medium Enterprises) from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows:
·Certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site if it is in the scope of the supplier.
·Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management

[B] Payment Terms (Services –To & fro visit charges & Supervision of Erection, Testing & Commissioning at Site): Supplier to submit bills along with billing checklist as per Annexure-III

100% payment along with applicable GST within 90 days (45 days for MSE, 60 Days for Medium Enterprises) from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original+ 2 copies).

Note:
(i) It should be ensured that Tax Invoice complies with statutory requirements under applicable law to enable BHEL to avail Input Tax Credit. If BHEL is unable to avail the input credit of tax paid by vendor due to any fault not attributable to BHEL, the same shall be recoverable from vendor.

9. **PRE-QUALIFICATION REQUIREMENT-** Technical Pre-Qualifying Criteria is specified in NIT (Annexure-TQR). The bidder must ensure that they are meeting the PQR (Technical) and should submit all the requisite credentials as per PQR.

10. **Vendor Approval -** Vendor to submit credentials and filled format with related document mentioned in vendor assessment form enclosed in NIT required for submission to customer for Vendor approval. Price bid opening/RA shall be done for technically qualified and customer approved vendor only.

11. **Project Status:** EXPORT. Supply portion shall be governed as per notification 41/2017 of IGST (Rate) dated 23.10.2017. GST (IGST) on Ex-works & Transportation is 0.1 % against LUT and notification no 41/2017 (interstate) & 0.05 % against LUT and notification no 40/2017 (intrastate).

12. **Inspection & MQP requirements -** Inspection shall be carried out by BHEL & Customer (End User) as per approved Quality Plan. For the same, Supplier to submit Quality Plan to BHEL for Customer approval.

13. **Guarantee-Supply-(Clause-5 of BHEL/TBG/GTC/2016 Rev.01):**

    The equipment / material supplied shall be guaranteed to be free from all defects and faults in design & engineering, material, workmanship & manufacture and in full conformity with the Purchase Order / Contract, Technical Specifications & approved drawings / data sheets, if any, for 18 months from the date of last delivery or 18 months from 31.12.2023 whichever is later.

    The defective equipment / material / component shall be replaced free of cost at site. Freight & Insurance during transit shall also be in the scope of the supplier / contractor. Any expenditure for dismantling and re-erection of the replaced equipment / material / component shall be to supplier's / contractor's account. All replacements during the guarantee period shall be delivered at site promptly and satisfactorily within a period not more than 45 days from the date of reporting the defect / rejection etc.

    In the event of the supplier / contractor failing to replace the defective equipment / material / component within the time period mentioned above, BHEL may proceed to undertake the replacement of such defective equipment / material / component at the risk and cost of the supplier / contractor without prejudice to any other rights under the contract and recover the same from PBG / other dues of this Purchase Order / Contract or any other Purchase Order / Contract executed by the supplier / contractor.

14. **Clause-7 of BHEL/TBG/GTC/2016 Rev.01 (PBG validity)**: Supplier shall arrange to submit PBG for 10% of the total Ex-works value (excl. Supervision charges), valid up to Guarantee period with claim period of 3 months extra over and above. Ex-works PO value (excl. Supervision charges) at the time of placement of PO shall be considered for calculation of the PBG amount.

    "Bidder agrees to submit performance security required for execution of the contract within the time period mentioned. In case of delay in submission of performance security, enhanced performance security which would include interest (SBI rate + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms and conditions defined in NIT / Contract, from the bills along with due interest."

    Note: If no option is specified by the bidder, by default option – B for Bank Guarantee shall be considered. PBG for Main supply items, Spares shall be submitted separately.
    BG should be submitted on non-judicial stamp paper of appropriate value by the supplier not later than submission of first bill to BHEL.

15. **Delivery Period-(Clause-12 of BHEL/TBG/GTC/2016 Rev.01)-** Delivery requirement is **IMMEDIATE.** Delivery plan is as per activity schedule (Annexure-II) enclosed in this STC document. Early delivery acceptable.

Note: In case, BHEL's delivery requirement is not met by vendor(s), then a chance may be given to all such vendors to review their quoted delivery schedule in line with BHEL's delivery requirement. However, if vendor fails to meet the requisite delivery plan, then BHEL reserves the right not to consider the offer of such vendor(s).

16. **Liquidated Damage for Supply (Clause no. 13 of BHEL/TBG/GTC/2016 Rev.01):**
In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the total PO value for supply per week of delay or part thereof subject to a maximum of 10% of the total Purchase Order value for supply shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. **PO value is defined as PO EX-WORKS & FREIGHT & INSURANCE CHARGES**. Other terms as per General Terms and Condition (GTC - BHEL/TBG/GTC/2016 Rev-1).
Note - LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) contracts shall be considered as delivery date.

17. **Clause No. 33 of BHEL/TBG/GTC/2016 Rev.01 for Reverse Auction of NIT:** Reverse Auction applicable for this tender. "BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among all the techno-commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking." Abridged Version of "Guidelines for Reverse Auction-2021" may also be seen at BHEL website (www.bhel.com) on "Supplier Registration" Page.

18. **Clause No. 34 of BHEL/TBG/GTC/2016 Rev.01: Integrity Pact:** Not Applicable.

19. **Technical Specification- TB-405-316-007 Rev 00**. No permissible Technical Deviation has been envisaged. Bidders to quote as per Technical Specification.

20. **Make in India (PPP-MII):**
For this procurement, the local content to categorize a supplier as Class-I local supplier / class-II local supplier / Non-Local supplier and purchase preference to Class-I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020, issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT but before opening of part-II bids against this NIT.

"Bidder to specify the percentage of local content as per the format of self-declaration for local content" as per Annexure-V."

"This tender is not a global tender and only Class-I suppliers as defined under the DPIIT order no. P-45021/2/2017-PP (BE-II) dated 04.06.2020 and subsequent orders are eligible to bid in this tender. Bids received from Class II & Non-Local supplier shall be rejected." Note: Class-I supplier means Local content should be equal or greater than 60% for Illumination system as per DPIIT circular dated 16-11-2021.

21. **Compliance to GOI Order for restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017.**
    Refer Clause at Annexure-VI and Certification at Annexure-VII / Annexure-VIII (whichever is applicable) regarding restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017. Bidder to comply the clause and submit the certification. Non-compliance/ Non-submission of certification will lead to rejection of Offer.

22. **MOP Circular:**
    Bidder to comply the MOP circular dated 02-07-2020 (Annexure-IX) and its subsequent amendment, if any, in prescribed format (Annexure-X). Non-compliance/ Non-submission will lead to rejection of Offer [Not Applicable for cases where local content is 100%]. Vendor to quote as per specified price format of NIT, otherwise their offer shall be liable to be rejected.
    Following confirmation to be provided by vendor: "We confirm that we have quoted as per specified price format provided along with this tender".

23. **Validity of Purchase Order:** Purchase order shall be valid for two years from date of Purchase Order.

24. **Arbitration:** As per Annexure-IV of NIT.

25. **Splitting of Contract:** Splitting of Contract not applicable for this tender.

26. **Risk & Cost:** As per Annexure-XII of NIT.

27. **Prevention for cartel formation:** The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

28. **BHEL Supplier Registration Portal:** The link for Online Supplier Registration Portal is https://supplier.bhel.in/The link for Online Supplier Registration Portal may also be seen at BHEL website (www.bhel.com) on "Supplier Registration" Page.

29. **Quantity Variation -** BHEL shall have the right to variation in quantities of items within +/- 30% of the total Purchase Order / Contract value at the time of placement of PO or award of Contract on overall basis for all amendments together within two years from the date of original Purchase Order. The purchaser shall have the right to increase or decrease quantity and scope up to the above extent of value and seller/contractor shall be bound to accept the same at the contracted prices without any escalation.

30. **GeM Seller ID-** GeM seller ID is mandatory for the bidders and must be mentioned in their offer. In case at the time of submission of offer GeM seller ID is not available with bidder, then successful tenderer should ensure to have GeM Seller ID prior to award of contract. Department of Expenditure (DOE) OM no. 6/9/2020-PPD dated 24.08.2020 may be referred in this regard.

31. Deviations:

a) Technical Deviation: No Technical Deviation is envisaged.

b) Commercial Deviation: No Commercial Deviation envisaged except defined in GTC.

32. <u>Additional Instructions to the Bidders:</u>

a) Service charges like Supervision of ETC should not exceed 2% of the total contract value.

b) Bidder's offer will be technically acceptable subject to final acceptance of vendor by ultimate customer as approved supplier. Price Bid will be opened only for those bidders in respect of which vendor approval is received from respective customer. Necessary credentials/documents to be submitted to customer for approval.
Documents Required for Customer approval:
Bidders to submit below documents along with their offer but not limited to:
(i) PAN, GST, Certificate of Incorporation
(ii) Factory Registration Certificate
(iii) Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc.)
(iv) List of Plant and Machinery
(v) List of Testing and Measuring equipment
(vi) Third party approval, if any (viz. ISO, BIS)
(vii) Pollution clearance wherever applicable
(viii) Energy conservation & Efficiency Report (Applicable to industries having contact load more than 100KVA)
(ix) Manufacturing Quality Plan (MQP)
(x) List of past supplies references along with copy of major PO
(xi) Performance certificate from end user
(xii) Photographs of factory, plant and machinery & testing facilities

c) MQP Requirement: As per attached QATR (Quality Assurance Technical Requirements).

d) Inspection Agency: BHEL /Customer or their nominated Agency will witness the inspection as per approved QAP.

e) Destination address shall be: -
Ward No. 3, Gokuwa chowk, Budhiganga Gaupalika
District Morang, Biratnagar, Nepal

f) Scope for the unloading of the material / Custom clearance /transportation of the material and delivery of material at the site (Applicable for supply portion only):-
The material is to be unloaded at the storage area in Nepal which is approx. 8-10 Km from Jogbani Border. The ware house address in Nepal is:
Ward No. 3, Gokuwa chowk, Budhiganga Gaupalika District Morang, Biratnagar, Nepal.

Unloading at the storage area along with custom clearance, payment of custom duty shall be in the scope of the BHEL/BHEL's appointed Agency.

Due to limitation of gates at border, following are proposed for smooth operation:
(i) One invoice for one vehicle-load job to be ensured to streamline the dispatch and documentation at the border.

(ii) Merging of consignments with an ODC consignment in the same invoice to be avoided wherever possible, so that vehicles may not be stranded at the customs gate.
(iii) Immediate after dispatching vehicles, all the requisite documents (invoices, LR copy, etc.) to be sent to BHEL for advanced clearance of the customs, IBN approval etc. in order to avoid detention at border.
Further, the transportation of BHEL's material from the warehouse (Biratnagar, Nepal) to Arun-3 site is in the scope of BHEL.

Bidder's may take the note and quote accordingly.

33. **List of documents required** from vendor end for the custom clearance by BHEL's appointed agency (Applicable only for Supply Portion):
Vendor needs to provide following documents immediately after dispatch.
a. L.R.
b. Packing list.
c. Vendor's invoice.
d. Any other documents required for taking permission from IBN (Investment board of Nepal) for payment of applicable custom duty for custom clearance.

34. **Consignee Address: -**
BHEL C/o Engineer-in-Charge SJVN Arun-3 Power Development Company (P) Limited (SAPDC),
SAPDC Office Complex, Tumlingtar, District Sankhuwasabha, (Nepal).

35. **Bill to Address: -**
Bharat Heavy Electricals Limited-TBG, 10th Floor, Plot No.C-20/1A/1, Joy Tower, Sector-62, Noida-201301, U.P.
GSTN-09AAACB4146P2ZC

36. Bidder to mention their works address below from where material will be supplied.
Works Address----------

Annexure II

ACTIVITY SCHEDULE FOR SUPPLY AND SERVICES OF ILLUMINATION SYSTEM

SN	ACTIVITY	ACTIVITY TIME [in weeks]	REMARKS
	PO / Input receipt from BHEL	0	
1.	Submission of Documents (after complete inputs given by BHEL) necessary for getting manufacturing clearance like Drawings, Data sheet MQP etc.	4	SUPPLIER SCOPE
2.	Approval of documents/Manufacturing Clearance from BHEL	4	BHEL SCOPE
3.	Manufacturing time after drawings docs approval & Manufacturing Clearance with Inspection Call	20	SUPPLIER SCOPE
4.	BHEL/Customer Inspection & Dispatch Clearance	2	BHEL SCOPE

5.	Dispatch	2	SUPPLIER SCOPE

1. Inspection call to be issued 1 week in advance.
2. Supplier must ensure the completeness and correctness of the requisite documents before submission for approval. Delay in approval on account of incomplete / inadequate information shall be the responsibility of supplier.
3. Inspection call should be given in the prescribed format only. Inspection calls not in the prescribed format shall not be entertained.
4. Vendor to ensure resubmission of drawings / documents within 1 Week from the date of comment given by BHEL. Any delay in resubmissions w.r.t 1 Week shall be reduced from Activity No.3 as above.
5. Count of resubmissions shall be certified by TBEM and same shall be compensated in schedule by adding certified time or number for resubmissions.

(Sign and seal of Bidder)

TENDER INVITING AUTHORITY : BHEL TBG NOIDA

NAME OF WORK : SUPPLY AND SERVICES OF ILLUMINATION SYSTEM FOR ARUN3 PROJECT

ENQUIRY / NIT NO. :

NAME OF THE BIDDER/ BIDDING FIRM / COMPANY:

UNPRICE BID SCHEDULE

SR. NO	ITEM DESCRIPTION	Item code / make	Qty.	UNIT	Unit Ex-work PRICES	GST RATE ON EX WORKS PRICES (%)	GST AMOUNT ON TOTAL EX WORKS PRICES (INR)	UNIT FREIGHT & INSURANCE CHARGES (INR)	GST ON FREIGHT & INSURANCE CHARGES (%)	GST AMOUNT ON FREIGHT & INSURANCE CHARGES (INR)	HSN Code	Total Ex-work + F & I amount excluding GST	Total Ex-work + F & I amount including GST
1	Supply of Main Lighting Distribution Board (MLDB) comprising 415V, 200A, 3-Ph, 4-wirebus and 2 no incomers each with One (1) no. Lighting transformer: 100kVA with One (1)MCCB (Inclusive of CT,Voltmeter, Ammeter, Contactor with timer, indicating lamps etc), Bus coupler -200A MCCB and Outgoing feeders 6 No. 63A TPN MCCB on each Bus Section	item1 of BOQ	1	Nos.								-	
2	Supply of Emergency Lighting Distribution Board (MLDB) comprising 415V, 100A, 3-Ph, 4-wirebus and 2 no incomers each with One (1) no. Lighting transformer: 50kVA with One (1)MCCB (Inclusive of CT,Voltmeter, Ammeter, Contactor with timer, indicating lamps etc), Bus coupler -100A MCCB and Outgoing feeders 4 No. 63A TPN MCCB on each Bus Section	item2 of BOQ	1	Nos.								-	
3	Supply of Lighting Distribution Board (DC-LDB) comprising with One (1) No. Incomer 125ADP Switchfuse unit with contactor, Outgoing feeders 6 No. 32A DP MCB	item3 of BOQ	1	Nos.								-	
4	Supply of Indoor LIGHTING FIXTURE - RECESSED MOUNTED LED	item4 of BOQ	32	Nos.								-	
5	Supply of Indoor lighting fixtures Surface mounted LED	item5 of BOQ	160	Nos.								-	
6	Supply of LED INDOOR HIGH BAY FITTINGS TYPE IHB	item6 of BOQ	30	Nos.								-	
7	Supply of FLOOD LIGHT LED TYPE LIGHTING FIXTURE WITH ACCESSORIES	item7 of BOQ	80	Nos.								-	
8	Supply of STREET LIGHTING FIXTURES	item8 of BOQ	20	Nos.								-	
9	Supply of LIGHTING FIXTURE - DC LED BULKHEAD	item9 of BOQ	30	Nos.								-	
10	Supply of LIGHTING FIXTURE - DC LED DOWNLIGHTER	item10 of BOQ	15	Nos.								-	
11	Supply of Emergency Exit Sign/Board	item11 of BOQ	15	Nos.								-	
12	Supply of LIGHTING FIXTURE - LED POST TOP LANTERN	item12 of BOQ	16	Nos.								-	
13	Supply of 32A TPMCB with Receptacle for split AC unit	item13 of BOQ	14	Nos.								-	
14	Supply of 1 Ph, 5/15A Socket Decorative Socket(RI)	item14 of BOQ	21	Nos.								-	
15	Supply of 15A,240V,2 POLE, 3 PIN OUTDOOR RECEPTACLE (TYPE RO)	item15 of BOQ	33	Nos.								-	
16	Supply of 63A, 415V : INTERLOCKED SWITCH SOCKET OUTDOOR RECEPTACLE (TYPE RP)	item16 of BOQ	12	Nos.								-	
17	Supply of 415 V A.C. Indoor type Lighting Panel (Normal)	item17 of BOQ	3	Nos.								-	
18	Supply of 415 V A.C. Indoor type Lighting Panel (Emergency)	item18 of BOQ	3	Nos.								-	
19	Supply of LIGHTING PANEL (INDOOR) TYPE DCELP/ DCLP-1	item19 of BOQ	5	Nos.								-	
20	Supply of Outdoor Junction Box	item20 of BOQ	15	Nos.								-	
21	Supply of 415 V A.C. Outdoor type Lighting Panel (Normal)	item21 of BOQ	4	Nos.								-	
22	Supply of 415 V A.C. Outdoor type STREET LIGHTING PANEL	item22 of BOQ	2	Nos.								-	
23	Supply of OUTDOOR POWER RECEPTACLE FOR OIL FILTRATION UNIT (250A)	item23 of BOQ	3	Nos.								-	
24	Supply of decoravtive type switch & socket with two nos of 5 A switch	item24 of BOQ	10	Nos.								-	
25	Supply of decoravtive type switch & socket with Four nos of 5 A switch with one nos Socket	item25 of BOQ	20	Nos.								-	
26	Supply of decoravtive type switch & socket with Six nos of 5 A switch with one nos Socket	item26 of BOQ	10	Nos.								-	
27	Supply of Single socket outlet comprising RJ-11 Socket	item27 of BOQ	10	Nos.								-	
28	Supply of WALL FAN 400MM SWEEP, INDUSTRIAL TYPE, ENERGY EFFICIENT	item28 of BOQ	6	Nos.								-	
29	Supply of 1200/1400 MM size Ceiling Fan	item29 of BOQ	28	Nos.								-	
30	Supply of 300 mm Swipe type Exhaust Fan	item30 of BOQ	6	Nos.								-	
31	Supply of OCCUPANCY BASED INFRA RED SENSORS	item31 of BOQ	10	Nos.								-	
32	Supply of LIGHT LEVEL SENSORS AND OTHER ACCESSORIES AS REQUIRED FOR CONTROL OF LIGHTING IN THE STAIRS AREA OF CONTROL ROOM CUM ADMINISTRATIVE BUILDING AS PER SPECIFICATION	item32 of BOQ	2	Nos.								-	

SR. NO	ITEM DESCRIPTION	Item code / make	Qty.	UNIT	Unit Ex-work PRICES	GST RATE ON EX WORKS PRICES (%)	GST AMOUNT ON TOTAL EX WORKS PRICES (INR)	UNIT FREIGHT & INSURANCE CHARGES (INR)	GST ON FREIGHT & INSURANCE CHARGES (%)	GST AMOUNT ON FREIGHT & INSURANCE CHARGES (INR)	HSN Code	Total Ex-work + F & I amount excluding GST	Total Ex-work + F & I amount including GST
33	Supply of TELEPHONE POINTS- SINGLE OUTLET TELEPHONE SOCKET INCLUDING CABLE/WIRE AND ACCESSORIES	item33 of BOQ	4	Nos.								-	
34	Supply of Telephone JB	item34 of BOQ	2	Nos.								-	
35	Supply of Temperature transducer for AC rooms	item35 of BOQ	2	Nos.								-	
36	Supply of LAN Cable	item36 of BOQ	300	Mtr.								-	
37	Supply of LAN Socket (LAN POINTS INCLUDING ACCESSORIES)	item37 of BOQ	3	Nos.								-	
38	Supply of Structural Steel for Illumination receptacles, panels, etc.	item38 of BOQ	4	MT								-	
39	Supply of EARTHING MATERIAL - 25X6MM GI FLAT	item39 of BOQ	500	Mtr.								-	
40	Erection items Indoor- Point wiring for AC fixture, fans & lights (20mm, 25mm PVC/GI Conduit ; 1.5, 2.5, 4 Sq. mm Cu Wire etc.)	item40 of BOQ	1	LOT								-	
41	Erection items Outdoor- Point wiring for AC fixture, fans & lights (20mm, 25mm PVC/GI Conduit ; 1.5, 2.5, 4 Sq. mm Cu Wire etc.)	item41 of BOQ	1	LOT								-	
42	Supply of 25 M HIGH LIGHTING HIGH MAST WITH LANTERN CARRIAGE (WINCH TYPE) FOR SWITCHYARD LIGHTING ALONG WITH FEEDER PILLAR & JUNCTION BOX (JB-M)	item42 of BOQ	4	Nos.								-	
43	Supply of Street Pole 9M	item43 of BOQ	15	Nos.								-	
44	Supply of 4.5M HIGH LIGHTING POLE FOR POST-TOP LANTERN	item44 of BOQ	5	Nos.								-	
45	Supply of CartWheel mounted Aluminium ladder AS PER TECHNICAL SPECIFICATION	item45 of BOQ	2	Nos.								-	
46	Supply of Vehicle mounted adjustable platform extended upto 12 m (Vehicle is clarified as Hand (Manual) driven Cart. (Motorised / Battery operated vehicle is not need to be considered)	item46 of BOQ	1	No.								-	
47	Supply of Ladder - 1 ladder each of 2m and 5m	item47 of BOQ	2	No.								-	
48	SERVICES- ILLUMINATION EQUIPMENT : TO & FRO TRAVEL CHARGES TO SITE FOR SUPERVISION OF ERECTION TESTING & COMMISSIONING FOR ILLUMINATION SYSTEM PER VISIT (PER VISIT SHALL BE MINIMUM 7 DAYS)	item48 of BOQ	8	VISIT								-	
49	SERVICES- ILLUMINATION EQUIPMENT : SUPERVISION OF ERECTION TESTING & COMMISSIONING FORILLUMINATION SYSTEM ON PER MANDAY BASIS	item49 of BOQ	56	MANDAY								-	
50	SPARES- ILLUMINATION EQUIPMENT : MULTIPLE PLUG POWER SOCKETSSUITABLE FOR 63/32A, SINGLE PHASE [1 LOT = 20% OF INSTALLED QUANTITY]	item50 of BOQ	1	LOT								-	
51	SPARES- ILLUMINATION EQUIPMENT : MULTIPLE PLUG POWER SOCKETSSUITABLE FOR 15A/5 A [1 LOT = 20% OF INSTALLED QUANTITY]	item51 of BOQ	1	LOT								-	
52	SPARES- ILLUMINATION EQUIPMENT : LAMPS OF EACH TYPE & RATING [1 LOT = 10% OF INSTALLED QUANTITY]	item52 of BOQ	1	LOT								-	
53	SPARES- ILLUMINATION EQUIPMENT : CONTROL GEAR BOX OF EACH TYPE-20% OF INSTALLED	item53 of BOQ	1	LOT								-	
54	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - RECESSED MOUNTED LED	item54 of BOQ	7	Nos.								-	
55	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - SURFACE MOUNTED LED	item55 of BOQ	32	Nos.								-	
56	SPARES- ILLUMINATION EQUIPMENT : LED INDOOR HIGH BAY FITTINGSTYPE IHB	item56 of BOQ	6	Nos.								-	
57	SPARES- ILLUMINATION EQUIPMENT : FLOOD LIGHT LED TYPE LIGHTINGFIXTURE WITH ACCESSORIES	item57 of BOQ	16	Nos.								-	
58	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - LED STREETLIGHT	item58 of BOQ	4	Nos.								-	
59	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LEDBULKHEAD	item59 of BOQ	6	Nos.								-	
60	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LEDDOWNLIGHTER	item60 of BOQ	3	Nos.									

SR. NO	ITEM DESCRIPTION	Item code / make	Qty.	UNIT	Unit Ex-work PRICES	GST RATE ON EX WORKS PRICES (%)	GST AMOUNT ON TOTAL EX WORKS PRICES (INR)	UNIT FREIGHT & INSURANCE CHARGES (INR)	GST ON FREIGHT & INSURANCE CHARGES (%)	GST AMOUNT ON FREIGHT & INSURANCE CHARGES (INR)	HSN Code	Total Ex-work + F & I amount excluding GST	Total Ex-work + F & I amount including GST
61	SPARES- ILLUMINATION EQUIPMENT : EMERGENCY EXIT SIGNBOARD/LAMP	item61 of BOQ	3	Nos.									
62	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - LED POST TOPLANTERN	item62 of BOQ	4	Nos.									
63	SPARES- ILLUMINATION EQUIPMENT : SWITCHES, CONTACTORS, TERMINALBLOCKS, SCREWS [1 LOT = 20% OF INSTALLED QUANTITY]	item63 of BOQ	1	LOT								-	
64	SPARES- ILLUMINATION EQUIPMENT : CONDUITS, CABLES, WIRES [1 LOT = 5% OF INSTALLED QUANTITY]	item64 of BOQ	1	LOT								-	
65	SPARES- ILLUMINATION EQUIPMENT : INDICATING LAMPS, MCCBS., MCBS:AUX_ RELAYS, PUSH BOTTOMS ETC.- 20% OF INSTALLED	item65 of BOQ	1	LOT								-	
66	SPARES- ILLUMINATION EQUIPMENT : SOLAR PANEL- 10% OF INSTALLED	item66 of BOQ	1	LOT								-	
67	SPARES- ILLUMINATION EQUIPMENT : CONTROL GEAR BOX OF SOLAR PANEL.(INCLUDING BATTERY BANK) - 10% OF INSTALLED	item67 of BOQ	1	LOT								-	
68	SPARES- ILLUMINATION EQUIPMENT : 4.5M HIGH LIGHTING POLE FORPOST-TOP LANTERN	item68 of BOQ	1	Nos.								-	
69	SPARES- ILLUMINATION EQUIPMENT : STREET POLE 9 METER	item69 of BOQ	1	Nos.								-	
70	SPARES- ILLUMINATION EQUIPMENT : LUX METER	item70 of BOQ	1	Nos.								-	
71	SPARES- ILLUMINATION EQUIPMENT : LUG, THIMBLE, GLANDS ETC- 10% OF INSTALLED	item71 of BOQ	1	LOT								-	
	GRAND TOTAL											-	

NOTE:

1. **PLEASE NOTE THAT UNPRICED COPY OF PRICE BID (i.e. WITH ALL PRICES BLANKED) SHALL BE FURNISHED ALONG WITH TECHNO-COMMERCIAL BID.**
2. **REQUIRED COPIES OF FORMAT BE MADE & DETAILS MAY BE ANNEXED.**
3. **THE PRICES MUST BE QUOTED IN THE PRESCRIBED FORMAT IN PORTAL ONLY.**

SIGNATURE & SEAL OF TENDERER

VENDOR / SUB-VENDOR ASSESSMENT SHEET

TO BE FILLED-IN BY SUPPLIER / SUB-VENDOR

NAME OF SUPPLIER / SUB-VENDOR IN FULL		
	REGISTERED OFFICE	FACTORY / WORKS
ADDRESS		
TELEPHONE NO.		
FAX NO.		
EMAIL ID		
PERSON(S) TO BE CONTACTED (NAME & DESIGNATION & MOBILE NO.)		
WEEKLY OFF		

SHIFT WORKING		**Type of Company (Pl. Tick)**		**Type of Industry (Pl. Tick)**	
OFFICE	WORKS	**Pvt. Ltd** ☐	**Public Ltd.** ☐	**MSME** ☐	**Large Scale** ☐
ONE ☐	ONE ☐	**Proprietary** ☐	**Partnership** ☐	**Govt.** ☐	**Contractor** ☐
TWO ☐	TWO ☐	**Public Sector** ☐			
THREE ☐	THREE ☐				

Prepared By:	Reviewed By:	Approved By: Process Owner

Sr. No.	Items / Services / Process for which Approval is desired for	Rating / Size & Type	Applicable Standards IS/DIN/BS/IEC Etc.

REGISTRATION DETAILS #

PAN / TAN NO.	CENTRAL SALES TAX REG. NO.	STATE SALES TAX / TIN NO.	EXCISE DUTY REGISTRATION NO.
EXCISE CONTROL CODE NO.	SERVICE TAX REG. NO.	CATEGORY OF INDUSTRY	REGSISTRATION NO. & VALIDITY DATE
		Micro ☐ Small ☐ Medium ☐ Large ☐	

Prepared By:	Reviewed By:	Approved By: Process Owner

A.	ORGANISATIONAL SOUNDNESS				
SR. NO.	DESCRIPTION			DETAILS TO BE FURNISHED	
1.	Nature of Business (Strike whichever is not applicable)			Manufacturing Unit / Engineering Consultant / Agents / Distributors / Stockists / Dealers / Traders / Indian Subsidiary / EPC contractor / Channel Partner (Attach authorization certificate of principal) / Erection contractor / Other	
2.#	Year of commencement of Business / Factory Establishment				
3.	Year of Commencement of Manufacture / Services				
4.	Total Area/Covered Area in Sq. m.			**Total Area**	**Covered Area**
5.	Electric Power-Connected Load				
6.#	Electric Power Standby Load & System				
7.	Details of Directors				
Sr. No.	Name	Designation		Qualification	Experience
8.	Details of Employees				

Pleases attach copy of Company's Organization Chart (For Unit)

Division Status	Graduate		Diploma	Skilled	Un-Skilled	Remarks
	Technical	Non-Technical				
Production						
Engineering & Quality Control						
Administration & Other Supporting activities.						

Prepared By:	Reviewed By:	Approved By: Process Owner

9.	Brief Details of Product and Manufacturing Capability				
Sr. No.	Item & Material	Description (Type, Size Rating)	Annual Production for Last Three Years		
			I	II	III
10.#	Details of Foreign or Indigenous Collaborator				
Sr. No.	Product	Name & Address of Collaborator	Collaboration		
			Scope	Year	Valid up to
11#	Have your product been type tested by any external agency? If so, give details				
Sr. No.	Product	Test (Size / Type & class	Test Report No.		Next Due date

Prepared By:	Reviewed By:	Approved By: Process Owner

12.#	Have you been approved by any Statutory agency / third party agency like LLOYD, ASME, NTPC, PGCIL, EIL, Railways etc. ? If so, indicate details and enclose copies of approval letters				
Sr. No.	Item / Material / Service / Process	Description (Size, Type & Class)	Agency	Date of approval	Next Due date

13.#	Indicate Approval / Certification by National / International Standards / Agencies applicable for the subject product.		
Sr. No.	Product	Codes / Standards	License No. & Date

14.#	Reference List (Experience in Particular Type of Equipment / Service / Process). Please indicate since how many years similar type of item / equipment / service / process provided (please furnish documentary evidence).				
Sr. No.	Item / Material / Service / Process	Type & Capacity / Rating	Customer (End User with Address)	Date of Supply / Service provided	Under Operation since year / Month

#Note: Please furnish the performance feedback certificate for proposed item / equipment / process / service form end user in line with requirement stipulated in Technical Specification.

15.#	Business Commenced with SJVN in past		
Sr. No.	Year	Name of Department / Project Dealt with	Item Supplied / Services Offered.

16.A#	Machinery, Instrument & other Equipment Specific to Process & Product Facilities / service				
Sr. No.	Description of Machine	Capacity & Nos.	Location Shop	Make	Year of Manufg.

16.B#	Other General Facilities				
Sr. No.	Description of Machine	Capacity & Nos.	Location Shop	Make	Year of Manufg.
i	Material Handling Mobile Crane Fork Lift Over Head Cranes				
ii	Metal Cutting & Bending				
iii	Casting				
iv	Forging				
v	Fabrication				
vi	Welding				
vii	Machining				
viii	Heat Treatment				
ix	Sheet Metal				
x	Fettling & Cleaning, Sand Blasting, Shot Blasting & Pickling				
xi	Painting				
xii	Metal Coating				
xiii	Protection before packing				
xiv	Packing				
xv	Other				
17.#	If In-House Manufacturing Facilities not available, inform source of manufacturing details along with their facilities and experience				
Sr. No.	Process outsourced	Name of the company	Description of machine / Equipment		Remarks

18. A#	Facilities for In-house Testing & Inspection				
Sr. No.	Description	Capacity & Nos.	Make & Year of Mfg.	Calibration Status	Approval Qualification

18.B#	If In-house testing facilities are not available, indicate source of testing with relevant details.					
Sr. No.	Source of Testing	Description	Capacity & Nos.	Make & Year of Mfg.	Calibration Status	Approval Qualification

Note: In case of outsourcing of major testing such as NDT, Electrical & Mechanical testing, no marks will be awarded. However, material composition testing by chemical method from NABL Lab shall not attract negative marking.

18 C #	Details of any Government Laboratory facility available in area	
	Product related testing facility (type / Performance / Routine / Acceptance Test)	

19	Sources of Raw Material and Bought out Items	
Sr. No.	Description of Raw Material / Bought Out Items	Source
20 #	Storage Area Availability	
	Storage for finished goods (Open / Close)	
	Raw Material storage and identification	
21 #	Do you have in-house Design / R&D departments?	
22 #	Details of pending legal issues on contractual aspects with customers, if any.	
23 #	Please furnish details of Labour problems in the last three years, if any?	

B.	**FINANCIAL SOUNDNESS OF ORGANIZATION**			
	Financial Information for last Three Years (Please furnish copy of annual report)			
Sr. No.	Parameters	Year 20	Year 20	Year 20
1#	Please furnish annual turnover of the company.			
	Growth in annual turnover w.r.t. previous years (%)			
2#	Please furnish Profit before tax (PBT) of the company.			
	Growth in PBT w.r.t. previous years (%).			
3#	Please indicate the net worth (Net current assets – Net current liabilities) of the company?			
4#	Whether the vendor has been referred to BIFR / NCLT / any other similar Govt. agency.			
5#	Whether the supplier is a potentially sick company.			
6	Please mention current order book position, as on date in terms of Value and time			

C.	QUALITY SYSTEM	
SR. NO.	DESCRIPTION	Sub-vendor response (along with supporting document)
1#	Are you an ISO 9001 company? If yes, please furnish the certificate and what is your quality policy?	
2#	Is the company an ISO 14000 approved?	
3#	Is the company an OHSAS approved?	
4#	Have your company won any Quality award like Rajeev Gandhi National Quality Award, IMC Ramkrishna Bajaj National Quality Award, Golden Peacock National Quality Award etc? If yes provide documentary evidence.	
5#	Have you received appreciation letter from your customer. Please provide evidence.	
6	To whom your Q.C./Q.A. Chief reports to ? (Please furnish your organization structure)	
7#	If you have a written quality control manual/procedure, then please furnish the same.	
7 (i)#	Incoming Material Control System (Furnish a copy of system and organization)	
7 (ii)#	Process Control: Are written procedure defining stage wise operations and functions on shop floor established and followed? (Furnish copy of work instruction and record of process control parameter)	
7 (iii)#	Manufacturing/Testing Procedure Qualification & Personnel Qualification (Procedure qualification specification & Record of personnel qualification (PQR) to be submitted).	
7 (IV)#	Are written Quality Control Instruction sheets prepared & properly used? (Please furnish evidence)	
7 (V)#	Are records generated during inspection maintained & available for review? (Please furnish evidence)	
7 (VI)#	Are quality control checks / procedure adequate to maintain desired quality level right from the incoming stage to final stage? Please furnish copy of such control checks / procedure.	
8.#	**Documentation Control**	
8 (i)	Does a system for clear and precise stipulation of responsibilities for documentation issue & change control exists?	
8 (ii)	Are changes made in writing?	
9#	**Control of Inspection, measuring and testing equipment**	

9 (i)	Are necessary gauges, testing and measuring equipment's, available and used?	
9 (ii)	Are testing and measuring equipment properly maintained?	
9 (iii)	Is recorded control on calibration of equipment available?	
10#	System of Identification & Traceability of materials, tools, jigs, fixtures & processed components, etc. (Copy of procedure to be submitted).	
11#	System of Storage / Preservation / Painting and Packing (copy of Procedure to be submitted)	
12#	Do you have written procedure for disposing off the non-conformities? If yes, please furnish the copy of the same also furnish three copies of NCR & CAPA.	
13#	Safety measures (Submit copy of safety system & record of accidents for last two years)	
14#	What type of Sampling Inspection Plan is used in your factory/company? Please furnish details.	
15	How good are you in keeping your dispatch commitments? Please give details of last ten deliveries stating details as below (Provide documentary evidence) Within delivery period: Delayed but accepted by user: Delayed but accepted with penalty:	
16#	Have you ever been de-listed or put in under temporary suspension by any customer / contractor.	
D.	**AFTER SALES SERVICE**	
SR. NO.	DESCRIPTION	Sub-vendor response (along with supporting document)
1#	For overcoming product deficiencies what are the analytical methods used at Customer's premises?	
2#	What is the strength of your "after-sales service" team?	
3#	What is the response time after receiving complaints from the customers? Provide evidence.	
4#	Customer complaints handling system (Submit list of customer complaints & status for the last three years) Please furnish complete list	

	of complaints attended to during last one year.	
5#	How do you keep your "after-sales service" team updated?	
6#	Provide certificate from 02 customers (end user) for satisfactory after sails services.	

Declaration by Director/ Partner/ Proprietor

I declare that the information furnished above and attached documents are correct to the best of my knowledge, I undertake to inform you at the earliest any change(s) in the details mentioned above.

Signature and Date

Name & Designation

TO BE FILLED BY MAIN CONTRACTOR FOR SUB-VENDOR (MC)

Sr. No.	Parameters	Supplier response (along with supporting document)
1	Name and address of sub-vendor:	
2 (a)	Type of equipment / item / process / service for which approval is sought:	
2 (b)	Details of equipment / item / process / service for which approval is sought (i.e. Rating, capacity, type, size, weight, etc.):	
3	Experience of main contractor with sub-vendor:	
(a)#	Since how many years sub-vendor is registered with you for proposed type of equipment / item / process / services (furnish documentary evidence):	
4#	Whether sub-vendor is meeting the qualification criteria indicated in the technical specification (furnish documentary evidence).	
5#	Sub-vendor rating as per contractor's internal procedure in the scale 0-10 or 0-100% (furnish documentary evidence).	
6#	Any dispute of main contractor with vendor during execution of last 05 contracts.	
7#	Have you ever de-listed or put in temporary suspension the proposed sub-vendor? If yes, please provide the reason for same.	
8	Please indicate the reason for re-approving / re-listing the sub-vendor.	

I declare that the information furnished by Sub-vendor has been verified and found in order / minor changes which have been marked and initialed on this form itself / observed the following discrepancies.

(Signature & Designation)

GUIDELINES TO SUPPLIERS FOR FILLING-UP VENDOR/SUPPLIER REGISTRATION FORM

1. All columns are to be filled up properly in the space provided for. Wherever it is not applicable / not available, please mention "Not Applicable" / "Not Available". All pages of the form are to be signed along with seal by the authorized signatory.
2. A separate sheet may be attached if the space provided is insufficient or additional information is to be given, Please put proper identification tag on the separately attached sheet.
3. Any information / clarification required by SJVN during evaluation must be given expeditiously.
4. Please ensure that all required enclosures are attached with the filled up Vendor Registration Form.
5. Marks shall be awarded on the basis of documentary evidences submitted by Vendor / sub-vendor wherever called in vendor / sub-vendor assessment form.
6. Incomplete or incorrect forms will be rejected.
7. Please fill up the check list given below and send along with the vendor registration forms to SJVN.
8. In case any information found incorrect / false, the vendor shall be rejected / de-listed at any stage.
9. Information with # marks is score able.
10. Accepting or rejecting a vendor is sole discretion of SJVN.
11. Product catalogue / manual for the proposed item / equipment / process / service, if available, shall be submitted alongwith other documents.

Furnish following information/Documents:-

Sr. No.	Description	Yes / No	Page No / Annexure
1	Latest audited annual account.		
2	Balance Sheet.		
3	Valid Income Tax Clearance Certificate.		
4	Details of Pending Arbitration cases.		
5	Details of pending disputes with Statutory Authorities.		
6	Organization chart		
7	Copy of Performance certificate (minimum 03)		
8	Copy of minimum three (03) completion certificates of similar work / service.		
9	Latter of approval from ASME / NTPC/ EIL / Railway / Lloyds / Power Grid etc. if any.		
10	ISO: 9001 certificate		
11	Quality Manual		
12	ISO: 14000 certificate		
13	OHSAS, ISO 18000 certificate		
14	Experience list		
15	Type test report & approval certificate		
16	Product Approval certificate from national / international agency.		
17	Quality award certificate		
18	Process and Personnel qualification certificates		
19	Copy of registration / enlistment with reputed / large organizations		
20	Detail of existing clients and details such as address, contact number and mail address.		
21	List of works / projects of similar nature executed with documentary evidences of works executed in last 02 years.		
22	Other documents mentioned elsewhere in vendor / sub-vendor assessment form.		

(Signature & Designation)

Guidelines for Reverse Auction – 2021

Doc. No. AA:SSP:RA:05
Dated: 08.03.2021

1.0 Scope

This document describes the guidelines to be followed by BHEL for conducting Reverse Auction (RA) for procurement of material/ works/ services. The RA shall follow the philosophy of English Reverse (No ties).

English Reverse (No ties) is a type of auction where the starting price and bid decrement are announced before start of online reverse auction. The interested bidders can thereupon start bidding in an iterative process wherein the lowest bidder at any given moment can be displaced by an even lower bid of a competing bidder, within a given time frame. The bidding is with reference to the current lowest bid in the reverse auction. All bidders will see the current lowest quoted price and their rank. The term 'No ties' is used since more than one bidder cannot give an identical price, at a given instant, during the reverse auction. In other words, there shall never be a tie in the bids.

3.0 Upfront declaration in NIT

Decision to go for RA would be taken before floating of the tender. In case it is decided to go for RA, same shall be declared upfront in NIT by inserting the following **clause:**

"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the techno-commercially qualified bidders.

Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

6.0 Business rules for RA

Model Annexure-I is attached.

7.0 Role of Service Provider

- Acknowledge the receipt of mandate from BHEL.
- Contact the bidders, provide business rules and train them, as required.
- Get the process compliance form signed by all the participating bidders before RA event.

- Conduct the event as per the contract and business rules.
- Submit the Login Reports, Results, History sheet and authorized final bid from the bidders.
- To obtain price breakup from successful bidder and submit the same to BHEL.

10.0 Reverse Auction Process

10.1 Reverse Auction will be conducted if two or more bidders are techno-commercially qualified. In case of two or three qualified bidders, there shall be no elimination of H1 bidder (whose quote is highest in sealed envelope price bid). In case of four qualified bidders, the H1 bidder shall be eliminated whereas in case of five qualified bidders, H1 & H2 bidders shall be eliminated. However, in case of six or more qualified bidders are available, RA would be conducted amongst first 50% of the bidders arranged in the order of prices from lowest to highest. Number of bidders eligible for participating in RA would be rounded off to next higher integer value if number of qualified bidders is odd (e.g. if 7 bids are qualified, then RA will be conducted amongst lowest four bidders). However, there will be no elimination of qualified bidders who are MSE or qualifying under PPP-MII, Order 2017, irrespective of the number of bidders qualifying techno-commercially.

In case of multiple H1 bidders, all H1 bidders (excluding MSEs and bidders qualifying under PPP-MII, Order 2017) shall be removed provided minimum two bidders remain in fray, else no H1 removal.

10.2 During RA, all bidders will see their rank and current L1 price on the screen. Once the RA is done, the ranking status would be based on the last quoted price of the bidder(s) irrespective of the quote received in RA or sealed envelope price bid.

10.3 No bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.

11.0 Processing of case after RA

11.2 In case of splitting requirement, bidders who were removed from participation in RA may also be considered for counter offer if the pre-stated (NIT) numbers of suppliers do not accept the counter offer.

13.0 Others

13.2 In case of enquiry through e-Procurement, the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.

13.3 BHEL will inform bidders the details of service provider who will provide business rules, all necessary training and assistance before commencement of online bidding.

13.4 Bidders will be advised to read the 'Business Rules' indicating details of RA event carefully, before reverse auction event.

---XXX---

Doc. No. AA:SSP:RA:05
Dated: 08.03.2021

Business Rules for Reverse Auction

Annexure – I

This has reference to tender no ***{tender number….date***…}. BHEL shall finalise the Rates for the supply of {*item name}* through Reverse Auction mode. BHEL has made arrangement with M/s. {*Service provider},* who shall be BHEL's authorized service provider for the same. Bidders should go through the instructions given below and submit acceptance of the same.

The technical & commercial terms are as per (a) BHEL Tender Enq. No. {…} dated {...}, (b) Bidders' technical & commercial bid (in case of two part bid) and (c) subsequent correspondences between BHEL and the bidders, if any.

1. Procedure of Reverse Auctioning

i. Price bids of all techno-commercially qualified bidders shall be opened.

ii. **Reverse Auction**: The 'bid decrement' will be decided by BHEL.

iv. Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become "L1" and this continues as an iterative process. However, no bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.

v. After the completion of the reverse auction, the Closing Price shall be available for further processing.

vi. Wherever the evaluation is done on total cost basis, after Reverse Auction, prices of individual line items shall be reduced on pro-rata basis.

2. Schedule for reverse auction: The Reverse Auction is tentatively scheduled on *{date}: ;{start time}: ;{Close Time: }*.

3. Auction extension time: If a bidder places a bid in the last {…} minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another {…} minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last {…} minutes and if that bid gets accepted as the lowest bid. If the bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last {…}

minutes. In case, there is no bid in the last {…} minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, bidders are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

The above process will continue till completion of Reverse Auction.

Complaints/ Grievances, if any, regarding denial of service or any related issue should be given in writing thru e-mail/ fax to M/s. {Service provider} with a copy to BHEL within 15 minutes prior to initial closing time of Reverse Auction.

4. **Bid price:** The Bidder has to quote the {……} Price inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, taxes, duties, freight and insurance as specified in tender document. including loading (if indicated by BHEL due to deviations in technical/ commercial terms) for the Items specified. Details are as shown in Excel Sheet for calculation of total cost to BHEL (To be specified by Unit as per NIT conditions).

5. **Bidding currency and unit of measurement:** Bidding will be conducted in *Indian Rupees* per *Unit* of the material as per the specifications {...}

   In case of foreign currency bids, exchange rate (TT selling rate of State Bank of India) as on scheduled date of tender opening (Part-I bid) shall be considered for conversion in Indian Rupees. If the relevant day happens to be a Bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.

6. **Validity of bids:** Price shall be valid for {… *days}* from the date of reverse auction. These shall not be subjected to any change whatsoever.

7. **Lowest bid of a bidder**: In case the bidder submits more than one bid, the lowest bid at the end of Reverse Auction will be considered as the bidder's final offer to execute the work.

8. Unique user IDs shall be used by bidders during bidding process. All bids

made from the Login ID given to the bidders will be deemed to have been made by the bidders/ bidders' company.

9. **Post auction procedure**: BHEL will proceed with the Lowest Bid in the Reverse Auction for further processing.

11. Reverse auction shall be conducted by BHEL (through M/s {*Service Provider*}), on pre-specified date, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.

During the RA process if a bidder is not able to bid and requests for extension of time by FAX/ email/ phone then time extension of additional 15 minutes will be given by the service provider provided such requests come before 5 minutes of auction closing time. However, only one such request per bidder can be entertained.

In order to ward-off contingent situation of connectivity failure bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power or loss of connectivity at the premises of bidders during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor M/s. {*Service provider*} is responsible for such eventualities.

12. Proxy bids: Proxy bidding feature is a pro-bidder feature to safe guard the bidder's interest of any internet failure or to avoid last minute rush. The proxy feature allows bidders to place an automated bid in the system directly in an auction and bid without having to enter a new amount each time a competing bidder submits a new offer. The bid amount that a bidder enters is the minimum that the bidder is willing to offer. Here the software bids on behalf of the bidder. This obviates the need for the bidder participating in the bidding process until the proxy bid amount is decrementally reached by other bidders. When proxy bid amount is reached, the bidder (who has submitted the proxy bid) has an option to start participating in the bidding process.

The proxy amount is the minimum amount that the bidder is willing to offer.

During the course of bidding, the bidder cannot delete or change the amount of a proxy bid.

Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that the auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing bidder bids, regardless of the fact whether the competing bids are submitted as proxy or standard bids. However, it may please be noted that if a manual bid and proxy bid are submitted at the same instant manual bid will be recognized as the L1 at that instant.

In case of more than one proxy bid, the system shall bid till it crosses the threshold value of 'each lowest proxy bid' and thereafter allow the competition to decide the final L1 price.

Proxy bids are fed into the system directly by the respective bidders. As such this information is privy only to the respective bidder(s).

13. Bidders are advised to get fully trained and clear all their doubts such as refreshing of Screen, quantity being auctioned, tender value being auctioned etc from M/s {*Service provider*}.

14. M/s. {*Service provider*}, shall arrange to demonstrate/ train the bidder or bidder's nominated person(s), without any cost to bidders. M/s. {*Service provider*}, shall also explain the bidders, all the business rules related to the Reverse Auction. Bidders are required to submit their acceptance to the terms/ conditions/ modalities before participating in the Reverse Auction in the process compliance form as enclosed. Without this, the bidder will not be eligible to participate in the event.

15. Successful bidder shall be required to submit the final prices (L1) in prescribed format (Annexure – VI) for price breakup, quoted during the Reverse Auction, duly signed and stamped as token of acceptance without any new condition (other than those already agreed to before start of auction), after the completion of auction to M/s. {*Service provider*} besides BHEL within two working days of Auction without fail.

16. Any variation between the final bid value and that in the confirmatory

signed price breakup document will be considered as tampering the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

17. Bidders' bid will be taken as an offer to execute the work/ supplies the item as per enquiry no. *{…}* dt. *{…}*. Bids once made by the bidder, cannot be cancelled/ withdrawn and bidder shall be bound to execute the work as mentioned above at bidder's final bid price. Should bidder back out and not execute the contract as per the rates quoted, BHEL shall take action as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

18. Bidders shall be able to view the following on their screen along with the necessary fields during Reverse Auction:

a. Leading (Running Lowest) Bid in the Auction (only total price of package)
b. Bid Placed by the bidder
c. Start Price
d. Decrement value
e. Rank of their own bid during bidding as well as at the close of auction.

19. BHEL's decision on award of contract shall be final and binding on all the Bidders.

20. BHEL reserves the right to extend, reschedule or cancel the Reverse Auction process at any time, before ordering, without assigning any reason, with intimation to bidders.

21. BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause. In such cases, the decision of BHEL shall be binding on the bidders.

22. Other terms and conditions shall be as per bidder's techno-commercial offers and other correspondences, if any, till date.

23. If there is any clash between this business document and the FAQ available, if any, in the website of M/s. *{Service provider},* the terms & conditions given in this business document will supersede the information contained in the FAQs. Any changes made by BHEL/ service provider (due to unforeseen

contingencies) after the first posting shall be deemed to have been accepted if the bidder continues to access the portal after that time.

24. Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action *as per extant BHEL guidelines for suspension of business dealings (as available on www.bhel.com)*, shall be initiated by BHEL.

निविदा / Enquiry

भारत हेवी इलेक्ट्रिकल्स लिमिटेड / BHARAT HEAVY ELECTRICALS LIMITED
पारेषण व्यापार समूह / Transmission Business Group
सामग्री प्रबंधन / Materials Management

Project : SJVNL ARUN-3

Enquiry No	Enquiry Date	Rev No	Rev Date	PI No	Enquiry Type	Inspection by	Due Dt	Commercial Comments	Technical Comments	Signing Authority
20Q2300118	05-Sep-22	0		20I2300583	Package		16-Sep-22	AS PER NIT	AS PER TB-405-316-007 Rev01	Shipra Gupta

Equipment Detail

SN	Material Code	Equipment	HSN Code	Phy Unit	Qty	Plan Dt	Comments
1	TB9200006045	SUPPLY- ILLUMINATION EQUIPMENT : FLOOD LIGHT LED TYPE LIGHTING FIXTURE WITH ACCESSORIES	0	NO	80.0000		
2	TB9200004572	SUPPLY- ILLUMINATION EQUIPMENT : STREET LIGHTING FIXTURES	0	NO	20.0000		
3	TB9200003812	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LED DOWNLIGHTER	0	NO	15.0000		
4	TB9200003803	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LED BULKHEAD	0	NO	30.0000		
5	TB9200003851	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - LED POST TOP LANTERN	0	NO	16.0000		
6	TB9200000342	SUPPLY- ILLUMINATION EQUIPMENT : 15A,240V,2 POLE, 3 PIN OUTDOOR RECEPTACLE (TYPE RO)	0	NO	33.0000		
7	TB9200000334	SUPPLY- ILLUMINATION EQUIPMENT : 63A, 415V : INTERLOCKED SWITCH SOCKET OUTDOOR RECEPTACLE (TYPE RP)	0	NO	12.0000		
8	TB9200004741	SUPPLY- ILLUMINATION EQUIPMENT : 415 V A.C. INDOOR TYPE LIGHTING PANEL (NORMAL) (TYPE NLP-1)	0	NO	3.0000		
9	TB9200000472	SUPPLY- ILLUMINATION EQUIPMENT : INDOOR EMERGENCY LIGHTING PANEL	0	NO	3.0000		
10	TB9200004755	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING PANEL (INDOOR) TYPE DCELP/ DCLP-1	0	NO	5.0000		
11	TB9200002536	SUPPLY- ILLUMINATION EQUIPMENT : JUNCTION BOXES FOR OUTDOOR	0	NO	15.0000		
12	TB9200000493	SUPPLY- ILLUMINATION EQUIPMENT : OUTDOOR LIGHTING PANEL	0	NO	4.0000		
13	TB9200000565	SUPPLY- ILLUMINATION EQUIPMENT : STREET LIGHTING PANEL	0	NO	2.0000		
14	TB9200000353	SUPPLY- ILLUMINATION EQUIPMENT : OUTDOOR POWER RECEPTACLE FOR OIL FILTRATION UNIT (250A)	0	NO	3.0000		
15	TB9200006256	SUPPLY- ILLUMINATION EQUIPMENT : DECORATIVE TYPE SWITCH & SOCKET WITH TWO NOS OF 5 A SWITCH	0	NO	10.0000		
16	TB9200006266	SUPPLY- ILLUMINATION EQUIPMENT : DECORATIVE TYPE SWITCH & SOCKET WITH FOUR NOS OF 5 A SWITCH WITH ONE NOS SOCKET	0	NO	20.0000		
17	TB9200006272	SUPPLY- ILLUMINATION EQUIPMENT : DECORATIVE TYPE SWITCH & SOCKET WITH SIX NOS OF 5 A SWITCH WITH ONE NOS SOCKET	0	NO	10.0000		
18	TB9200001131	SUPPLY- ILLUMINATION EQUIPMENT : SINGLE SOCKET OUTLET RJ-11	0	NO	10.0000		
19	TB9200006232	SUPPLY- ILLUMINATION EQUIPMENT : MAIN LIGHTING DISTRIBUTION BOARD (MLDB) COMPRISING 415V, 200A, 3-PH, 4-WIREBUS AND 2 NO INCOMERS EACH WITH ONE (1) NO. LIGHTING TRANSFORMER: 100KVA WITH ONE (1)MCCB (INCLUSIVE OF CT,VOLTMETER, AMMETER, CONTACTOR WITH TIMER, INDICATING LAMPS ETC), BUS COUPLER -200A MCCB AND OUTGOING FEEDERS 6 NO. 63A TPN MCCB ON EACH BUS SECTION	0	NO	1.0000		
20	TB9200006426	SUPPLY- ILLUMINATION EQUIPMENT : EMERGENCY LIGHTING DISTRIBUTION BOARD (MLDB) COMPRISING 415V, 100A, 3-PH, 4-WIREBUS AND 2 NO INCOMERS EACH WITH ONE (1) NO. LIGHTING TRANSFORMER: 50KVA WITH ONE (1)MCCB (INCLUSIVE OF CT,VOLTMETER, AMMETER, CONTACTOR WITH TIMER, INDICATING LAMPS ETC), BUS COUPLER -100A MCCB AND OUTGOING FEEDERS 4 NO. 63A TPN MCCB ON EACH BUS SECTION	0	NO	1.0000		
21	TB9200006241	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING DISTRIBUTION BOARD (DC-LDB) COMPRISING WITH ONE (1) NO. INCOMER 125ADP SWITCH-FUSE UNIT WITH CONTACTOR, OUTGOING FEEDERS 6 NO. 32A DP MCB	0	NO	1.0000		
22	TB9200005326	SUPPLY- ILLUMINATION EQUIPMENT : 32A RECEPTACLES WITH TP MCB FOR AC UNIT	0	NO	14.0000		
23	TB9200002731	SUPPLY- ILLUMINATION EQUIPMENT : 5A/15A RECEPTACLE TYPE RI	0	NO	21.0000		

SN	Material Code	Equipment	HSN Code	Phy Unit	Qty	Plan Dt	Comments
24	TB9200004975	SUPPLY- ILLUMINATION EQUIPMENT : WALL FAN 400MM SWEEP, INDUSTRIAL TYPE, ENERGY EFFICIENT	0	NO	6.0000		
25	TB9200004063	SUPPLY- ILLUMINATION EQUIPMENT : 1200 MM SWEEP CEILING FAN	0	NO	28.0000		
26	TB9200002814	SUPPLY- ILLUMINATION EQUIPMENT : 300 MM SWEEP EXHAUST FANS	0	NO	6.0000		
27	TB9200003403	SUPPLY- ILLUMINATION EQUIPMENT : OCCUPANCY BASED INFRA RED SENSORS	0	NO	10.0000		
28	TB9200002705	SUPPLY- ILLUMINATION EQUIPMENT : LIGHT LEVEL SENSORS AND OTHER ACCESSORIES AS REQUIRED FOR CONTROL OF LIGHTING IN THE STAIRS AREA OF CONTROL ROOM CUM ADMINISTRATIVE BUILDING AS PER SPECIFICATION	0	NO	2.0000		
29	TB9200002765	SUPPLY- ILLUMINATION EQUIPMENT : TELEPHONE POINTS- SINGLE OUTLET TELEPHONE SOCKET INCLUDING CABLE/WIRE AND ACCESSORIES	0	NO	4.0000		
30	TB9200001104	SUPPLY- ILLUMINATION EQUIPMENT : TELEPHONE JB	0	NO	2.0000		
31	TB9200002725	SUPPLY- ILLUMINATION EQUIPMENT : TEMPERATURE TRANSDUCER	0	NO	2.0000		
32	TB9200006316	SUPPLY- ILLUMINATION EQUIPMENT : STREET POLE 9 METER	0	NO	15.0000		
33	TB9200001194	SUPPLY- ILLUMINATION EQUIPMENT : CARTWHEEL MOUNTED ALUMINIUM LADDER AS PER TECHNICAL SPECIFICATION	0	NO	2.0000		
34	TB9200006326	SUPPLY- ILLUMINATION EQUIPMENT : VEHICLE MOUNTED ADJUSTABLE PLATFORM EXTENDED UPTO 12 M.	0	NO	1.0000		HAND,MANUAL DRIVE CART
35	TB9200006015	SUPPLY- ILLUMINATION EQUIPMENT : LADDER	0	NO	2.0000		1 NO LADDER EACH FOR 2M AND 5M
36	TB9200002774	SUPPLY- ILLUMINATION EQUIPMENT : LAN POINTS INCLUDING ACCESSORIES	0	NO	3.0000		
37	TB8200006392	SPARES- ILLUMINATION EQUIPMENT : LUX METER	0	NO	1.0000		
38	TB9200006286	SUPPLY- ILLUMINATION EQUIPMENT : STRUCTURAL STEEL FOR ILLUMINATION RECEPTACLES, PANELS, ETC.	0	MT	4.0000		
39	TB8200006402	SPARES- ILLUMINATION EQUIPMENT : LUG, THIMBLE, GLANDS ETC- 10% OF INSTALLED	0	LOT	1.0000		
40	TB8200006334	SPARES- ILLUMINATION EQUIPMENT : MULTIPLE PLUG POWER SOCKETS SUITABLE FOR 63/32A, SINGLE PHASE	0	LOT	1.0000		1 LOT=20% OF INSTALLED QUANTITY
41	TB8200005713	SPARES- ILLUMINATION EQUIPMENT : MULTIPLE PLUG POWER SOCKETS SUITABLE FOR 15A/5 A	0	LOT	1.0000		1 LOT =20% OF INSTALLED QUANTITY
42	TB8200002191	SPARES- ILLUMINATION EQUIPMENT : LAMPS OF EACH TYPE & RATING	0	LOT	1.0000		1 LOT=10% OF INSTALLED QUANTITY
43	TB8200006342	SPARES- ILLUMINATION EQUIPMENT : CONTROL GEAR BOX OF EACH TYPE- 20% OF INSTALLED	0	LOT	1.0000		
44	TB8200005743	SPARES- ILLUMINATION EQUIPMENT : SWITCHES, CONTACTORS, TERMINAL BLOCKS, SCREWS	0	LOT	1.0000		1 LOT=20% OF INSTALLED QUANTITY
45	TB8200005752	SPARES- ILLUMINATION EQUIPMENT : CONDUITS, CABLES, WIRES	0	LOT	1.0000		1 LOT=5%OF INSTALLED QUANTITY
46	TB8200006352	SPARES- ILLUMINATION EQUIPMENT : INDICATING LAMPS, MCCBS., MCBS: AUX_ RELAYS, PUSH BOTTOMS ETC.- 20% OF INSTALLED	0	LOT	1.0000		
47	TB8200006362	SPARES- ILLUMINATION EQUIPMENT : SOLAR PANEL- 10% OF INSTALLED	0	LOT	1.0000		
48	TB8200006376	SPARES- ILLUMINATION EQUIPMENT : CONTROL GEAR BOX OF SOLAR PANEL. (INCLUDING BATTERY BANK) - 10% OF INSTALLED	0	LOT	1.0000		
49	TB9200003624	SUPPLY- ILLUMINATION EQUIPMENT : EARTHING MATERIAL - 25X6MM GI FLAT	0	MTR	500.0000		
50	TB9200002782	SUPPLY- ILLUMINATION EQUIPMENT : LAN CABLE	0	MTR	300.0000		
51	TB3200003981	SERVICES- ILLUMINATION EQUIPMENT : TO & FRO TRAVEL CHARGES TO SITE FOR SUPERVISION OF ERECTION TESTING & COMMISSIONING FOR ILLUMINATION SYSTEM PER VISIT	0	VISIT	8.0000		PER VISIT SHALL BE MINIMUM 7 DAYS

SN	Material Code	Equipment	HSN Code	Phy Unit	Qty	Plan Dt	Comments
52	TB3200001946	SERVICES- ILLUMINATION EQUIPMENT : SUPERVISION OF ERECTION TESTING & COMMISSIONING FOR ILLUMINATION SYSTEM ON PER MANDAY BASIS	0	MANDAY	56.0000		
53	TB8200006045	SPARES- ILLUMINATION EQUIPMENT : FLOOD LIGHT LED TYPE LIGHTING FIXTURE WITH ACCESSORIES	0	NO	16.0000		
54	TB8200003843	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - LED STREET LIGHT	0	NO	4.0000		
55	TB8200003805	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LED BULKHEAD	0	NO	6.0000		
56	TB8200003816	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LED DOWNLIGHTER	0	NO	3.0000		
57	TB8200003855	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - LED POST TOP LANTERN	0	NO	4.0000		
58	TB8200001721	SPARES- ILLUMINATION EQUIPMENT : 4.5M HIGH LIGHTING POLE FOR POST-TOP LANTERN	0	NO	1.0000		
59	TB9200006301	SUPPLY- ILLUMINATION EQUIPMENT : ERECTION ITEMS OUTDOOR- POINT WIRING FOR AC FIXTURE, FANS & LIGHTS (20MM, 25MM PVC/GI CONDUIT ; 1.5, 2.5, 4 SQ. MM CU WIRE ETC.)	0	LOT	1.0000		
60	TB9200006295	SUPPLY- ILLUMINATION EQUIPMENT : ERECTION ITEMS INDOOR- POINT WIRING FOR AC FIXTURE, FANS & LIGHTS (20MM, 25MM PVC/GI CONDUIT ; 1.5, 2.5, 4 SQ. MM CU WIRE ETC.)	0	LOT	1.0000		
61	TB9200002981	SUPPLY- ILLUMINATION EQUIPMENT : 25M HIGH MAST WITH FEEDER PILLAR (WITHOUT FIXTURES)	0	NO	4.0000		
62	TB8200001416	SPARES- ILLUMINATION EQUIPMENT : EMERGENCY EXIT SIGN BOARD/LAMP	0	NO	3.0000		
63	TB9200000243	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - SURFACE MOUNTED LED	0	NO	160.0000		
64	TB9200002635	SUPPLY- ILLUMINATION EQUIPMENT : LED INDOOR HIGH BAY FITTINGS TYPE IHB	0	NO	30.0000		
65	TB9200001415	SUPPLY- ILLUMINATION EQUIPMENT : EMERGENCY EXIT SIGN BOARD/LAMP	0	NO	15.0000		
66	TB9200001721	SUPPLY- ILLUMINATION EQUIPMENT : 4.5M HIGH LIGHTING POLE FOR POST-TOP LANTERN	0	NO	5.0000		
67	TB8200000255	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - RECESSED MOUNTED LED	0	NO	7.0000		
68	TB8200002633	SPARES- ILLUMINATION EQUIPMENT : LED INDOOR HIGH BAY FITTINGS TYPE IHB	0	NO	6.0000		
69	TB9200000254	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - RECESSED MOUNTED LED	0	NO	32.0000		
70	TB8200000243	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - SURFACE MOUNTED LED	0	NO	32.0000		
71	TB8200006314	SPARES- ILLUMINATION EQUIPMENT : STREET POLE 9 METER	0	NO	1.0000		

Instructions to Bidders

You are requested to submit your most competitive offer so as to reach us positively by the tender opening date & time. THE TENDERS NOT RECEIVED WITHIN SCHEDULED DATE AND TIME ARE LIKELY TO BE IGNORED. BHEL shall not be responsible for any postal delay.

In your own interest, you are advised to carefully read "the instructions to bidders". Incomplete bids and/or bids not complying with tender conditions shall be treated as non-responsive and are likely to be ignored.

In case Tender Documents are not received within 7 days of this E-mail message, intimate BHEL accordingly. If no intimation is received, it will be considered that you have received tender enquiry and delay in submission offer due to late receipt of tender documents will not be entertained.

You are requested to submit your most competitive offer as stated in Terms & conditions.

BHEL reserves the right to opt for reverse auction for obtaining best prices.

Offers Through E-MAIL / FAX / E-Procurement Portal:WHOSOEVER DESIRES TO SEND OFFERS ON THEIR OWN RISK (COMPLETE IN ALL RESPECTS) VIA E-MAIL or FAX HAVE TO SEND THE OFFERS TO THE COMMON E-MAIL ADDRESS tenderbox@bhel.in or 0120-6748581 FAX or bhel.abc.procure.com as instructed.THE RECEIVED EMAIL OFFERS WILL BE PRINTED BY PURCHASE COORDINATOR AND PUT THEM INTO COVERS AS PER CONVENTIONAL METHOD FOR TENDER OPENING I.E., TECHNO COMMERCIAL & PRICE OFFER SHALL BE PUT INTO TWO SEPARATE COVERS AND BOTH THE COVERS ARE KEPT IN THIRD COVER DULY SUPER SCRIBING ENQY. NO. AND DUE DATE. OFFERS SENT TO ANY OTHER E-MAIL ID or FAX NO AND INCOMPLETE OFFERS SHALL NOT BE CONSIDERED FOR EVALUATION PURPOSE.The venders who has sent offers with password,the passwords are to be forwarded to email id:tenderbox@bhel.in

It is suggested that the bidders are advised to send the files with 'password protection'.

भारत हैवी इलेक्ट्रिकल्स लिमिटेड के लिए / for BHARAT HEAVY ELECTRICALS LTD

Please acknowledge the receipt of tender enquiry and e-mail/fax back this letter by ticking the appropriate item below.

We acknowledge the receipt of tender.

(a) The offer against subject enquiry shall be submitted by the scheduled date and time.

(b) We regret to quote. The item in reference is out of our manufacturing range.

(c) We regret because of our prior commitments.

(d) Any other reason.

To
Shipra Gupta
Bharat Heavy Electricals Limited
Transmission Business Group
Tower-A,5th Floor,
Advant Navis IT Business Park,
Plot No-7,Sector-142,Expressway Noida
Noida-201305
Distt. Gaut am BudhNagar,U.P
Ph: 0120-6748137

हस्ताक्षर और निविदाकार की सील / Signature and Seal of Tenderer

Enquiry No : 20Q2300118 **Enquiry Date:** 05-Sep-22

Addendum to General Terms and Conditions (GTC)

1	Offer Submission/ Opening Time	Offer Submission Time: 14:00 Hrs IST Offer Opening Time: 14:30 Hrs IST
2	Instruction to Bidder(s)	I. For Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site is in the scope of the supplier or Supply where Testing & Commissioning (T&C) at Site is in scope of the supplier, minimum 10% of total ex-works value shall be quoted under supervision of ETC/T&C. In case bidder quotes less than 10%, then 10% of Total PO value excluding GST and F&I shall be allocated to the supervision of ETC/T&C scope. Service charges shall be back calculated to keep 10% of total cost to BHEL (without GST). This price adjustment shall be done from supply Ex works prices only on prorata basis for all supply line items. II. For Supply where Erection, Testing & Commissioning (ETC) at Site is in the scope of the supplier, minimum 20% of total ex-works value shall be quoted under ETC. In case bidder quotes less than 20%, then 20% of Total PO value excluding GST and F&I shall be allocated to the ETC scope. Service charges shall be back calculated to keep 20% of total cost to BHEL (without GST). This price adjustment shall be done from supply Ex works prices only on prorata basis for all supply line items. III. Endorsed LR is not required in GST Regime. IV. Bidder's offer will be technically acceptable subject to final acceptance of vendor by ultimate customer as approved supplier. Price Bid will be opened only for those bidders in respect of which vendor approval is received from CUSTOMER. Necessary credentials/documents to be submitted for approval by Customer.
3	Offer Submission Mode	Clause No. 1.3 of GTC – Tender is invited through e-Procurement System only. The bidder shall submit their bid through e-Procurement platform at https://bhel.abcprocure.com Vendors participating through e-procurement portal for this tender should have Class-III Digital Signature Certificate (DSC) for Signing & Encryption of bids issued by any of the valid Certifying Authorities (approved by Controller of Certifying Authorities) in India.
4	Validity of Purchase Order	Purchase order shall be valid for two (02) years from date of Purchase Order.
5	Work Address	Bidder to mention their works address below from where material will be supplied Works Address: ---------- ---------- ----------
6	Pre- Qualification Requirement(PQR)	As per **Annexure-I.** The bidder must ensure that they confirm the PQR (Technical)
7	Deviation	Technical Deviation: No Technical Deviation is envisaged. Commercial Deviation: No Commercial Deviation envisaged except defined in GTC.
8	Project Status	Domestic/Export. GST shall be payable as applicable.
9	Delivery Plan	As per Activity Schedule **(Annexure-II).**
11	Terms of Payment	As per clause 3.1 to 3.7 of GTC (as applicable) . Supplier to submit bills alongwith billing checklist as per **Annexure-III**
12	Performance Bank Guarantee (PBG)	Clause No. 7 of GTC, If no option is specified by the bidder, by default option – B for Bank Guarantee shall be considered. Separate BG for Spares shall be submitted alongwith BG for main supply items. Note: BG should be submitted on non-judicial stamp paper of appropriate value by the supplier alongwith first submission of bill to BHEL.
13	Liquidated Damage	Clause no. 13 of GTC - In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of delayed lot value (Ex Works and F&I charges) for supply per week of delay or part thereof subject to a maximum of 10% of delayed lot value (Ex Works and F&I charges) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. LD will calculated for lotwise and Manufacturing Clearance (MFC) date will be the last date of inputs for that particular lot Lot-1: items for which MFC is issued from 1-15 days of calendar month Lot-2: items for which MFC is issued from 16-30/31 days of calendar month Lot-3: items for which MFC is issued from 1-15 days of next calendar month, Lot-4: items for which MFC is issued from 16-30/31 days of next calendar month and so on...
14	Arbitration	As per **Annexure-IV**

Addendum to General Terms and Conditions (GTC)

15	Reverse Auction	"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among all the techno-commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking." Abridged Version of "Guidelines for Reverse Auction-2020" may also be seen at BHEL website (www.bhel.com) on "Supplier Registration" Page.
16	Splitting of Contract	Splitting of Contract not applicable for this tender.
17	Make In India (PPP-MII)	For this procurement, the local content to categorize a supplier as class-I local supplier / class-II local supplier / Non-Local supplier and purchase preference to class-I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020, issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT but before opening of part-II bids against this NIT. "Bidder to specify the percentage of local content as per the format of self-declaration for local content" as per Annexure-V." "This tender is not a global tender and only **class-I and Class II** suppliers as defined under the DPIIT order no. P-45021/2/2017-PP (BE-II) dated 04.06.2020 are eligible to bid in this tender. Bids received from Class-II & Non-Local supplier shall be rejected."
18	Compliance to GOI Order for restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017	Refer Clause at Annexure-VI and Certification at Annexure-VII / Annexure-VIII (whichever is applicable) regarding restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017. Bidder to comply the clause and submit the certification. Non-compliance/ Non-submission of certification will lead to rejection of Offer.
19	MOP Circular	Bidder to comply the MOP circular dated 02-07-2020 (Annexure-IX) and its subsequent amendment, if any, in prescribed format (Annexure-X). Non-compliance/ Non-submission will lead to rejection of Offer [Not Applicable for cases where local content is 100%]. Vendor to quote as per specified price format of NIT, otherwise their offer shall be liable to be rejected. Following confirmation to be provided by vendor: ***"We confirm that we have quoted as per specified price format provided along with this tender".***
20	Integrity Pact	*As per Annexure-XI.*
21	Risk and Cost	*As per Annexure-XII*
22	Prevention for cartel formation	The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.
23	Docuemts Required for Customer approval	Bidders to submit below documents alongwith their offer but not limited to: (a) PAN, GST, Certificate of Incorporation (b) Factory Registration Certificate (c) Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc.) (d) List of Plant and Machinery (e) List of Testing and Measuring equipment (f) Third party approval, if any (viz. ISO, BIS) (g) Pollution clearance wherever applicable (h) Energy conservation & Efficiency Report(Applicable to industries having contact load more than 100KVA) (i) Manufacturing Quality Plan (MQP) (j) List of past supplies references along with copy of major PO (k) Performance certificate from end user (j) Photographs of factory, plant and machinery & testing facilities
24	BHEL Supplier Registration Portal	The link for Online Supplier registration Portal is https://supplier.bhel.in/ The link for Online Supplier Registration Portal may also be seen at BHEL website (www.bhel.com) on "Supplier Registration" Page.
25	Start-up India	Start-up vendors to submit applicable documents alongwith their offers for availing the benefits as per GOI guidelines.

The Notice Inviting Tender (NIT)/ the tender requirement of BHEL will not be henceforth published in newspapers. All the concerned are hereby notified that tender enquiries of BHEL will be published on BHEL tender website (www.bhel.com) and Government's Central Public Procurement Portal (https://eprocure.gov.in/)

(Sign and seal of Bidder)

SCHEDULE OF COMMERCIAL DEVIATION

This Format is to be submitted in original duly signed by bidder.
The following are the devitions/variations/exceptions from the Terms and Conditions :-

S N	CLAUSE NO. OF TERMS AND CONDITIONS	STATEMENT OF DEVIATION

In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the Terms and Conditions.

If there is NIL deviation,even then the format to be filled as NIL DEVIATION.

Note : Continuation Sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

Signature of the authorised representative of

Place : ……

Date : ……

Bidder's name :……

Designation:……..

Company Seal:……

SCHEDULE OF TECHNICAL DEVIATION

This Format is to be submitted in original duly signed by bidder.
The following are the devitions/variations/exceptions from the Terms and Conditions :-

S N	CLAUSE NO. OF TERMS AND CONDITIONS	STATEMENT OF DEVIATION

In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the Terms and Conditions.

If there is NIL deviation,even then the format to be filled as NIL DEVIATION.

Note : Continuation Sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

Signature of the authorised representative of

Place : ……

Date : ……

Bidder's name :……

Designation:……..

Company Seal:……

ACTIVITY SCHEDULE (ANNEXURE-II)
ENQUIRY NO. -
PROJECT -
BIDDER NAME -

(SEPARATE ACTIVITY SCHEDULE TO BE FILLED-UP FOR EACH PROJECT BY THE SUPPLIER)

Name of Bidder:- Please fill here

Sl. NO.	ACTIVITY	ACTIVITY TIME IN WEEKS	REMARKS IF ANY
1	Inputs to vendor by BHEL. Last inputs date will consider		BHEL Activity
2	Submission of Documents necessary for getting manufacturing clearance like Drawings, Date sheet etc.		Vendor to fill ensuring Delivery completion date mentioned by BHEL in the NIT
3	Approval of documents/ Manufacturing Clearance from BHEL / Customer *	4	BHEL Time to issue Manufacturing Clearance
4	Manufacturing time		Vendor to fill ensuring Delivery completion date mentioned by BHEL in the NIT
5	Inspection call		Vendor to fill ensuring Delivery completion date mentioned by BHEL in the NIT
6	Customer Inspection & Dispatch Clearance	2	BHEL Time to issue MICC
7	Dispatch		Vendor to fill ensuring Delivery completion date mentioned by BHEL in the NIT
8	ETC site		Not Applicable

Note: 1) * Supplier must ensure the completeness and correctness of the requisite documents before submission for approval. Delay in approval on account of incomplete/inadequate information shall be the responsibility of supplier.

2) Inspection call should be given in the prescribed format only. Inspection calls not in the prescribed format shall not be entertained.

3) Qty. to be offered for Inspection should be in accordance within Delivery- schedule - lot BHEL reserves the right not to entertain multiple inspection calls for a Delivery- lot and delay on this account shall be the responsibility of Supplier.

DATE
PLACE
SIGN AND STAMP OF BIDDER

Check List for Supply bills (ANNEXURE III)

Name Of the Project							
Package Description							
Invoice No. & Date							
PO No. & date							
Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks	Verification by MM	Verification by Fin
					(Y/N/NA)	(Y/N/NA)	(Y/N/NA)
1	Original for Buyer Invoice - GST compliant invoice	1 Original+2 Copy	1. Please ensure GST complaint invoice in original				
			2. Consignee address : BHEL C/o followed by site address				
			3. Item description and unit of quantity are matched with PO				
			4. Buyer address and GSTN No as required (TBG Noida or Nodal				
			5. PO No and date, LR No and date, Vehicle No and Project name are				
			6. Invoiced quantity are not more than th PO quantity and MICC				
			7. Ex works unit rate , Taxes and F&I rates are same as per PO				
			8. Signed and stamped by vendor				
2	Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes	1Orignal+2 Copy	1. Consignee address : BHEL C/o followed by Site address				
			2. In case of material purchased from sub vendor , Consignee address Vendor's name C/o BHEL C/o Site address				
			3. Vendor's Invoice no and Vehicle No are mentioned				
			4. No of boxes/No of packages are same as per Packing list				
			5. In case of and adverse remark on LR (Like shortages/damages/broken etc) , clarification from site/TBMM/TBCM is nedded				
			6. LR is readable				
			7. In case of photo copy, LR is verified by TBMM				
			8. LR date is after the date of MICC/(MDCC if issued) or same date				
3	Packing List - showing number of packages, and gross weight/net Weight (if applicable)	1Orignal+2 Copy	1. PO No and date, LR No and date, Invoice No and date, Site Name and address, Consignor and consignee address are mentioned				
			2. Item description and quantity are matched with Invoice and PO				
			3. Signed and stamped by vendor				
			4. No of packages/ Item descriptions are matched with MRC and LR				
4	MICC from BHEL	1Original+2Copy	1. BHEL MICC has been issued prior to the date of dispatch or on same date				
			2. In case where MICC date is after the date of dispatch then MDCC date is same or prior to the date of dispatch				
			3. Project Name, PO,Po Date, Vendor's name and address is correct				
			4. Item description, Quantity and unit of quantity are same as per PO				
			5. All hold point in MICC , if any, have been resolved before submission of bill				
			6. Signed and stamped by BHEL Executive				
			7. MICC and MDCC quantity are not less than Invoice quantity and cover all invoiced items.				
5	Guarantee Certificate	1 Original+2 Copy	1. Project Name, PO No., Invoice No , LR No and date are mentioned .				
			2. Guarantee Certificate is strictly matched with PO T&C				
			3. Signed and stamped by vendor				
6	Bank Guarantee	1 Copy	'1. Ensure submission of BG directly from Bank before supply of material so that BG confirmation may be arranged before processing				
			2. Bill can be processed only after receipt of BG confirmation directly from bank				
			3. It should be in the name of BHEL , TBG Noida with registered office address Siri Fort, New Delhi				
			4. It should be in prescribed format.				
			5. BG value and valdity plus claim period should be minimum as specified in PO / RC. Please check before supply , If BG extension is required please arrange the same				
			6. Vendor's name address should be same as per PO				
			7. Po No / RC No and date should be correct				
7	Insurance Certifcate	1 Orignal+2 Copy	1. Invoice No and date, Vendor's Name,Place from Consignor to Consignee are mentioned				
			2. It has not been issued later than the LR date				
			3. Insured value is not less than the Invoice value				
			4. Signed and stamped by Insurance Company				
			5. In case of Open Insurance Policy, declaration has been submitted to Insurance Company as per declaration clause of Open policy and				
			6. In case of any discrepancy , consent of TBCM is required for processing the bill and amount will be deducted for invalid Insurance				
8	PVC (If applicable) Invoice is submitted along with the Despatch Invoice	1Original+2Copy	PVC (If applicable) Invoice is submitted along with the Despatch Invoice				
			1. PVC invoice is attched along with supply Invoice				
			2. Calculation sheet and applicable PVC indices are also enclosed				
			3. If delay in delivery, then PVC indicies are as per PO conditions.				
9	Material receipt Certificate		1. LR No and date, Invoice No and date, Vehicle No and date , Site Name an address are mentioned				
			2. Date of receipt of material				
			3. Item description and quantity are same as per Invoice / Packing List				
			4. It is signed and stamped by Site executive				
			5. In case of any shortages / damages / adverse remark , clarification is needed				
10	Other Documents		To be seen as per specific requirement of PO.				

Check List for Supply bills

Name Of the Project							
Package Description							
Invoice No. & Date							
PO No. & date							
Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks	Verification by MM	Verification by Fin
					(Y/N/NA)	(Y/N/NA)	(Y/N/NA)
1	Original for Buyer Invoice - GST compliant invoice	1 Original+2 Copy	1. Please ensure GST complaint invoice in original				
			2. Consignee address : BHEL C/o followed by site address				
			3. Item description and unit of quantity are matched with PO				
			4. Buyer address and GSTN No as required (TBG Noida or Nodal				
			5. PO No and date, LR No and date, Vehicle No and Project name				
			6. Invoiced quantity are not more than th PO quantity and MICC				
			7. Ex works unit rate , Taxes and F&I rates are same as per PO				
			8. Signed and stamped by vendor				
2	Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes	1Orignal+2 Copy	1. Consignee address : BHEL C/o followed by Site address				
			2. In case of material purchased from sub vendor , Consignee address Vendor's name C/o BHEL C/o Site address				
			3. Vendor's Invoice no and Vehicle No are mentioned				
			4. No of boxes/No of packages are same as per Packing list				
			5. In case of and adverse remark on LR (Like shortages/damages/broken etc) , clarification from site/TBMM/TBCM is nedded				
			6. LR is readable				
			7. In case of photo copy, LR is verified by TBMM				
			8. LR date is after the date of MICC/(MDCC if issued) or same date				
3	Packing List - showing number of packages, and gross weight/net Weight (if applicable)	1Orignal+2 Copy	1. PO No and date, LR No and date, Invoice No and date, Site Name and address, Consignor and consignee address are mentioned				
			2. Item description and quantity are matched with Invoice and PO				
			3. Signed and stamped by vendor				
			4. No of packages/ Item descriptions are matched with MRC and LR				
4	MICC from BHEL	1Original+2Copy	1. BHEL MICC has been issued prior to the date of dispatch or on same date				
			2. In case where MICC date is after the date of dispatch then MDCC date is same or prior to the date of dispatch				
			3. Project Name, PO,Po Date, Vendor's name and address is correct				
			4. Item description, Quantity and unit of quantity are same as per PO				
			5. All hold point in MICC , if any, have been resolved before submission of bill				
			6. Signed and stamped by BHEL Executive				
			7. MICC and MDCC quantity are not less than Invoice quantity and cover all invoiced items.				
5	Guarantee Certificate	1 Original+2 Copy	1. Project Name, PO No., Invoice No , LR No and date are mentioned .				
			2. Guarantee Certificate is strictly matched with PO T&C				
			3. Signed and stamped by vendor				
6	Bank Guarantee	1 Copy	'1. Ensure submission of BG directly from Bank before supply of material so that BG confirmation may be arranged before processing				
			2. Bill can be processed only after receipt of BG confirmation directly from bank				
			3. It should be in the name of BHEL , TBG Noida with registered office address Siri Fort, New Delhi				
			4. It should be in prescribed format.				
			5. BG value and valdity plus claim period should be minimum as specified in PO / RC. Please check before supply , If BG extension is required please arrange the same				
			6. Vendor's name address should be same as per PO				
			7. Po No / RC No and date should be correct				
7	Insurance Certifcate	1 Orignal+2 Copy	1. Invoice No and date, Vendor's Name,Place from Consignor to Consignee are mentioned				
			2. It has not been issued later than the LR date				
			3. Insured value is not less than the Invoice value				
			4. Signed and stamped by Insurance Company				
			5. In case of Open Insurance Policy, declaration has been submitted to Insurance Company as per declaration clause of Open policy and				
			6. In case of any discrepancy , consent of TBCM is required for processing the bill and amount will be deducted for invalid Insurance				
8	PVC (If applicable) Invoice is submitted along with the Despatch Invoice	1Original+2Copy	PVC (If applicable) Invoice is submitted along with the Despatch Invoice				
			1. PVC invoice is attched along with supply Invoice				
			2. Calculation sheet and applicable PVC indices are also enclosed				
			3. If delay in delivery, then PVC indicies are as per PO conditions.				
9			1. LR No and date, Invoice No and date, Vehicle No and date , Site Name an address are mentioned				
			2. Date of receipt of material				

Check List for Supply bills

Name Of the Project							
Package Description							
Invoice No. & Date							
PO No. & date							
Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks	Verification by MM	Verification by Fin
					(Y/N/NA)	(Y/N/NA)	(Y/N/NA)
	Material receipt Certificate		3. Item description and quantity are same as per Invoice / Packing List				
			4. It is signed and stamped by Site executive				
			5. In case of any shortages / damages / adverse remark , clarification is needed				
10	Other Documents		To be seen as per specific requirement of PO.				
To be filled by BHEL (MM) only							
10	Date Of Submission of Last Billing Document		Date to be mentioned		Not to be filled by vendor		
11	LD Calculation, if applicable, as per PO.		Calculation Sheet of LD due to delay in delivery is attached				
12	Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes	1 Copy	Damages if any mentioned in the Receipted LR have been accounted for. Withhel amount if any_____				
13	Packing List - showing number of packages and gross weight & net Weight (If applicable)	1 Original	If Packing list does not match with Purchase order (with ref to sl 4 above), Engg/MM acceptance as to the completeness is enclosed.				
14	PO copy	1 Copy	PO copy with original seal and signature is attached along with amendment if any				
15	Dan	1 copy	Relevant DANs are attached duly signed by TBMM representative.				
Note*	Every Field to be ticked. If some document is not applicable, same should be mentioned, All Pages to be numbered upward from the bottom Page						
	Invoice control No				Vendor Signature	MM Signature	Finance Signature
					Date:	Date:	Date:

Check List for Freight(Exclusive as per Transportation contract)

Name Of the Project	
Package Description	
Invoice No. & Date	
PO No. & date	

Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks	Verification by MM	Verification by Fin
					(Y/N/NA)	(Y/N/NA)	(Y/N/NA)
1	Invoice	1 Original	Freight Invoice				
			Invoice for the Main Supply submitted				
2	Receipted LR (signed & stamped)/ confirmation from site regarding receipt ofpackages/ Boxes	1 Copy	1. Consignee address : BHEL C/o followed by Site address				
			2. In case of material purchased from sub vendor , Consignee address Vendor's name C/o BHEL C/o Site address				
			3. Vendor's Invoice no and Vehicle No are mentioned				
			4. No of boxes/No of packages are same as per Packing list				
			5. In case of and adverse remark on LR (Like shortages/damages/broken etc) , clarification from site/TBMM/TBCM is nedded				
			6. LR is readable				
			7. In case of photo copy, LR is verified by TBMM				
			8. LR date is after the date of MICC/(MDCC if issued) or same date				
3	Transporter's document indicating the freight amount. Original money receipt to be submitted if required as per SCC	1 Original	As per Rate Contract (if any)/ WO.				
4	PVC (If applicable) Invoice is submitted along with the Despatch Invoice		1. PVC invoice is attched along with supply Invoice 2. Calculation sheet and applicable PVC indices are also enclosed 3. If delay in delivery, then PVC indicies are as per PO conditions.				
5	LD Calculation, if applicable		Calculation Sheet of LD due to delay in delivery is attached				
6	MRC		1. LR No and date, Invoice No and date, Vehicle No and date , Site Name an address are mentioned				
			2. Date of receipt of material				
			3. Item description and quantity are same as per Invoice / Packing List of supply				
			4. It is signed and stamped by Site executive				
			5. In case of any shortages / damages / adverse remark , clarification is needed				
	Invoice control No				Vendor Signature	MM Signature	Finance Signature
					Date:	Date:	Date:

Applicable check list for MRC Bills:

Name Of the Project	
Package Description	
Invoice No. & Date	
PO No. & date	

Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks (Y/N/NA)	Verification by MM (Y/N/NA)	Verification by Fin (Y/N/NA)
1	Invoice	1 Original	MRC Bill enclosed				
2	Material Receipt Certificate	1 Copy	1. LR No and date, Invoice No and date, Vehicle No and date , Site Name an address are mentioned				
			2. Date of receipt of material				
			3. Item description and quantity are same as per Invoice / Packing List of supply				
			4. It is signed and stamped by Site executive				
			5. In case of any shortages / damages / adverse remark , clarification from site/MM/CM is needed				
3	Submission of all final documents for the packages as detailed in Anx-10 of GCC rev 00, duly certified by Engg. Deptt. of purchaser or As per PO	1 Copy	Certificate as per PO requirement is attached				
Note*	Every Field to be ticked. If some documents is not applicable, same should be mentioned, All Pages to be numbered starting from the Last Page.						
	Invoice control No				Vendor Signature	MM Signature	Finance Signature
					Date:	Date:	Date:

Annexure-IV

(A) CONCILIATION (MODEL CONCILIATION CLAUSE FOR CONDUCTING CONCILIATION PROCEEDINGS UNDER THE BHEL CONCILIATION SCHEME, 2018)

The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract or the Memorandum of Understanding (whichever is inapplicable), which the Parties are unable to settle mutually), arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

Notes:

1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.

2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in **Annexure-A to this GCC (Enclosed).**

The Annexure-A together with it's appendices will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in these GCC."

(B) ARBITRATION (WITH SOLE ARBITRATOR)

1.1. Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the Parties, in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, then, either Party may, by a notice in writing to the other Party refer such dispute or difference to the Sole Arbitrator and such Arbitrator appointed by Head of the BHEL Unit/Region/Division issuing the Contract.

1.2. The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the Parties.

1.3. Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) and amended in 2015 and further amendment passed in 2019 or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause. The seat of arbitration shall

be New Delhi. The language of arbitration shall be English and the documents shall be submitted in English.

1.4. The cost of arbitration shall initially be borne equally by the Parties subject to the final apportionment of the cost of the arbitration in the award of the Arbitrator.

1.5. Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

1.6. **SETTLEMENT OF COMMERCIAL DISPUTES BETWEEN CPSES INTER SE AND CPSE(S) AND GOVERNMENT DEPARTMENT(S)/ ORGANISATION(S) – ADMINISTRATIVE MECHANISM FOR RESOLUTION OF CPSES DISPUTES (AMRCD) – REGARDING**

Vide Dept. of Public Enterprises OM No. F. No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22.05.2018 it has been conveyed that *"To make the mechanism more effective and binding on the disputing parties, a new mechanism namely Administrative Mechanism for resolution of CPSEs Disputes (AMRCD) having two level (tier) structure has been evolved in consultation with various stakeholders to replace the existing PMA mechanism which stands wound up from the date of issue of this OM."* Accordingly, the existing Permanent Machinery of Arbitration (PMA) stands wound up with effect from 22.05.2018 and cases relating to disputes or differences relating to the interpretation and application of the provisions of commercial contract(s) between CPSEs / Port Trust / Central or State Government Department / Organisations (excluding disputes concerning Railways, Income Tax, Customs and Excise Departments) shall be taken up by either party for its resolution through Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD).

(C) JURISDICTION AND GOVERNING LAWS

The Courts at New Delhi shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract. This Contract shall be construed as per and be governed by the Laws of India.

ANNEXURE TO MODEL CONCILIATION CLAUSE FOR CONDUCT OF CONCILIATION UNDER THE BHEL CONCILIATION SCHEME, 2018

BRIEF PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:

2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings.

3. The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.

4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores Conciliation shall be carried out by 3 Conciliators nominated by BHEL.

5. The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.

6. The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.

7. The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within

15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.

8. Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.

9. In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.

10. Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.

11. When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.

12. In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.

13. Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.

14. In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.

15. The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.

16. Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.

17. In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.

18. A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.

19. The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.

20. Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall

however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.

21. Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.

22. The proceedings of Conciliation under this Scheme may be terminated as follows:
    a. On the date of signing of the Settlement agreement by the Parties; or,
    b. By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,
    c. By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
    d. By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration.
    e. On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.

23. The Conciliator(s) shall be entitled to following fees and facilities:

Sl No	**Particulars**	**Amount**
1	Sitting fees	Each Member shall be paid a Lump Sum fee of Rs 75,000/- for the whole case payable in terms of paragraph No. 27 herein below.
2	Towards drafting of settlement agreement	In cases involving claim and/or counter-claim of up to Rs 5crores. Rs 50,000/- (Sole Conciliator)

Sl No	Particulars	Amount
		In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator) In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.
3	Secretarial expenses	Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC. Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC
4	Travel and transportation and stay at outstation i) Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL.

Sl No	Particulars	Amount
		Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region / Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

24. The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s)on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.

25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.

26. The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.

27. Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.

28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 3 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.

29. The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement, except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/ regulatory body, as the case may be.

30. The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
    a. Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
    b. admissions made by the other party in the course of the Conciliator proceedings;
    c. proposals made by the Conciliator;
    d. The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.

31. The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.

32. None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.

33. The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue

notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.

34. The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.

Format 2 to BHEL Conciliation Scheme, 2018

FORMAT FOR SEEKING CONSENT FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

M/s. (Stakeholder's name)

Sub: Resolution of the Disputes through conciliation by Independent Expert Committee (IEC).

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Sir,

With reference to above referred Contract/MoU/Agreement/LOI/LOA, you have raised certain Disputes/claims. Vide your letter dated____ you have requested BHEL to refer the Disputes/claims to IEC for Conciliation.

We are enclosing herewith Format (3) for giving consent and the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. You are requested to give your unconditional consent to the said terms and conditions of the Scheme by returning the same duly sealed and signed on each page. On receipt of your consent, matter will be put to the Competent Authority for consideration and decision.

Please note that BHEL has also certain claims against you (if applicable). BHEL reserves its right to agree or not to agree conciliation of the said disputes through BHEL and this letter is being issued without prejudice to BHEL's rights and contentions available under the contract and law.

Yours faithfully,

Representative of BHEL

Format 3 to BHEL Conciliation Scheme, 2018

FORMAT FOR GIVING CONSENT BY CONTRACTOR/VENDOR/CUSTOMER/COLLABORATOR/CONSORTIUM PARTNERSFOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

BHEL

.....

Sub: Resolution of Disputes through Conciliation by Independent Expert Committee (IEC).

Ref: Contract/MoU/Agreement/LOI/LOA No & date____

With reference to above referred contract, our following bills/invoices/claims submitted to BHEL are still unpaid giving rise to Disputes:

SL. no.	Claim Description	Bill submitted to BHEL (no. and date)	Amount of the bill/claim	Amount received from BHEL	Outstanding Amount

Accordingly we request you to kindly refer the Disputes in respect of above claims to IEC for Conciliation.

We hereby agree and give our unconditional consent to the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. We have signed the same on each page and enclosed it for your consideration.

Yours faithfully,

(Signature with stamp)

Authorized Representative of Contractor
Name, with designation
Date

Format 5 to BHEL Conciliation Scheme, 2018

STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO THE IEC BY BOTH THE PARTIES

1. Chronology of the Disputes

2. Brief of the Contract/MoU/Agreement/LOI/LOA

3. Brief history of the Disputes:

4. Issues:

5. Details of Clam(s)/Counter Claim(s):

Sl. No.	**Description of claim(s)/Counter Claim**	**Amount (in INR)Or currency applicable in the contract**	**Relevant contract clause**

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– *The Statement of Claims/Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/Counter Claims. The statement of Claims/Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.*

Item/Package Name :	
Enquiry No.:	
Project:	
Type of project	
Percentage of Local Content	***(Bidder to enter the applicable % of local content)***

Self-certification to be submitted in INR 100/- non judicial stamp paper

Format of Self certification regarding Local Content in line with PPP-MII order, 2017 & its revision dated 04.06.2020.

Date:……..

I _____S/o, D/o, W/o, _____Resident of_____ hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the Public Procurement (Preference to Make in India) Order, 2017 (*hereinafter PPP-MII order*) of Government of India issued vide Notification No: P-45021/2/2017-BE-II dated 15/06/2017, its revision dated 04/06/2020 and any subsequent modifications/Amendments**,** if any**.**

That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring entity/BHEL or any other Government authority for the purpose of assessing the local content of goods/services/works supplied by me for …… *(Enter the name of the Equipment/Item for Project).*

That the local content for all inputs which constitute the said goods/services/works has been verified by me and I am responsible for the correctness of the claims made therein.

That the goods/services/works supplied by me for …… *(Enter the name of the Equipment/Item for Project)* **contains……..%** (mention the Local content in %age) Local Content.

That the value addition for the purpose of meeting the 'Minimum Local Content 'has been made by me at …… (*Enter the details of the location(s) at which value addition is made).*

That in the event of the local content of the goods/services/works mentioned herein is found to be incorrect and not meeting the prescribed supplier class categorization criteria as per said order, based on the assessment of procuring agency (ies)/BHEL/Government Authorities for the purpose of assessing the local content, action shall be taken against me in line with the PPP-MII order and provisions of the Integrity pact/ Bidding Documents.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority.

i Name and details of the Local Supplier
(Registered Office, Manufacturing unit location, nature of legal entity)

ii. Date on which this certificate is issued

Item/Package Name :	
Enquiry No.:	
Project:	
Type of project	
Percentage of Local Content	***(Bidder to enter the applicable % of local content)***

Self-certification to be submitted in INR 100/- non judicial stamp paper

iii. Goods/services/works for which the certificate is produced

iv. Procuring entity to whom the certificate is furnished

v. Percentage of local content claimed and whether it meets the Minimum Local Content prescribed

vi. Name and contact details of the unit of the Local Supplier (s)

vii. Sale Price of the product

viii Ex-Factory Price of the product

ix. Freight, insurance and handling

x. Total Bill of Material

xi List and total cost value of input used to manufacture the Goods/to provide services/in construction of works

xii. List and total cost of input which are domestically sourced. Value addition certificates from suppliers, if the input is not in-house to be attached

xiii. List and cost of inputs which are imported, directly or indirectly

For and on behalf of…… (Name of firm/entity)

Authorized signatory (To be duly authorized by the Board of Directors)
<Insert Name, Designation and Contact No.>

Annexure-VI

Clause regarding regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017 as per Government of India order OM No.6/18/2019-PPD dated 23.07.2020

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.

II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not failing in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. "Bidder from a country which shares a land border with India" for the purpose of this Order means:

a. An entity Incorporated, established or registered in such a country; or
b. A subsidiary of an entity Incorporated, established or registered in such a country; or
c. An entity substantially controlled through entitles incorporated, established or registered in such a country; or
d. An entity whose *beneficial owner* is situated in such a country, or
e. An Indian (or other) agent of such an entity; or
f. A natural person who is a citizen of such a country; or
g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

IV. The *beneficial owner* for the purpose of (iii) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
   Explanation-
   a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;
   b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholder's agreements or voting agreements;
2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of Individuals;
4. Where no natural person is Identified under (1) or (2) or (3) above the beneficial owner is the relevant natural person who holds the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another or to represent another in dealings with third person.

Annexure-VI

Clause regarding regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017 as per Government of India order OM No.6/18/2019-PPD dated 23.07.2020

VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

***** *The above clause is not applicable to the bidders from those countries (even if* sharing a land border with India) to which the GoI has extended lines of credit or in which the GoI is engaged in development projects.

* List of countries to which lines of credit have been extended or in which development projects are undertaken are available on the Ministry of External affaires website (https://www.mea.gov.in/)

Annexure-VII

Compliance to be submitted in INR 100/- non judicial stamp paper

Sub: **Compliance to Government of India order OM No.6/18/2019-PPD dated 23.07.2020 regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017**

Sl No.	Description	Bidder's confirmation
1	*We, M/s_____have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; We hereby certify that we are not from such a country.*	*Agreed*

(Note: Non-compliance of above said GoI Order and its subsequent amendment, (if any), by any bidder(s) shall lead for commercial rejection of their bids by BHEL)

Bidder's authorized signatory with stamp & seal

Annexure-VIII

Compliance to be submitted in INR 100/- non judicial stamp paper

Sub: **Compliance to Government of India order OM No.6/18/2019-PPD dated 23.07.2020 regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017**

Sl No.	Description	Bidder's confirmation
1	*We, M/s_____have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India. We are from such a country which shares a land border with India & have been registered with the Competent Authority as specified in above said order. We hereby certify that we fulfil all requirements in this regard and are eligible to be considered.* ***Evidence of valid registration by the Competent Authority is attached.***	*Agreed*

(Note: Non-compliance of above said GoI Order and its subsequent amendment, (if any), by any bidder(s) shall lead for commercial rejection of their bids by BHEL)

Bidder's authorized signatory with stamp & seal

Annexure-IX

No.25-111612018-PG

Government of India

Ministry of Power

Shram Shakti Bhawan, Rafi Marg, New Delhi • — 110001

Tele Fax: 011-23730264

Dated 02/07/2020

ORDER

Power Supply System is a sensitive and critical infrastructure that supports not only our national defence, vital emergency services including health, disaster response, critical national infrastructure including classified data & communication services, defence installations and manufacturing establishments, logistics services but also the entire economy and the day-today life of the citizens of the country. Any danger or threat to Power Supply System can have catastrophic effects and has the potential to cripple the entire country. Therefore, the Power Sector is a strategic and critical sector.

The vulnerabilities in the Power Supply System & Network mainly arise out of the possibilities of cyber attacks through malware / Trojans etc. embedded in imported equipment. Hence, to protect the security, integrity and reliability of the strategically important and critical Power Supply System & Network in the country, the following directions are hereby issued:-

1. All equipment, components, and parts imported for use in the Power Supply System and Network shall be tested in the country to check for any kind of embedded malware/trojans/cyber threat and for adherence to Indian Standards.
2. All such testings shall be done in certified laboratories that will be designated by the Ministry of Power (MOP).
3. Any import of equipment/components/parts from "prior reference" countries as specified or by persons owned by, controlled by, or subject to the jurisdiction or the directions of these "prior reference" countries will require prior permission of the Government of India
4. Where the equipment/components/parts are imported from "prior reference" countries, with special permission, the protocol for testing in certified and designated laboratories shall be approved by the Ministry of Power (MOP).

This order shall apply to any item imported for end use or to be used as a component, or as a part in manufacturing, assembling of any equipment or to be used in power supply system or any activity directly or indirectly related to power supply system.

This issues with the approval of Hon'ble Minister of State for Power and New & Renewable Energy (Independent Charge).

(Goutam Ghosh)

Director Tel: 011-23716674 To:

1. All Ministries/Departments of Government of India (As per list)
2. Secretary (Coordination),Cabinet Secretariat
3. Vice Chairman, NITI Aayog

Annexure-X

Vendor Compliance format in bidder letter head

In view of by order No. 25-111612018-PG, Dated 02.07.2020 of Ministry of Power, GOI

Enquiry No/ PO No & Date :
Project :
Name of items/Package :

This is to certify that all equipment, components, and parts imported for use in the Power Supply System and Network are in strict compliance to directions issued by Ministry of Power, Govt. of India vide order No. 25-111612018-PG dated 02.07.2020. The imported component(s), part or assembly item(s) does not carry any malware/Trojan etc.

Note: Non-compliance of MoP Order and its subsequent amendment(s), (if any), by vendor shall lead to rejection of their offer or cancellation of contract, which is awarded by BHEL.

Bidder's authorized signatory

with stamp & seal

BHARAT HEAVY ELECTRICALS LTD.
(TRANSMISSION BUSINESS GROUP)

GENERAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

This is to be submitted duly signed by bidder in original. Clause-wise deviations and / or additional conditions / clarifications, if any, are to be brought out clearly in "Schedule of Commercial Deviation". Deviations and / or additional conditions / clarifications, if any, mentioned elsewhere in the bid / offer, shall not be considered.

Sr. No.	
1.	**INSTRUCTION TO BIDDERS :** 1.1 Sealed bids are invited for the items mentioned in the tender enquiry conforming to the NIT including Technical Specifications. Bids should be typed and free from overwriting and erasures. Corrections or additions / deletions, if any, must be clearly written and attested, otherwise offer may be rejected. 1.2 Bidder must ensure that their bid is submitted / dropped in the tender box on or before **14-00 Hrs.** IST on the due date of opening, unless otherwise specified in the NIT, at the address as follows :- Tender Box, Materials Management, Transmission Business Group, Bharat Heavy Electricals Limited, 5th Floor, Tower-A, Advant Navis IT Business Park, Plot-7, Sector-142, Noida Expressway, Noida, Dist. G. B. Nagar, U. P. ï 201305 1.3 In case tender enquiry is floated though the e-procurement system, offer / bid has to be submitted through the e-procurement system **ONLY** as per instructions given in the e-procurement portal (https://bheleps.buyjunction.in). 1.4 The bids shall be opened at 14-30 Hrs. IST on the due date of opening, in the presence of participating bidders who may like to be present, unless otherwise specified in the NIT. Bids received late are liable for rejection. Bidders sending bids by courier or post will have to ensure that it is timely delivered at the above address. 1.5 Bids are to be submitted duly signed with seal in two parts :- a) **Techno-commercial Bid (Part-I**) ï To be submitted in 2 sets (original + copy). A copy of Price Bid (Part-II) clearly mentioning all the necessary information as per format **without prices** ñUn-Priced Bidò is also to be enclosed in Part-I Bid. b) **Price Bid (Part-II)** ï To be submitted only in one set in a separate sealed envelope. This should not contain any Technical and / or Commercial Terms and Conditions. The rates should be quoted both in figures and words. 1.6 The Part-I and Part-II Bids are to be sealed in separate envelopes and marked

Sr. No.	
	as ñTechno-commercial Bid (Part-I)ò and ñPrice Bid (Part-II)ò respectively. Both the envelopes are to be kept in another common envelope and marked as ñBIDò. Each envelope should be sealed and super scribed with tender enquiry no., item / package name, project name and due date of opening. Bidderôs name and address shall also be mentioned on each envelope. 1.7 For any technical clarification, please contact official mentioned in the tender enquiry / NIT. 1.8 For any commercial clarification please contact official issuing tender enquiry / NIT. 1.9 Price bid (Part-II) should not contain any additional information / description other than given in ñUn-Priced Bidò submitted with ñTechno-commercial Bid (Part-I)ò except prices, otherwise bid is liable for rejection. 1.10 Price Bid submitted along with the bid shall remain valid up to validity of offer. Any discount / revised offer submitted by the bidder on its own shall be accepted provided it is received before the due date and time of offer submission (i.e. Part-I Bid). The discount shall be applied on pro-rata basis to all items including optional items, if any, unless specified otherwise by the bidder. Discount offered shall be valid for full duration of validity of the offer including extension of validity, if any. Unsolicited Supplementary / Revised Price Bid submitted after the due date and time of offer submission (i.e. Part-I Bid), during validity period of offer, unless asked by BHEL, shall not be considered. Withdrawal of quotation by the bidder, at any stage after its opening, may entail suitable action against such bidder by BHEL. 1.11 The consultants / firm (and any of its affiliates) shall not be eligible to participate against tender enquiry for the related goods or works or services for the same project, if they were engaged by BHEL-TBG for the consultancy services. 1.12 In case any Foreign OEM / Foreign Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer / supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer / supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from the manufacturer / supplier and the agent, bid received from the agent shall be ignored. 1.13 Non-conformities / errors / discrepancies in quoted prices in price bids shall be dealt as follows :- a) If, in the price structure quoted for the required goods / services / works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of BHEL there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly. b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected. c) If there is a discrepancy between words and figures, the amount in

Sr. No.	
	words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above. d) If there is such discrepancy in an offer as mentioned in (a), (b) & (c) above, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the BHEL, the bid is liable to be ignored. 1.14 In case the scope of the successful bidder / supplier against this tender enquiry includes Erection, Testing and Commissioning (ETC) of the equipment / material at site in addition to Supply, Purchase Order shall be placed for Supply Portion and Contract shall be separately awarded for ETC at Site Portion. General Terms and Conditions for Tender Enquiry / Contract mentioned herein shall be applicable for both Supply & ETC at Site. Additional Terms and Conditions for Tender Enquiry / Contract for Erection, Testing and Commissioning at Site ñBHEL/TBG/GTC-ETC/2016 Rev. 01ò shall be applicable for ETC at Site only which is to be read in conjunction with General Terms and Conditions for Tender Enquiry / Contract mentioned herein. However, any breach of either the Purchase Order or the Contract shall be deemed to be breach of the other. 1.15 Taxes and Duties payable extra as per Clause No. 2.3 in NIT, if not specified/quoted clearly as extra shall be considered as included in Ex-works Price and therefore shall not be reimbursed. Taxes and duties not payable extra as per NIT shall be deemed to be included in Ex-works Price. 1.16 If the rates for taxes and duties in respect of the quoted materials and / or services assumed by the Supplier are less than the tariff prevailing at the time of tendering, Supplier will be responsible for such under quotations. However if the rates assumed are higher than the correct rates prevailing at the time tendering, the difference will be to the credit of BHEL. Note : Representative / official deputed by the bidder to witness tender opening must produce authorization letter for the same.
2.	**PRICES :** 2.1 Unless specifically indicated in the NIT, all prices shall be FIRM. No enhancement of rate for whatsoever reasons unless and until asked by BHEL shall be allowed. 2.2 Unless specifically indicated in the NIT, the prices shall be on INR basis. 2.3 Unless specifically indicated in the NIT, the prices are to be quoted on FOR (Site / Destination) basis excluding GST. The break-up of prices shall be as under :- a) **Ex-works Price**: Ex-works price including packing & forwarding charges. b) **Freight**: Freight for door delivery up to destination / site / store are to be quoted separately. c) **Insurance**: Insurance for door delivery up to destination / site / store are to be quoted separately.

Sr. No.	
	d) **Type Test Charges**: If asked in the technical specification, it is to be quoted separately for each test. e) **Charges for Supervision of Erection, Testing & Commissioning (ETC) at Site**: To be quoted separately if specified in NIT/Price Schedule. f) **Charges for Testing & Commissioning at Site**: To be quoted separately if specified in NIT/Price Schedule. g) **Charges for Erection, Testing & Commissioning at Site**: To be quoted separately if specified in NIT/Price Schedule. h) Training Charges: To be quoted separately if specified in NIT/Price Schedule. 2.4 **GST rates** along with HSN/SAC code as applicable on Sr No (a) to (h) above is to be mentioned separately in percentage in both un-priced bid and price bid. Note : i) Unless otherwise specified in the NIT, the purchase order shall be placed on Ex-works basis for Indian bidders. ii) Prices quoted by Indian bidders shall be in Indian Rupees only. iii) In case Supervision of Erection, Testing & Commissioning (ETC) at Site or Testing & Commissioning at Site or Erection, Testing & Commissioning at Site is also in scope of the bidder along with supply, bidder has to ensure that prices quoted for such services also are in line with special terms & conditions of the NIT, if any. iv) Unless otherwise specified in the NIT, Unloading at Site / Destination shall not be in the scope of the supplier. v) Prices in respect of Sr No (a) to Sr No (h) of Clause 2.3 above are to be quoted inclusive of all taxes & Duties, charges. Levies, royalty etc. if any, excluding GST.
3.	**TERMS OF PAYMENT :** 3.1 **For Supply only in scope of the supplier** 100% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. . GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order. 3.2 **For Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier or Supply where Testing & Commissioning at Site is in scope of the supplier**

Sr. No.	
	a) 95% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. . GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order. b) 5% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · Certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site if it is in the scope of the supplier or Certificate of successful completion of Testing & Commissioning at Site if it is in the scope of the supplier. · Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.3 **For Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier** a) 90% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. · GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order b) 10% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · Certificate of successful completion of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management · Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.4 For Type Test Charges 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with copy of Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management in 3 sets (original + 2 copies) on completion of delivery (at site, if F&I is in scope of

Sr. No.	
	supplier) of main supplies (excluding spares) for which Type Tests are applicable. List of main supplies (excluding spares) for which Type Tests are applicable shall be certified by BHEL Engineering Management. 3.5 For Charges for Supervision of Erection, Testing & Commissioning at Site 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies). 3.6 For Charges for Testing & Commissioning at Site 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies). 3.7 For Training Charges 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of completion of training issued by BHEL Engineering Management in 3 sets (original + 2 copies). Note : i) Supplier has to submit invoice(s) as per PO or approved billing break-up of prices (if applicable as per NIT). ii) In case of supplies for overseas project, Material Receipt Certificate issued by BHEL Authorized Representative shall also be acceptable. iii) In case of Transit Insurance under Open Insurance Policy, Intimation / Declaration of Transit Insurance as per terms of the relevant Open Insurance Policy along with copy of Open Insurance Policy from underwriters shall also be acceptable. iv) Supplier has to ensure commencement of transit insurance from the date not later than LR / GR date. v) Supplier has to submit Tax Invoice(s). Supplier should ensure that Tax Invoice should comply all statutory requirements under GST Law to enable BHEL to avail input credit vi) MSMED Act, 2006 and the rules made thereunder as amended from time to time shall be applicable for release of payment to suppliers qualified & registered as Micro & Small Enterprises based on documents mentioned in the NIT for MSME. vii) Supplier has to submit PBG (as per BHEL format) & Guarantee Certificate as per PO terms. viii) In case any shortages and / or damages in supplies, an amount calculated

Sr. No.	
	based on comments against Material Receipt Certificate issued by the BHEL Site Official shall be withheld from the supply payment against 3.1(a) or 3.2(a) above to be deemed fit by BHEL subject to a minimum of 10% of the total ex-works value of the invoice corresponding to the LR / GR against which any shortages and / or damages are reported. The withheld amount shall be released after the shortages and / or damages in supplies are supplied / replenished against Certification by BHEL Site Official. ix) Payment of GST component shall be made only if vendor has deposited the Tax and credit for the same is reflected in GSTN (GST Network). In case credit of the same is not reflected in GSTN , vendor may alternatively furnish BG of GST Amount for a period valid for not less than 1 month .In case of disallowance of credit /non reflection of credit in GSTN , amount will be recovered from supplier along with applicable Interest , penalty etc from any of his dues. x) If GST is payable by BHEL on reverse Charge Mechanism basis, vendor should ensure the submission of GST compliant Tax invoice immediately on dispatch/ performance of service. In case of non-compliance any additional charges towards interest, penalty etc, will be to vendors account. xi) TDS under GST Act, if applicable, shall be deducted unless Exemption Certificate If applicable, from the appropriate authority is furnished to BHEL along with Invoice.
4.	**INTEREST LIABILITY :** In case of any delay in payment due to any reason, BHEL shall not pay any interest on delayed payment. Also, no interest shall be payable by BHEL on the bank guarantee / deposit amount or balance payment or any other money which may become due owing to difference or misunderstanding or any dispute before any quasi judicial authority between BHEL and the Supplier / Contractor.
5.	**GUARANTEE :** The equipment / material supplied and services rendered (if applicable) shall be guaranteed to be free from all defects and faults in design & engineering, material, workmanship & manufacture and in full conformity with the Purchase Order / Contract, Technical Specifications & approved drawings / data sheets, if any, for 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is earlier. Wherever Erection, Testing & Commissioning at Site are also in the scope of the Supplier, the guarantee period shall be 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is later. The defective equipment / material / component shall be replaced free of cost at site. Freight & Insurance during transit shall also be in the scope of the supplier / contractor. Any expenditure for dismantling and re-erection of the replaced equipment / material / component shall be to supplier's / contractor's account. All replacements during the guarantee period shall be delivered at site promptly and satisfactorily within a period not more than 45 days from the date of reporting the defect / rejection etc. In the event of the supplier / contractor failing to replace the defective equipment / material / component within the time period mentioned above, BHEL may proceed to undertake the replacement of such defective equipment / material / component at the risk and cost of the supplier / contractor without prejudice to any other rights under the contract and recover the same from PBG / other dues of this Purchase

Sr. No.	
	Order / Contract or any other Purchase Order / Contract executed by the supplier / contractor. Note : i) In case of Illumination System, items viz. Lamps, Tubes, Ballast, Starters, Capacitors & Fuses will not be under Guarantee after commissioning. ii) In addition to the above guarantee period, Extended Guarantee / Warranty, if any, shall be as per NIT / Technical Specifications. iii) In case offer of agent of Foreign OEM / Foreign Principal is considered, as per Clause No. 1.12 above, Guarantee as mentioned above has to be provided by the Foreign OEM / Foreign Principal also.
6.	**LATENT DEFECT :** Liability for latent defects shall be for defects inherently lying within material or arising out of design deficiency which does not manifest itself during guarantee period but later and shall be limited to five years from the expiry of the guarantee period.
7.	**PERFORMANCE BANK GUARANTEE (PBG) :** Supplier shall arrange to submit Performance BG / Deposit on a non-judicial stamp paper of appropriate value along with first invoice or within 60 days from placement of Purchase Order (PO) whichever is earlier, in line with one of the applicable options as follows :- Option ñAò A single rolling PBG for Rs. 50 Lakhs initially valid for 18 months with claim period of 3 months extra over and above 18 months for all the Purchase Orders being executed for Transmission Business Group, BHEL. However, validity of the PBG shall be extended till 18 months from the date of last delivery with 3 months claim period extra over and above 18 months. Single Rolling PBG option shall not be applicable in case Ex-works value of the PO at the time of placement of PO exceeds Rs. One Crore. Option ñBò PBG for 10% of the total Ex-works PO value, valid for 18 months from the date of last delivery with claim period of 3 months extra over and above 18 months. Ex-works PO value at the time of placement of PO shall be considered for calculation of the PBG amount. Option ñCò In case the total Ex-works PO value at the time of placement of PO does not exceed Rs. Ten Lakhs, interest free Deposit of 10% of the total Ex-works PO value at the time of placement of PO in form of Demand Draft favouring ñBharat Heavy Electricals Limitedò and payable at New Delhi / Delhi / Noida shall also be acceptable to BHEL in lieu of PBG, which shall be released after expiry of 21 months from the date of last delivery after deduction, if any, within 60 days from receipt of invoice in 3 sets (original + 2 copies) to be submitted by the supplier. Note : i) The Bank Guarantee shall be from any bank as per Annexure for List of Banks (32 Nos.). The original PBG should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida. ii) Extension of validity of the PBG in original, as per above clause, should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida at least 45 days before expiry of validity of the PBG. iii) Unless otherwise specified in the NIT, deviation taken for non-submission of PBG / Deposit, as applicable, shall not be accepted.

Sr. No.	
	iv) Supplier has to confirm one of the applicable options for submission of PBG / Deposit before placement of PO. v) In case of nonï submission PBG / Deposit, as applicable, BHEL reserve the right for Risk Purchase as per terms of the NIT and impose Suspension of Business Dealings with the Supplier / Contractor. vi) BHEL reserve the right to encash the Bank Guarantee and forfeit the amount in the event of any default, failure or neglect on part of the Supplier in fulfilment of performance of the Purchase Order. vii) Value of the Bank Guarantee (at the time of submission) shall remain unchanged for any subsequent variations in Purchase Order value up to ± 20%. Beyond this variation of ± 20%, the Supplier shall arrange to enhance or may reduce the value of the Bank Guarantee accordingly for the total variation promptly. viii) Vendor to ensure submission of Certificate of Final Documentation /Confirmation regarding Non applicability of Final Documentation, as the case may be, as referred in clause No 9 regarding Final Documentation. BG shall be released only after submission of the same to BHEL TBMM.
8.	**SUBMISSION OF DRAWINGS / DOCUMENTS FOR APPROVAL :** Supplier shall submit the master document list within 7 days from date of Purchase Order / Contract, unless otherwise specified in the NIT, with planned dates for submission which shall be in line with activity schedule as per Purchase Order / Contract and shall be finalized with BHEL Engineering Management. Date of first submission of drawings / documents shall be certified by BHEL Engineering Management after the receipt of applicable drawings / documents (e.g. project specific cover sheet, GTP, OGA drawings, schemes, type test reports etc.) by BHEL. During detailed engineering stage, necessary hard copies of the engineering drawings / documents shall also be submitted by the supplier as per the Purchase Order / Contract requirement. The supplier shall also submit the packing drawings as per technical specifications. In case item(s) offered require any interface details of other item (not in the scope of supplier & required for operating the equipment), the supplier has to submit interfaces schedule along with submission of engineering drawings / documents. It shall be responsibility of the supplier to get the details of the interfaced item from BHEL before manufacturing to avoid any mismatch at site.
9.	**FINAL DOCUMENTATION :** Final documentation as called in the Technical /contract specification is to be submitted within 3 months from the date of first delivery of respective equipment, item/material. After submission of Final Documentation, BHEL Engineering Management (TBEM) will issue a Certificate of Completion of Final Documentation. Wherever Final Documentation is not applicable, BHEL Engineering Management (TBEM) will issue confirmation regarding the same, Vendor to submit the Certificate of Final Documentation /Confirmation regarding Non applicability of Final Documentation, as the case may be, to BHEL TBMM. In case of Non Submission of Certificate of Final Documentation /Confirmation regarding Non applicability of Final Documentation, BG will be liable for encashment.
10.	**INSPECTION :** BHEL / customer / third party shall inspect equipment / material before despatch. Stage inspection during manufacturing may also be carried out. Material to be despatched only after getting Material Despatch Clearance Certificate (MDCC) / MICC issued by BHEL. Supplier shall send inspection call on prescribed format / web site only, with an advance notice of 15 days. Supplier to ensure submission of all routine / acceptance test reports, inspection

Sr. No.	
	reports and all other documents related to inspection, immediately to BHEL. BHEL representative is authorised to carry out audits along with Third Party Inspection Agency at vendorâs / supplierâs works before clearing the items for despatch.
11.	**DESPATCH DOCUMENTS :** Despatch documents to be immediately sent to BHEL on despatch are as follows :- • Copy of Invoice • Copy of LR / GR in case of Indian suppliers or BL / AWB in case of foreign suppliers • Copy of Packing List (Case-wise) • Copy of Transit Insurance Certificate from underwriters • Copy of Guarantee Certificate
12.	**DELIVERY PERIOD :** Delivery / Completion requirement shall be mentioned in the NIT. Bidder to specify best delivery / completion period possible in weeks from the date of LOI / PO as per activity schedule for consideration by BHEL. Time required for type test, if applicable, is to be separately indicated. Note : LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) contracts shall be considered as delivery date.
13.	**LIQUIDATED DAMAGES FOR DELAYED DELIVERY**: In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the total Purchase Order value for supply (incl. taxes and duties, freight & insurance as applicable) per week of delay or part thereof subject to a maximum of 10% of the total Purchase Order value for supply (incl. taxes and duties, freight & insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. However, in case of staggered (lot-wise) contractual delivery schedule, an amount of 0.5% of the total Purchase Order value for supply (incl. taxes, duties, freight & insurance as applicable) of delayed lot per week of delay or part thereof subject to maximum of 10% of the total Purchase Order value. (Incl taxes, duties, Freight &Insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. Note : i) In case of any amendment / revision in PO /WO, the LD shall be linked to the amended / revised Purchase Order / Contract value and delivery / completion time / schedule, if applicable. ii) LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) for imported supplies shall be treated as the date of dispatch for levying LD as above. iii) However, for indigenous supply, if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 30 days, where distance from place of despatch as per LR / GR is upto 1000 Kms or if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 45 days, where distance from place of despatch as per LR / GR is more than 1000 Kms, such excess period shall also be considered for LD purpose. iv) If, as per supplier, delay is not attributable to the supplier, delay analysis with documentary evidence may be submitted by the supplier at the earliest but not

Sr. No.	
	later than six months from the end of the financial year in which the payment is withheld. Based on the above details / documents submitted by the supplier, BHEL shall take final decision and if considered appropriate by BHEL, withheld amount (full or part as the case may be) shall be released, otherwise, full or balance withheld amount shall be treated as deduction of Liquidated Damages (LD) towards delayed delivery.
14.	**VALIDITY OF OFFER :** The offer shall be valid for 120 days from the due date of opening of tender (i.e. techno-commercial bid unless otherwise specified in the NIT). Prices of Spares, wherever they optional items, shall be valid till two years from the date of placement of PO.
15.	**ACCEPTANCE / REJECTION OF TENDER :** BHEL reserve the right to reject in full or part, any or all tender without assigning any reason thereof. BHEL also reserve right to vary the quantities as mentioned in the NIT. Acceptance of offer is subject to vendor approval by customer before opening of price bid. BHEL shall not be bound by any power of attorney granted by tenderer or by changes in composition of the firm made subsequent to award of order / contract. BHEL may however recognize such power of attorney and changes after obtaining proper legal advice, cost of which will be chargeable to the seller / contractor concerned. If the tenderer deliberately gives wrong information, BHEL reserves the right to reject such an offer at any stage or cancel the order / contract, if awarded, and forfeit the security deposit and bank guarantee.
16.	**DEVIATION :** The bids having deviation(s) w.r.t. tender are liable for rejection. However, BHEL, at its discretion, may load the prices for evaluation of offer with prior intimation to bidder.
17.	**TENDER EVALUATION :** Comparative statement shall be prepared and evaluated on total cost basis at destination/site (as per terms of NIT) considering overall quantity indicated in NIT unless contrary to same is specifically mentioned in the tender enquiry / NIT. Total cost for this purpose shall include cost of scope of work as mentioned in NIT along with applicable taxes & duties, and other services etc. (if applicable). GST input credit available to BHEL shall be reduced from prices while determining L1 status. In case all bidders are foreign & Port of Import (destination port) is same for all the bidders, evaluation of offers shall be done on CIF (Port of Import) basis. Otherwise, evaluation of offers shall be done on the basis of delivered cost at site /destination to BHEL. Further, in case of foreign bidders, marine freight & insurance are to be quoted separately & the purchase order may be placed on FOB basis with an option for delivery on CIF / CFR basis, if required, later. In case of foreign bidders, Exchange Rate (TT selling rate of State Bank of India) as on date of tender opening (Part-I Bid in case of two part bid) shall be considered. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken for tender evaluation.
18.	**LOADING CRITERIA :** List of permissible deviations & loading criteria thereof are as follows :- a) Payment Terms Base rate of SBI (as applicable on the date of bid opening / techno-commercial bid opening in case of two part bids) + 6% shall be considered for loading for the period of relaxation sought by bidder(s) against terms of payment in the NIT. b) Liquidated Damages (LD) for Delayed Delivery

Sr. No.	
	Loading on LD clause shall be to the extent to which it is not agreed to by the bidder (at offered value). c) In case of foreign bidders, if the quoted prices is on CIF basis only, it shall be loaded to arrive at total FOR (Site / Destination) price, as applicable, by factors as follows :- i) Port handling / clearing charges: @ 1% of CIF value to arrive at Customs Assessable Value. ii) Custom Duty (including CVD & SAD) as per NIT prevailing on date of price bid opening. iii) Inland Freight & Transit Insurance: @ 5% of CIF value where distance between site / destination and Port of Discharge is upto 1000 Kms or @ 7% of CIF value where distance between site / destination and Port of Discharge is more than 1000 Kms. Note : Additional deviations (if considered acceptable by BHEL) & the loading criteria shall be communicated to all the qualified bidders before price bid opening.
19.	**ARBITRATION :** In the event of any dispute emanating from and relating to this contract, the matter shall be referred to the sole arbitration of the person appointed by the competent authority of BHEL. Subject to aforesaid, the provisions of ñThe Arbitration and Conciliation Act, 1996ò and the rules made thereunder as amended from time to time in India shall apply to the arbitration proceedings. The venue of arbitration shall be in New Delhi. Further there shall be no claim for any pre-reference or pendente-lite interest on the claims and any claim for such interest made shall be void. However, in case of contract with Public Sector Enterprise / Undertaking (PSE/PSU) or Govt. Dept., the extant guidelines of Govt. of India shall be followed.
20.	**LEGAL SETTLEMENT :** Indian Courts at New Delhi / Delhi shall have exclusive jurisdiction to decide the dispute, if any, arising out of or in respect of the contract(s) to which these conditions are applicable. Contract, including all matters connected with contract, shall be governed by the Indian Law, both substantive and procedural, for the time being in force including modification thereto.
21.	**SUB-CONTRACTING :** In case further subcontracting of BHEL Purchase Order / Contract or part thereof is envisaged by supplier, the same can be done after written permission is obtained from BHEL. However it shall not absolve the Supplier / Contractor of the responsibility of fulfilling BHEL Purchase Order / Contract requirements. In case of subcontracting of Purchase Order / Contract awarded by BHEL or part thereof without such permission, BHEL reserve the right to cancel the Purchase Order / Contract and source such material / component / equipment / system from any other agency at the risk and cost of the Supplier / Contractor. If Supplier / Contractor is an individual or proprietary concern and the individual or the proprietor dies or the partnership is dissolved or substantially affected, then unless BHEL is satisfied that legal representative of individual Supplier / Contractor or proprietor of proprietary concern and surviving partners of partnership firm are capable of carrying out and completing the Purchase Order / Contract, BHEL shall be entitled to cancel the Purchase Order / Contract as to its incomplete portion and without being in any way liable to payment of any compensation to legal representative of Supplier / Contractor and / or to surviving partners of Supplierôs / Contractorôs firm on account of cancellation of the Purchase Order / Contract. Decision of BHEL that legal representatives of deceased Supplier / Contractor or

Sr. No.	
	surviving partners of the Supplier's / Contractor's firm cannot carry out and complete the Purchase Order / Contract shall be final and binding on the parties hereto. Terms and Conditions shall not get affected in case of de-merger / amalgamation / taking-over / re-constitution etc.
22.	**RISK PURCHASE :** In case the Supplier / Contractor fails to supply or fails to comply with terms & conditions of the Purchase Order / Contract or delivers equipment / material not of the contracted quality or fails to adhere to the contract specifications or fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery / completion period to justify that supplies shall be inordinately delayed beyond contractual delivery / completion period, BHEL reserve the right to cancel the Purchase Order / Contract either in whole or in part thereof without compensation to Supplier / Contractor and if BHEL so desires, may procure such equipment / material / items not delivered or others of similar description where equipment / material / items exactly complying with particulars are not readily procurable in the opinion of BHEL which is final and in such manner as deemed appropriate, at the risk and cost of the Supplier / Contractor and the Supplier / Contractor shall be liable to BHEL for any excess cost to BHEL. However, the Supplier / Contractor shall continue execution of the Purchase Order / Contract to the extent not cancelled under the provisions of this clause. Recovery amount on account of purchases made by BHEL at the risk and cost of Supplier / Contractor shall be the difference of total value of new Purchase Order (PO) value and total value of old Purchase Order for applicable items, where the total value of new PO is more than total value of old PO for applicable items, plus additional 15% of the total ex-works value of new PO as overheads. The Supplier / Contractor shall on no account be entitled to any gain on such risk & cost purchase. In case the purchase order (PO) value of the new PO is less than the PO value of the old PO, 15% of the total ex-works value of the new PO shall be recovered as overheads and the difference between the PO value of the old PO and the new PO shall not be considered for calculation of the recovery amount.
23.	**ADJUSTMENT OF RECOVERY :** Any amount payable by the Supplier / Contractor under any of the condition of this contract shall be liable to be adjusted against any amount payable to the Supplier / Contractor under any other Purchase Order / Contract awarded to him by any BHEL unit. This is without prejudice to any other action, as may be deemed fit, by BHEL.
24.	**FORCE MAJEURE CONDITION :** If by reason of war, civil commotion, act of god, Government restrictions, strike, lockout which are not in control of Supplier / Contractor the deliveries / services are delayed, Supplier / Contractor shall not be held responsible. If at any time during the continuance of the Purchase Order / Contract, the performance in whole or in part by either party of any obligations under the Purchase Order / Contract is prevented or delayed by reason of any war hostilities, acts of the public enemy, restrictions by Govt. of India, civil commotion, sabotage, fires, floods, explosion, epidemics, quarantine restrictions, strike, lock-outs or acts of God (hereinafter referred to as "event"), which are not in control of Supplier / Contractor or BHEL, then provided notice of the happening of such event is given by either party to the other within fifteen (15) days from the date of occurrence thereof, neither party shall by reason of such event be entitled to terminate the Purchase Order / Contract nor shall have any claim for damages against each other in respect of such non-performance and delay in performance. Performance under the Purchase Order / Contract shall be resumed immediately after such event has come to an end or

Sr. No.	
	ceased to exist and decision of BHEL as to whether the deliveries have to be resumed or not shall be final, conclusive and binding on the parties hereto. In the event of the parties hereto not able to agree that a force majeure event has occurred, the parties shall submit the disputes for resolution pursuant to the provisions hereunder, provided that the burden of proof as to whether a force majeure event has occurred shall be upon the party claiming such an event. Notwithstanding above provisions, BHEL shall reserve the right to cancel the Purchase Order / Contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of delivery and other schedules.
25.	**MANUFACTURING QUALITY PLAN (MQP) :** Supplier to submit approved MQP in line with requirement of BHEL/customer.
26.	**SUPPLIER PERFORMANCE MONITORING AND RATING SYSTEM :** BHEL reserve the right for evaluation of Supplier Performance Rating as per Supplier Performance Monitoring and Rating System of BHEL for necessary action. Details are available at BHEL Website www.bhel.com for reference.
27.	**DEALING WITH BANNED SUPPLIERS / CONTRACTORS IN BHEL :** Offers of the bidders, who are on the banned list, as also the offers of the bidders who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website www.bhel.com for reference.
28.	**ORDER OF PRECEDENCE :** The order of precedence shall be as follows :- a) Special Terms & Conditions (STC) for Tender Enquiry / Contract, if any b) General Terms & Conditions (GTC) for Tender Enquiry / Contract & Additional General Terms & Conditions (GTC) for Tender Enquiry / Contract for Erection Testing & Commissioning (ETC) at Site, if applicable Provisions in (a) above shall prevail over (b). In case of conflict, between Technical Specifications and STC / GTC, bidder to seek necessary clarifications from BHEL concerned official as specified in NIT.
29.	**PACKING :** Packing shall be in conformity with specifications and shall be such as to ensure prevention of damages, corrosion, deterioration, shortages, pilferage and loss in transit or storage. In case of shipment by sea or air, the packing shall be sea-worthy or air-worthy respectively and of international standards. Different types of spares i.e. start-up / commissioning spares and initial spares (mandatory spares and recommended O&M spares) are to be packed separately. Packing List shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate :- a) Case / Packing size (as applicable). b) Gross weight and net weight of each package. c) Detailed contents of the package with quantity of each item separately. Project, Item / Package Description, BHELôs PO No. with date & Case / Packing Mark should also be clearly mentioned on the Case / Packing and Packing List for identification. Also, Packing List must be duly signed & should include respective Invoice No. & LR No. Note : Foreign suppliers to furnish details to arrange inland transportation by BHEL, if applicable, as follows :- i) No. of Packages ii) Size with Weight (Gross & Net) of each Package iii) No. of Containers with type & size required for inland transportation

Sr. No.	
	iv) Type of Cargo (Break Bulk / LCL / FCL) v) Customs Tariff No.
30.	**COLOUR CODING :** Aluminium stickers are required to be attached to large components but plastic sheet tags should be tied with small components, giving details like purchase order, description of the component, quantity etc. Tags should be of the colour as follows :- a) Main equipment : Yellow or White tag b) Start-up / Commissioning spares : Blue tag c) Mandatory spares : Pink or Red tag d) Recommended / O&M spares : Green tag
31.	**MICRO, SMALL & MEDIUM ENTERPRISES (MSME) :** MSMED Act 2006 as amended from time to time & extant regulations of Govt. of India for MSME will be applicable. Micro & Small Enterprises (MSE) can avail the intended benefits only if they submit along with the offer / bid, attested copies of either Acknowledgement of Entrepreneur Memorandum Part-II (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 (As per BHEL format where deemed validity of EM-II certificate of five years have expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of opening (for Techno-commercial Bid : Part-I in case of two part bid). Non-submission of such documents will lead to consideration of their bid at par with other bidders. No benefit 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 arrested (in original) by a Gazetted officer. Copy of Udyog Aadhaar Memorandum with Acknowledgement of Ministry of Micro, Small & Medium Enterprises should also be furnished.
32.	**BUSINESS ETHICS / SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS / CONTRACTORS :** If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution, indulges in malpractices cheating, bribery, fraud or other misconduct or formation of cartel so as to influence the bidding process or influences the price or fails to perform or is in default without any reasonable cause etc or performs any act considered objectionable as per extant guidelines, action may be taken against such bidders/supplier/contractor as per extant ñGuidelines for Suspension of Business Dealings with Suppliers/Contractorsò. Abridged version of same is available at BHEL website (www.bhel.com) on ñSupplier Registrationò Page.
33.	**REVERSE AUCTION :** BHEL reserve the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder or price bid submitted by the bidder through e-procurement system. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA. In case BHEL decides to go for Reverse Auction, only those bidders who have given their unconditional acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit ñonline sealed bid in the Reverse Auction. Non-submission of ñonline sealed bid by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue. General Terms and Conditions of RA are available at Annexure. Business Rules for

Sr. No.	
	RA shall be sent to the bidders before conducting RA. Abridged Version of ñCommon Guidelines for Conducting Reverse Auctionòmay also be seen at BHEL website (www.bhel.com) on ñSupplier Registrationò Page & ñTender NotificationsòPage.
34.	**INTEGRITY PACT :** Bidders shall have to enter into Integrity Pact with BHEL, duly signed with seal in original, if specified in NIT / RFQ failing which bidderôs offer shall be liable for rejection.
35.	**TERMINATION OF CONTRACT :** BHEL shall have the right to cancel the Purchase Order / Contract without any financial implication to BHEL if vendor approval by end user / customer is withdrawn or in case of Suspension of Business Dealings with the Suppliers / Contractors by BHEL. BHEL shall have the right to cancel Purchase Order / Contract, wholly or in part, in case they are obliged to do so on account of any decline, diminution, curtailment or stoppage of their business and in that event, the Supplierôs / Contractor' compensation claim shall be settled mutually. In case of cancellation of Purchase Order / Contract for main supply, all other associated Purchase Orders / Contracts like those for Mandatory Spares / Recommended Spares / Erection, Testing & Commissioning (ETC) / Supervision of ETC, if any, would also get cancelled.
36.	**SHELF LIFE :** Supplier has to inform the list of the items / sub-items which have limited shelf life like consumables or those required for the first fill and shall indicate the corresponding shelf life period in the offer. Such items / sub-items shall be manufactured / despatched only after getting formal clearance from BHEL.
37.	**LIMITATION OF LIABILITY :** Notwithstanding any other provisions, except in cases of wilful misconduct and / or criminal negligence / acts, a) Neither the Supplier / Contractor nor BHEL shall be liable to the other, whether in Purchase Order / Contract, tort, or otherwise, for any consequential loss or damage, loss of use, loss of production or loss of profits or interest costs, provided however that this exclusion shall not apply to any obligation of the Supplier / Contractor to pay Liquidated Damages to the BHEL and b) Notwithstanding any other provisions incorporated elsewhere in the contract, the aggregate liability of the Contractor in respect of this contract, whether under the Contract, in tort or otherwise, shall not exceed total Contract Price, provided however that this limitation shall not apply to any obligation of the Vendor to indemnify BHEL with respect to Patent Infringement or Intellectual Property Rights.
38.	**SHORTAGES / DAMAGES :** a) Against Supply only or Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site or Supply where Testing & Commissioning at Site is in scope of the supplier : Any shortages and / or damages in supplies shall be supplied / replenished free of cost by the supplier as early as possible but not later than 30 days from the date of intimation by BHEL to the supplier. b) Against Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier :

Sr. No.	
	Any shortages and / or damages in supplies and during handling / storage, erection, testing and commissioning at site shall be supplied / replenished free of cost by the Supplier / Contractor, as early as possible, to meet the contractual completion time / schedule. Note: There shall not be any extension in the contractual delivery time / schedule due to any shortages and / or damages in supplies.
39.	**VARIATION OF CONTRACT VALUE / QUANTITY VARIATION :** BHEL shall have the right to variation in quantities of items within ± 30% of the total Purchase Order / Contract value at the time of placement of PO or award of Contract on overall basis for all amendments together within two years from the date of original Purchase Order / Contract or completion of execution of the Purchase Order / Contract whichever is earlier but quantities of individual items may vary to any extent or may get deleted unless otherwise specified in the technical specifications. No compensation is payable due to variation in the quantities and the Supplier / Contractor shall be bound to accept the same the contracted prices / rates without any escalation. However, if the Purchase Order / Contract is on ñLumpsumò basis, no variation of Purchase Order / Contract value shall be admissible to the Supplier / Contractor within the scope of Purchase Order / Contract, as long as the inputs remain unchanged.
40.	**STATUTORY VARIATION :** GST rates prevailing at the time of dispatch of goods / completion of services shall be payable by BHEL. All other taxes, duties, charges, royalty, cess, other levies shall be deemed to be included in the Ex Works Prices / Charges quoted by bidders and no variations shall be payable in respect thereof. No other variations such as on customs duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the BHEL. Notwithstanding anything above, where the actual completion of the supply / services occurs beyond the period stipulated in the Purchase Order / Contract or any extension thereof, variations referred to above, will be limited to the rates prevailing on the dates of such agreed completion periods only. For variations after the agreed completion periods, the Supplier / Contractor alone shall bear the impact for the upward revisions and for downward revisions BHEL shall be given the benefit of reduction in applicable taxes /GST. This will be without prejudice to the levy of liquidated damages for delay in delivery / completion. If new tax is introduced by Central/ State Govt / Municipality becomes directly applicable on items specified in Bill of Quantities/Purchase Order/Contract, full reimbursements shall be made provided it becomes applicable on items specified in Bill of Quantities. However, any additional tax implication due to delay in delivery, beyond the Contractual Delivery, attributable to supplier shall be borne by supplier.
41.	**MODE OF PAYMENT :** Payment shall be made directly to the Supplier / Contractor by BHEL through NEFT / RTGS.
42.	**CONFIDENTIALITY :** Supplier / Contractor shall, at all times, undertake to maintain complete confidentiality of all data, information, software, drawings & documents etc. belonging to BHEL and also of systems, procedures, reports, input documents, manuals, results and any other BHEL documents discussed and / or finalized during the course of execution of Purchase Order / Contract.
43.	**INDEMNIFICATION :** The Supplier / Contractor shall indemnify and keep indemnified and hold harmless BHEL and its employees and officers from and against any and all claims, suits, actions or administrative proceedings, demands, losses, damages, costs and

Sr. No.	
	expenses and any other claim of whatsoever nature in respect of the death or injury of any person or loss of or damage to any property arising during the course and out of the execution of the Purchase Order / Contract.
44.	**TITLE OF GOODS :** a) Ownership of the equipment / material procured in India, shall be transferred to BHEL upon loading on to the mode of transport to be used for transportation of the said equipment / material from the works to the site / destination and upon endorsement of the dispatch documents in favour of BHEL. b) Ownership of the equipment / material to be imported into the country where the site is located, if not procured in India, shall be transferred to BHEL upon loading on the mode of transport to be used for transportation of the equipment / material from the country of origin to that country / destination and upon endorsement of despatch document in favour of BHEL. c) Notwithstanding the transfer of ownership of the equipment / material, the responsibility for care and safe custody thereof together with the risk of loss or damage thereto for whatsoever reason shall remain with the Supplier.
45.	**COMPLIANCE OF STATUTORY REQUIREMENTS :** The vendor shall comply with all State and Central Laws / Acts, Statutory Rules, Regulations etc., as may be enacted by the Government during the tenure of the Purchase Order / Contract and having in force and applicable to the Purchase Order / Contract and nothing shall be done by the Supplier / Contractor in contravention of any Law / Act and / or Rules / Regulations, thereunder or any amendment thereof. The Supplier / Contractor shall pay all taxes, fees, licence charges / deposits, duties, tolls, royalty, commissions or other charges which may be levied on account of any of his operations connected with the Purchase Order / Contract. In case BHEL is constrained to make any of such payments, BHEL shall recover the same from the Supplier / Contractor either from moneys due to him or otherwise as deemed fit.
46.	**ACCEPTANCE OF ORDER :** Supplier should acknowledge and accept the Letter of Award / Purchase Order issued by BHEL within 7 days of the issue of Letter of Award / Purchase Order. In case of any discrepancy / typographical error in issue of Purchase Order / Contract, the agreed terms & conditions, scope of work, rates / prices for placement of PO / award of contract shall be applicable and BHEL reserves the right to issue amendment(s) to PO / Contract for correction of discrepancies / typographical errors in the PO / Contract at a later date.
47.	**FRAUD PREVENTION POLICY :** The Bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

Signature of Bidder (Authorized Signatory) with Date & Seal

Annexure - I

Certificate by Chartered Accountant on letter head

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

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

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

(Strike off whichever is not applicable)

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

Or

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

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant

Ref. BHEL/TBG/GTC/2016

Annexure for List of Banks (32 Nos.)

Sr. No.	Name of Bank
1	Allahabad Bank
2	Andhra Bank
3	Bank of Baroda
4	Canara Bank
5	Corporation Bank
6	Central Bank
7	Indian Bank
8	Indian Overseas Bank
9	Oriental Bank of Commerce
10	Punjab National Bank
11	Punjab & Sindh Bank
12	State Bank of India
13	State Bank of Hyderabad
14	Syndicate Bank
15	State Bank of Travancore
16	UCO Bank
17	Union Bank of India
18	United Bank of India
19	Vijaya Bank
20	IDBI
21	CITI Bank N. A.
22	Deutsche Bank AG
23	The Hongkong and Shanghai Banking Corporation Limited
24	Standard Chartered Bank
25	J P Morgan
26	Axis Bank
27	The Federal Bank Limited
28	HDFC
29	Kotak Mahindra Bank
30	ICICI
31	Indusind Bank
32	Yes Bank

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS ENGINEERING MANAGEMENT
NOIDA

DOCUMENT NO.	TB-405-316-007	Rev 01	Prepared	Checked	Approved
TYPE OF DOC.	TECHNICAL SPECFICATION	NAME	MSP	JKS	VK
TITLE		SIGN			
		DATE	06.07.2022	06.07.2022	06.07.2022
Illumination System		GROUP	TBEM		
		WO No.	88010		

CUSTOMER	SJVN Arun-3 Power Development Company (P) Ltd. (SAPDC)
Consultant	SJVN Ltd
PROJECT	4x225MW Arun-3 (HEP),Nepal

Contents

Section No.	Description	No of Pages
Section-1	Scope, Technical Requirements Annexure-1 (BILL OF QUANTITIES) Drawings as per CL. 1.1 (F) Annexure-TQR (Technical Qualifying requirement)	29
Section-2	Equipment Specification under scope of supplies and	19
Section-3	Project details and general technical requirements (For all equipment under the Project)	38
Section-4	ANNEXURES	
Annexure-A	Schedule of Technical Deviation	01
Annexure B	Design Memorandum	09
Annexure-C	Guaranteed Technical Particulars	02
Annexure-D	Technical Checklist	02
Annexure-E	Quality and Inspection Format	18
Annexure –F	Sea Worthy Packing	17

Rev. No.	Date	Altered	Checked	Approved	
01	31.08.22				Technical Corrigendum 1.1 is added, BOQ has bene revised Please follow the same

Distribution	To	
	Copies	

TECHNICAL CORRIGENDUM - 1.1 (ARUN-3 ILLUMINATION SYSTEM) **dated 31 Aug 2022**

SL		DESCRIPTION	REMARKS
1	Clause 22.4.1 Chapter 22: Illumination System ED/TS/ARUN/01.06.17 Page 10 of 19	Design & Construction scheme of luminaries & fittings, Sr. (1) -Indoor & outdoor type luminaries/junction boxes/ TBs IP 65	IP 65 for outdoor light fitting IP 55 for outdoor Junction Box IP 20 for indoor light fitting
2	Clause 22.4.1 Chapter 22: Illumination System ED/TS/ARUN/01.06.17 Page 11 of 19	Recessed type luminaries IP21	IP 20 for indoor light fitting
3	Section-22, Illumination System (SJVN), Cl. No, 22.1.1.8 (i & ii) -	Common supplies & services- Please note that sr. no. (i) & (ii) is missing in the main BOQ. Please clarify that the same has to be required or not and in whose scope the same.	**Please consider the followings in bidder's scope of supply**. Cost of the same deemed inclusive of the offer (1.) Portable plug in type inspection lamps with mechanical protection cover for 240V with 5 meter cable. Cable shall be flexible copper withbraided sheath. - Qty 5 nos. (2.) Power plug consisting of five (5) no. power sockets of 5A/15A with 30m cable length and five (5) pin 32 A plug to be connected from the nearest receptacle. Cable shall be flexible copper with braided sheath. - 2 Number
4	As per BOQ item 1.47 and Section-22, Cl.No. 22.1.1.5 (ii)	Please clarify about the Vehicle. Is it the same in our scope or not? If yes, then please clarify about the vehicle.	**Vehicle is clarified as Hand (Manual) driven Cart.** (Motorised / Battery operated vehicle is not need to be considered)
5	Section-1 BHEL	e) Section 1, Clause No. 1.1 Scope, Point (d): Storage space shall be provided by BHEL. Please note that ETC is not in our scope so materials shall be stored in BHEL Store with watch & ward in BHEL scope. Please confirm.	Noted and confirmed

TECHNICAL CORRIGENDUM - 1.1 (ARUN-3 ILLUMINATION SYSTEM) **dated 31 Aug 2022**

SL		DESCRIPTION	REMARKS
6	Section-22, Illumination System (SJVN), Cl. No, 22.1.1.1.2 -	Outdoor Lighting System (iii) - Please note that 30M, 10 Nos. Mast is mentioned (under cl. 22.5.12) and in BOQ, 30 M, 4 Nos is provided. Please clarify. Also please clarify Point No. (vi) under the same clasue also.	For quantity please follow Bid Price Schedule. (Height is updated, please refer clarification 6 above)
7	Section-22, Illumination System (SJVN), Cl. No, 22.1.1.3 -	Power supply network. Please clarify that the same is in our scope or not because this item is missing in BOQ.	Requirement of Power supply network shall be met with Fixed wall mounted sockets of three-phase, five pin, 63A available in Bid Price Schedule.
8	Section-22, Illumination System (SJVN), Cl. No, 22.4.1 -	Design & Construction scheme of luminaries & fittings, Sr. (1) - IP 65 for Indoor fixtures.:- Please note that IP of indoor lighting fixtures are available in IP 20 instead of IP 65. Please confirm that the same is required with IP 20 or IP 65. Please note that indoor fixtures with IP 65 are not available with the reputable manufacturers. Also note that Sr. (4) -Drainage sump and Sr. No. (5) - Recessed type fixtures, The fixtures shall be provided as per the availability instead of IP 67 & IP 21. Please confirm.	Please ref. clarification Sr.1 & 2 above. Further please note, Drainage & Sump area is not applicable in the present scope.
9	BHEL	l) As per Annexure-B of TS No. TB-405-316-007, R0, Cl 2.7 and in other sections, asked for 50% street lighting lux level with solar lights and conventional lights. Please arrange the complete requirement of solar street light system with the complete specification	Bidder to follow technical specification. Outdoor street lighting shall be designed having combination of solar lights and conventional lights in such a way that 50% lux level should be maintained in case of prolonged non availability of the sun. However, detailed scheme shall be finalized during detailed engineering.
10	clause no. 3.6 Transport Limitation page 144/228.	The existing roads allow the transport of the packages of the following size and weight Size (in mm) (l x b x h) - 9700 x 6000 x 6000 Weight (Tonnes) - 70R	Bidder to follow the same
11	General	Kindly send the vehicle size for transportation of material to site. So that we quote accordingly.	Please refer clause no. 3.6 Transport Limitation page 144/228 The existing roads allow the transport of the packages of the following size and weight Size (in mm) (l x b x h) - 9700 x 6000 x 6000 Weight (Tonnes) - 70R

SECTION-1

SCOPE, SPECIFIC TECHNICAL REQUIREMENTS AND QUANTITIES

1.0 The illumination System is required for the following project.

Name of the Customer/ UPPTCL	:	**SJVN ARUN-3 POWER DEVELOPMENT COMPANY (P) LTD. (SAPDC)**
Name of Consultant	:	**SJVN LIMITED**
Name of Main Contractor	:	**Bharat Heavy Electricals Limited**
Name of the Project	:	**4 x 225 MW ARUN-3 HYDRO ELECTRIC PROJECT, NEPAL**

The specification comprises of following sections,

Section-1 : Scope, Project specific technical requirements & Bill of Quantities (Annexure BOQ) , MQP/FQP Format and Annexure TQR

Section-2 : Specific technical requirements for the equipment under scope of supplies.

Section-3 : Project Details and General technical requirements for all equipment under the Project.

Section-4 : **Annexure-A (SCHEDULE OF TECHNICAL DEVIATIONS)**

Annexures
Annexure-B (Compliance Certificate)
Annexure-C (Guaranteed Technical Particulars)
Annexure-D (Technical Checklist)
Annexure-E (Quality Formats)
Annexure-F (Export Worthy Packing)

The following order of priority shall be followed. In case of conflict between requirements specified in various documents, the more stringent one shall be followed.

Statutory Regulations:

In particular, the latest version of the following statutory regulations, as applicable, shall be followed for system,

1. Indian Electricity Act
2. CEA regulations
3. The Factory Act
4. Section-1 ##
5. Section-2(SJVN specification)
6. Section-3

Note: Technical corrigendum 1.1 shall supersede all other Section of technical specification

7. Codes & standards

Bidder shall furnish list of conflicts/ ambiguities/ deviations, if any, along with their technical offer and also furnish the basis that is considered for submitting technical offer. BHEL will resolve listed conflicts prior to award. In case of ambiguity, bidder shall inform BHEL of their interpretation. In case bidder fails to convey the same prior to award, the Owner's decision on interpretation shall be considered final if need arises during the execution. No additional cost or extra time on account of conflicts/ ambiguities/ deviations shall be admissible.

No deviation from the requirements specified in various clauses of this specification shall be allowed and hence, a certificate to this effect shall have to be furnished along with the offer (Annexure-A) and (Annexure-B). Any conflicts/ ambiguities/ deviations mentioned elsewhere in technical offer shall not be reviewed.

1.1 SCOPE

This specification covers the specific technical requirements of Illumination System Comprising

a) Design, engineering, manufacture, Supply, testing at works, packing and dispatch of equipment & material to site.
b) Supervision of Erection, testing, commissioning.
c) Lux level demo for all areas
d) Storage space shall be provided by BHEL.

A. <u>The Contract shall be on Bill of Quantity basis for the package. In case of change in scope after award of the contract, the additions/ deletions to the scope shall be as per the breakup unit rates for all the equipment and services furnished by the bidder in his offer. The Contractor shall be responsible for the design and verification of the Illumination system, demonstration of lux levels and other criteria at site.</u>

B. After placement of order, the bidder has to design the system as per relevant standard/codes to the satisfaction of BHEL/Customer/Customer Consultant.

C. It is not the intent to specify herein all the details of design and manufacturing. The equipment and the system shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to Purchaser/Owner, who will interpret the meaning of drawings and specifications and shall be entitled to reject material, which in his judgment is not in full accordance herewith.

D. The Bidder shall have deemed to have understood completely all the Tender drawings and documents and quoted accordingly.

E. It is the responsibility of the successful Bidder to obtain necessary approval/clearance from statutory organizations wherever applicable for the equipment/systems under the scope specified.

F. The term "Owner' appearing in this specification shall refer to ultimate customer, the term 'Purchaser" shall refer to BHEL and the term 'Contractor" shall refer to the successful Bidder.

The Illumination System shall be provided for the following areas:

- ❑ Switchyard Control Room cum Administrative Office Building
- ❑ 400kV GIS Building
- ❑ DG Set area lighting
- ❑ Line/Bus Reactor Area
- ❑ Illumination around CRB & GIS Buildings
- ❑ Outdoor lighting (flood lights) of switchyard
- ❑ Street lighting for switchyard
- ❑ Ventilation Room area

The roads & the area of the outdoor switchyard/ indoor building areas to be illuminated are as per enclosed drawing, list as below.

Sl. No.	BHEL Drg. No.	Drawing Title
1.	TB-3-405-316-001, Rev.07	Electrical Layout Plan & section of 4 X 225MW of ARUN-3 HEP
2.	TB-3-405-316-020, Rev.02	Layout of GIS Building of 4 X 225MW of ARUN-3 HEP
3.	TB-3-405-316-021, Rev.06	Conceptual Layout of CRP Room in Switchgear Building of 400kV Switchyard of ARUN-3 HEP

2.0 DESIGN CRITERIA

2.1 The illumination System for outdoor Switchyard shall comprise of:

- ❑ Normal AC lighting
- ❑ Emergency AC Lighting

For outdoor switchyard approximately 80% of luminaries shall be connected on normal AC and 20% on emergency

The illumination System for Indoor area (GIS Bldg/Control room and other buildings) shall comprise of:

- ❑ Normal AC Lighting

- ❑ Emergency AC Lighting
- ❑ Emergency DC Lighting

For switchyard control room building normally all AC luminaries (approximately 80% on ACN and 20% on ACE) shall be in service and DC luminaries shall be off. On failure of AC normal supply, DC luminaries shall be automatically switched 'ON'. On restoration of AC Emergency supply through DG, DC luminaries shall be put-off automatically after a time gap of about three minutes following the restoration of supply to normal AC or emergency AC lighting system.

DC Emergency lighting shall be provided in the following areas for the safe movement of personnel during emergency.
i) Control room
ii) LT switch board & charger room
iii) Battery Room
vi) Corridor
v) GIS Room

2.2 The lux levels to be maintained in the switchyard shall be as per following:

Sl. No.	Area	Average Lux level
GENERAL AREAS		
1.	Store	150
2.	Changing rooms, washrooms and toilets	150
3.	Staircases	150
4.	Pantry/ canteen	150
OFFICE AREAS		
5.	Offices	300
6.	Conference room	300
7.	Data Processing areas	300
8.	Control room	300
EQUIPMENT AREAS		
9.	GIS Building	200
OUTDOOR AREAS		
10.	Various approach roads for switchyard area	50
11.	Pot head yard	50

Illumination luminaries for indoor and outdoor lighting shall be achieved through metal halide lamps / sodium vapour / mercury vapour / LED lighting / Fluorescent type fixtures. Selection of illumination luminaries shall be done during detailed engineering based on criteria of achieving required lux level, 10% of fixtures with minimum restriking time in

lighting zone and visual comfort to the human being. The location of the lighting fixtures shall be such as to keep the areas behind the panels with equal lux level for better working there. In addition to above, the selection of luminaries for various areas should be such that the proposed illumination design is most energy efficient and decorative as per latest international trend.

Outdoor street lighting shall be designed having combination of solar lights and conventional lights in such a way that 50% lux level should be maintained in case of prolonged non availability of the sun. However, detailed scheme shall be finalized during detailed engineering.

The concept of decorative lighting especially in the area of importance with false ceilings such as Reception area, Conference room, Control room and any other area deemed necessary, etc. shall be taken into consideration. Fixtures with LED lighting or latest state of art technology will be adopted for these locations. Lighting contractor shall coordinate with the civil architecture contractor for interfacing of decorative lighting fixtures for aesthetic requirement.

Other design criterion such as amenity, visual performance, comfort realization, safety viewing and daylight effect shall be taken into consideration.

2.3 In an area, the lighting fixtures shall be arranged in different phase / LPs such that even in case one lighting panel is faulty complete lighting is not affected. In case of any location the lighting shall be arranged from all three phases for normal as well as normal/emergency supply.

2.4 Detailed lighting design calculations considering the number of fittings as per BOQ shall be submitted by contractor for approval of BHEL / Customer.

2.5 Values of Maintenance Factor (MF), which includes the luminaire depreciation factor also as per IS-3646, shall be considered as given below:

a) Indoor area - non AC: 0.7
b) Control room & air conditioned area: 0.8
c) Outdoor switchyard and Road: 0.6

The Reflection Factor (RF) for indoor shall be considered as given below:

Ceiling (rc)	**Wall (rw)**	**Floor (rf)**
60	40	20

2.6 For safe movement of personnel during emergency 2Nos. self-contained sealed

maintenance free lead acid battery operated emergency lighting units (ELU) with 4 hours duration is envisaged.

1200 mm Sweep ceiling fans/Wall mounted fans shall be provided in office, Pantry, record room & maintenance room.

2.7 AC Normal lighting fixtures are fed through a conveniently located AC Lighting panel (ACNLP) which are fed from Lighting Distribution Board (LDB).

LDB shall consist of 100 kVA / 50 kVA dry type isolation transformers & distribution panels shall have TPN switch fuse unit for incoming & outgoing feeders. The ACNLPs shall be provided with 3-phase switch fuse unit for incoming and MCBs for outgoing.

AC Emergency lighting fixtures fed through conveniently located AC Emergency Lighting panel (ACELP) which is fed from AC Emergency Lighting Distribution Board (ACELDB).

ACELDB consist of 50 kVA dry type isolation transformer & distribution panels, shall have 3-phase switch fuse unit for incoming & outgoing feeders. The ACELPs shall be provided with TPN switch fuse unit for incoming and MCB for outgoing.

DC Emergency lighting fixtures fed through conveniently located DC Lighting Distribution Board (DCLDB). Each DCLDB shall have 2-pole switch fuse unit and contactor for incoming. For outgoing feeders 2-pole MCB shall be provided, suitable for DC.

All LPs & LDBs shall be powder coated with outside shade No: 631 of IS-5 & inside glossy white.

Emergency exit lamps backed up by battery shall be provided at strategic locations of the building for safe exit of personnel. These exit lamps will remain ON all the time and normally received power supply from AC lighting panel.

Ni-Cd battery with 4 hrs battery back-up shall be provided at standalone system where DC battery backup is not available. However, wherever DC battery is available, same shall be used for backup supply.

Further strategic locations shall include all exit doors and routes in GIS Building. However, exact location will be finalized during detailed engineering.

2.8 The contractor shall submit detailed calculation for reaching the above Lux level for Employer's approval during detailed engineering.

2.9 After placement of order, the bidder has to design the system as per relevant standards/codes to the satisfaction of BHEL/Customer

2.10 The detailed drawings showing lighting layout, disposition and location of lighting fixtures, receptacles, switchboards, ceiling fan points etc, wiring scheme, wiring & conduit layout, fixing details, OGAs of all equipment, Cable schedule for switchyard etc shall be submitted for approval.

2.11 Tentative quantities are mentioned in BOQ. Actual quantities to be supplied shall be as per the quantities approved based on design drawings.

2.12 Occupancy sensors shall be provided in rooms as per section 2.

2.13 Temperature Transducer - Each switch-yard panel room shall be provided with temperature transducer to monitor the temperature of the panel room. The Temperature transducer shall have the following specification:

- Sensor: Air temperature sensor (indoor use)
- Output: 4 to 20mA
- Temperature range: -5°C to 60°C
- Resolution: 0.1°C
- Accuracy: 0.5°C or better

3.0 SCOPE OF SUPPLIES & SERVICES

(i) System Design Engineering is included in vendor's scope, which includes design of complete lighting system for indoor and outdoor areas. Please refer the list of reference drawings as per annexure for the tentative areas to be covered by the lighting system. The aspect of engineering covers preparation of

- electrical distribution and control schemes,
- quantity estimation for both indoor & outdoor
- lighting layout drawings for outdoor yard
- Street lighting layout
- lighting layout for buildings
- conduit layout drawings lighting system,
- conduit layout drg for split AC, telephone points, firefighting system
- wiring schemes upto luminaires,
- cable schedules

and all associated design work not specifically mentioned in the specification. The quantity estimation to include all items required for the complete lighting system viz. lighting fixtures, lamps, Lighting DBs, Welding DBs, lighting panels, conduits, PVC wires, mounting hardware etc. complete in all respect.

Bidder to prepare BOQ for point wiring material (separate for each building/area) and other accessories and submit for Approval. Cost for design deemed to be included in equipment prices.

(ii) The main items to be furnished for Substation under this contract are detailed in Bill of Quantity (Annexure-BOQ) and shall be read in conjunction with other clauses of this specification.

(iii) Further, in case any type of luminaire/ panels etc not included below but are required for meeting the technical specification shall be specifically brought out in the offer/shall be supplied.

(iv) Bidder shall indicate in his offer, catalogue nos. of all equipment offered.

(v) Earthing of Junction box & Lighting Panels etc is to be done by 25X6 mm/50X6 mm GS Flat. For Lighting fixture, receptacle, conduits and switchboxes, 16SWG wire is to be used for earthing. However for Junction box, 8SWG wire shall be used for earthing. The above mentioned earthing material shall be in bidder scope.

(vi) Earthing of Lighting Poles (for lighting poles outside switchyard) is to be done by 40 mm dia 3000 mm long rod electrode. Rod electrode shall be free issued by BHEL.

(vii) Supply of necessary wire/cable for consumption within the street light pole assembly, such as pole mounted JB to respective light fittings etc. shall be in bidder's scope.

(viii) All lighting panels, junction boxes, receptacles fixtures, conduits etc. shall be grounded in compliance with the provision of I.E. rules.

(ix) Supply of all other items such as wires, steel wire, lugs, Cable glands, earthing material etc. required to complete the works are in bidder's scope.

(x) The equipment / services to be furnished for Substations under this contract are detailed hereunder and shall be read in conjunction with other clauses of this specification. All such items though not specifically mentioned but required to meet specification and for safe and satisfactory operation of equipment/ system will also be treated as included and the same shall be supplied at NO EXTRA COST to Purchaser. Further, in case any item not included below but are required to meet the technical specification, to be brought out by bidder at tender stage itself. Such items may be mentioned and included under separate head in the table below.

(xi) **Supervision of** Erection & Commissioning of conduits & wiring points for

- Lighting system,
- Split AC,
- telephone points

(xii) Civil design for lighting mast / pole is included in bidder's scope

(xiii) Design rectification engineering (if any) is included in vendor's scope. In case of revised inputs or site feedback, preparation and submission of revised engineering outputs shall also be in the scope of vendor.

(xiv) Although Erection and Commissioning is not included in vendor's scope, the vendor shall be fully responsible for establishing the correctness of engineering and equipment at site.

(xv) Review of sub-vendor's documents by the purchaser shall not relieve the vendor from the responsibility of design & supply.

(xvi) Further, in case any type of luminaire/ panels etc. not included below but are required to meet the technical specification shall be specifically brought out in the offer/ shall be deemed to be included in offer.

(xvii) Lighting Panel/ Junction Box: The bidder shall supply junction boxes complete with terminals as required. The supports, brackets, bolts, nuts, screws etc. required for erection are also included in scope of the bidder.

(xviii) Junction boxes shall be provided with two earthing terminals suitable for 8 swg GI earthing wires.

(xix) The continuous conductor of specified GI wire shall be run all along each conduit run. The conductor shall be connected to each panel ground bus. All junction boxes, receptacles, switches, lighting fixtures etc. shall be connected to specified GI wire. Supply of GI ground wire shall be included in bidder's scope.

(xx) Supply of all other items such as wires, steel wire, lugs, cable glands, earthing material etc. required to complete the work is in bidder's scope.

(xxi) Cable gland plate thickness in all the panels shall be minimum 3.0 mm.

(xxii) The documents shall be in English language and MKS system of units.

(xxiii) All accessories shall be wired upto a terminal block or a separate weather proof metallic terminal box suitable for 2.5 sq. mm. copper wire termination.

(xxiv) Single line diagrams of power distribution upto Lighting Panels. Separate drawing for complete lighting distribution shall also be prepared by vendor.

(xxv) Preparation of **As-Built drawings** and submission of the same in hard copy 5 sets & in CD ROM – 2 numbers.

(xxvi) Conducting of lux level measurement as per approved designs to the satisfaction of owner / purchaser shall be under bidder's scope.

(xxvii) Bidder shall ensure that sufficient quantity of commissioning spares is made available for timely completion of commissioning of the system. The bidder shall furnish a list of Commissioning spares that will be provided by him. The unused commissioning spares shall be returnable to the bidder.

4.0 EXCLUSIONS / BHEL ISSUED ITEMS FOR ILLUMINATION:

Following items are supplied by BHEL for illumination system. Remaining all items required for successful completion of illumination system is under scope of bidder. Bidder to however submit estimate and calculation sheet BHEL supplied item during contract stage.

- Multicore armoured power & control cables
- 75x12 GI flat for earthing works, however GI flat of size less than 75X12 shall be supplied by bidder.
- 110/50mm GI/ PVC pipe for cabling works
- 40mm dia MS rod for earthing works

5.0 BILL OF QUANTITY – refer attached Annexure-BOQ

6.0 TECHNICAL QUALIFYING REQUIREMENT

Technical qualifying requirement shall be as per "**Annexure-QR"** attached.

7.0 TYPE TESTING

All supply items i.e. Luminaries, Lighting Panels, Junction box, Receptacles are to comply type test requirement as per relevant IS / IEC / Specification (Cl. 22.7.1 of Section-2).

The contractor shall only submit the certificates from Govt. approved labs/ accredited laboratories of the type tests listed under Category -II for the respective equipment which should have been carried out within last five (5) years from the date of bid opening (09.02.2018). These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. In case the contractor is not able to submit report of the type test(s) conducted within last five years from the date of bid opening, or in case the type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct the test without any financial implication to BHEL/SAPDC/SJVN.

All acceptance and routine tests as per relevant standards and specification shall be deemed to be included in the bidder's scope.

Additional Type test certificate on equipment, if any, shall be furnished, else the equipment shall have to be type tested, free of cost, to prove design. Items like ceiling fans, Emergency Lighting unit, flexible conduit, earthing wire & flat, 24V supply module, ladder, switch boxes, exit sign, structural steel shall be cleared based on Certificate of Compliance.

8.0 QUALITY PLAN

The Bidder shall follow Quality Assurance Programme to ensure that the equipment and services under the scope of contract whether manufactured or performed at the Bidder's works or at his sub-vendor's premises or at the SAPDC's site or at any other place of work are in accordance with the technical specifications. Such programme shall be outlined by the Bidder and be submitted along with the bid. The QA programme shall be generally in line with IS/ISO- 9001, Section-2 & Section-3.

9.0 INSPECTION & TESTING

Before being fitted on the equipment, all components shall be subjected to routine tests at the bidder's factory, provided by the relevant IEC/IS standards. A detailed test report proving the successful passing of such tests shall be provided.

Prior to dispatch, the routine & acceptance tests shall be carried out on each item in accordance with the applicable IEC/IS and the material shall be offered for final inspection by BHEL/SAPDC/SJVN in accordance with agreed quality plan with 3 weeks' advance information. The charges for these shall be deemed to be included in the equipment price.

10.0 PACKING

The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to any subsequent instruction ordered by the Employer consistent with the requirements of the Contract AS PER Specification. Reference Export-worthy packing details is attached "**Annexure - Export Worthy Packing".**

ILLUMINATION PACKAGE FOR ARUN-III

Rev.02 dated 02.09.2022

SN	Equipment	Phy Unit	Qty	Comments
1	SUPPLY- ILLUMINATION EQUIPMENT : MAIN LIGHTING DISTRIBUTION BOARD (MLDB) COMPRISING 415V, 200A, 3-PH, 4-WIREBUS AND 2 NO INCOMERS EACH WITH ONE (1) NO. LIGHTING TRANSFORMER: 100KVA WITH ONE (1)MCCB (INCLUSIVE OF CT,VOLTMETER, AMMETER, CONTACTOR WITH TIMER, INDICATING LAMPS ETC), BUS COUPLER -200A MCCB AND OUTGOING FEEDERS 6 NO. 63A TPN MCCB ON EACH BUS SECTION	NO	1	
2	SUPPLY- ILLUMINATION EQUIPMENT : EMERGENCY LIGHTING DISTRIBUTION BOARD (MLDB) COMPRISING 415V, 100A, 3-PH, 4-WIREBUS AND 2 NO INCOMERS EACH WITH ONE (1) NO. LIGHTING TRANSFORMER: 50KVA WITH ONE (1)MCCB (INCLUSIVE OF CT,VOLTMETER, AMMETER, CONTACTOR WITH TIMER, INDICATING LAMPS ETC), BUS COUPLER -100A MCCB AND OUTGOING FEEDERS 4 NO. 63A TPN MCCB ON EACH BUS SECTION	NO	1	
3	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING DISTRIBUTION BOARD (DC-LDB) COMPRISING WITH ONE (1) NO. INCOMER 125ADP SWITCH-FUSE UNIT WITH CONTACTOR, OUTGOING FEEDERS 6 NO. 32A DP MCB	NO	1	
4	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - RECESSED MOUNTED LED	NO	32	
5	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - SURFACE MOUNTED LED	NO	160	
6	SUPPLY- ILLUMINATION EQUIPMENT : LED INDOOR HIGH BAY FITTINGS TYPE IHB	NO	30	
7	SUPPLY- ILLUMINATION EQUIPMENT : FLOOD LIGHT LED TYPE LIGHTING FIXTURE WITH ACCESSORIES	NO	80	
8	SUPPLY- ILLUMINATION EQUIPMENT : STREET LIGHTING FIXTURES	NO	20	
9	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LED BULKHEAD	NO	30	
10	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LED DOWNLIGHTER	NO	15	
11	SUPPLY- ILLUMINATION EQUIPMENT : EMERGENCY EXIT SIGN BOARD/LAMP	NO	15	
12	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - LED POST TOP LANTERN	NO	16	
13	SUPPLY- ILLUMINATION EQUIPMENT : 32A RECEPTACLES WITH TP MCB FOR AC UNIT	NO	14	
14	SUPPLY- ILLUMINATION EQUIPMENT : 5A/15A RECEPTACLE TYPE RI	NO	21	
15	SUPPLY- ILLUMINATION EQUIPMENT : 15A,240V,2 POLE, 3 PIN OUTDOOR RECEPTACLE (TYPE RO)	NO	33	
16	SUPPLY- ILLUMINATION EQUIPMENT : 63A, 415V : INTERLOCKED SWITCH SOCKET OUTDOOR RECEPTACLE (TYPE RP)	NO	12	
17	SUPPLY- ILLUMINATION EQUIPMENT : 415 V A.C. INDOOR TYPE LIGHTING PANEL (NORMAL) (TYPE NLP-1)	NO	3	
18	SUPPLY- ILLUMINATION EQUIPMENT : INDOOR EMERGENCY LIGHTING PANEL	NO	3	

ILLUMINATION PACKAGE FOR ARUN-III Rev.02 dated 02.09.2022

SN	Equipment	Phy Unit	Qty	Comments
19	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING PANEL (INDOOR) TYPE DCELP/ DCLP-1	NO	5	
20	SUPPLY- ILLUMINATION EQUIPMENT : JUNCTION BOXES FOR OUTDOOR	NO	15	
21	SUPPLY- ILLUMINATION EQUIPMENT : OUTDOOR LIGHTING PANEL	NO	4	
22	SUPPLY- ILLUMINATION EQUIPMENT : STREET LIGHTING PANEL	NO	2	
23	SUPPLY- ILLUMINATION EQUIPMENT : OUTDOOR POWER RECEPTACLE FOR OIL FILTRATION UNIT (250A)	NO	3	
24	SUPPLY- ILLUMINATION EQUIPMENT : DECORATIVE TYPE SWITCH & SOCKET WITH TWO NOS OF 5 A SWITCH	NO	10	
25	SUPPLY- ILLUMINATION EQUIPMENT : DECORATIVE TYPE SWITCH & SOCKET WITH FOUR NOS OF 5 A SWITCH WITH ONE NOS SOCKET	NO	20	
26	SUPPLY- ILLUMINATION EQUIPMENT : DECORATIVE TYPE SWITCH & SOCKET WITH SIX NOS OF 5 A SWITCH WITH ONE NOS SOCKET	NO	10	
27	SUPPLY- ILLUMINATION EQUIPMENT : SINGLE SOCKET OUTLET RJ-11	NO	10	
28	SUPPLY- ILLUMINATION EQUIPMENT : WALL FAN 400MM SWEEP, INDUSTRIAL TYPE, ENERGY EFFICIENT	NO	6	
29	SUPPLY- ILLUMINATION EQUIPMENT : 1200 MM SWEEP CEILING FAN	NO	28	
30	SUPPLY- ILLUMINATION EQUIPMENT : 300 MM SWEEP EXHAUST FANS	NO	6	
31	SUPPLY- ILLUMINATION EQUIPMENT : OCCUPANCY BASED INFRA RED SENSORS	NO	10	
32	SUPPLY- ILLUMINATION EQUIPMENT : LIGHT LEVEL SENSORS AND OTHER ACCESSORIES AS REQUIRED FOR CONTROL OF LIGHTING IN THE STAIRS AREA OF CONTROL ROOM CUM ADMINISTRATIVE BUILDING AS PER SPECIFICATION	NO	2	
33	SUPPLY- ILLUMINATION EQUIPMENT : TELEPHONE POINTS- SINGLE OUTLET TELEPHONE SOCKET INCLUDING CABLE/WIRE AND ACCESSORIES	NO	4	
34	SUPPLY- ILLUMINATION EQUIPMENT : TELEPHONE JB	NO	2	
35	SUPPLY- ILLUMINATION EQUIPMENT : TEMPERATURE TRANSDUCER	NO	2	
36	SUPPLY- ILLUMINATION EQUIPMENT : LAN CABLE	MTR	300	
37	SUPPLY- ILLUMINATION EQUIPMENT : LAN POINTS INCLUDING ACCESSORIES	NO	3	
38	SUPPLY- ILLUMINATION EQUIPMENT : STRUCTURAL STEEL FOR ILLUMINATION RECEPTACLES, PANELS, ETC.	MT	4	
39	SUPPLY- ILLUMINATION EQUIPMENT : EARTHING MATERIAL - 25X6MM GI FLAT	MTR	500	
40	SUPPLY- ILLUMINATION EQUIPMENT : ERECTION ITEMS INDOOR- POINT WIRING FOR AC FIXTURE, FANS & LIGHTS (20MM, 25MM PVC/GI CONDUIT ; 1.5, 2.5, 4 SQ. MM CU WIRE ETC.)	LOT	1	

ILLUMINATION PACKAGE FOR ARUN-III Rev.02 dated 02.09.2022

SN	Equipment	Phy Unit	Qty	Comments
41	SUPPLY- ILLUMINATION EQUIPMENT : ERECTION ITEMS OUTDOOR- POINT WIRING FOR AC FIXTURE, FANS & LIGHTS (20MM, 25MM PVC/GI CONDUIT ; 1.5, 2.5, 4 SQ. MM CU WIRE ETC.)	LOT	1	
42	SUPPLY- ILLUMINATION EQUIPMENT : 25M HIGH MAST WITH FEEDER PILLAR (WITHOUT FIXTURES)	NO	4	
43	SUPPLY- ILLUMINATION EQUIPMENT : STREET POLE 9 METER	NO	15	
44	SUPPLY- ILLUMINATION EQUIPMENT : 4.5M HIGH LIGHTING POLE FOR POST-TOP LANTERN	NO	5	
45	SUPPLY- ILLUMINATION EQUIPMENT : CARTWHEEL MOUNTED ALUMINIUM LADDER AS PER TECHNICAL SPECIFICATION	NO	2	
46	SUPPLY- ILLUMINATION EQUIPMENT : VEHICLE MOUNTED ADJUSTABLE PLATFORM EXTENDED UPTO 12 M.	NO	1	Vehicle is clarified as Hand (Manual) driven Cart. (Motorised / Battery operated vehicle is not need to be considered)
47	SUPPLY- ILLUMINATION EQUIPMENT : LADDER	NO	2	1 NO LADDER EACH FOR 2M AND 5M
48	SERVICES- ILLUMINATION EQUIPMENT : TO & FRO TRAVEL CHARGES TO SITE FOR SUPERVISION OF ERECTION TESTING & COMMISSIONING FOR ILLUMINATION SYSTEM PER VISIT	VISIT	8	PER VISIT SHALL BE MINIMUM 7 DAYS
49	SERVICES- ILLUMINATION EQUIPMENT : SUPERVISION OF ERECTION TESTING & COMMISSIONING FOR ILLUMINATION SYSTEM ON PER MANDAY BASIS	MANDAY	56	
50	SPARES- ILLUMINATION EQUIPMENT : MULTIPLE PLUG POWER SOCKETS SUITABLE FOR 63/32A, SINGLE PHASE	LOT	1	1 LOT=20% OF INSTALLED QUANTITY
51	SPARES- ILLUMINATION EQUIPMENT : MULTIPLE PLUG POWER SOCKETS SUITABLE FOR 15A/5 A	LOT	1	1 LOT=20% OF INSTALLED QUANTITY
52	SPARES- ILLUMINATION EQUIPMENT : LAMPS OF EACH TYPE & RATING	LOT	1	1 LOT=10% OF INSTALLED QUANTITY
53	SPARES- ILLUMINATION EQUIPMENT : CONTROL GEAR BOX OF EACH TYPE- 20% OF INSTALLED	LOT	1	
54	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - RECESSED MOUNTED LED	NO	7	
55	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - SURFACE MOUNTED LED	NO	32	
56	SPARES- ILLUMINATION EQUIPMENT : LED INDOOR HIGH BAY FITTINGS TYPE IHB	NO	6	
57	SPARES- ILLUMINATION EQUIPMENT : FLOOD LIGHT LED TYPE LIGHTING FIXTURE WITH ACCESSORIES	NO	16	
58	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - LED STREET LIGHT	NO	4	
59	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LED BULKHEAD	NO	6	

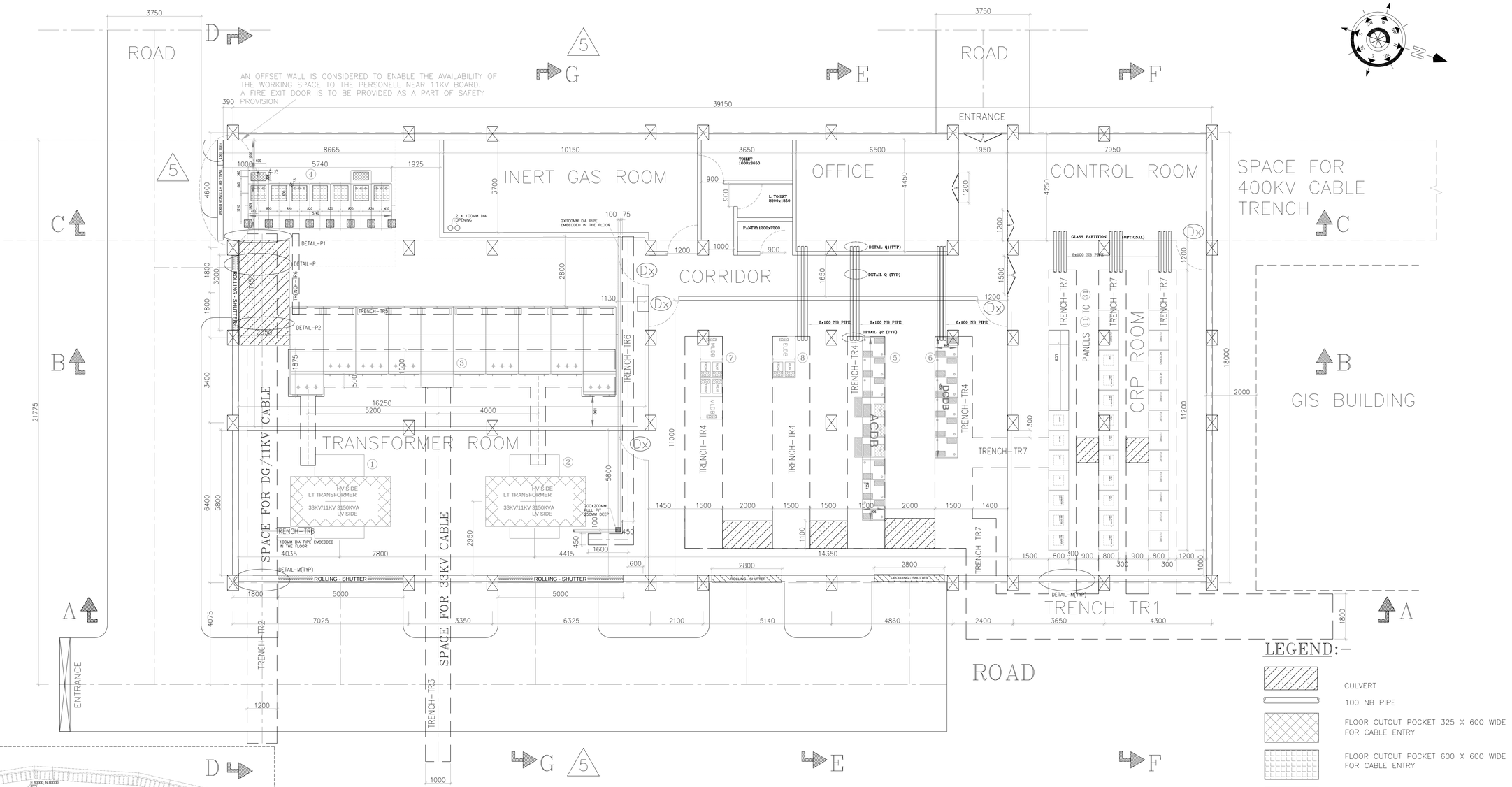
ILLUMINATION PACKAGE FOR ARUN-III Rev.02 dated 02.09.2022

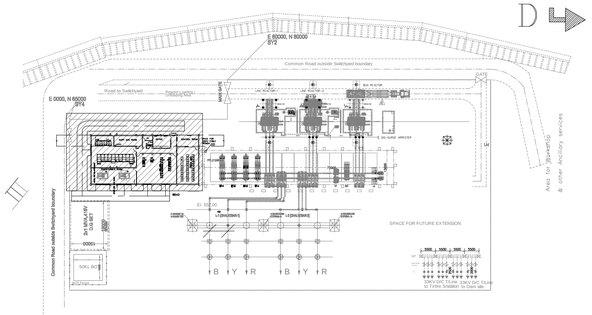
SN	Equipment	Phy Unit	Qty	Comments
60	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - DC LED DOWNLIGHTER	NO	3	
61	SPARES- ILLUMINATION EQUIPMENT : EMERGENCY EXIT SIGN BOARD/LAMP	NO	3	
62	SPARES- ILLUMINATION EQUIPMENT : LIGHTING FIXTURE - LED POST TOP LANTERN	NO	4	
63	SPARES- ILLUMINATION EQUIPMENT : SWITCHES, CONTACTORS, TERMINAL BLOCKS, SCREWS	LOT	1	1 LOT=20% OF INSTALLED QUANTITY
64	SPARES- ILLUMINATION EQUIPMENT : CONDUITS, CABLES, WIRES	LOT	1	1 LOT=5% OF INSTALLED QUANTITY
65	SPARES- ILLUMINATION EQUIPMENT : INDICATING LAMPS, MCCBS., MCBS: AUX_ RELAYS, PUSH BOTTOMS ETC.- 20% OF INSTALLED	LOT	1	
66	SPARES- ILLUMINATION EQUIPMENT : SOLAR PANEL- 10% OF INSTALLED	LOT	1	
67	SPARES- ILLUMINATION EQUIPMENT : CONTROL GEAR BOX OF SOLAR PANEL. (INCLUDING BATTERY BANK) - 10% OF INSTALLED	LOT	1	
68	SPARES- ILLUMINATION EQUIPMENT : 4.5M HIGH LIGHTING POLE FOR POST-TOP LANTERN	NO	1	
69	SPARES- ILLUMINATION EQUIPMENT : STREET POLE 9 METER	NO	1	
70	SPARES- ILLUMINATION EQUIPMENT : LUX METER	NO	1	
71	SPARES- ILLUMINATION EQUIPMENT : LUG, THIMBLE, GLANDS ETC- 10% OF INSTALLED	LOT	1	

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-3-405-021





KEY PLAN

LEGEND:-

- CULVERT
- 100 NB PIPE
- FLOOR CUTOUT POCKET 325 X 600 WIDE FOR CABLE ENTRY
- FLOOR CUTOUT POCKET 600 X 600 WIDE FOR CABLE ENTRY
- FLOOR CUTOUT POCKET 300 X 300 WIDE FOR CABLE ENTRY
- (Dx) DOOR FOR STAFF MOVEMENT ONLY SIZE AS PER CUSTOMER STANDARDS
- COLUMN OF THE BUILDING

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
06	11.11.2021	CHD/APPD	05	03.11.2021	CHD/APPD	04	08.09.2021	CHD/APPD	03	30.06.2021	CHD/APPD
ZONE	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 9 NOV .2021		ZONE	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 21.09.2021 AND VC HELD BETWEEN BHEL AND SJVN DATED : 26.10.2021		ZONE	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021 AND AUGUST 20.08.2021		ZONE	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021

REV.	DATE	ALTERED	REV.	DATE	ALTERED
02	07.06.2021	CHD/APPD	01	05.03.2021	CHD/APPD
ZONE	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 19.03.2021 AND MEETING WITH SJVN		ZONE	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 23.02.2021	

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD. (A JOINT VENTURE OF GOVT OF INDIA SND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA

	NAME	SIGN.	DATE
DRN.	PK		30/10/2018
CHD.	Vyom/JK		30/10/2018
APPD.	SKS		30/10/2018

DEPT. TBG | CODE | SCALE NTS | CARD CODE

TITLE: CONCEPTUAL LAYOUT of CRP ROOM IN SWITCHGEAR BUILDING OF 400kV SWITCHYARD OF ARUN 3 HEP

DRG.NO. TB-3-405-316-021 | REV. 6

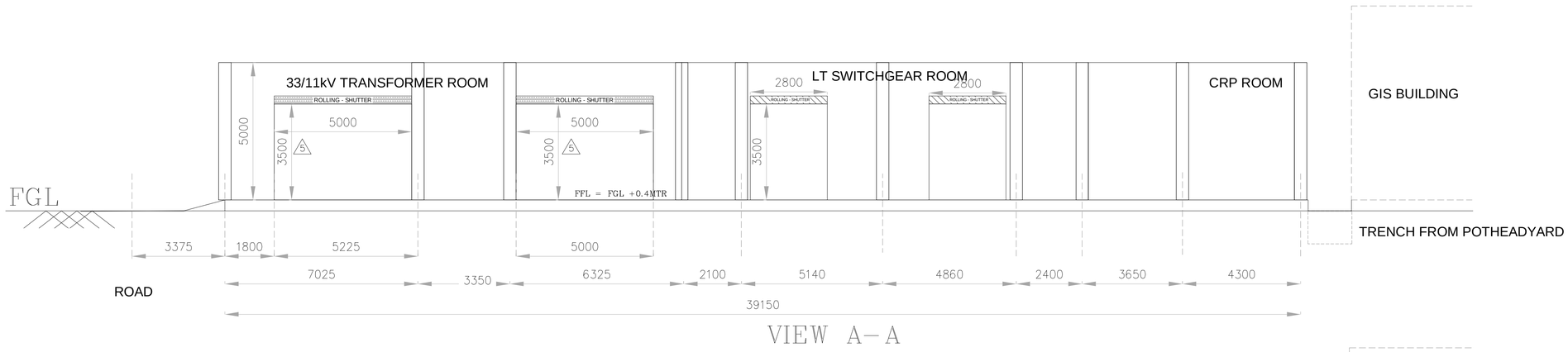
SHT. No 1 | NO. OF SHT. 05

SIZE-A2

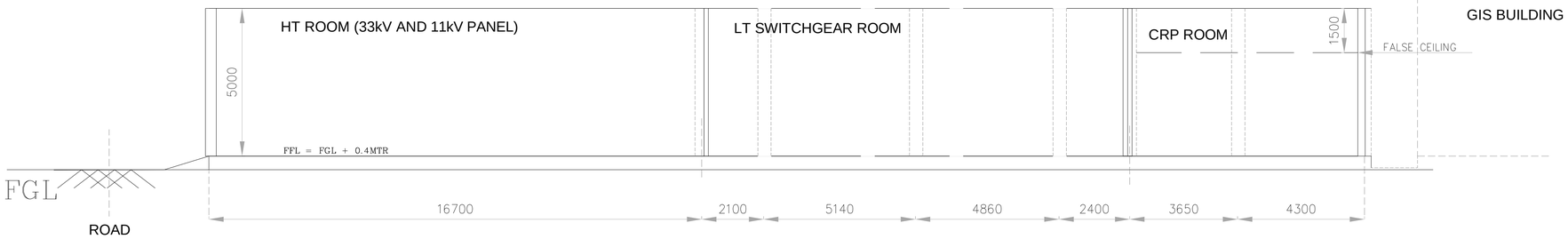
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

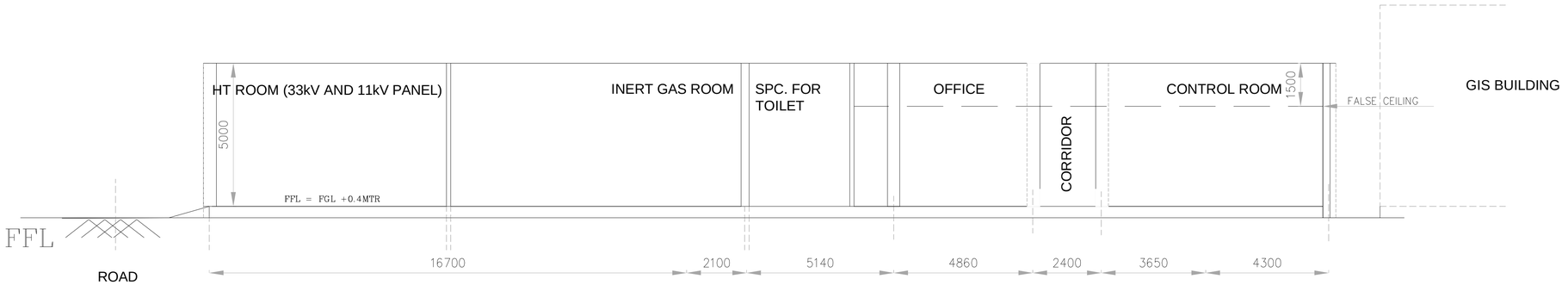
DRG. NO. TB-3-405-316-021



VIEW A–A



VIEW B–B



VIEW C–C

NOTE:

CLEAR HEIGHT OF THE OPENING IN THE DOORS TO BE CONSIDERED AS 3250 MM

ROLLING SHUTTER /STEEL DOOR TO BE PROVIDED IN 33/11KV TRANSFORMER ROOM

REV.	DATE	ALTERED
06	11.11.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 9 NOV .2021

REV.	DATE	ALTERED
05	03.11.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 21.09.2021 AND VC HELD BETWEEN BHEL AND SJVN DATED : 26.10.2021

REV.	DATE	ALTERED
04	08.09.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021 AND AUGUST 20.08.2021

REV.	DATE	ALTERED
03	30.06.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021

REV.	DATE	ALTERED
02	07.06.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 19.03.2021 AND MEETING WITH SJVN

REV.	DATE	ALTERED
01	05.03.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 23.02.2021

PROJECT: ARUN–3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN–3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD.
(A JOINT VENTURE OF GOVT OF INDIA SND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA

	NAME	SIGN.	DATE
DRN.	PK		30/10/2018
CHD.	Vyom/JK		30/10/2018
APPD.	SKS		30/10/2018

DEPT. TBG. CODE | SCALE NTS | CARD CODE

TITLE: CONCEPTUAL LAYOUT of CRP ROOM IN SWITCHGEAR BUILDING OF 400kV SWITCHYARD OF ARUN 3 HEP

DRG.NO. TB–3–405–316–021 REV. 6

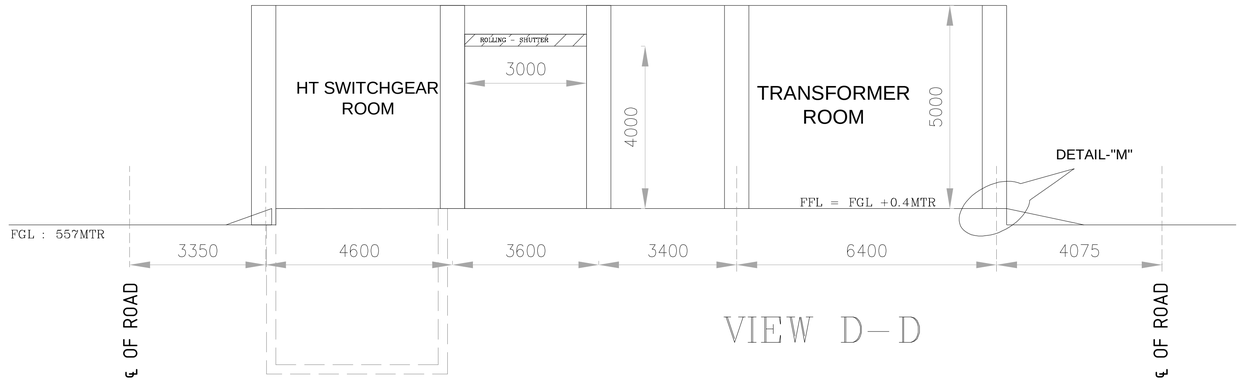
SHT. No 2 NO. OF SHT. 05

SIZE–A2

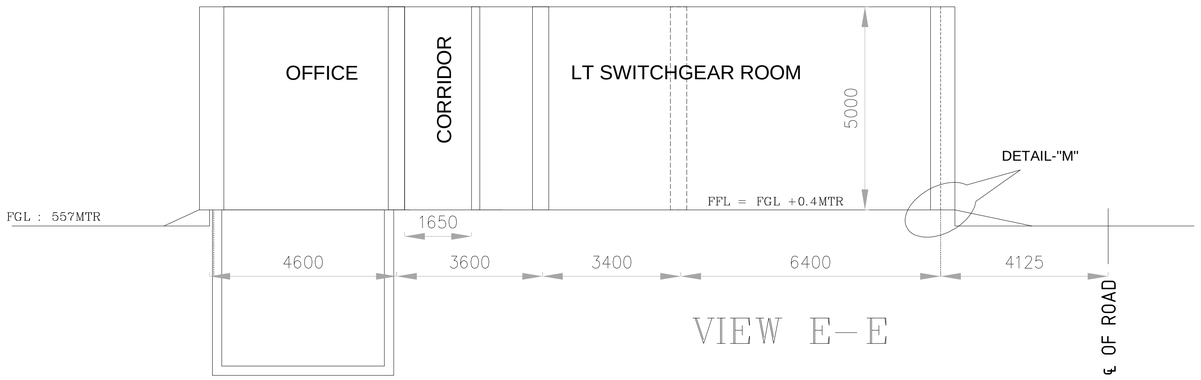
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

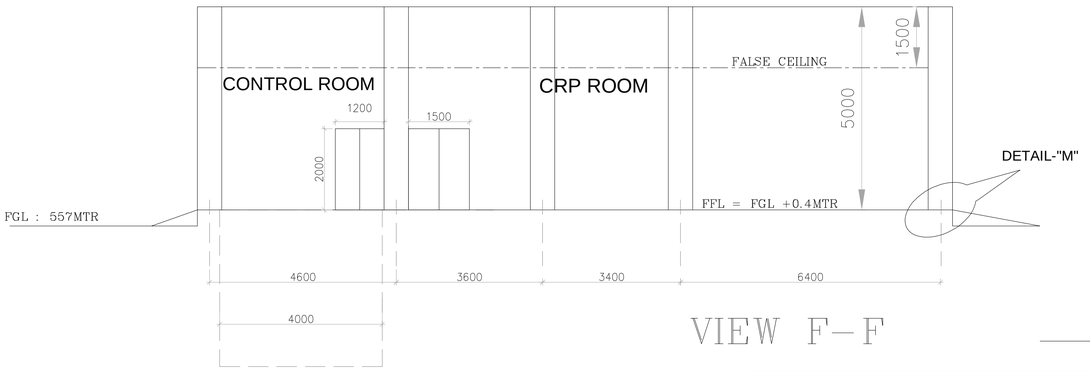
DRG. NO. TB-3-405-316-021



VIEW D–D



VIEW E–E



VIEW F–F

Panel References :

A	**Transformer Room**	
1	Transformer 33kV/11kV -A	1 Nos
2	Transformer 33kV/11kV -B	1 Nos
B	HT Panel Room	
3	33kV Panels - 13.0m x 3.50m x 2.50m - dwg no : 3 521 00 5 6540	1 Nos
4	11kV Panels - 5.74m x 2.35m x 2.70m - dwg no : 3 521 00 5 6517	1 Nos
B	**LT Panel Room**	
5	ACDB - 7.36m x 0.9m x 2.8m (tentative)	1 Nos
6	DCDB - 5.00m x 0.9m x 2.8m (tentative)	1 Nos
7	MLDB - 3.30m x 0.9m x 2.8m (tentative)	1 Nos
8	ELDB - 1.60m x 0.9m x 2.8m (tentative)	1 Nos
9	AC-PDB - 1.80m x 0.9m x 2.8m (tentative)	1 Nos
10	VENTILLATION-PDB - 1.80m x 0.9m x 2.8m (tentative)	1 Nos
C	**CRP Room**	
11	400kV Side Generator Transformer	1 Nos
12	400kV Line Reactor-1 (Panel A)	1 Nos
13	400kV Line Reactor-1 (Panel B)	1 Nos
14	400kV Line Dhalkebar-1 (Panel A)	1 Nos
15	400kV Line Dhalkebar-1 (Panel B)	1 Nos
16	400kV Side Generator Transformer	1 Nos
17	400kV Line Dhalkebar-2 (Panel A)	1 Nos
18	400kV Line Dhalkebar-2 (Panel B)	1 Nos
19	400kV Line Reactor-2 (Panel A)	1 Nos
20	400kV Line Reactor-2 (Panel B)	1 Nos
21	400kV Bus Coupler -2 (Panel B)	1 Nos
22	400kV Bus Reactor (Panel A)	1 Nos
23	400kV Bus Reactor (Panel B)	1 Nos
24	400kV Side GT	1 Nos
25	400kV Side GT	1 Nos
26	400kV Bus Bar	1 Nos
27	400kV Bus Bar	1 Nos
28	LCB - 3.0m x 0.8m x 2.5m - DWG NO : 3 694 00 00 836 Rev 02	1 Nos
29	PLCC/FOTE (SAPDC/SJVN Supply) - 0.75 m x 0.75 m x 2.2m (tentati	2 Nos
30	METERING PANEL - 0.75 m x 0.75 m x 2.2m	2 Nos
31	FUTURE PANEL - 0.75 m x 0.75 m x 2.2m	10 Nos

NOTES:–

1. ALL DIMENSION ARE IN MM UNLESS OTHERWISE NOTED.
2. HEIGHT OF ROOMS SHOWN IN SECTION IS CLEAR HEIGHT FROM BEAMS TO FFL.
3. ELEVATION SHOWN ABOVE IS FOR INDICATION OF HEIGHTS ONLY.
4. CABLE ENTRY FOR ALL PANELS SHALL BE THROUGH BOTTOM.
5. SIZE AND NUMBER OF PANELS INDICATED HERE ARE TENTATIVE AND SUBJECT CHANGES.
6. TRENCH SECTION SHALL BE PART OF DRAWING OF INDOOR TRENCH LAYOUT.
7. EDGE PROTECTION TO BE PROVIDED AT THE EDGE OF FLOOR CUTOUT AND CABLE TRENCH.
8. ALL THE PVC PIPE OPENINGS SERVING AS THE CONDUIT SHALL BE SEALED WITH A SEALANT AFTER CABLE LAYING.

DRAWING REFERENCE:–

1. 33kV POTHEADYARD SWITCHBOARD – 3 521 00 5 6540
2. 11KVPOTHEADYARD SWITCHBOARD – 3 521 00 5 6517
3. OGA OF LCB OF 400KV SWITCHYARD – 3 694 00 00836 r2
4. OGA OF LCB OF 400KV SWITCHYARD – 3 694 00 00836 r2
5. OGA OF 400KV SWITCHYARD RELAY PANEL – 25610051715
6. OGA OF 33/11Kv 3150KVA tRANSFORMER – DWG NO :34730052489

REV.	DATE	ALTERED	ZONE
06	11.11.2021	CHD/APPD	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 9 NOV .2021
05	03.11.2021	CHD/APPD	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 21.09.2021 AND VC HELD BETWEEN BHEL AND SJVN DATED : 26.10.2021
04	08.09.2021	CHD/APPD	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021 AND AUGUST 20.08.2021
03	30.06.2021	CHD/APPD	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021
02	07.06.2021	CHD/APPD	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 19.03.2021 AND MEETING WITH SJVN
01	05.03.2021	CHD/APPD	THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 23.02.2021

PROJECT: ARUN–3 HYDRO ELECTRIC PROJECT (NEPAL)
(4 x 225 MW)

CUSTOMER: SJVN ARUN–3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD.
(A JOINT VENTURE OF GOVT OF INDIA SND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA

	NAME	SIGN.	DATE
DRN.	PK		30/10/2018
CHD.	Vyom/JK		30/10/2018
APPD.	SKS		30/10/2018

DEPT. TBG | CODE | SCALE NTS | CARD CODE

TITLE: CONCEPTUAL LAYOUT of CRP ROOM IN SWITCHGEAR BUILDING OF 400kV SWITCHYARD OF ARUN 3 HEP

DRG.NO. TB-3-405-316-021 | REV. 6

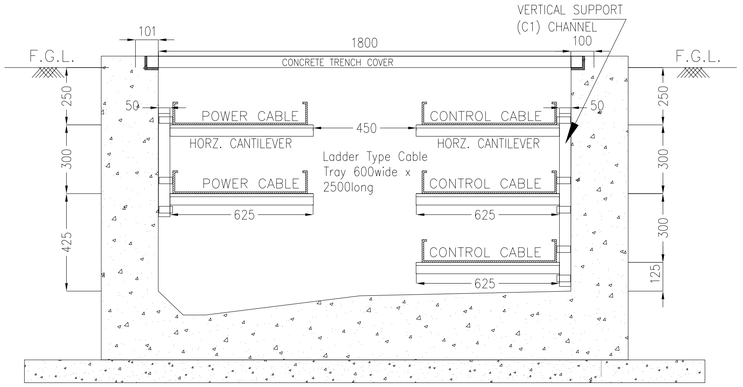
SHT. No 3 | NO. OF SHT. 05

SIZE–A2

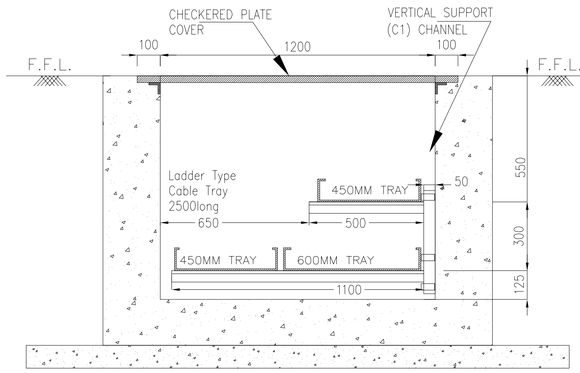
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

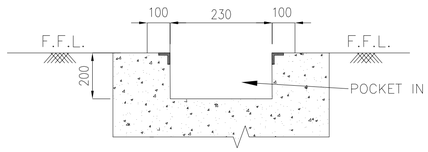
DRG. NO. TB-3-405-021



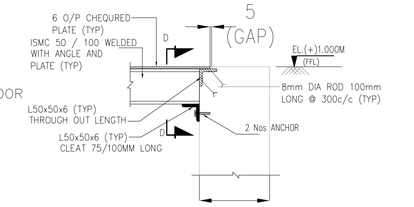
SECTION TR1 (OUTDOOR)

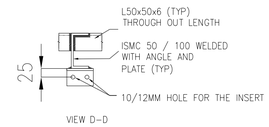


SECTION TR2 5

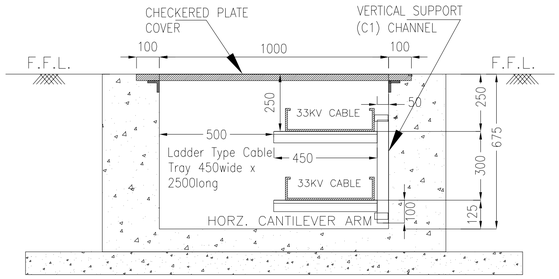


SECTION TR5

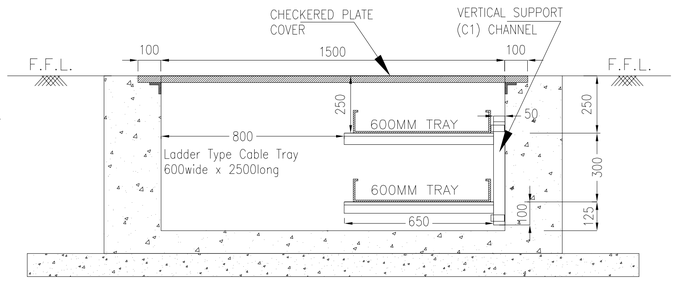




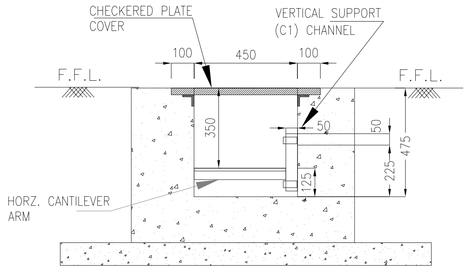
TYPICAL INSERT ARRANGEMENT IN THE TRENCH



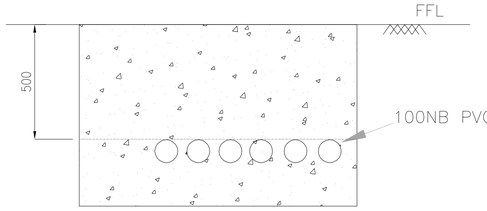
SECTION TR3



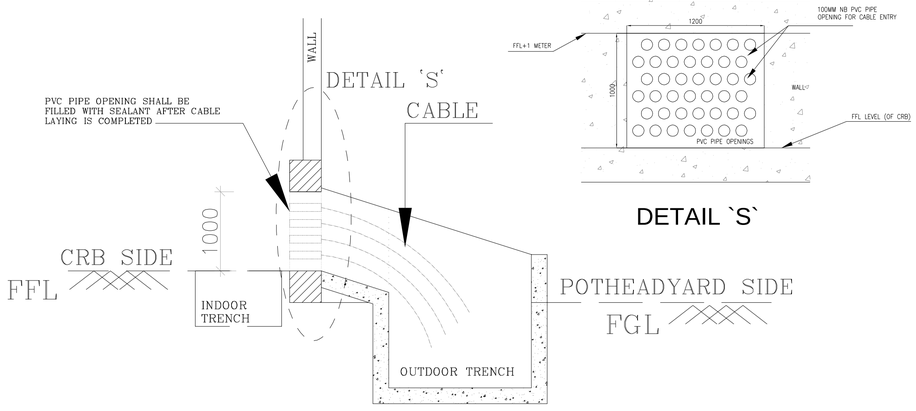
SECTION TR4



SECTION TR-6



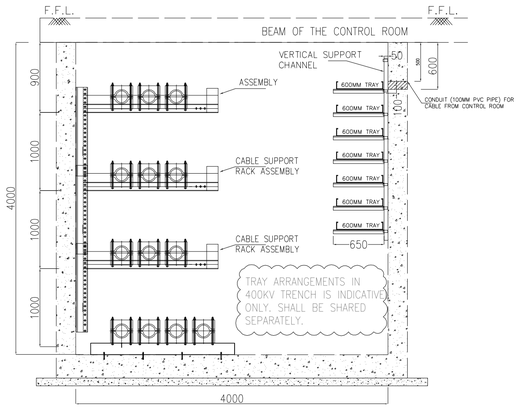
DETAIL Q

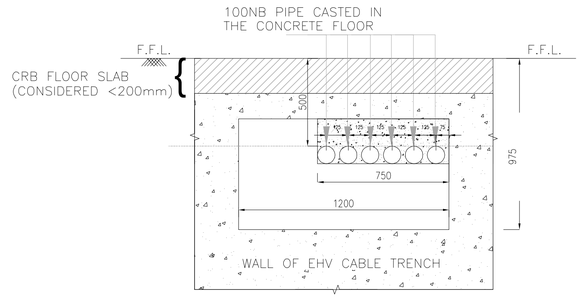


DETAIL `S`

DETAIL-"M"

TYPICAL CABLE ENTRY ARRANGEMENT INTO CRP ROOM (FOR ALL TYPE OF ENTRY)





5

DETAIL-P

REV.	DATE	ALTERED
06	11.11.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 9 NOV .2021

REV.	DATE	ALTERED
05	03.11.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 21.09.2021 AND VC HELD BETWEEN BHEL AND SJVN DATED : 26.10.2021

REV.	DATE	ALTERED
04	08.09.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021 AND AUGUST 20.08.2021

REV.	DATE	ALTERED
03	30.06.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021

REV.	DATE	ALTERED
02	07.06.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 19.03.2021 AND MEETING WITH SJVN

REV.	DATE	ALTERED
01	05.03.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 23.02.2021

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL)
(4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD.
(A JOINT VENTURE OF GOVT OF INDIA SND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA

	NAME	SIGN.	DATE
DRN.	PK		30/10/2018
CHD.	Vyom/JK		30/10/2018
APPD.	SKS		30/10/2018

DEPT. TBG CODE | SCALE NTS | CARD CODE

TITLE: CONCEPTUAL LAYOUT of CRP ROOM IN SWITCHGEAR BUILDING OF 400kV SWITCHYARD OF ARUN 3 HEP

DRG.NO. TB-3-405-316-021 REV. 6

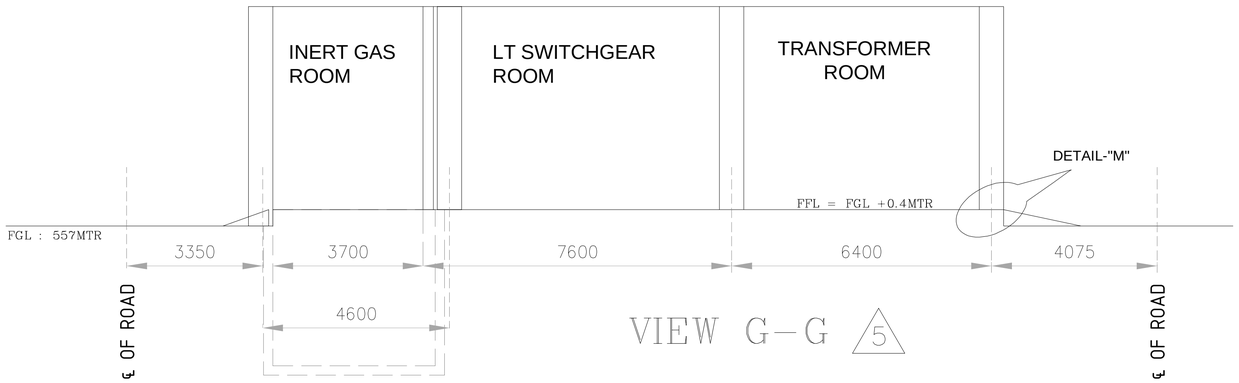
SHT. No 4 NO. OF SHT. 05

SIZE-A2

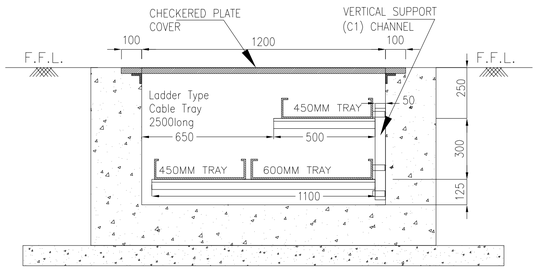
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

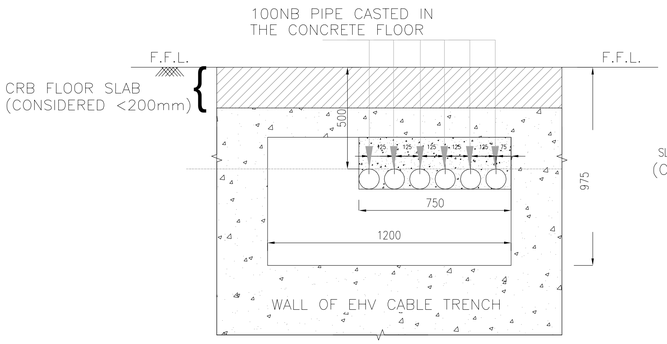
DRG. NO. TB-3-405-316-021



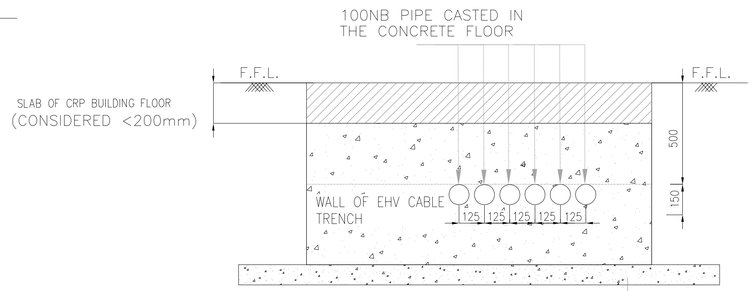
VIEW G–G 5



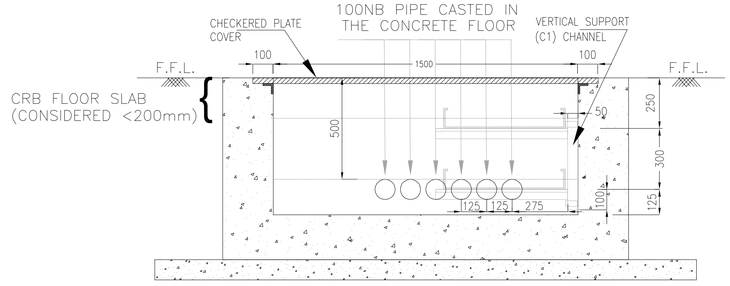
SECTION TR–7



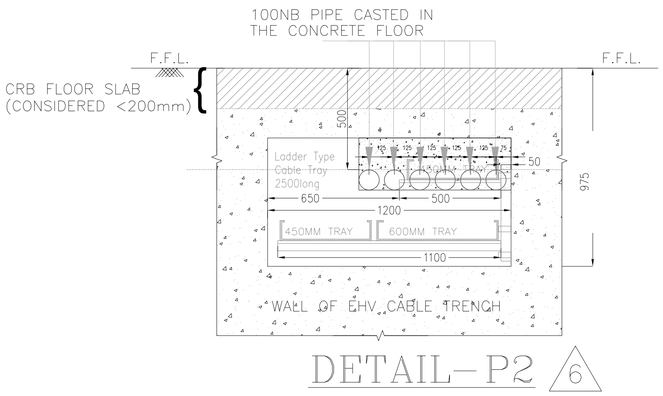
DETAIL–P1 6



DETAIL–Q1



DETAIL–Q2



DETAIL–P2 6

REV.	DATE	ALTERED
06	11.11.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 9 NOV .2021

REV.	DATE	ALTERED
05	03.11.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER DATED 21.09.2021 AND VC HELD BETWEEN BHEL AND SJVN DATED : 26.10.2021

REV.	DATE	ALTERED
04	08.09.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021 AND AUGUST 20.08.2021

REV.	DATE	ALTERED
03	30.06.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MEETING WITH SJVN AND TELECONFERENCE IN JUNE 2021

REV.	DATE	ALTERED
02	07.06.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 19.03.2021 AND MEETING WITH SJVN

REV.	DATE	ALTERED
01	05.03.2021	CHD/APPD

ZONE: THE DOCUMENT HAS BEEN REVISED BASED ON THE COMMENTS RECIVED FROM THE CUSTOMER VIDE MOM DATED 23.02.2021

PROJECT: ARUN–3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN–3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD.
(A JOINT VENTURE OF GOVT OF INDIA SND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA

	NAME	SIGN.	DATE
DRN.	PK		30/10/2018
CHD.	Vyom/JK		30/10/2018
APPD.	SKS		30/10/2018

DEPT. TBG | CODE | SCALE NTS | CARD CODE

TITLE: CONCEPTUAL LAYOUT of CRP ROOM IN SWITCHGEAR BUILDING OF 400kV SWITCHYARD OF ARUN 3 HEP

DRG.NO. TB–3–405–316–021 | REV. 6

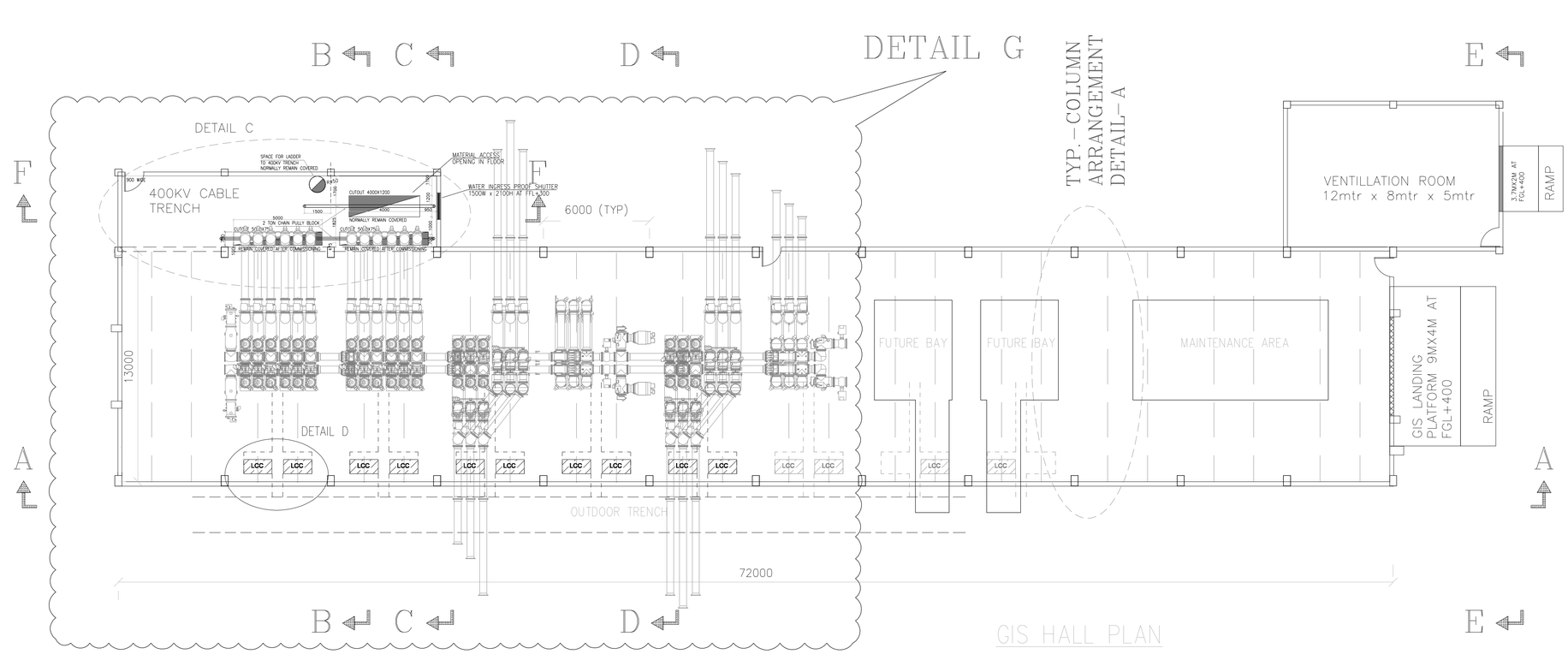
SHT. No 5 | NO. OF SHT. 05

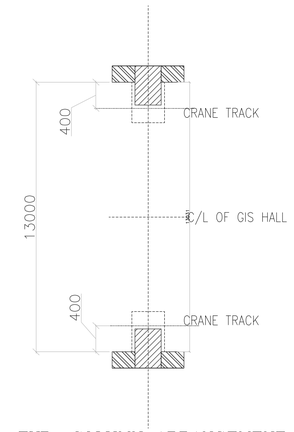
SIZE–A2

FIRST ANGLE PROJECTION

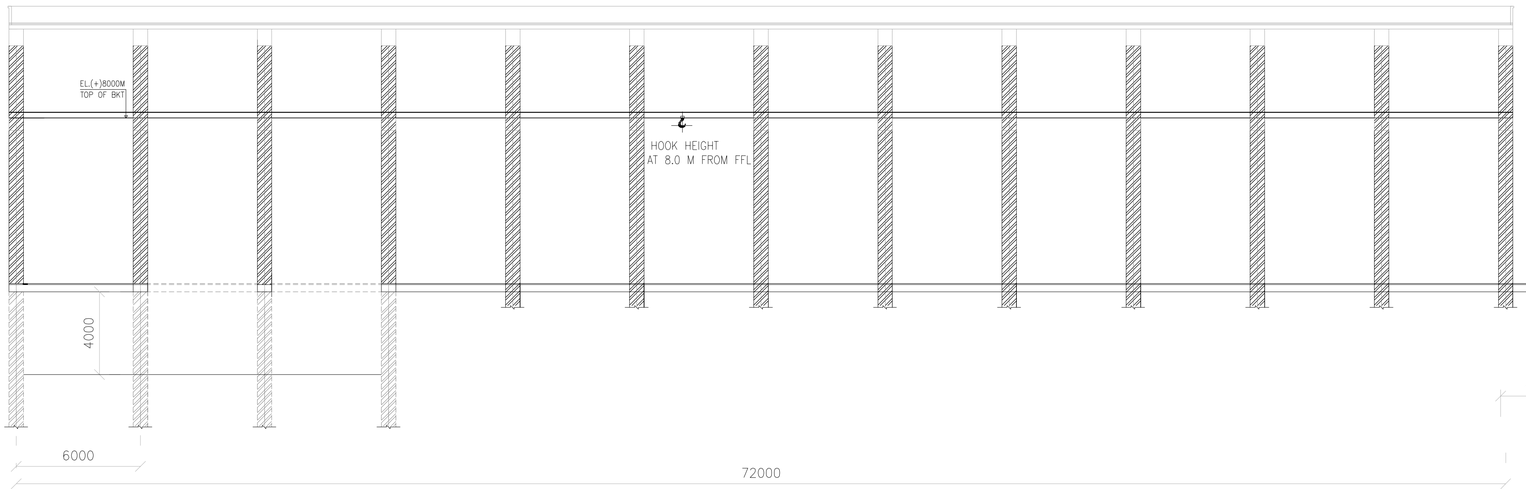
(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-3-405-316-020

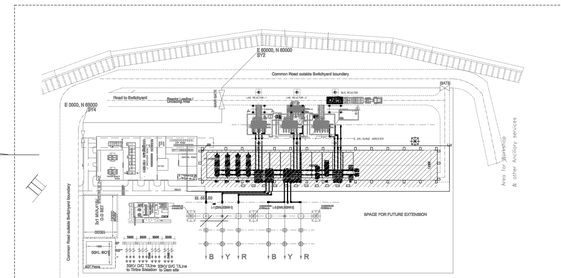




TYP.–COLUMN ARRANGEMENT DETAIL A



SECTION A–A



KEY PLAN

REV.	DATE	ALTERED	CHD/APPD
ZONE			
02	02.09.2021	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM DTD–20.08.2021	CHD/APPD
01	05.07.2021	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM dtd–22.02.2021 & email dtd–22.03.2021	CHD/APPD

PROJECT: ARUN–3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN–3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD. (A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA

	NAME	SIGN.	DATE
DRN.	PK		27/01/2021
CHD.	VYOM/JK		27/01/2021
APPD.	SKS		27/01/2021

DEPT. TBG | CODE | SCALE NTS | CARD CODE

TITLE: LAYOUT OF GIS BUILDING OF 4x225MW ARUN–3 HEP

DRG.NO. TB–3–405–316–020 REV. 02

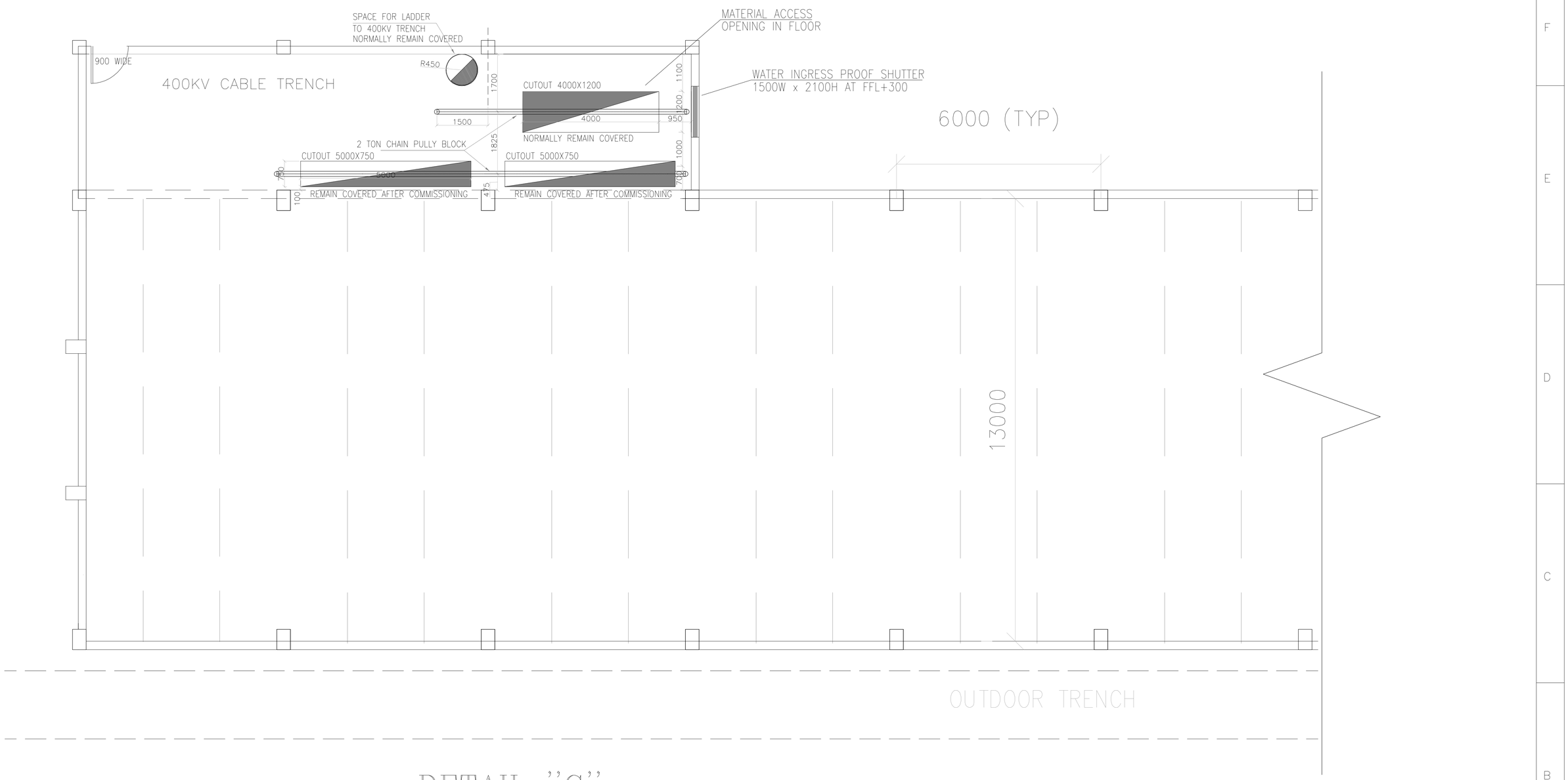
SHT. No 01 NO. OF SHT. 05

SIZE–A3

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-3-405-316-020



DETAIL ''G''

GIS HALL PLAN

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD	02	02.09.2021	CHD/APPD	01	05.07.2021	CHD/APPD
ZONE			ZONE			ZONE	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM DTD-20.08.2021		ZONE	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM dtd-22.02.2021 & email dtd-22.03.2021	

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL)
(4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD.
(A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA

	NAME	SIGN.	DATE
DRN.	PK		27/01/2021
CHD.	VYOM/JK		27/01/2021
APPD.	SKS		27/01/2021

DEPT. TBG | CODE | SCALE NTS | CARD CODE

TITLE: LAYOUT OF GIS BUILDING OF 4x225MW ARUN-3 HEP

DRG.NO. TB-3-405-316-020 REV. 02

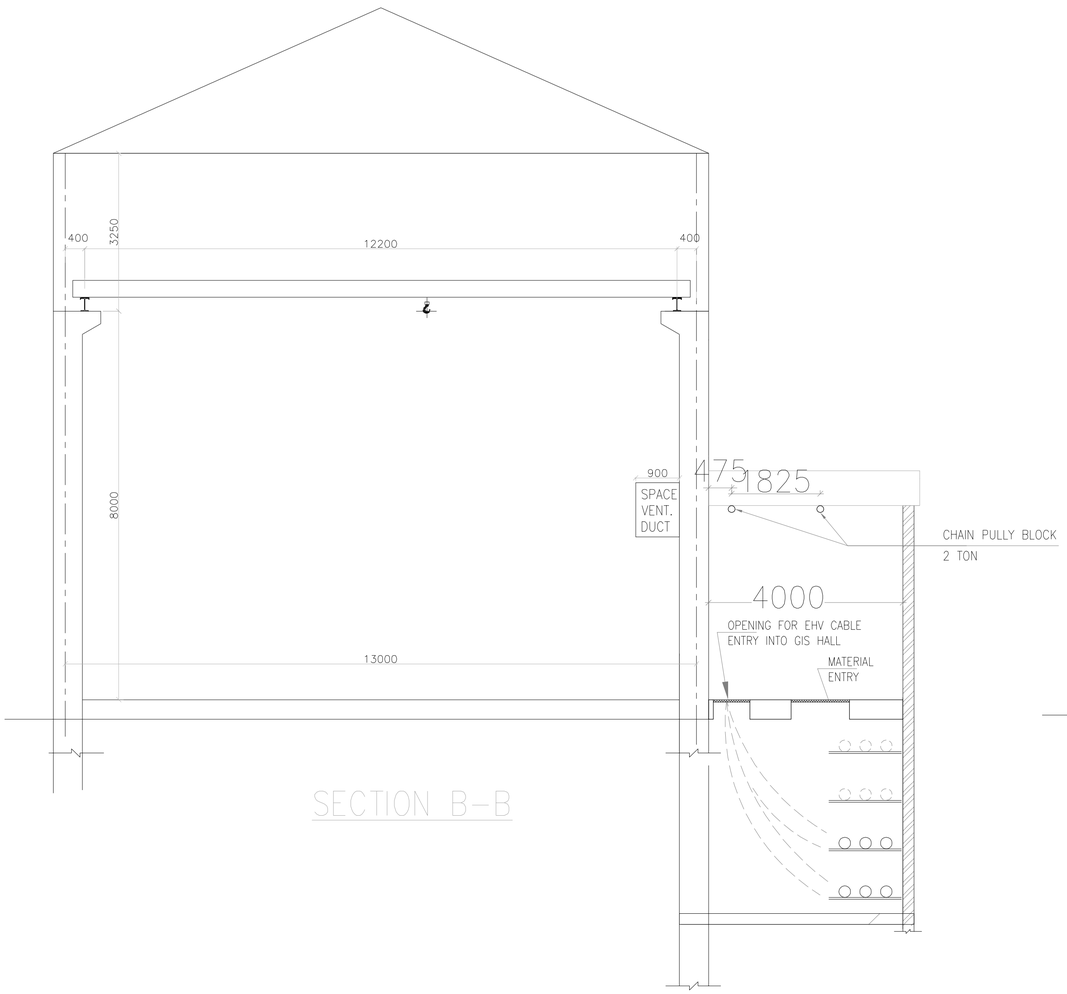
SHT. No 02 NO. OF SHT. 05

SIZE-A3

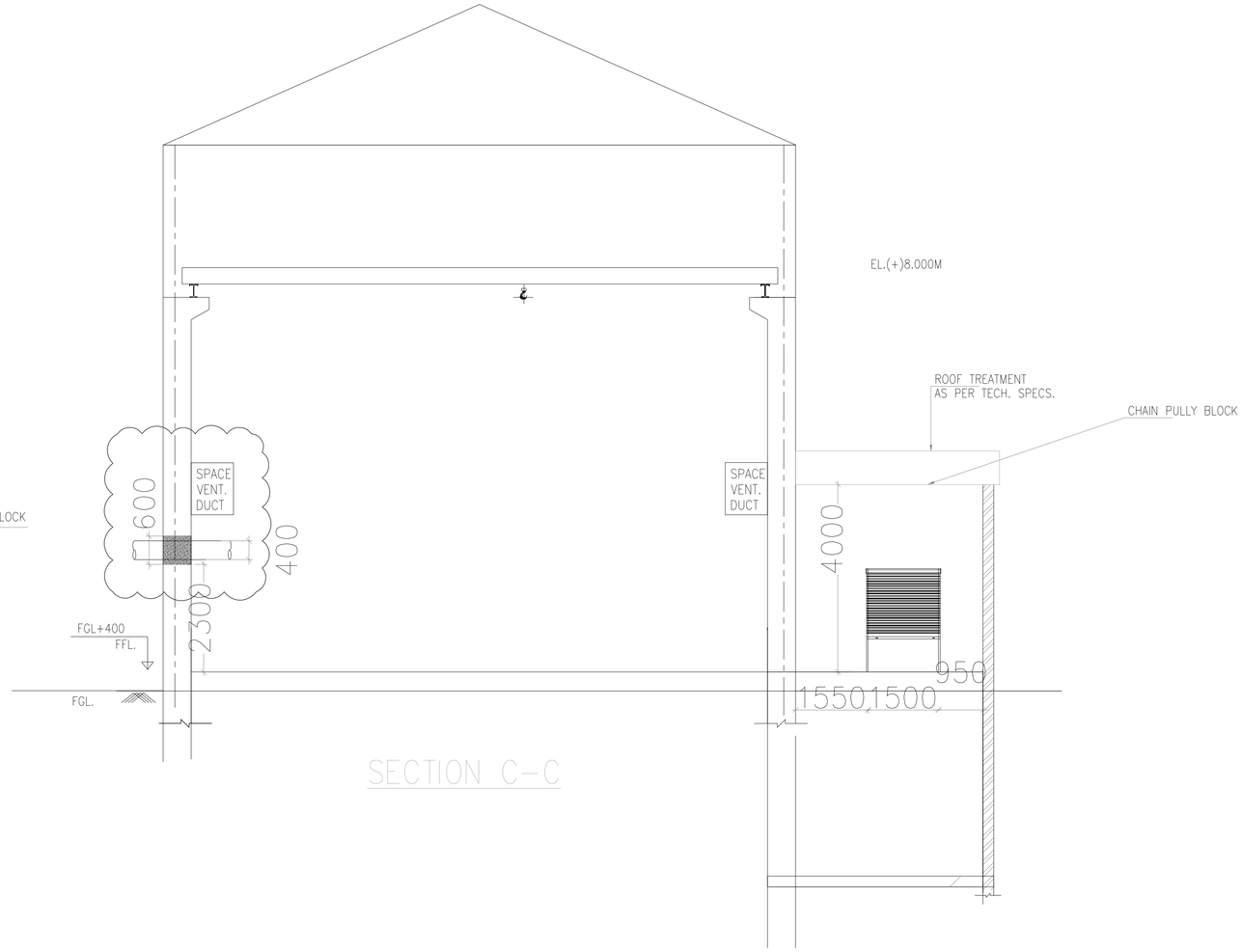
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-3-405-316-020



SECTION B-B



SECTION C-C

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD	02	02.09.2021	CHD/APPD	01	05.07.2021	CHD/APPD
ZONE			ZONE			ZONE	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM DTD-20.08.2021		ZONE	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM dtd-22.02.2021 & email dtd-22.03.2021	

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD. (A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA

	NAME	SIGN.	DATE
DRN.	PK		27/01/2021
CHD.	VYOM/JK		27/01/2021
APPD.	SKS		27/01/2021

DEPT. TBG | CODE | SCALE NTS | CARD CODE

TITLE: LAYOUT OF GIS BUILDING OF 4x225MW ARUN-3 HEP

DRG.NO. TB-3-405-316-020 REV. 02

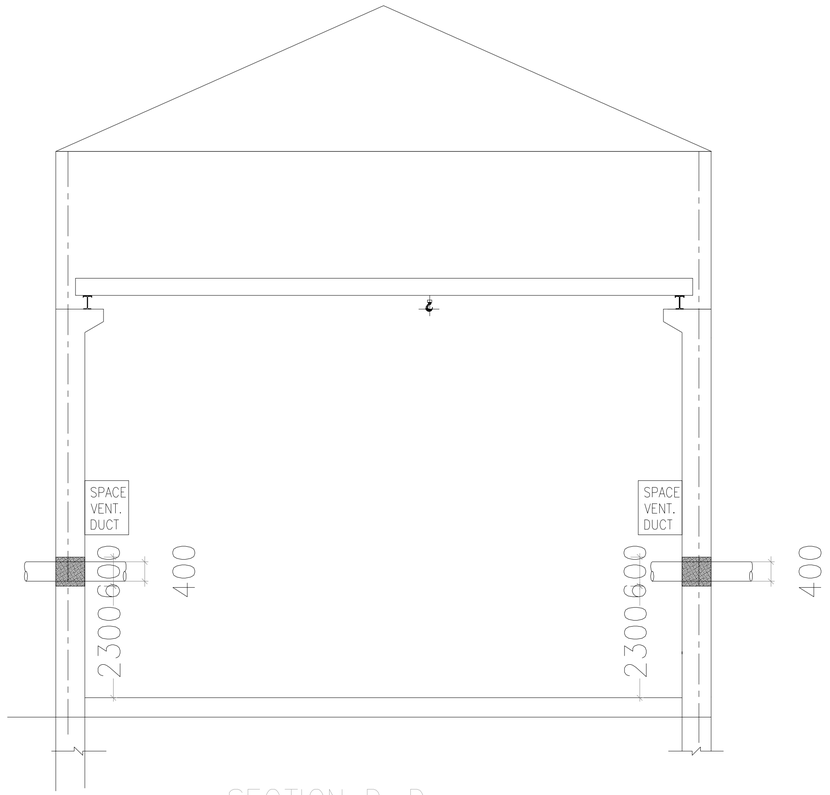
SHT. No 03 NO. OF SHT. 05

SIZE-A3

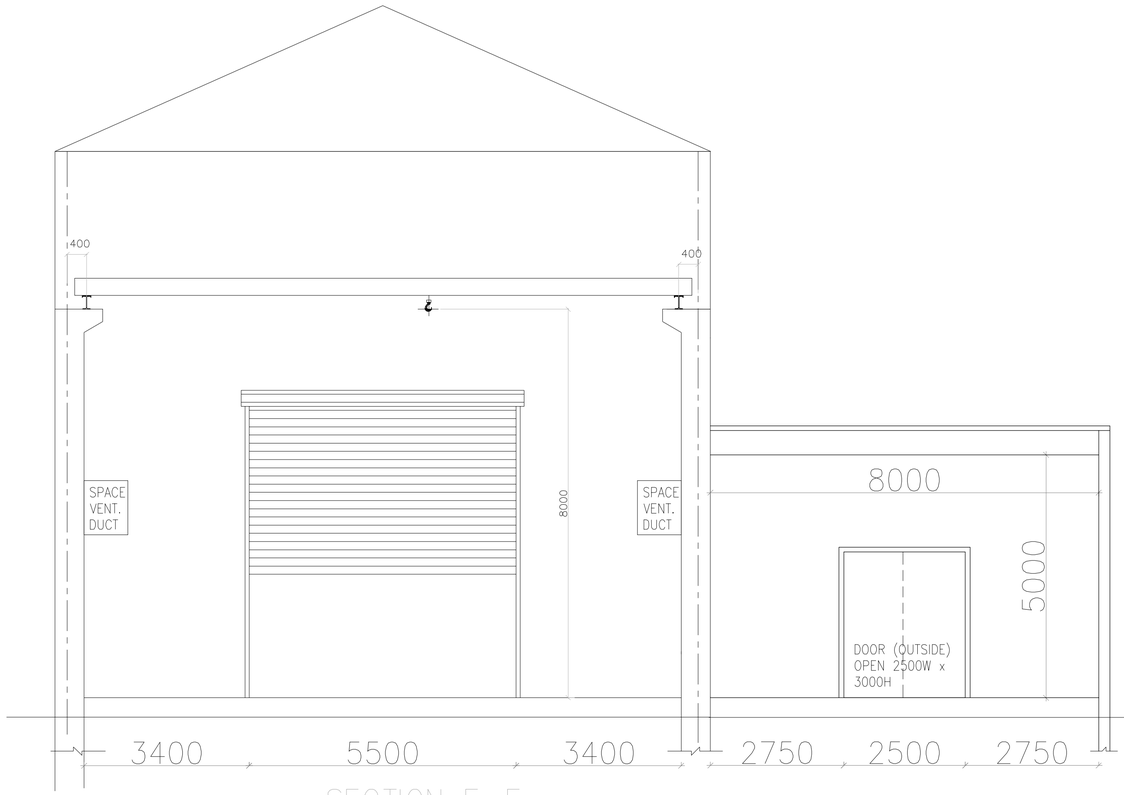
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-3-405-316-020



SECTION D-D
LINE + REACTOR BAY



SECTION E-E

REV.	DATE	ALTERED	CHD/APPD
ZONE			
REV.	DATE	ALTERED	CHD/APPD
ZONE			
02	02.09.2021	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM DTD-20.08.2021	
ZONE			
01	05.07.2021	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM dtd-22.02.2021 & email dtd-22.03.2021	

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD.
(A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA

	NAME	SIGN.	DATE
DRN.	PK		27/01/2021
CHD.	VYOM/JK		27/01/2021
APPD.	SKS		27/01/2021

DEPT. TBG CODE | SCALE NTS | CARD CODE

TITLE: LAYOUT OF GIS BUILDING OF 4x225MW ARUN-3 HEP

DRG.NO. TB-3-405-316-020 REV. 02

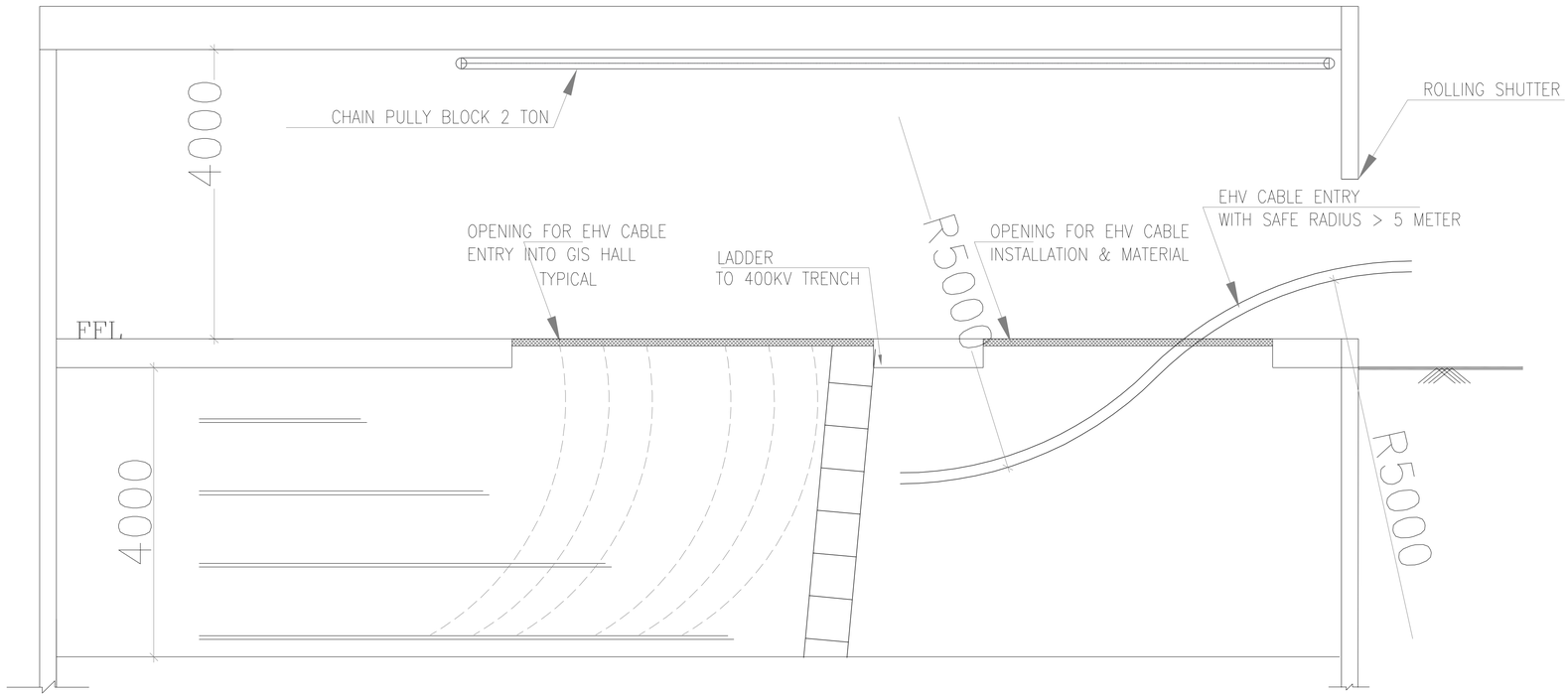
SHT. No 04 NO. OF SHT. 05

SIZE-A3

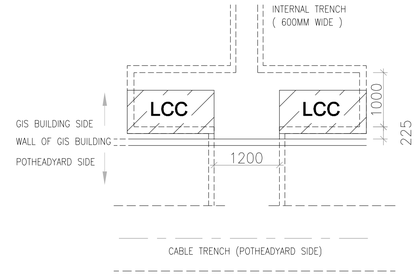
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

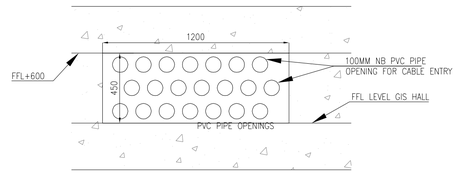
DRG. NO. TB-3-405-316-020



SECTION F-F



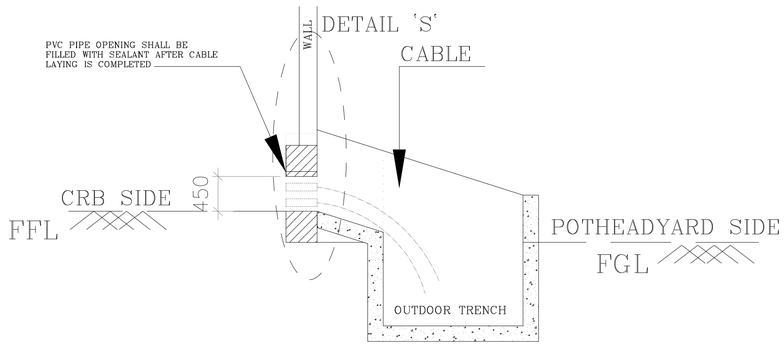
DETAIL D : PLAN OF CABLE TRENCH IN GIS BUILDING



DETAIL ''S''

NOTES :-

1. ALL DIMENSION ARE IN MM UNLESS OTHERWISE MENTIONED.
2. HEIGHT OF ROOMS SHOWN IN SECTION IS CLEAR HEIGHT FROM BEAMS BOTTOM TO FFL.
3. CABLE ENTRY FOR ALL PANELS SHALL BE THROUGH BOTTOM.
4. DETAIL OF EHV CABLE TRENCH DRAWING SHALL BE SUBMITTED SEPARATELY.
5. HEIGHT OF GIS BUS DUCT EXIT TO BUILDING MAY CHANGE. WE SHALL SUBMIT THE SAME SHORTLY.
6. THE ROOF IS CONSIDERED TO BE SLOPING TYPE.
7. THE GIS BAYS ARE TO BE ARRANGED IN SUCH A WAY THAT FAULTY CBS CAN BE REMOVED WITHOUT DISTURBING ANY HEALTHY PHASE.
8. STATIC & DYNAMIC LOAD OF CIRCUIT BREAKERS OF GIS, OTHER EM EQUIPMENT WHICH ARE PLACED IN OTHER BUILDING SHALL BE SUBMITTED WITH GIS LAYOUT.
9. CIVIL GUIDE DRAWING OF GIS BUILDING SHALL BE SUBMITTED SEPARATELY.
10. 50X50X6 EDGE PROTECTION ANGLES ARE TO BE PROVIDED ON ALL CABLE TRENCH & FLOOR CUTOUT.



CABLE ENTRY TO GIS BUILDING

REV.	DATE	ALTERED	CHD/APPD
02	02.09.2021	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM DTD-20.08.2021	
01	05.07.2021	REVISED IN LINE WITH THE CUSTOMER COMMENTS DATED THROUGH MOM dtd-22.02.2021 & email dtd-22.03.2021	

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD. (A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA

	NAME	SIGN.	DATE
DRN.	PK		27/01/2021
CHD.	VYOM/JK		27/01/2021
APPD.	SKS		27/01/2021

DEPT. TBG | CODE | SCALE NTS | CARD CODE

TITLE: LAYOUT OF GIS BUILDING OF 4x225MW ARUN-3 HEP

DRG.NO. TB-3-405-316-020 REV. 02

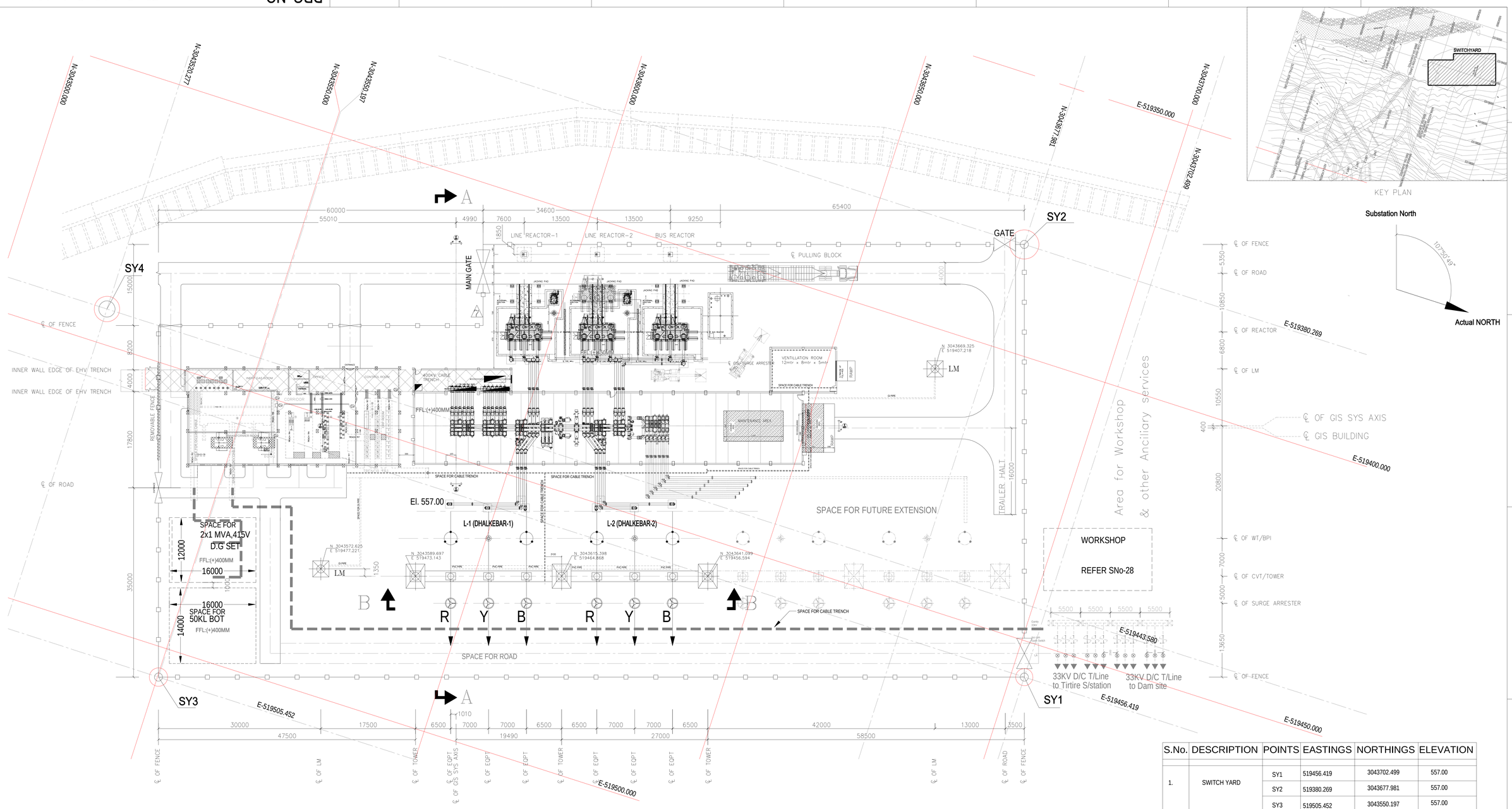
SHT. No 05 NO. OF SHT. 05

SIZE-A3

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-3-405-316-001



S.No.	DESCRIPTION	POINTS	EASTINGS	NORTHINGS	ELEVATION
1.	SWITCH YARD	SY1	519456.419	3043702.499	557.00
		SY2	519380.269	3043677.981	557.00
		SY3	519505.452	3043550.197	557.00
		SY4	519443.580	3043520.277	557.00

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
07	16/12/21	CHD/APPD	06	22/06/21	CHD/APPD	05	28/05/21	CHD/APPD
ZONE	CURRENT REVISION INCORPORATES CHANGES AS PER REVISED GIS DRAWING AND CUSTOMER'S COMMENT DATED 14 JUNE AND 5TH JULY 2021 FROM M/S SJVN	ZONE	CURRENT REVISION INCORPORATES CHANGES AS PER EMAIL DATED 14 JUNE 2021 FROM M/S SJVN	ZONE	CURRENT REVISION INCORPORATES SOAK PIT AS PER SOAK PIT DOCUMENT REV-04 (TB-405-316-018)			

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
04	20/10/20	CHD/APPD	03	10/03/20	CHD/APPD	02	07/06/19	CHD/APPD	01	30/03/19	CHD/APPD
ZONE	1. DETAILS OF THE REACTOR AND REACTOR CUM NGR AREA INCLUDED. 2. DISTANCE BETWEEN THE REACTORS OPTIMISED. 3. REPRESENTATION OF THE REACTOR UNLOADING INCLUDED. 4. RAILS REMOVED FROM THE MAIN ROAD.	ZONE	1. Building for Ventillation Room is now limited for catering to the requirement of GIS.	ZONE	1.Building for Inert Gas System included. 2.Common Ventillation Room for Power House and GIS Building included. 3.Cable Trench shown for the CAT to Switchyard. 4. The Layout of the Tranformer Cavern shall be part of shown in "Cross Section and Plan of Transformer Cavern - 1 200 00 20558. 5. Comments marked on Rev-01 incorporated.	ZONE	Revised Switchyard Layout - Sketch - Drg No. SJVN/ED/Arun-III/EM-2017-04				

ADDITIONAL INFORMATION :
WO NO. :

STATUS OF DRAWING :

DISTRIBUTION OF PRINTS :

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD. (A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA

	NAME	SIGN.	DATE
DRN.	PK		30/10/2018
CHD.	Vyom/VK		30/10/2018
APPD.	SKS		30/10/2018

DEPT. TBG CODE | SCALE NTS | CARD CODE

TITLE: ELECTRICAL LAYOUT PLAN AND SECTION OF 4x225MW OF ARUN-3 HEP

DRG.NO. TB-3-405-316-001 REV. 07

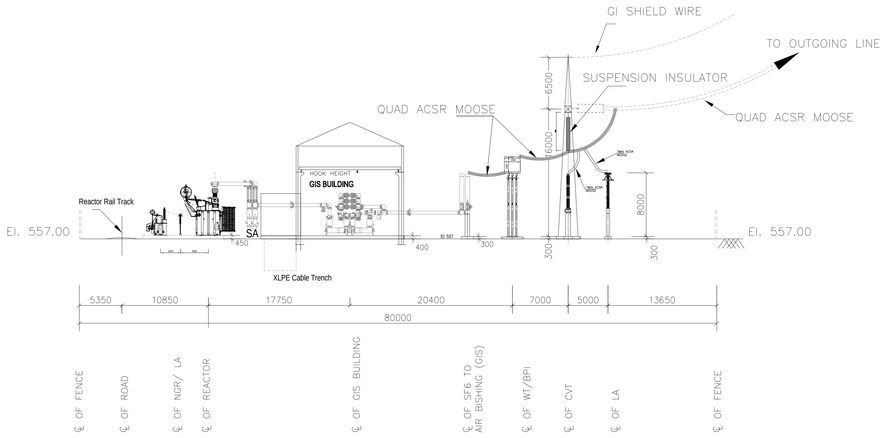
SHT. No 01 NO. OF SHT. 04

SIZE-A2

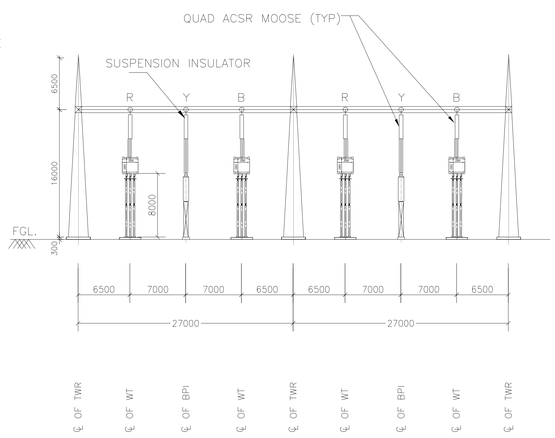
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-3-405-316-001



SECTION A-A



SECTION B-B

MINIMUM CLEARANCE TABLE	400kV
PHASE TO PHASE (PP) (mm)	4000
PHASE TO EARTH (PE) (mm)	3500
SECTION CLEARANCE (SC) (mm)	6500
HEIGHT OF CONDUCTOR CENTRE LINE OF FIRST LEVEL (MIN.) MM. (FROM PLINTH LEVEL)	8000
GROUND CLEARANCE TO NEAREST PART NOT AT EARTH POTENTIAL OF AN INSULATOR SUPPORTING LIVE CONDUCTOR	2550
CREEPAGE DISTANCE (mm/kV)	25

CONDUCTOR SIZE DETAILS		
EQUIPMENT INTERCONNECTION	400 KV	QUAD 'MOOSE' CONDUCTOR
CONNECTION DROPS	400 KV	QUAD 'MOOSE' CONDUCTOR TWIN 'MOOSE' CONDUCTOR ON CVT AND SURGE ARRESTER

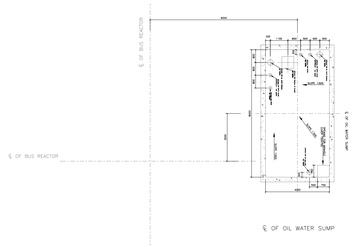
BILL OF QUANTITY OUTDOOR EQUIPMENT:-

S.NO.	DESCRIPTION	SYMBOL	QUANTITY (NOS.)
1	420 kV INDOOR GIS		01
2	420 KV, 1-ph SF6 TO AIR BUSHING		06
3	420kV, 1-ph CVT		06
4	336kV, 1-ph SURGE ARRESTER		06
5	420kV, 8 KN , 1-ph, BUS POST INSULATOR		02
6	WAVE TRAP		04
7	400KV,80MVAR REACTOR (BHEL MAKE)		03
8	NGR (BHEL MAKE)		02
9	120kV, 1-ph SURGE ARRESTER FOR NGR		2

CO-ORDINATES & ELEVATIONS OF IMPORTANT POINTS

CO-ORDINATES & ELEVATIONS OF IMPORTANT POINTS

S.No.	DESCRIPTION	POINTS	EASTINGS	NORTHINGS	INVERT ELEVATION	REMARKS
1.	SWITCH YARD	SY1	519456.419	3043702.499	557.00	FINISHED LEVEL
		SY2	519380.269	3043677.981	557.00	-DO-
		SY3	519505.452	3043550.197	557.00	-DO-
		SY4	519443.580	3043530.277	557.00	-DO-



PLAN VIEW OF OIL/WATER SUMP

SCOPE OF CUSTOMER

ITEM NO.	DESCRIPTION	QTY.
01	GRATING IN LINE REACTOR AREA	2 LOT
02	GRATING IN BUS REACTOR AREA	1 LOT
03	PULLING BLOCK	6 NOS
04	FENCE	1 LOT
05	GRAVEL	1 LOT

1. ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE SPECIFIED.
2. MINIMUM CLEARANCE TABLE
   (a) PHASE TO PHASE = 4000 MM.
   (b) PHASE TO EARTH = 3500 MM.
   (C) SECTIONAL CLEARANCE = 6500 MM
7 3. REMARK FOR 400KV GIS IN POTHEAD YARD: PLEASE REFER DRAWING # TB-405-317-10-02 (1HYG900079-2) 400KV GIS LAYOUT (PLAN, SECTION & ISOMETRIC VIEW) FOR RELATIVE SPACING & DIMENSIONS OF GIS ASSEMBLY, GAS INSULATED BUS DUCT, SF6 TO AIR BUSHING ETC. THIS DRAWING INDICATE REFERENCE AXIS OF GIS ASSEMBLY.
4. LEVELS FOR SWITCHYARD ARE AS PER Revised Switchyard Layout – Sketch – Drg No. SJVN/ED/Arun-III/EM-2017-04
5. ELEVATION OF SWITCHYARD AREA = 557.00 M.
6. SYSTEM NOMINAL VOLTAGE = 400kV.
7. SYSTEM HIGHEST VOLTAGE = 420kV.
8. DOUBLE BUS-BAR SCHEME WITH BUS-COUPLER HAS BEEN ADOPTED IN GIS.
9. CONDUCTOR FOR 400kV SYSTEM WILL BE QUAD/TWIN MOOSE.
10. ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL. PLINTH LEVEL – 300 MM ABOVE F.G.L.
11. ALL FLEXIBLE CONNECTIONS ARE WITH QUAD MOOSE/TWIN ACSR MOOSE CONDUCTOR WITH 450 MM SPACING.
12. LOCATION OF WAVE TRAPS ARE INDICATIVE ONLY AND THE EXACT LOCATION WILL BE BASED ON PLCC REQUIREMENT. THE FDN. DESIGN SHALL BE PROVIDED BY BHEL.
13. GIS/BUS DUCT LAYOUT IS TENTATIVE AND SHALL BE FINALIZED AFTER VENDOR FINALIZATION OF GIS.
14. SWITCHGEAR ROOM AND GIS BUILDING LAYOUT SHALL BE SUBMITTED SEPARATELY.
15. THE SCOPE OF BHEL SHALL BE LIMITED TO POINT OF CONNECTION OF OUTGOING LINE AT THE DEAD END GANTRY.
16. THE DETAIL OF THE CABLE TERMINATION ON GT AND CABLE SUPPORT SYSTEM SHALL BE ADDED IN SUCCESSIVE REVISIONS.
17. ROADS , FENCE AND GATE IS NOT IN BHEL's SCOPE.
18. OUTGOING STRINGING OF LINE CONDUCTOR & SHIELD WIRE ARE NOT IN BHEL SCOPE BUT CONNECTION OF EQUIPMENT TOWARDS LINE SIDE SHALL BE DONE BY BHEL..
19. CONSTRUCTION OF FIRE RESISTANT WALL BETWEEN 400kV REACTOR UNITS ARE NOT IN BHEL SCOPE.
20. PHASE SEQUENCE IS INDICATIVE & IT SHALL BE VERIFIED AT SITE DURING EXECUTION.
21. THE DIMENSION OF THE XLPE CABLE TRENCH IS TENTATIVE AND SHALL BE FINALISED IN LINE WITH THE CABLE LAYING PHILOSOPY OF THE EHV XLPE CABLE SUPPLIER.
22. THE SWITCHGEAR BUILDING LAYOUT SHALL BE FURNISHED AS A SEPARATE DRAWING.
DETAILS OF CABLE TRENCH – ROAD CROSSING ARRANGEMENT SHALL BE SHOWN IN CABLE TRENCH LAYOUT.
23. FOUNDATION WORKS TO BE UNDERTAKEN BY EMPLOYER.HOWEVER,BHEL SHALL BE RESPONSIBLE FOR DESIGNING AND SUPPLYING DRAWINGS AND MATERIALS SUCH AS INSERT,EMBEDMENTS,BOLTS FOR FOUNDATION.
24. REACTOR , UNLOADING AND HANDLING AT SITE SHALL BE ARRANGED BY BHEL.
25. REFER SOAK PIT DESIGN FOR THE DETAILS OF THE SOAK PIT .
26. REFER TO THE CONCEPTUAL DRAWING OF THE CONTROL ROOM BUILDING FOR THE CONTROL ROOM BUILDING DETAIL.
27. SCOPE : GRAVEL AND THE GRATING IN THE REACTOR PIT SHALL BE IN THE SUPPLY SCOPE OF THE END CUSTOMER.
28. THE ACTUAL CORDINATES OF THE DG AND THE BOT SHALL BE FINALISED BY THE END CUSTOMER.
29. LOCATION OF WORKSHOP & 33KV T/L IS INDICATIVE. EXACT LOCATION TO BE FINALISED BY SAPDC AS PER SITE CONDITION.

SYSTEM PARAMETERS

NOTES:-

	400KV SWITCHYARD
1. RATED VOLTAGE	: 400kV
2. HIGHEST SYSTEM VOLTAGE	: 420kV
3. SYSTEM VOLTAGE VARIATION	: -5% to +5%
4. RATED FREQUENCY	: 50 Hz, ±3%
5. INSULATION LEVELS FOR 400KV CIRCUIT BREAKERS AND DISCONNECTING SWITCHES	
5A. RATED ONE MINUTE POWER FREQUENCY WITHSTAND VOLTAGE BETWEEN LIVE TERMINAL AND EARTH	: 650 KV RMS (GIS) 630 KV RMS FOR POTHEAD YARD EQUIPMENTS
5B. RATED LIGHTNING IMPULSE WITHSTAND VOLTAGE	A) ± 1425 KVP BETWEEN LIVE TERMINALS AND EARTH. B) ± 1665 KVP IMPULSE ON ONE TERMINAL AND OTHER TERMINAL EARTHED (ACROSS ISOLATING DISTANCE).
5C. RATED SWITCHING IMPULSE WITHSTAND VOLTAGE	: 1050 KVP (PHASE TO EARTH) 1425 KVP (PHASE TO PHASE)
6. RATED SHORT TIME WITHSTAND CURRENT CAPACITY	: 50 KA/SEC. RMS
7. SYSTEM NEUTRAL EARTHING	: EFFECTIVELY EARTHED
8. AC AUX. SUPPLY	: 415V, 3PH, 4 WIRE (+10% TO -10%) : 240V, 1PH, 2 WIRE (+10% TO -10%)
9. CONTROL VOLTAGE	: 220V DC, 2 WIRE, +10% TO -20%
11. GIS BUS CONFIGURATION	: DOUBLE BUSBAR, 400 kV, 2500A, 50kA FOR 1S
12. ALL EQUIPMENT SHALL BE RATED FOR 50 DEG CENTIGRADE AMBIENT AND OUTDOOR INSTALLATION.	

LEGEND TABLE:-

	400kV TENSION INSULATOR NOT IN BHEL's SCOPE
	QUAD MOOSE ACSR CONDUCTOR
	TWIN MOOSE ACSR
	SHIELD WIRE
	FENCE (NOT IN SCOPE OF BHEL)
	CONNECTION TO QUAD ACSR MOOSE CONDUCTOR
	PROPOSED SCOPE
	EXISTING/FUTURE SCOPE (NOT IN TBG SCOPE)
	GIB (GAS INSULATED BUS DUCT)
	TOWER WITH PEAK
	LM (LIGHTNING MAST)
	ENTRY GATE (NOT IN BHEL SCOPE)

REV.	DATE	ALTERED	ZONE
07	18/11/21	CHD/APPD	CURRENT REVISION INCORPORATES CHANGES AS PER EMAIL DATED 14 JUNE 2021 AND 5TH JULY 2021 FROM M/S SJVN
06	22/06/21	CHD/APPD	CURRENT REVISION INCORPORATES CHANGES AS PER EMAIL DATED 14 JUNE 2021 FROM M/S SJVN
05	28/05/21	CHD/APPD	CURRENT REVISION INCORPORATES SOAK PIT AS PER SOAK PIT DOCUMENT REV-04 (TB-405-316-018)
04	20/10/20	CHD/APPD	1. DETAILS OF THE REACTOR AND REACTOR CUM NGR AREA INCLUDED. 2. DISTANCE BETWEEN THE REACTORS OPTIMISED. 3. REPRESENTATION OF THE REACTOR UNLOADING INCLUDED.
03	10/03/20	CHD/APPD	1. Building for Ventillation Room is now limited for catering to the requirement of GIS.
02	07/06/19	CHD/APPD	1.Building for Inert Gas System included. 2.Common Ventillation Room for Power House and GIS Building included. 3.Cable Trench shown for the CAT to Switchyard. 4. The Layout of the Tranformer Cavern shall be part of shown in "Cross Section and Plan of Transformer Cavern - 1 200 00 20558. 5. Comments marked on Rev-01 incorporated.
01	30/03/19	CHD/APPD	Revised Switchyard Layout - Sketch - Drg No. SJVN/ED/Arun-III/EM-2017-04

ADDITIONAL INFORMATION :
WO NO. :

STATUS OF DRAWING :

DISTRIBUTION OF PRINTS :

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL)
(4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD.
(A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA

	NAME	SIGN.	DATE
DRN.	PK		30/10/2018
CHD.	Vyom/VK		30/10/2018
APPD.	SKS		30/10/2018

DEPT. TBG CODE | SCALE NTS | CARD CODE

TITLE: ELECTRICAL LAYOUT PLAN AND SECTION OF 4x225MW OF ARUN-3 HEP

DRG.NO. TB-3-405-316-001 REV. 07

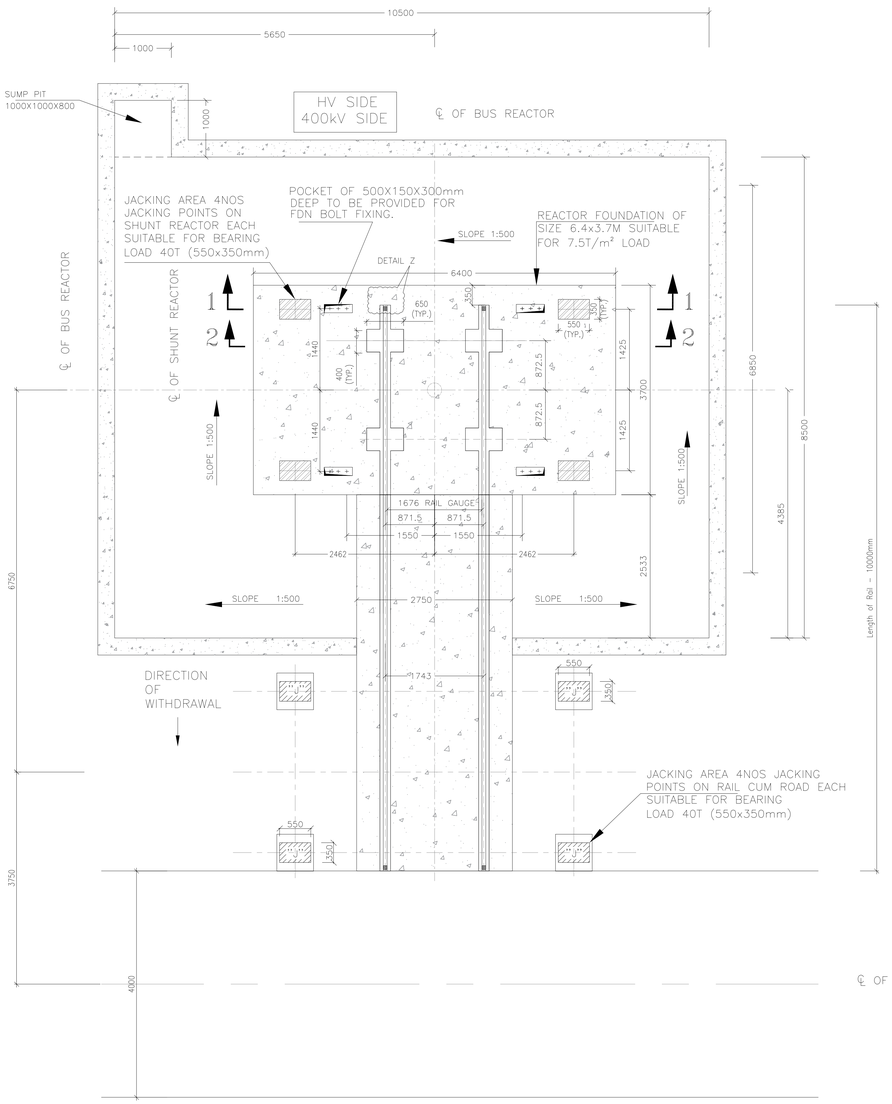
SHT. No 02 NO. OF SHT. 04

SIZE-A2

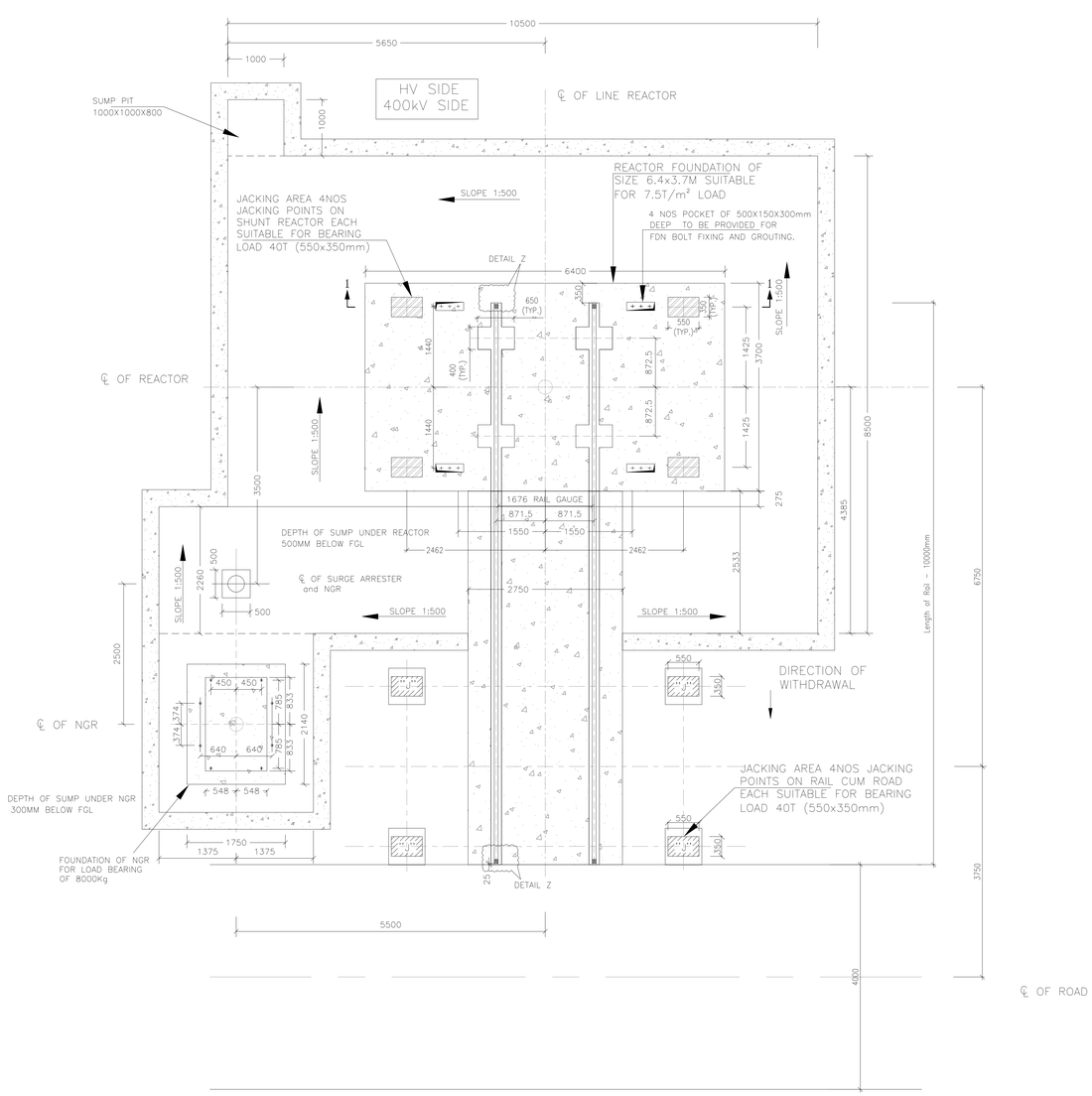
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. TB-3-405-316-001



PLAN VIEW OF SHUNT REACTOR AREA(TYP)



7 PLAN VIEW OF LINE REACTOR WITH NGR AREA (TYP)

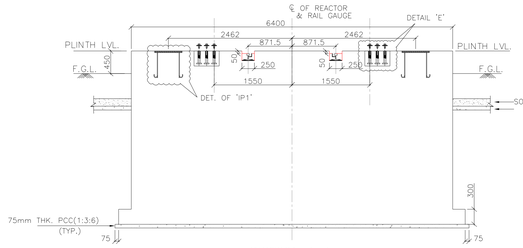
PROJECT:	ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)		
CUSTOMER:	SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)		
CONSULTANT:	SJVN LTD. (A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)		
ADDITIONAL INFORMATION : WO NO. :	BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA	NAME / SIGN. / DATE	
		DRN. PK	30/10/2018
		CHD. Vyom/VK	30/10/2018
		APPD. SKS	30/10/2018
STATUS OF DRAWING :	DEPT. TBG / CODE	SCALE NTS	CARD CODE
DISTRIBUTION OF PRINTS :	TITLE: ELECTRICAL LAYOUT PLAN AND SECTION OF 4x225MW OF ARUN-3 HEP	DRG.NO. TB-3-405-316-001	REV. 07
		SHT. No 03	NO. OF SHT. 04

SIZE-A2

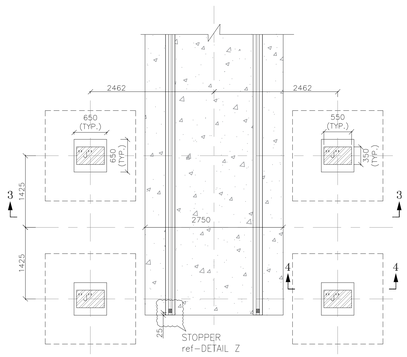
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

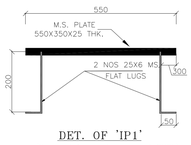
DRG. NO. TB-3-405-316-001



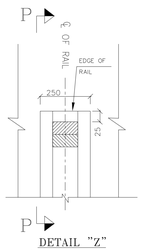
SECTION 1-1



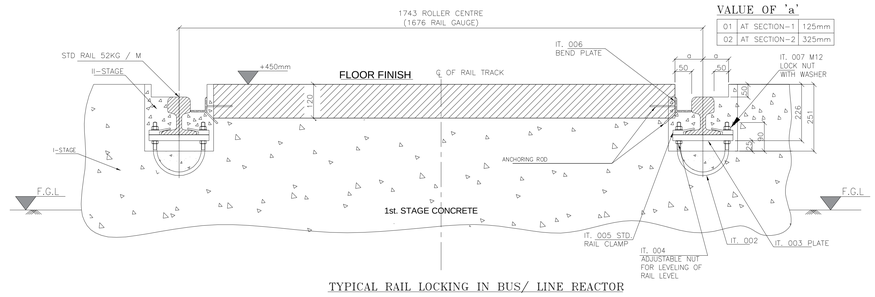
TYPICAL RAIL CUM ROAD



DET. OF 'IP1'
(item not in supply scope of BHEL)



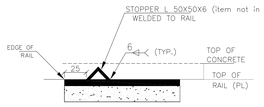
DETAIL "Z"
(STOPPER DETAIL)



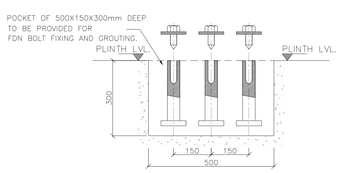
VALUE OF 'a'

01 AT SECTION-1	125mm
02 AT SECTION-2	325mm

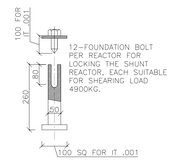
TYPICAL RAIL LOCKING IN BUS/ LINE REACTOR



VIEW P-P



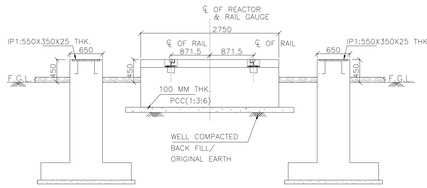
DETAIL "E"



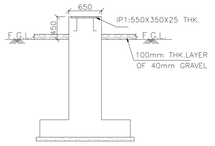
12-FOUNDATION BOLT PER REACTOR FOR LOCKING THE SHUNT REACTOR, EACH SUITABLE FOR SHEARING LOAD 4900KG.

DETAIL OF FOUNDATION BOLT

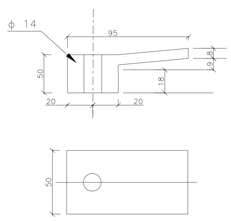
SECTION 2-2

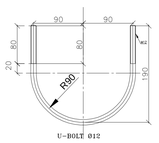


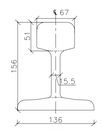
SECTION 3-3

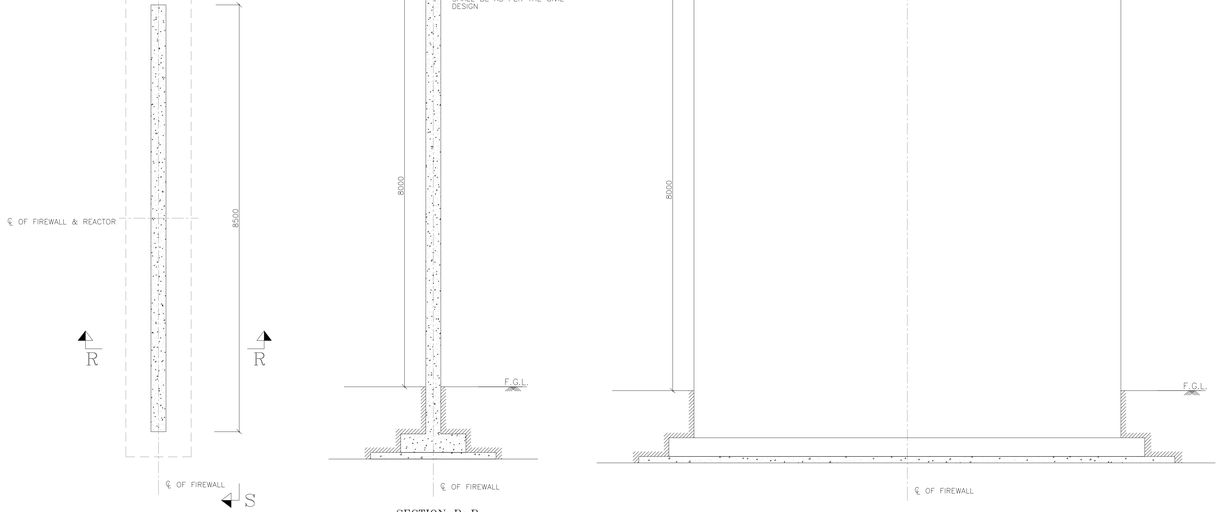


SECTION 4-4





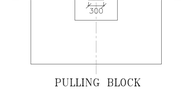




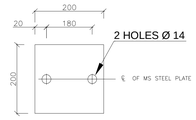
SECTION R-R

SECTION S-S

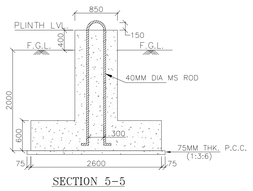
DETAILS OF FIREWALL FOR THE REACTOR



PULLING BLOCK



MILD STEEL PLATE
220 X 200 X 20
IT.003



SECTION 5-5

TABLE-A (BOM FOR RAIL FIXING ITEM) SCOPE OF BHEL-BHOPAL

ITEM NO.	DESCRIPTION	QTY.
01	RAIL	60 METER
02	U BOLT FOR RAIL FIXING	124 NOS.
03	PLATE MS (220 x 200 X 20 MM)	124 NOS.
04	ADJUSTABLE NUT M12	248 NOS.
05	RAIL CLAMP	248 NOS.
06	BEND PLATE WITH ANCHORED ROD (50 X 50, 5mm)	62 METER
07	LOCK NUT M12 WITH WASHER	248 NOS.

PROJECT: ARUN-3 HYDRO ELECTRIC PROJECT (NEPAL) (4 x 225 MW)

CUSTOMER: SJVN ARUN-3 POWER DEVELOPMENT COMPANY PVT. LTD. (SAPDC LTD.)

CONSULTANT: SJVN LTD. (A JOINT VENTURE OF GOVT OF INDIA AND GOVT OF HP)

ADDITIONAL INFORMATION :
WO NO. :

STATUS OF DRAWING :

DISTRIBUTION OF PRINTS :

BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION BUSINESS GROUP NOIDA

	NAME	SIGN.	DATE
DRN.	PK		30/10/2018
CHD.	Vyom/VK		30/10/2018
APPD.	SKS		30/10/2018

DEPT. TBG
CODE

SCALE NTS

CARD CODE

TITLE: ELECTRICAL LAYOUT PLAN AND SECTION OF 4x225MW OF ARUN-3 HEP

DRG.NO. TB-3-405-316-001

REV. 07

SHT. No 04 NO. OF SHT. 04

SIZE-A2

ANNEXURE - TQR

Name of Project : - 4x225MW Arun-3 (HEP), Nepal

Name of Customer : - SJVN Arun -III Power Development

Consultant : - SJVN Limited

Name of Item : - Illumination System

TECHNICAL QUALIFYING REQUIREMENT

The Sub-Contractor shall have designed, manufactured, type tested

and

at least the specified quantity of the all equipment covered under the scope of this contract of at least the rating as specified herein under or higher in last 20 years

and

supplied equipment should be in successful operation for at least 2 years in last 10 years as on the date of #Cut-off date of this Tender in Power Plant or Sub-stations or Industrial Complex etc.

#: Cut-off date means Bidder's Bid Opening date scheduled for subcontracting

Notes (General points):

1. Consideration of offer shall be subject to customer's approval of bidder's, if applicable.
2. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self- attested English translated document should also be submitted.
3. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
4. After satisfactory fulfilment of all the above criteria / requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

Date: Bidder's Stamp & Signature

SECTION-22

ILLUMINATION SYSTEM

22.1 SCOPE OF WORK

Scope of work under this section covers the provision of labour, tools, plants, materials and performance of work necessary for the design, engineering, manufacture, quality assurance, quality control, shop assembly, shop testing, packaging & delivery at site including insurance, unloading, site storage and preservation, in plant transportation at site, erection / installation, testing supervision, pre commissioning, successful commissioning, performance and acceptance testing, handing over and warrantee for two years of Illumination system, as per the specifications hereunder, each complete with all auxiliaries, accessories, spare parts and warranting a trouble free safe operation of the installation. The scope of work covered under this section shall be read in conjunction with General Technical specifications, Chapter-1.

22.1.1 Detailed Scope of Work

The scope of work shall be a comprehensive functional system complete in every respect including but not be limited to following:

22.1.1.1 Normal Lighting System

22.1.1.1.1 Indoor Lighting System

Normal Indoor lighting system shall include lighting of power house, transformer hall cavern, switchyard area building BFV house, surge shaft area building, Dam complex building, and galleries, MATs, CATs, Bus duct tunnels, escape tunnels, Interconnecting tunnels, cable Tunnels, Adit-2 of HRT (Gated access of HRT) comprising following major components:

i) Lighting equipment, including the light fittings, lighting panels, Warning/ sign boards, junction boxes etc.

ii) Power sockets, receptacles

iii) Control points, including:

a) Push-buttons or switches,

b) Dimmers, smart switches/sensors

c) LEDs on the main panel indicating on-off circuits.

iv) All cabling and wiring including conduits, Earth wires/flats, racks, ducts, channels or any other media of cable runs and associated accessories/ fixtures/ fasteners for normal lighting system from lighting panel to lighting fixtures.

v) Exclusion :- power cable from LT Board to Lighting panel is covered under section 18.

22.1.1.1.2 Outdoor Lighting System

Normal outdoor lighting system shall include lighting of Pot head yard area, TRT outfall, surge shaft area, Dam complex, approach road to Power House, TRT Outfall, Pothead yard, BVH, Surge Shaft, Dam and other adjoining areas, comprising following major components:

i) Lighting equipment, including the light fittings, lighting panels, Warning/ sign boards, junction boxes etc.

ii) Street light poles and other accessories (combination of solar and conventional lamps

iii) Ten (10) nos. tower masts outdoor lighting system including all necessary auxiliaries and accessories such as raising & lowering mechanism, winch, head frame etc. Location to be finalized during detailed engineering.

iv) Control points, including:

d) Push-buttons or switches,

e) Dimmers, smart switches/sensors

f) LEDs on the main panel indicating on-off circuits.

v) All cabling and wiring including conduits, Earth wires/flats, racks, ducts, channels or any other media of cable runs and associated accessories/ fixtures/ fasteners for normal lighting system from lighting panel to lighting fixtures.

vi) Two (2) nos. Neon lighting system depicting company logo & name, project name & capacity at a tentative height of 30m. Complete design & supply of the system including fixing arrangement, support system, aviation lamp etc. shall be in the scope of contractor.

vii) Exclusion: - power cable from LT Board to Lighting panel is covered under section 18.

22.1.1.2 Emergency lighting system

Emergency lighting system shall cover all the strategic locations like exits, escape tunnels, stairs, power house, Dam building, GIS Building and comprise of:

i) Lighting equipment, including the light fittings, lighting panels, Warning/ sign boards, junction boxes etc.

ii) All cabling and wiring including conduits, racks, Earth wires/flats, ducts, channels or any other media of cable runs and associated accessories/ fixtures/ fasteners for emergency lighting system from lighting panel to lighting fixtures.

iii) LED based sign boards indicating direction using arrows and text exit in all exit doors and routes at Power House, GIS Building, Dam Complex, HRT Gate area.

The system shall be suitable for AC as well as DC supply. In the normal operation system will be illuminated through AC supply. On failure of AC supply, DC supply shall be fed automatically, wherever DC supply will be available.

iv) Exclusion: - power cable from LT Board to Lighting panel is covered under section 18.

22.1.1.3 Power supply network

Maintenance power supply network shall comprise of:

i) The power outlets circuits and individual sockets of single phase 5A/ 15A.

ii) Fixed wall mounted sockets of three-phase, five pin, 63A & 32A.

iii) Portable socket cubicles supplied from a network of sockets distributed throughout the various areas.

iv) All cabling and wiring including conduits, racks, ducts, Earth wires/flats, channels or any other media of cable runs and associated accessories/ fixtures/ fasteners for power supply network panel to individual equipment.

v) Exclusion: - power cable from LT Board to Lighting panel is covered under section 18.

22.1.1.4 Illumination panels

Illumination panels complete with cubicles, bus-bar system, circuit breakers, instrument transformers, instruments cabling and wiring and complete with all other accessories.

Vehicle is clarified as Hand (Manual) driven Cart.

22.1.1.5 Maintenance ladders and platforms

i) Two (2) nos. wheel mounted platforms with ladder for maintenance of overhead indoor lighting system extended upto 12 m.

ii) One (1) no. vehicle mounted adjustable platform for maintenance of overhead outdoor lighting system extended upto 12 m.

iii) Two (2) sets of assorted portable aluminum ladders of 2m and 5m each.

22.1.1.6 Civil works

i) For indoor lighting system (normal / emergency) minor civil works like chipping, drilling etc. shall be in the scope of the contractor. However, foundation plates, inserts, embedment, clamp etc to be provided by the employer based on the drawing submitted by the contractor.

Please consider the followings in bidder's scope of supply. Cost of the same deemed inclusive of the offer (1.) Portable plug in type inspection lamps with mechanical protection cover for 240V with 5 meter cable. Cable shall be flexible copper with braided sheath. - Qty 5 nos. (2.) Power plug consisting of five (5) no. power sockets of 5A/15A with 30m cable length and five (5) pin 32 A plug to be connected from the nearest receptacle. Cable shall be flexible copper with braided sheath. - 2 Number

ii) For outdoor installation (lighting poles, tower mast, lighting panel etc.), civil work in respect of excavation, refilling, disposal of excavated mug, equipment foundation, panel foundation and other civil work including supply of cement, steel, sands, aggregate, bricks and other material as per specification clause 22.5.10 & any other civil works not specifically mentioned shall be done by the contractor. Further, Design and erection of civil works for outdoor lighting shall also be in the scope of contractor.

22.1.1.7 Control, monitoring and related items and services

Co-ordination and provision of necessary contacts and/or ports for integration with plant SCADA system.

22.1.1.8 Common supplies and services

i) Twenty four (24) nos. portable plug in type inspection lamps with mechanical protection cover for 240V with 5 meter cable. Cable shall be flexible copper with braided sheath.
ii) Five (5) no. Power plug consisting of five (5) no. power sockets of 5A/15A with 30m cable length and five (5) pin 32 A plug to be connected from the nearest receptacle. Cable shall be flexible copper with braided sheath.
iii) Drawings, documents and design calculations as per clause 22.6.
iv) Shop, assembly, inspection & tests as per clause no. 22.7.
v) Packaging, handling and site storage as per clause no. 22.8.
vi) Delivery, installation and commissioning as per clause no. 22.9.
vii) Tools and instruments as per clause no. 22.10.
viii) Spare parts as per clause no. 22.11
ix) Field/touch-up painting including all painting materials.

22.1.1.9 Completeness of System

Any other item (s) not mentioned specifically but necessary for the satisfactory completion of scope of work defined above, as per accepted standard (s)/best international practice.

22.2 STANDARDS & REGULATIONS

The design, manufacture and testing of the various equipment covered under this specification shall comply with the requirements of the latest edition of the relevant IEC/IS/IEEE/ISO standards only. Preference for latest IEC standards for particular equipment / system shall be governed over IEEE/ IS/ ISO standards. Further rules, guide

lines and standard laid down by international/ national agency shall be applicable in this specification.

The relevant abstract (in soft / hard copy) of all referred standards shall be provided free of cost during engineering stage for facilitating review/ approval of submitted drawing/documents.

22.3 PARAMETERS & GUARANTEES

22.3.1 Specific Parameters and Layout Conditions

The illumination system for power house complex, transformer hall cavern , BFV house, HRT Gates, intake gates , surge shaft area , TRT outfall , Dam complex , GIS Building ,Blower room, DG set room , Pothead yard and other adjoining areas, shall be supplied from the respective 415V LT boards located at various sites of the project.The boards are supplied by respective distribution transformers and D.G.Sets as per the tender drawing no SJVN/ED/ARUN III/2017-EM-02 & 03.

Indicative lighting and service power supply network shall cover following major areas:

a) Indoor lighting

i. Power House Complex – Machine area (El 520.5 , El 529.5, El 534, El 539)
ii. Power House Complex – Control Block(El 543.5, El 547, El 552)
iii. Transformer Cavern at EL 552.
iv. BFV house
v. Bus Ducts tunnel
vi. Service Bay
vii. Access Tunnels and Cable Tunnel cum ventilation tunnel
viii. Cable Spread Areas
ix. Switchgear rooms at Power House Areas, Dam Areas and Pot head yard Areas.
x. DG Rooms/Blower room
xi. GIS building
xii. Pump houses
xiii. Inspection Gallery of the Dam
xiv. Staircases, lift wells, toilets, kitchens and any other utility areas,
xv. Any other area not mentioned specifically (to be decided during detail engineering).

b) Outdoor lighting

i. Approach Roads to Powerhouse
ii. Pot head yard areas and its approach road,
iii. Outside Power House including security areas,
iv. Tail race area,

v. Road to BFV

vi. Surge shaft areas and its approach road,

vii. Dam site, Intake area and reservoir area,

viii. Any other area not mentioned specifically (to be decided during detail engineering).

The entire lighting network of the power house shall be supplied from two different boards, each board supplying the half of lighting load of each lighting zone (floor, room, tunnel etc.) to avoiding excess cable routing.

22.3.2 System Description

The philosophy of illumination design shall be based on achievement of desired illumination levels concept with minimum glare. Illumination luminaries for indoor and outdoor lighting shall be achieved through metal halide lamps / sodium vapour / mercury vapour / LED lighting / Fluorescent type fixtures. Selection of illumination luminaries shall be done during detailed engineering based on criteria of achieving required lux level, 10% of fixtures with minimum restriking time in lighting zone and visual comfort to the human being. The location of the lighting fixtures shall be such as to keep the areas behind the panels with equal lux level for better working there. In addition to above, the selection of luminaries for various areas should be such that the proposed illumination design is most energy efficient and decorative as per latest international trend.

Outdoor street lighting shall be designed having combination of solar lights and conventional lights in such a way that 50% lux level should be maintained in case of prolonged non availability of the sun. However, detailed scheme shall be finalized during detailed engineering.

The concept of decorative lighting especially in the area of importance with false ceilings such as Control bay, Machine Hall, Reception area, Conference room, Control room and any other area deemed necessary, etc. shall be taken into consideration. Fixtures with LED lighting or latest state of art technology will be adopted for these locations. Lighting contractor shall coordinate with the civil architecture contractor for interfacing of decorative lighting fixtures for aesthetic requirement.

Other design criterion such as amenity, visual performance, comfort realization, safety viewing and daylight effect shall be taken into consideration.

The design and bill of material shall be based upon illumination levels/lux level as specified in clause no 22.3.6 at various locations and recommended type of luminaries for various areas.

All the equipment/accessories shall be warranted and must operate at or above the

guaranteed values.

The equipment proposed to be supplied by the Contractor shall be industry proven products and not the R&D products models. All supplies shall conform to the requirements of relevant national and International standard. The supporting documents in this regard shall be submitted during datasheet/ drawing approval.

Installation of the equipment shall be done by the Contractor at Site (exact location shall be intimated by Employer at the time of installation). Material/manpower required for such installation shall be arranged by the Contractor.

Technical literature of the equipment/components offered and as published by the original manufacturer of the component, shall be submitted.

22.3.3 Normal lighting

Normal lighting in each functional area shall be divided in four circuits, each circuit providing one fourth of specified lux level. Control points shall be arranged to provide lighting of varying intensity. Smart switches/ sensors shall be installed in office/ facility areas to turn off or on the lights depending upon occupancy for the purpose of power saving. Provisions shall be made to get glare free uniform intensity of light in the area.

22.3.4 Emergency lighting

A separate emergency lighting system shall be supplied through emergency lighting boards. Emergency lighting boards shall be fed from 220V DC distribution boards. Emergency lighting shall automatically replace normal lighting, if the power supply source fails. It shall be off when normal lighting is operational. The design and construction of illumination system and that of 220V DC systems shall be adequately coordinated.

22.3.5 Operating Description

Service voltages:

S.No	System	Requirement
1)	Normal lighting system	Three-phase, five wire, 415/240 V, 50 Hz
2)	Emergency lighting system	Two wire, 220 V DC

3)	A.C. socket outlets	Single-phase, three pins, 240 V, 50 Hz
4)	Power socket outlets	Three-phase, five pins, 415/240 V, 50 Hz

Lux levels:

a) General areas:

S.No	**Area**	**Lux level**
1)	Store	150 Lux
2)	Changing rooms, washrooms and toilets	150 Lux
3)	Staircases	150 Lux
4)	All lift landing	150 Lux
5)	Pantry/canteen	150lux
6)	MATs	200 lux
7)	Cable tunnel , ventilation tunnel	100lux

b) Office areas:

S.No	**Area**	**Lux level**
1)	Offices	300 Lux
2)	Conference room	300 Lux
3)	Data processing areas	300 Lux
4)	Other office areas	300 Lux
5)	Control room	300 Lux

c) Equipment areas:

S.No	Area	Lux level
1.	Power house machine hall, service bay area	300 Lux
2.	High and low voltage switching installations in building	200 Lux
3.	DG set room/Battery room	200lux
4.	LTAC Area	200lux
5.	Mechanical equipment areas	200 Lux
6.	Drainage / dewatering gallery and sump	100lux
7.	Blower room	200lux
8.	GIS building	200lux
9.	Transformer cavern	200lux
10.	Turbine pit	200lux

d) Outdoor area

S.No	Area	Lux level
1.	Surge shaft area	50 lux
2.	Various approach road	50 lux
3.	TRT area	50 lux
4.	Dam area	50 lux
5.	Pot head yard	50 lux
6.	BFV area	50 lux

22.3.6 Rating and Functional Characteristics

Rating and functional characteristics of all the components of the illumination system shall be of latest state of the art technology. If the system components mentioned in the awarded contract becomes obsolete at the time of approval of General technical particulars during detail engineering, the Contractor shall offer the latest model without any extra cost to purchaser. The components of the system shall be selected taking the following requirements into consideration:

- Reliability of components and subsystems.
- Scalability of the system for future extensions.
- Availability of spares.
- Ease of maintenance.

22.3.7 Performance Criteria and Guarantee

The illumination system along with all auxiliaries and accessories shall be capable of performing intended duties under specified conditions It is the responsibility of the Contractor to supply the equipment as per relevant standards and shall also guarantee the reliability and performance for the same to meet the provisions of contract.

2.4 DESIGN AND CONSTRUCTION

22.4.1 Design and Construction Scheme of Luminaries and Fittings

Luminaries and fittings are proposed to be installed at various indoor and outdoor locations as per cl. no. 22.3.2. However, these shall be finalized during detail engineering and contractor shall supply the fittings and luminaries as per the approved drawings/GTPs.

Latest and state of art luminaries/fittings with electronic ballasts, wherever applicable, shall be installed. However, the quantity and type shall be finalized during detail engineering and contractor shall supply the fittings and luminaries as per the approved drawings. The contractor shall co-ordinate with civil contractor for providing false ceiling in control room for supplying/installing matching decorative fittings. The type, model etc. of the fittings shall have to be got approved from the Employer.

The IP of the fittings, junction box, control gear box, conduits etc. shall be as under:-

S.No	Area
1	Indoor & outdoor type luminaries/junction boxes/ TBs
2	Out door panels
3	Indoor panel
4	Drainage/ dewatering sump & gallery, area under turbine pit and turbine

IP 65 for outdoor light fitting
IP 55 for outdoor Junction Box
IP 20 for indoor light fitting

5	recessed type luminaries	IP 20

22.4.2 Distribution Board

The boards shall be of wall-mounted type and shall be suitably located above the floor. The board shall be made of sheet steel as defined in the GTS and provided with front hinged cover for further enabling the board to be unscrewed for inspection of wiring in the board.

Boards shall be waterproof and shall be provided with glands or adapters to receive a screwed conduit.

22.4.3 LIGHTING PANELS

Each three phase 415 volts, 4 wire, 220 volts/D.C. 2 wire lighting panel shall be provided with incoming triple pole MCCB with neutral link, triple pole miniature circuit breakers and outgoing single pole miniature circuit breakers distribution boards as per the scheme supplied by the bidder. The rating of the MCCBs shall be decided during detail engineering. The location and distribution of these panels in various areas shall be proposed by the bidder and approved by the purchaser at the stage of detailed engineering.

Earthing of the panel upto the nearest risers shall be in the scope of contractor. Further, provision of pipe / strip earthing and connection to the respective lighting panel shall be in the scope of contractor, wherever required while designing the outdoor lighting system and isolated area like BVH,.

Panels shall be fitted with phase separation barriers between the ways of banks. The board shall have adequate cabling space for top and bottom entry. The board shall have a neutral bar and this bar shall have sufficient terminals for full number of single phase out going circuits.

Panels shall be indoor/outdoor type as per site locations. The lighting panel shall be erected at the location indicated in the contractor's drawing approved by the purchaser. The panels shall have provision of lamp holders with switch for 230V AC supply and also for 220V DC supply separately.

[

The panels shall be suitable for cable/conduit entry from the top and bottom. Suitable removable cable gland-plate shall be provided on the top and bottom of panels. Necessary number of cable glands shall be supplied which shall be fitted on to this gland plate. The cable glands shall be of screw type and made of tinned brass.

The color of the panels shall be of shade 631 of IS-5 for both exterior and interior.

Each panel shall have a caution notice plate fixed on it. Each lighting panels shall be provided with 'ON' indicating lamp for each phase.

Necessary provision in respect of auto switching on & off of surface panel and DC emergency lighting panel shall be designed by contractor by using timer, photo electric sensor, contactors etc. scheme to be finalized during detailed engineering,

Bus bars shall be of aluminum alloy and shall have adequate cross section to carry the rated continuous and withstand short circuit currents. Maximum operating temperature of bus bars shall not exceed 85 deg.C

All equipments of lighting panel shall be ISI marked.

22.4.4 Switchboards

The boards with the required number of piano type switches and socket sets of state of the art technology shall be made of metal on all sides, except on the front, bakelite sheet of minimum 3 mm thickness shall be fixed with brass screws.

22.5 AUXILIARY SYSTEM AND MISCELLANEOUS COMPONENTS

22.5.1 Cables

All power supply cables shall be 1100V grade FRLS PVC, heat resistant type for use with temperature of 85^{o} C under normal continuous operation and 160^{o} C under short circuit conditions, strip armoured/unarmoured/3.5/4 core, multi-stranded of various sizes as required. The armoured cable shall be laid in cable trenches from lighting panel to junction box mounted on the tubular poles and from pole to pole. The cables shall be laid in G.I. pipe from the cable trench to pole mounted junction box and vice-versa. The unarmounred cables shall be laid from Main light distribution panels to Lighting panels/distribution board/receptacles in conduit in the indoor areas/walls otherwise buried/trenched cable shall be armoured only.

The conductor shall be multistranded compacted circular shape, composed of high conductivity Aluminum (H2) grade wires conforming to clause II of IS-8130 latest.

The conductor shall be insulated with heat resistant type polyethylene or cross-linked 110V grade insulation with inner sheath of same material. The insulation shall be applied by extrusion method and shall have heat, moisture and fungus resistant properties. The sheath shall be of adequate thickness and shall be applied through extrusion method. It shall form compact homogenous body. It shall be possible to strip the sheath readily from the core without damaging the insulation.

The cable shall be ISI marked. The length and size of the cable shall be marked on every one meter along cable length.

22.5.2 Lighting Wires

The wiring used for lighting shall be of standard products from reputed manufacturer.

The wires shall be 1100V grade of non corrosive and fire retardant material i.e., polyethylene insulated, or cross linked polymer single core cable conforming to IS:1596 with nominal conductor cross sectional area of 2.5/4 mm^2 as per requirement.

The conductor sizes of wires used for point wiring beyond lighting panels shall be single core cable conforming to IS:694.

The wires used for connection of a lighting fixture from nearest junction box for loop in loop-out connection between two lighting fixtures shall be single core copper standard conductor 1100 V grade flexible polyethylene or cross linked insulated cable conforming to IS:1596 with nominal conductor cross sectional area of 2.5/4mm^2 as per requirement.

Wiring shall be spliced only at junction box with approved type terminal strip Maximum two wires can be terminated to each way of terminal connectors. Separate neutral wires are to be provided for each circuit.

AC and D.C. wiring should not run through the same conduit. In A.C. system wiring, wire for different phases shall run in separate conduits and under no circumstances running of cables of the different phases in the same conduit is permissible. Also power sub-circuits for convenience outlets, heating and ventilating equipments shall be kept separate and distinct from lighting sub-circuits. All types of wiring whether concealed or unconcealed shall be capable of easy inspection. In all types of wiring, due consideration shall be given for neatness and good appearance.

22.5.3 Wiring

It is proposed to carry out surface wiring for illumination circuits as well as for power outlets. In some areas, concealed wiring shall be done based on the site requirements. The cables shall be connected to terminals only by lugs.

22.5.4 Lighting Accessories

Each socket outlet for lighting and power shall be controlled by a switch, which shall be on the live side on the line. The socket outlets shall be of pin type, 3rd pin being connected to the earth. The sockets should be ISI marked.

All lighting outlets (5 amps & 15 amps) shall be located at the switchboard located 1.5 m above the floor.

The power socket outlets should be 32A & 63A as per requirement to be approved by the employer. These sockets shall be suitable for supplying power to split / cassette type Air Conditioning system covered in section 25.

22.5.5 Conduits

The GI conduits shall be manufactured in accordance with the latest standards and shall be supplied in random length of 4 m to 6 m. The sockets should be ISI marked.

22.5.6 Conduits Joints

Conduit joints shall be made by means of screwed couplers and screwed accessories. The sockets should be ISI marked.

22.5.7 Bends

All necessary bends in the system shall be done by bending of conduits or by inserting suitable solid or inspection type normal boards, elbows or similar fittings whichever is more suitable.

22.5.8 Inspection Box

Suitable inspection boxes shall be provided to permit inspection and to facilitate removal of wires if necessary.

22.5.9 Earthing

The continuous earth shall be run for all the 3 pin sockets.

The neutral will be earthed at distribution transformer and the three phase four wires distribution system shall be connected to the station earthing system at two or more places.

22.5.10 Foundation and other Civil Works

Equipment foundations, panel foundation and other civil work including supply of cement, steel and other material as per relevant drawings and specification clauses shall be provided by the Contractor. It shall be the responsibility of the Contractor to check the foundations before commencement of erection to ensure their suitability. All final adjustment of foundation levels, chipping and dressing of foundation surfaces, setting and grouting of anchor bolts, sills, inserts and fastening devices shall be carried out by the Contractor including minor modification of civil work as may be required for erection. Any cutting of masonry/ concrete work, which is necessary, shall be made good to match the original work.

The Contractor shall make the cable trenches for burying cables for lighting poles and lighting mast and other areas as per the specification requirements. The trenches shall be made as per relevant normal standard practices. The Contractor shall submit the drawings showing trench arrangement during detailed engineering for review and approval.

The Contractor shall obtain approval of the Employer before proceeding with any cutting of masonry/ concrete work. The Contractor shall perform all excavation and back fillings required for ground connections and casting foundations. The Contractor shall make use of his own arrangements for pumping out any water that may be accumulated in the excavation. All excavation shall be backfilled to the original level with good consolidation.

22.5.11 Lighting Poles

The poles shall be of specified lengths, stepped or swaged and joined together. Poles shall be smooth cylindrical and swan neck or straight as specified. Poles shall be complete with base plate & taper plugs, and necessary pipe reducer/fixing brackets for fixing the lighting fixture and junction box etc.

Lighting poles shall be painted with two coats of Red Oxide and Zinc chromate in Synthetic compound primer on the exposed outside surface and with Bituminous paint all along the inside of the pole and outside portion which shall be embedded in foundation at manufacturing stage.

22.5.12 Tower Masts

25 meter

The tower shall consist of a single sectioned tube made from high tensile steel connected to a flat base plate. The thickness of base plates shall range from 1.5 to 4-inches. The base plate shall be bolted to a concrete foundation that extends several feet into the ground. Anchor rods shall be used to connect the high-mast base plate to the concrete foundation. The size and number of anchor rods used shall be determined by the size and height of the high-mast tower. The height of the tower mast shall be ~~30~~ meters. However, height may be changed based on the location to be decided during detailed engineering based on the terrain / layout of the project. Further luminaries shall be LED based with suitable numbers of fitting which shall be weather proof. The design of tower mast shall be in such a way that it shall provide uniform illumination of at least 30 lux.

Provision of two (2) number earth pits along with earthing connection for each tower mast shall also be in the scope of contractor.

A set of two (2) red colored neon aviation obstruction light of reliable design and reputed manufacturer shall be provided on top of each mast.

22.6 DRAWINGS, DOCUMENTS AND DESIGN CALCULATIONS

After award of contract, the contractor shall furnish all drawings, documents, design calculations, data, manuals & other necessary literature, pertaining to equipment offered by them & so specified under various clauses, in accordance

with requirements stipulated in "clause 1.19 of Section – 1 i.e. General Technical Specification (GTS)". A comprehensive list of all such drawings/documents planned to be submitted for reference/approval shall be provided beforehand for approval of the purchaser as already explained in clause no. 1.19.6 of Section – 1 (GTS). The list of drawings & documents to be furnished for approval / reference shall not be limited to the following:-

i) Drawings, documents, design calculations literatures, manuals etc. as per clause no. 1.19 of Section-1 (GTS)

ii) Drawings, documents, design calculations, literatures, manuals as listed in Annexure – D of Section -1 (GTS) referred under clause no. 1.19.6

iii) Detailed quality assurance plan, giving complete specifications of the materials and specifications relating to inspection and testing of materials and finished components.

iv) All drawings having bearing on civil foundations, equipments foundation details and loads

v) Arrangement, installation, foundation, plan, section, detailing of main equipment and sub-assemblies including piping, control & instrumentation system.

vi) All Electrical, Hydraulic & Control Drawings such as Electrical Panels OGA, Cable Block & Termination Diagram, Schematic Diagram, JB/MB/Kiosk Diagram etc. in respect of this section.

vii) All manufacturing drawings not specifically covered under approval/reference category shall be submitted for record and facilitate inspection of the component in the shop and assembly at site.

viii) Any other drawings, documents, design calculations, literatures, manuals etc. not covered anywhere in the specification, but required to be furnished for approval / reference of employer for suitability of design to fulfill the scope of work.

22.7 SHOP ASSEMBLY, INSPECTION AND TESTS

22.7.1 Type tests

Type test of illumination system shall fall under CAT-II.(refer clause no 1.16 of GTS).

Type test reports of the following tests shall be submitted for each type of luminaries/lamps with adequate details/ drawings to establish equivalence with the offered type:

a) Luminaires

i.	Test for mechanical strength
ii.	Thermal Test
iii.	Endurance test
iv.	Protection against electric shock
v.	Thermal shock proof test for glass (as applicable)
vi.	Wind loading test on street light luminaries
vii.	Power factor measurement test, IR, electric strenght & HV test
viii.	IP Test
ix.	Humidity test
x.	Photometry test
xi.	Resistance to fire ,heat & tracking
xii.	Creepage distance and cracking
xiii.	Resistance to corrosion

B) Lamps

	Rating Test
	Life Test
	Visual examination and checking for marking
	Torsion test
	Burning test
	Insulation resistance test
	Starting characteristics test
	Test for electrical, luminous and colour characteristics

A compliance / performance certificate for equipments, not specified above , as specified in the technical specifications shall be submitted by the contractor stating that the equipments are manufactures and tested in accordance with relevant IEC/IS standards and shall meet the performance guarantees to meet the provision of contract

22.7.2 Routine tests

The equipments shall be routine tested as per Indian/International standards. Customer reserves the right to witness conductance of routine test on sampling basis at the works of supplier.

22.7.3 Commissioning Tests

At least following tests shall be performed:

- Verification of electrical continuity between exposed conductive parts and the general earth circuit.
- Blank operational, tests, in co-ordination with other Contractors.
- Testing of main and auxiliary circuit insulation.
- Complete functional testing of illumination system.
- Lux level test in various areas.
-

22.7.4 Performance Testing

After completion of commissioning tests and commissioning of complete system ,the test service period of thirty (30) days shall follow after taking over. During this test service period, the system / installations must perform satisfactorily & if any defects are observed , same shall be rectified by contractor without any financial implication to employer.

22.8 PACKAGING, HANDLING & SITE STORAGE

The contractor shall be liable for all packing, handling and site storage of all the equipment till the installation is handed over to the Engineer in charge.

22.9 SITE INSTALLATION AND COMMISSIONING

22.9.1 General

The Contractor has to do all the work related to assembly, erection, testing and commissioning complete in all respects. All necessary tools, plants, labour, materials including consumables for performing installation, testing and pre-commissioning shall be provided by the Contractor.

The Contractor shall provide and install the concrete inserts/embedment; support steels and/or components for foundation /supports purpose, shall do any chipping / leveling works , denting / painting etc.

The Contractor shall supply sufficient number of erection and commissioning spare based on their experience so that erection, testing and commissioning work progresses smoothly and is not hampered for want of such spares.

22.10 TOOLS AND INSTRUMENTS

22.10.1 Tools for erection and Installation.

The Contractor shall bring his own tools, devices, testing instruments / equipments to site in order to erect and install the complete equipment delivered under this section. These shall remain the property of the Contractor unless otherwise agreed to take over any / all of these at mutually agreed conditions.

22.11 SPARE PARTS

The spare parts mentioned here under are meant for use by the Employer during operation and maintenance stage and shall not be used as erection spares required during installation.

22.11.1 Mandatory Spare Parts

The Contractor shall supply the mandatory spare parts as per schedule-III.

22.11.2 Recommended Spare Parts

The Contractor shall furnish the list of recommended spare parts at schedule-IV.

SECTION- 3

PROJECT DETAILS AND GENERAL SPECIFICATIONS

3.0 GENERAL

This section stipulates the General Technical Requirements under the Contract and will form an integral part of the Technical Specification.

The provisions under this section are intended to supplement general requirements for the materials, equipment and services covered under other sections of tender documents and are not exclusive. However in case of conflict between the requirements specified in this section and requirements specified under other sections, the requirements specified under respective sections shall prevail.

3.1 PROJECT DETAILS

Name of the Project:	**4x225MW , Arun-3 HEP ,Nepal**
Name of the Customer:	**SAPDC**
Name of Consultant :	**SJVN**

SJVN Arun-3 Power Development Company (P) Ltd. (SAPDC), a company promoted by SJVN Ltd., as a single shareholder company in Nepal having its registered office at Lokanthali, Kathmandu, Nepal has signed Project Development Agreement with Government of Nepal to plan, promote, organize & execute Arun-3 Hydroelectric Project (900 MW) in Sankhwasabha District. of Nepal.

The bid prepared by the Bidder and all correspondence and documents related to the bid exchanged by the Bidder and the consultant/owner shall be written in the English, provided that any printed literature furnished by the Bidder may be written in another language, as long as such literature is accompanied by a translation in English, in which case, for purposes of interpretation of the bid, the translation shall govern.

3.2 Location & Land Availability:

The proposed project site is located at a distance of 50 km from Khandbari, the headquarters of Sankhuwa sabha District of Nepal. It is at about 240 km from Biratnagar and about 740 km from Kathmandu. The location details of the proposed project site are as indicated below:

- Latitude …… .27^{O}30’N – 27^{O} -35’N
- Longitude …… ...87º -12’E – 88^{O}-20’E
- Distance from Tumlingtar (domestic airport) town is…….About 68 km
- Distance of Kathmandu (international airport) from Tumlingtar…..About 660.km

3.3 Climatic Condition

Average max temp : 30^{o} C
Average Minimum Temp : 20^{o} C
Maximum river water temperature : 25^{o}C
Minimum river water temperature : 10^{o}C
Ambient Temperature for the Equipment : 40^{o} C

3.4 Seismic Zone

The equipment shall be designed for operation in seismic zone IV for earthquake resistance. The equipment and each part of it shall be strong enough and sufficiently well connected to resist total operating stresses resulting from forces in normal operation, abnormal condition and forces superimposed due to occurrence of earthquakes of intensity which cause a ground acceleration of 0.16 g in vertical direction and 0.24 g in the other horizontal directions.

3.5 Transportation

Unless otherwise specified in the **Specification**, responsibility for arranging transportation of plant and equipment lies with the Contractor. The Contractor shall at its own risk and expense transport all plant and equipment to a destination specified in bid document. The contractor shall transport the contracted plant and equipment/ supplies through registered common carriers only.

The nearest major airport is at Kathmandu which is at a distance of 740km from Project Site. Biratnagar is connected to Kathmandu by Road.

The major nearest seaport for the trans-shipment of heavy equipment to Nepal is Kolkata. Other sea ports for imported equipment would be Mumbai or Chennai as convenient. The two sea ports Mumbai & Chennai are connected to Kolkata and Jogbani by rail as well as roads.

Railway transport is available from Kolkata and other locations of Indian Cities to the Nepal-India border only. The broad gauge line from Kolkata ends at Jogbani, Bihar. All rail freight for Nepal has to be unloaded there. The distance of Kolkata by rail route is about 800 km. From Jogbani, the road distance to the projects sites via Biratnagar is about 300km.

Road access to Arun-3 project from Kolkata to Jogbani is 600km; from Biratnagar to Project Area via Hile is 300km. Total distance to project area from Kolkata is 900km. Alternative route could be from Kolkata to Raxaul which is 800km, further from Birganj to Dhalkebar to Hile to Project Area which is 450km. Total distance Kolkata to Project Area is 1250km.

Local transportation, insurance and other services incidental to the delivery of facilities to be supplied from Employer's country (Schedule- 2 Items) shall be quoted separately.

3.6 Transport Limitation

The transport limitation by road from Jogbani to the project site is the governing factor for determining permissible package size and weight.
The existing roads allow the transport of the packages of the following size and weight.
Size (in mm) (l x b x h) - 9700 x 6000 x 6000*
Weight (Tonnes) - 70R
Heaviest package to be transported with suitable number of axle for safe transportation of consignment for 70R bridge capacity.

* Height from the ground.

3.7 Salient features of Project

The salient features of Arun-3 HEP are as follows:

A. POWER HOUSE COMPLEX

i. Power House Cavern		Underground on Left bank
ii.	Installed capacity	900 MW
iii.	No. of units	4
iv.	Unit Capacity	225 MW
v.	Size of Power House Cavern	179.50m (L) x 22.5m (W) x49.5m(H)

B. UNDERGROUND TRANSFORMER CAVERN

i. Size	146.14m (L) x 16 m(W)x 23m(H)
ii. Transformer Type	Single Phase
iii. Number and rating	13 nos. (including 1 spare), 15.75/420/√3kV, 50Hz, 92MVA
iv.Transformer Hall level	El. 552 m

C. Switchyard & Transmission

i.Type of Switching	Gas Insulated Substation and Pothead Yard
ii. Size	207m (L) x 106m (W)
iii. Switchyard level	El. 557 m
iv. Transmission System	400kV Arun III HEP – Muzzafarpur via Dhalkebar D/c Quad Moose Lines with LILO of both circuits at Dhalkebar 400/220kV substation

3.7.1 SYSTEM PARAMETERS

1	Continuous current carrying capacity (rms) at 40° C ambient temperature.	2000A (min)
2	Short time current carrying Capacity	50kA for 1sec
3	Voltage	400KV/420kV (rms) (Nom/Max)
4	Frequency	50Hz
5	System neutral earthing	Effectively earthed
6	Insulation Level	
a	One minute Dry Power frequency Withstand Voltage (kV rms)	630
b	One minute Wet power frequency Withstand Voltage (rms)	630
7	Switching Impulse withstand(250/2500 microsec.) voltage (kV peak)	1050
8	Impulse Withstand Voltage of arrester housing with 1.2/50 micro sec wave.	1425 kVp
9	Creepage distance	25 (mm/kV)
10	Radio Interference voltage at 320kV	As per CEA guidelines

3.7.2 AUXILIARY POWER SUPPLY

3.7.2.1 AC power

Three-phase system with grounded neutral for feeding three-phase and one-phase consumers (connected between phase and neutral), 415/240V ± 10% and 50Hz , -5% to +3 %. All motors and other electrical apparatus should be designed to work continuously under,-5% to +3 % frequency variation and ±10% voltage variation.

3.7.2.2 DC power

DC Systems, ungrounded, with earth fault detection 220V plus (+) 10% and minus (-) 20% for the supply of main control circuits for high and medium voltage switchgear, protection circuits and to other larger essentials loads. Other voltage systems eventually needed, shall be generated from the above systems by means of dc/dc converters, inverters etc.

3.7.2.3 Deleted

3.7.2.4 Cabling & wiring

Wiring within cubicles and equipment enclosures shall conform to requirements of this section unless otherwise specified. Control wiring shall be single / stranded copper subjected to prior approval by purchaser during detailed engineering and shall not be smaller than 2.5 Sq. mm, except as otherwise agreed by the purchaser.

All Distribution Boards, Control & Protection panels, Motor Control control panels etc. shall be supplied completely wired internally up to the terminal blocks ready to receive purchaser control cable.

All inter cubicle and inter panel wiring and connections between panels of same Distribution Board, Control & Protection panels, Motor Control panels including all bus wiring for AC and DC supplies shall be provided by the tenderer.
Larger size wiring shall be used where needed for the current carrying capacity requirements.

Cables shall have at least 1000 V PVC insulation except for 220V DC and telemetering or communication system equipment for which 650V and 300 V ratings respectively are acceptable.

For current and potential transformer secondary circuits the minimum cross section of the conductors shall not be less than 4.0 Sq. mm.

Wiring shall terminate at terminal blocks at one side only. Where tap connections are required, they shall be made on terminal blocks. Wiring shall be neatly arranged and laid in wire ways accessible from the front door.

Engraved core identification ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire.

Each cubical shall be provided with an earthing bar (PE) of sufficient cross section carrying any possible fault current without undue heating. All metallic parts of the cubicle not forming part of the live circuits, all instrument transformer terminals to be earthed and other earthing terminals as well as all cable screens and PE-wires shall be connected to the earthing bar.

3.7.2.5 Power outlets

Power outlet for utilities such as electric drills, welding equipment etc., shall be provided in all floors of the powerhouse to enable repair and maintenance works to be done locally/ in-situ.

3.7.2.6 Terminal blocks

The terminal blocks shall be located to allow a neat and easy connection work and shall be safely accessible while the equipment is in service. Control circuits and power circuits shall be completely separated by use of divided or separate terminal blocks. Power terminal blocks shall be rated in accordance with applicable standards, and shall be provided with covers. Terminal blocks shall be 1100V grade and have continuous rating to carry the maximum expected current on the terminals.

Terminal blocks for current transformer and voltage transformer secondary leads shall be provided with test links and isolating facilities. The current transformer secondary leads shall also be provided with short circuiting and earthing facilities.
The terminal shall be such that maximum contact area is achieved when a cable is terminated.
The terminal shall have a locking characteristic to prevent cable from escaping from the terminal clamp unless it is done intentionally.
The conducting part in contact with cable shall preferably be tinned or silver plated.
The terminal blocks shall be of extensible design. The terminal blocks shall have locking arrangement to prevent its escape from the mounting rails.

The terminal blocks shall be fully enclosed with removable covers of transparent, non-deteriorating type plastic material. Insulating barriers shall be provided between the terminal blocks. These barriers shall not hinder the operator from carrying out the wiring without removing the barriers.

Unless otherwise specified terminal blocks shall be suitable for connecting the following conductors on each side.

All circuits except CT/ PT flexible circuits	Minimum of two of 2.5 sq. mm copper
All CT/ PT Circuits flexible	Minimum of 2 nos. of 6 sq. mm copper

The arrangements shall be made in such a manner so that it is possible to safely connect or disconnect terminals on live circuits and replace fuse links when the cabinet is live.
Wherever duplication of a terminal block is necessary it shall be achieved by solid bonding links.

At least 20% spare terminals shall be provided on ach panel / cubicle / box and these spare terminals shall be uniformly distributed on all terminals rows.
There shall be minimum clearance of 250 mm between the first / bottom row of terminal block and the associated cable gland plate. Also, the clearance between two rows of terminal blocks shall be a minimum of 150 mm.

3.7.2.7 Protection requirement

For short circuit and overload protection of power and control circuits, air circuit breakers, moulded case circuit breakers or MCBs shall be used. Outlets from AC (and DC) distribution panels are protected in their respective panels.

3.7.2.8 Switches, Lamps & Instruments

General

Control switches, indicating lamps and instruments shall be arranged so that all parts are readily accessible for servicing without the necessity to remove other devices, terminal blocks or excessive amount of wiring.

All control switches and indicating devices mounted in cabinets and enclosures shall be visible with the doors closed.

Identification nameplates shall be provided for all control switches, indicating instruments and lamps, in accordance with clause “Nameplates”.
Instruments and controls shall be located so that their dials, indicators and nameplates are clearly readable. Data for all instruments to be provided, including type, size, scale range, electrical ratings, nameplate and name of manufacturer, shall be furnished. Steel panels shall be provided for group mounting of the instruments.

All instruments shall be of an approved type and shall match, insofar as practicable, the other instruments with which they are associated; their dial type, scaled markings and units, type of connection and mounting, shall be co-coordinated. All piping and tubing required for instruments shall be furnished and installed. All instruments and control switches shall be furnished with necessary auxiliaries,i.e. resistors, shunts etc.

3.7.2.9 Control and Selector switches

The switches and push buttons shall be provided with ample contact ratings, suitable cam or block arrangements necessary for the control functions on 230 V AC or 220V DC circuits. The control switches used in mimic diagrams shall be of discrepancy type with built in lamp indication.
Control and Selector switches shall be rotary type with escutcheon plates clearly marked to show the function and positions. The switches shall be of sturdy construction suitable for mounting on panel front.
Switches with shrouding of live parts and sealing of contacts against dust ingress shall be provided.
Circuit breaker control switches shall have three positions and shall be spring return to "NEUTRAL” from "CLOSE" and "TRIP" positions and shall have pistol grip handles. They shall have at least two (2) contacts closing in close position, and two (2) contacts closing in trip position unless specified otherwise.
Ammeter and voltmeter selector switches shall have four stay out position with adequate number of contacts for three phase 4 wire system. These shall have oval handles. Ammeter selector switches shall have make before break type contacts to prevent open circuiting of CT secondaries. Contacts of the switches shall be spring assisted and shall be of suitable material to give a long trouble free service.

3.7.2.10 Push buttons

Push-buttons shall be of spring return, push to actuate type. Their contacts shall be rated to make, continuously carry and break 10A at 230V AC and 0.5A at 220V DC.

All push buttons shall have one normally open and one normally closed contact, unless specified otherwise. The contact faces shall be of silver or silver alloy.

All push buttons shall be provided with integral escutcheon plates marked with its function. The colour of the button shall be as follows:

Green : Breaker Close
Red : Breaker Open
Black : For overload reset

3.7.2.11 Indicating and signaling lamps

Each indicating and signaling lamp shall have a removable cap, which can be inscribed with wording and shall not be affected with the heat of the lamp.
Indicating lamps are preferably of LED type & low watt consumption and shall be replaceable from the front of the panel. The indicating and signaling lamps shall be of the same size and type.
Lamps shall be provided with series resistors, preferably built-in the lamps assembly.
The lamps shall have escutcheon plates marked with its function, wherever necessary.

Lamps shall have translucent lamp-covers of the following colours, as warranted by the application.

Red : ACB's/MCCB's close
Green : ACB's/MCCB's open
White : Auto trip
Amber : For all healthy conditions e.g. control supply
Voilet : Circuit breaker spring charged
Blue : For all alarm conditions (e.g. overload) Also for "SERVICE" & "TEST" positions indicators

Indication lamps should be located just above the associated push buttons/control switches.
All indicating lamps shall be suitable for continuous operation at 90% to 110% of their rated voltage.

3.7.2.12 HRC Fuses

HRC-Fuses shall have visible operation indicators.

HRC-Fuses shall be mounted on fuses carriers, which are mounted on fuse bases. Wherever it is not possible to mount fuses on carriers, fuses shall be directly mounted on plug-in type of bases. In such cases one set of insulated fuse pulling handles shall be supplied with each switchgear.

HRC-Fuse rating shall be chosen by the tenderer depending upon the circuit requirements.

3.7.2.13 Indicating instruments and Meters

Instruments mounted on panels, shall be of the semi flush type back connected, matching pattern, shape, and of approved finish to present neat and fitting appearance consistent with functional requirements Mechanical quantity measuring instruments which are directly mounted on equipment shall have circular dials and shall be properly supported and guarded against accidental injury/breakage. These shall be placed in convenient locations.

The instruments shall accurately measure and indicate the quantity under all conditions of operation with minimum instrument errors. Changes in ambient temperature within the range prevailing at site shall not affect the accuracy Contact making instruments shall have contacts suitable for 240 V AC or 220 V DC circuits.

The reading scales on the dials shall be in metric units only and range shall be such that the normal operating values of the quantities are indicated in the middle 3rd of the scale. The dials pointer etc. shall be designed to facilitate accurate reading by minimizing parallax and glare from instrument window and by providing clear bold dial markings. The size of dial and length of the scales of the indicating instruments shall be large enough to suit the requirements. The scale plates of panel mounted indicating instruments shall have a permanent white mat finish with black graduations and the pointer shall also be of the black colour. Instruments mounted on panels shall be of flush type and shall be back connected. All instruments on a switchgear panel shall be of matching pattern, shape and finish so as to present a pleasing appearance consistent with the functional requirements.

All instruments shall conform to relevant International or national applicable standards. These shall be subjected to tests prior to dispatch. The instruments shall be shock, vibration and moisture proof. The electrical instruments shall withstand dielectric test of 2000 V RMS to ground for one (1) minute as per standards.

The coils of electrical instruments shall be designed for continuous operation at 110% of the full load current at instrument potential. The coil rating of the measuring instruments shall be coordinated with those of the associated instrument transformers (i.e. CTs, PTs, etc.) by the supplier. The VA burden of the instruments shall be as low as possible. The meters shall be of the first grade in respect of accuracy classification.

Energy meter shall be suitable for 3-phase, 4-wire unbalanced system and shall comply generally with the relevant standard. All instruments shall be tested in accordance with the requirements of relevant standards.

3.7.2.14 Integrating instruments

The Wh and VArh meters shall be of the semi-flush-mounted type. Each meter shall be connected to terminal blocks suitable for opening and short-circuiting for testing purposes. The meter cases shall be dust-tight and with removable covers. The meters shall be three-phase, three element, equipped with an impulse contact mechanism, potential free for remote metering purposes, and shall be suitable for continuous operation from secondary of potential transformers and from secondary of current transformers, with transformer ratios and connections indicated on the contract drawings.

The meters shall be provided with primary-rated, direct reading registers, with five or more digits and a suitable multiplier. The meters for the outgoing lines shall be of the two-way type and all meters shall have mechanism to prevent negative registration.

The meters shall have built in over-voltage protection and isolation according to IEC Publication 60521. The tolerance ambient temperature range of the meters shall be 0 to 45 degrees C.
The protection class of the Wh meters shall be 0.2 and the VArh meters 0.2 according to IEC Publication 60687.

3.7.2.15 Measuring converters

The converters shall be suitable for direct connection to the secondary circuits of the potential and current transformers used, or other sensors, each as they apply. The converters shall be static type, having all accessories to provide an output signal of 4-20 mA, filtered DC.
For the measuring converters the following minimum requirements shall be fulfilled:
Current transducers shall be single-phase, of accuracy class 0.5 or better. Voltage transducers shall be single-phase of accuracy class 0.5 or better. W and VAR transducers shall be two elements, three-phase. Accuracy class of the transducers shall be 0.5 or better.

3.7.2.16 Measuring transformers

All current and voltage transformers shall be completely encapsulated cast resin insulated type suitable for continuous operation at the temperature prevailing inside the switchgear enclosure, when the distribution board is operating at its rated condition and the outside ambient temperature is 40 deg.C.
All instrument transformers shall be able to withstand the thermal and mechanical stresses resulting from the maximum short circuit and momentary current ratings of the associated switchgear.
All instrument transformer shall have clear indelible polarity markings. All secondary terminals shall be wired to a separate terminal on an accessible terminal block where star-point formation and earthing shall be done.

All VTs shall have readily accessible HRC current limiting fuses on both primary and secondary sides.The class of insulation should be E or better.

The parameter & rating of CTs & PTs are minimum requirement & tentative only. Contactor shall submit the calculations for selection of CT/PT for approval to purchaser. Potential transformer secondary windings shall be rated 110 / V3 V Current transformer secondary windings shall have a rated current of 1A / 5A.

3.7.2.17 Nameplates and Labels

Each major and auxiliary item of equipment shall have a nameplate permanently affixed thereto, or as directed, showing in a legible and durable manner the serial number, name and address of the manufacture, rated capacity, speed, electrical characteristics, and other significant information, as applicable.
The module identification plate shall clearly give the feeder number and feeder designation wherever applicable. For single front switchboards, similar panel and board identification labels shall be provided at the rear also.
All name plates shall be of non rusting metal or 3-ply lamicoid with white engraved lettering on black back-ground, inscriptions and lettering sizes shall be as per their standard practice. Suitable plastic sticker labels shall be provided for easy identification of all equipment, located

inside the panel/module. These labels shall be positioned so as to be clearly visible and shall give the device number, as mentioned in the module wiring drawings.

3.7.2.18 Motors

All electric motors for driving various equipment shall conform to relevant standards viz. IEC, BS or IS as applicable. The motor rating, torque characteristics, speed etc. shall be selected to suit the duty requirements.

Type of starter for motors shall be duly approved by the purchaser during detailed engineering. The detailed design calculation for selection of type of starters is to be submitted for approval. The priority for type of starters shall be in the following order:

1. Variable frequency drive
2. Soft starter
3. Star delta/ auto –transformer
4. Direct on-line starter

The enclosure of each motor shall be of the type best suited for the service conditions of the motor.The motor insulation shall be resistant to moisture, oil or oil vapor and the motors in general shall be so designed as to suit the tropical climate. Varnished cambric or glass insulation class F shall be used for connection from the windings to the terminals.

The terminal box shall be closed conduit box type conveniently located, and shall have means for terminating the external wiring for outdoor use. The motor terminals shall be of the stud type totally enclosed. Eye bolts or lugs shall be provided for lifting.

Space heaters to avoid condensation shall also be provided. Special type of motors, not adequately covered by these specifications, shall be offered for any special application, but these shall be subject to the approval of purchaser.

3.7.2.19 Space heaters

Space heater shall be provided in the Distribution Boards, Control & Protection panels, Motor Control panels etc. The space heaters shall be suitable for continuous operation on 240V AC, 50 HZ single phase supply, and shall be automatically controlled by thermostats. Necessary isolating switches and fuses shall also be provided.

3.7.2.20 Auxiliary relay, contacts and devices

All relays and timers in protective circuits shall be flush mounted on panel front with connections from the inside. They shall have transparent dust tight covers removable from the front. All protective relays shall have a draw out construction for easy replacement from the front. They shall either have built-in test facilities, or shall be provided with necessary test blocks and test switches located immediately below each relay. The auxiliary relays and timers may be furnished in non-draw out cases.

All AC auxiliary relays shall be suitable for operation with VTs and CTs secondaries.

DC auxiliary relays shall be designed for 220V DC unless otherwise specified and shall operate satisfactorily between 80% and 110% of the rated voltage. Relays shall have adequate thermal capacity for continuous operation in circuits in which they are used.

All protective relays and timers shall have at least two potentially free output contacts. Relays shall have contacts as required for protection schemes. Contacts of relays and timers shall be silver faced and shall have a spring action. Adequate number of terminals shall be available on the relay cases for applicable relaying schemes.

Suitable number of auxiliary contacts or auxiliary relays shall be provided with each VCB's / ACB's for indication, remote indication, annunciation and automatic changeover and interlocking scheme.
All protective relays, auxiliary relays and timers shall be provided with hand reset operation indicators (flag) for analysing the cause of operation.

3.7.2.21 Welding & NDT

Preparation of base material

Members to be joined by welding may be cut to shape and size by mechanical means such as shearing, machining, grinding, or by gas or arc cutting, to suit the conditions. Edges shall be shaped according to ASME requirements. Design of welded joints and selection of weld filler metal shall be in accordance with approved standards and shall allow thorough penetration and good fusion of the weld with the base metal. The edges of surfaces to be welded shall be sound metal free of visible defects such as laminations or defects caused by cutting operation at least 30 mm back from the edge of the weld, and free from rust, oil, grease, and other foreign matter.

The establishment of welding procedures, welder's qualifications shall conform to the requirements of the ASME Boiler and Pressure Vessel Code Section VIII and IX. The approved copy of the WPS & WPQR in accordance with the ASME requirements shall be submitted to the purchaser for review and record.

3.7.2.22 Field welding

Filler material required for field-welded joints shall be furnished by the Contractor. The Contractor shall perform all welding work at site in accordance with the applicable WPS. Only qualified welders shall be used for undertaking welding as per the applicable WPS.NDT shall be performed as per the approved drawings.

Preparation for field welding

All cutting, chamfering, and other shaping of metals necessary for the field connection shall be done as far as possible in the shop. Adequate temporary bolted field connections shall be provided to hold the assemblies rigidly and in proper alignment during shop and field assembly.
To ensure proper alignment during field erection, a minimum of two dowels shall be provided for each field connection between subassemblies. The holes shall be drilled and the dowels fitted at shop assembly after the subassemblies have been satisfactorily aligned. All stipulations for welding, structural work and other, shall be applied to fieldwork as well as to shop work, except where otherwise stated.

3.7.2.23 Painting

All the equipment furnished and installed by the Contractor shall be completely painted for final use, with the exception of those parts or surfaces that are expressly designated as unpainted. Surfaces to be painted shall receive the preparatory treatment and required number of coats. The Contractor shall perform all painting work in the shop, before shipment, followed by a final coat of paint at site after installation as per the standard procedure.

All materials, supplies, and articles furnished shall be the standard products of recognized reputable manufacturers.Colour schedule of equipment supplied shall be finalized during detailed design stage.

3.7.2.24 Galvanization

All materials to be galvanized shall be of the full dimensions shown or specified and all punching, cutting, drilling, screw tapping and the removal of burrs shall be completed before the galvanizing process commences. All galvanizing shall be done by the hot dip process with smelter, not less than ninety eight percent (98%) of which must be pure zinc. No alternative process shall be used without the approval of the purchaser. No components shall be galvanized which are likely to come into subsequent contact with oil. Bolts shall be completely galvanized including the threads, but the threads shall be left uncoated in the case of nuts.
The zinc coating shall be uniform, clean, smooth and as free from spangle as possible. In the case of component parts the zinc coating shall weigh not less than 0.6 kg/m2 over the area covered and be not less than 0.09mm in thickness. All galvanizing shall comply with the requirements of the relevant ASTM standards/Indian Standards. All galvanized parts shall be protected from injury to the zinc coating due to differential aeration and abrasion during the period of transit, storage and erection. Damaged areas of the coating shall be touched up with an approved zinc dust paint or other approved flake metallic compound.

3.7.2.25 Pumps

All pumps forming part of the generating units and other plant and equipment shall be of high performance requisite type (viz. centrifugal, rotary etc.) and rating, of reputed make, and shall be directly coupled to their driving motors. The pumps shall be of self-priming type and with proper sealing systems and protection.
The materials of construction of pumps in general shall suit the service conditions. The materials of construction of the pumps handling water, such as drainage & dewatering pumps, turbine top cover drainage pumps etc. shall be resistant to abrasive effects of silt in such water. The pumps shall operate quietly without undue noise and vibration in their full operating range of head and flow. They shall be easy to maintain.

3.7.2.26 Embedded parts, Anchor Bolts and Fasteners

All embedded anchor bolts, rods, pipes, welding plates and support plates shall be provided by contractor. Anchor bolts shall consist of a threaded steel rod installed inside a pipe sleeve to provide lateral adjustment after the sleeve is embedded. The threaded end of the rod shall be provided with two steel nuts and two steel washers to permit leveling and anchoring the equipment prior to grouting.
Approved types of expansion or chemical anchors shall be used where practicable for small equipment.

3.7.2.27 Rust Prevention and Protection during Transit:-

Bright steel parts including all machined surfaces shall be given a thick coat of tar or tallow or any other approved rust resisting paint in plain colour to prevent rusting during shipment and transport.

3.7.2.28 Civil Works

Civil foundations for equipment of the generating units and other plant and equipment will be prepared by the Purchaser in accordance with the basic design data to be supplied by the Contractor.

The Contractor shall provide design for foundations and install the concrete inserts/embedment; support steels and/or components for foundation /supports purpose, shall do any chipping / levelling works, denting / painting etc.

3.7.3 Erection, Testing, Commissioning and performance of Guarantee Tests

3.7.3.1 Testing and inspection

Materials used for construction of major & important sub-assemblies shall be thoroughly shop tested and inspected by the Contractor at his own expense prior to dispatch. Shop test shall comprise of routine test & type tests.

The shop tests and inspections shall be as spelt out in individual equipment specifications as dealt in succeeding sections but shall not be limited to the same. Any other tests and inspection not specifically listed but are otherwise considered essential and advisable shall also be conducted.

The Bidders shall furnish schedule of the shop tests and inspections on materials and equipment. Important tests/inspections shall be subject to witness by the purchaser for which the Contractor shall give sufficient advance notice. In case purchaser is unable to witness shop tests/inspections, the Contractor shall be so intimated and the tests/inspections may then be carried out in the absence of the Purchaser.

Equipment on which tests and inspections have been duly witnessed and approved by the Purchaser may be dispatched by the Contractor. Equipment on which tests and inspections have not been witnessed by the purchaser shall be dispatched only after the shop tests and inspection Certificates have been approved by the Purchaser.

3.7.3.2 Dimensional Checks and Visual Inspection

Dimensional checks shall be performed on all major parts, components and partial assemblies, especially when close tolerances and fits are involved (tolerance of shafts, between stationary and moving parts, connecting dimensions for the assembly with other supplies, etc.). If the dimensional checks show discrepancies in measurement, which may affect the fit, assembly or dismantling of the respective part or component, the same have to be corrected correspondingly. Such correction or modification shall, however, in no way lead to sacrifices with respect to reliability of operation or inter-changeability, and shall be performed only after the agreement of the Owner has been obtained. If the correction or modification cannot be carried out in accordance with the terms mentioned above, the part or component concerned may be subject to rejection. Faulty machine parts or equipment shall by no means be delivered.

3.7.3.3 Functional Tests

Functional tests on partial assemblies and/or complete assemblies shall be carried out as much as possible already in the manufacturer's workshops. Such tests shall be performed as far as possible under operation-like conditions.

When requested by the Owner, the functional tests shall be repeated until full proof has been obtained that the functioning of the assemblies will comply with the requirements of the Contract Documents.

3.7.3.4 Erection, commissioning & field tests

The Contractor has to do all the work related to assembly, erection, testing and commissioning complete in all respects. All necessary tools, plants, labour, materials including consumables for performing installation, testing and pre-commissioning shall be provided by the Contractor.

The Contractor shall submit the necessary data/information, layout and foundation/support drawings well in advance. The Contractor shall provide and install the concrete inserts/embedment, support steels and/or components for foundation/supports purpose as per approved erection drawings and coordinate the activities with civil contractors to keep his activities in synchronism with civil work. All installation for foundation shall be verified and accepted by the Engineer.

The Contractor shall use anchor fasteners for installation of piping, fixtures, mountings, conduits, cabling, panels etc. Minor Chipping of concrete is permitted. However, taking support from reinforcement bars shall not be allowed.

3.7.3.5 Installation procedure

The Contractor shall submit six copies of all detailed programs and the procedures to be adopted for erection / installation, testing and commissioning well in advance, before start of erection activities/ installation.

The installation procedure shall also have a section “site quality assurance plan” containing erection data sheets / site protocols for various components. These sheets should specify site measurements/ inspections required to be made for ensuring proper installation.

3.7.3.6 Cable laying

Wiring between equipment enclosures shall be made with cables, laid in trenches and/or cable trays and in cable conduits. The Contractor shall submit for review to the Engineer a cable route layout-showing location of trenches, conduits and trays. All material for cable laying such as cable trays supports and fastening material shall be furnished and placed by the Contractor. Cables shall be properly fastened and marked where they enter enclosures by either cable clamps or nipples.

Cables in horizontal cable trays shall be fastened properly with clamps or plastic strips. Power and control cables shall be placed in separate trays or conduits. Cables shall be clearly marked at each terminal point and appropriate intermediate locations as per Standard.

Conduits shall be of heavy gauge rigid steel, hot-dip galvanized, cut square reamed, threaded and screwed tight at all joints.

Conduit entrances to pull boxes and switches shall have double lock nuts & insulating bushings. No running thread shall be used.

Flexible metallic conduit shall be used for connection to equipment, which are subject to vibration, and also for connection to level/limit/pressure switches.

3.7.3.7 Field inspection

The Contractor shall permit Engineer to perform inspections of the assembly which will include a complete verification of the assembly of all parts as to their levels, clearances, pertinent fits, alignments and quality of workmanship. The field supervisor of the Contractor shall provide Engineer with three (3) copies of all the clearances, tolerances and data of all pertinent fits, alignments and levels, so that the latter may repeat the Contractor's measurement, if desired.

Unless otherwise specified, any rejection based on the inspection will be reported to Contractor within fifteen (15) days.

3.7.3.8 Field tests

All field tests including tests during installation, pre-commissioning, commissioning, performance and field acceptance tests shall be conducted by the Contractor, in the presence of representative of the Employer. Procedure to be adopted for conducting these tests shall be submitted well in advance, before start of relevant testing, for approval of the Employer.

The equipment / system shall be deemed to be commissioned and ready for trial run only after successful operation for a test service period specified in sub clause "Performance Testing". In the event of any failure this period shall be repeated for any number of times till the successful operation as described above is achieved.

All test equipment and instruments shall be furnished by the Contractor and will remain the Contractor's property after the fulfillment of all field tests.

Any defects or leaks disclosed in the tests shall be duly mended/ repaired to meet the desired function and retested. All necessary materials and labour for performing all the above tests shall be provided by the Contractor.

The Contractor shall prepare written test certificates in a form agreed upon by the Contractor and Employer of all tests results and hand them over to the Employer in due time.

The design, location and approval tests of anchoring rings for the fixing of lifting apparatus necessary for assembly and dismantling of equipment and plant accessories shall be the responsibility of the Contractor.

3.7.3.9 Taking over of facilities

Taking over" means that the Facilities (or a specific part thereof where specified) have been completed operationally and structurally and put in a tight and clean condition, and that all work in respect of pre-commissioning of the Facilities or such specific part thereof has been completed and commissioning has been attained as per Technical Specifications. The contractor shall make formal request for taking over the facility to the EIC.

3.7.3.10 Operation acceptance

The operational acceptance by the Employer of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts), which certifies the Contractor's fulfillment of the Contract in respect of Functional Guarantees of the Facilities (or the relevant part thereof) in accordance with the provisions of Specification.

3.7.3.11 Consumables, oils and Lubricant

The Contractor shall deliver to the Owner all equipment complete with initial fill of fluids, grease or lubricants, transformer oil, Nitrogen, SF6 gas and other used gases in non returnable drums / containers and replace any quantity used up or lost during installation and testing.
The oil used for the lubrication and oil pressure systems for the turbine, governor, shutoff valve and generator shall be preferably of the same type.

Supply

The Contractor shall furnish the following:
(i) All oil for initial filling of all equipment supplied, plus additional oil equivalent to the first filling requirement of one unit.
(ii) Grease if required for initial filling of all of the equipment, plus 10% additional.
(iii) Gases for initial filling of all equipment supplied, plus 10 % additional quantity.
(iv) Flushing fluids to flush and clean all systems.

3.7.3.12 Deleted:

3.7.3.13 Submission of Drawings, Documents, Manual, software, Calculations, Safety Margin Details etc.

All drawings and documents shall be submitted to purchaser in hard form as well as in editable soft form. Bidder shall submit Ten (10) number hard copies of the documents & drawings to purchaser for reference / review / approval. A comprehensive list of all such drawings/documents planned to be submitted for reference/approval shall be provided beforehand to the purchaser.

Loading drawings

For all larger pieces of Works which, due to their dimensions and/or weight and transport limitations, will require special means for their transportation, the Contractor shall submit binding loading drawings indicating dimensions, weights, etc., of the respective pieces of Works and the necessary trailer for its transportation to the site.

Foundation drawings

If a piece of works requires its own foundation or needs a special area for installation, the contractor shall submit drawings indicating all pertinent dimensions, static and dynamic loads, etc. They shall include all essential details required for proper design and construction of the foundations and/or buildings.
In addition, they shall include openings, sleeves, slopes and the arrangement of any supporting structure, i.e. base-frames or other steel constructions for permanent fixing or erection purposes.
If conduits are to be installed in the foundations, the relevant information such as diameter, length, and purpose shall be indicated on the drawings.

Arrangement drawings

All arrangement drawings shall be drawn to scale. The General Arrangement Drawings shall show the physical arrangement of Works (constructions, machines, complete switchgears, control panels, instrument cubicles, etc.), civil constructions (buildings, rooms, foundations, ducts, etc.) and reserved areas (for pipes, cables, lines, etc.) in relation to each other and to

agreed co-ordinates and boundaries. Such drawings shall be prepared for the whole plot, for separate plots and for each building (building, hall, room, ducts and trenches, etc.).

Outline drawings

The Outline Drawing shall show all elements and the main dimensions of individual components where necessary in plan view, cross-section, side and top views. If reasonably possible such dimensions can be shown on Arrangement Drawings.

Design drawings

The Design Drawings shall include the shop drawings, assembly drawings, erection drawings, piping diagrams and piping arrangement drawings, etc., showing the dimensions, design and data of all constructions, apparatus and Works to be furnished under this Contract. The drawings shall - where applicable - substantially conform to the Contract Drawings and shall show:

- 3-D Assembly drawings for major components in hard and soft form.
- Details of manufacturing and treatment of major single work pieces specially manufactured for this Contract
- Assembly of the Works in plan and elevation with main dimensions Sub-assembly of the principal components of the Works with overall dimensions, adjustment and clearance tolerances, numbers of corresponding detail drawings
- Sub-assemblies in which the Contractor proposes to ship the Works
- All necessary details of the parts connecting to the Works supplied by others
- Location and sizes of auxiliary connections for oil, grease, water, air, electrical power etc.
- Location and size of the instruments and accessories provided
- Methods of lubrication and sealing
- Instructions for heat treatment, pressure tests, surface preparation and anticorrosive protection
- Full details of parts for which adjustment is provided or which are subject to wear
- Method and sequence of installation, field joints, erection and lifting devices, jacks, grout plugs, anchoring details, etc., if not shown on foundation drawings.

Installation drawings

The construction, mechanical, electrical and I & C Installation Drawings shall provide detailed information on the disposition of the various items of a system (e.g. lighting fixtures, socket outlets, connection boxes, transmitters, actuators, loudspeakers, telephones, pipes, valves, pumps, compressors, etc.) and of the piping and wiring respectively included in the installation or assembly. They shall be based on dimension drawings of cubicles, rooms, buildings or areas containing the Works.

Diagrams

Single-line diagrams

This is a simplified diagram of the essential electrical Works and their interconnections. Each circuit shall be represented by a single line only. It shall contain all required technical information of the Works represented, e.g. voltage, current, capacity, shortcircuit level, ratios,

voltage variations, positive and zero sequence impedances, measuring transformer and protection relay indices, interlocking, kind of switch drive, code designation, etc. as applicable.

Circuit diagrams

The Circuit Diagrams shall show the power circuits in all the phases with the main apparatus as well as the pilot circuits (measuring and control circuits). It shall show in full the functioning of part or all installations, Works or circuits with all required technical details.

Block diagrams

The Block Diagrams shall be used to show in a simplified manner the main inter - relationships between the elements of a system by means of symbols, block symbols and pictures without necessarily showing all the connections. The symbols used for the individual kinds of components, e.g. servomotors, computing modules, etc., shall clearly be explained on the diagram or on an attached legend.

Logic diagrams

The Logic or Functional Diagrams shall be used for representation of logic and sequence controls and interlocking by showing only binary logic elements and their effect on the various process equipment disregarding their electrical realisation. Logic function elements (AND, OR, NOR, NAND, STORAGE, etc.) shall be used for processing and combining binary signals.

Terminal diagrams

Such diagrams shall be prepared for any type of terminal box, marshalling rack, control cubicle, switchboard, etc., and shall show the terminals (properly numbered) and the internal and/or external conductors (wires or cables) connected to them.
The terminal diagram of each individual switchboard, terminal box, panel, etc., shall contain, but not be limited to the following information:

Protection co-ordination diagrams

These diagrams shall show in a graphical manner separately for each power supply circuit:

- A simplified single-line diagram of the circuit with technical data of all instrument transformers and relays
- Co-ordinated tripping curves of related protection devices
- Setting of the protection devices.

Emergency shutdown diagram

This diagram shall show the sequential steps and interdependencies during emergency closure.

Flow Charts

Flow charts shall be used for representing sequence of events for start / stop / shut down of the machine including associated equipment and auxiliaries.

Manuals

The following manuals covering all equipment of EM works shall be supplied as per the time schedule in both editable soft and hard form:-

Sr.No.	Manual Description
1.	Storage and preservation manual
2.	Safety manual
3.	Erection Manual
4.	Testing and commissioning manual
5.	Operation manual
6.	Maintenance manual
7.	Long term storage manual for Generator Transformer
8.	Long term storage manual for boxed up component / equipment.
9.	Repair process / procedure manual for equipment / system

As built drawing to be provided incorporating changes made during erection, testing and commissioning.

Drawing & Document Submission Schedule
Drawings & documents submission schedule of the EM package with the categorization (i.e. Approval / reference) & tentative submission date shall be submitted to purchaser.

Preliminary list of drawings under various categories have been prepared and appended at Section 1 of the Technical Specification.

3.8 DRAWINGS & DOCUMENTS TO BE SUBMITTED BY THE SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT

One set of soft copies of all the approved drawings, documents including as built drawings shall be furnished by the Bidder to the Owner / Consultant in compact discs.

White prints or other non-reproducible drawings can be mailed folded. Blue prints shall generally not be used.
All drawings, prepared by the Bidder shall be as per IS: 696. Supplier's standard drawings are exempted from the above size limitation, unless his "standard" includes drawings of very large size or length. There shall be sufficient reference notes on the drawings to permit identification of all the drawings which are required for a proper understanding.

Bills of material and drawings shall be cross-referenced for easy identification.

All drawings shall be dimensioned in the metric system. Where drawings are usually made in the British (or other) system, they shall also have metric system dimensions in parentheses or below dimension line. Titles and written notations shall be in English. If the original is in another language it shall carry English translation. The translations will appear immediately on the drawings. Attached lists of translated words shall not be accepted.

Drawings and bills of material shall be identified by a numbering system to be mutually agreed later on. Any additional identification numbers or symbols that the Bidder selects to use for his own purposes are permissible so long as Owner's number is the prime means of identification.

The scale of the drawing shall be shown clearly in the title block of the drawing. Wherever possible, scales of drawings shall be:-

1:1	1 : 2.5	1 : 5	1 : 10	1 : 20	1 : 25
1:50	1 : 100	1 : 200	1 : 300	1 : 500	
1: 1000	1 : 2000	1 : 5000			

All reproducible must be made from original drawings.

All revised drawing shall clearly indicate the number, date and subject to each revision. All the revisions carried out in the drawings shall be clearly identified and marked.

Drawing list shall be kept up-to-date, incorporating all new additions, cancellations and changes, and will be reissued periodically with Progress Report.

General arrangement drawings shall be submitted for approval to the Owner/ Consultant prior to the commencement of detail engineering by the Bidder. These drawings shall show to scale all major equipment including electrical equipment and building outlines and overall dimensions as well as tie-in dimensions and clearances shall be clearly indicated. Approved arrangement drawings shall be used as basis for design and preparation of detail drawing to be prepared by the Bidder. The Bidder shall furnish all the necessary drawings, data etc., of the plant/equipment with appropriate "Status" stamp in adequate no. of copies as indicated below:

S. No.	DESCRIPTION	TENDER STAGE	CONTRACT STAGE FOR APPROVAL	FINAL DOCUMENTATION	
			Prints	Prints	CDs
1	Drawings and Data Sheets	1	6	10	-
2	Drawings “As Built “	-	-	10	-
3	Type Test Reports	1	6	10	02
4	Erection Manuals	-	6	10	-
5	Operation and Maintenance Manuals	-	6	10	-
6	Manufacturing Quality Plan	1	6	10	-
7	Field Quality Plan	1	6	10	-
8	Inspection Test Reports	-	-	10	-

All instruction manuals / O&M Manual/”as built drawing”: 10 copies each

3.8.1.1 QUALITY ASSURANCE PROGRAMME

The Bidder shall follow Quality Assurance Programme to ensure that the equipment and services under the scope of contract whether manufactured or performed at the Bidder's works or at his sub-vendor's premises or at the SAPDC's site or at any other place of work are in accordance with the technical specifications. Such programme shall be outlined by the Bidder and be submitted along with the bid. The QA programme shall be generally in line with IS/ISO- 9001 and generally cover the following:

- ORGANISATION STRUCTURE FOR THE MANAGEMENT AND IMPLEMENTATION OF THE
- PROPOSED QUALITY ASSURANCE PROGRAMME
- QUALITY SYSTEM MANUAL
- DESIGN CONTROL SYSTEMS
- DOCUMENTATION AND DATA CONTROL SYSTEMS
- QUALIFICATION/EXPERIENCE OF BIDDER'S KEY PERSONNEL.
- PROCEDURE FOR PURCHASE OF MATERIAL, PARTS, COMPONENTS AND SELECTION OF SUB-VENDOR'S SERVICES INCLUDING VENDOR ANALYSIS, SOURCE INSPECTION, INCOMING RAW-MATERIAL INSPECTION, VERIFICATION OF MATERIALS PURCHASED, ETC.
- SYSTEM FOR SHOP MANUFACTURING AND SITE ERECTION CONTROLS INCLUDING PROCESS, FABRICATION AND ASSEMBLY.
- CONTROL OF NON-CONFORMING ITEMS AND SYSTEM FOR CORRECTIVE ACTIONS AND
- RESOLUTION OF DEVIATIONS.
- CONTROL OF CALIBRATION AND TESTING OF MEASURING / TESTING EQUIPMENT.
- SYSTEM FOR QUALITY AUDITS.
- SYSTEM FOR IDENTIFICATION AND APPRAISAL OF INSPECTION STATUS.
- SYSTEM FOR AUTHORISING RELEASE OF MANUFACTURED PRODUCT TO THE PURCHASER.
- SYSTEM FOR TRANSPORTATION /DELIVERY, HANDLING, STORAGE AND PRESERVATION.
- SYSTEM FOR MAINTENANCE OF RECORDS.

GENERAL REQUIREMENTS - QUALITY ASSURANCE

All materials, components and equipment covered under scope and its technical specifications shall be procured, manufactured, erected, commissioned and tested at all the stages, as per a comprehensive Quality Assurance Programme agreed mutually.

Minimum Quality Assurance Test Requirement (QATR) to be followed during Manufacturing and Field erection indicating requirement of various tests / inspections, on major equipment / items, to be carried out as stipulated in technical specification and standards mentioned therein, are attached hereto and are part of bidding documents.

Clarification, if any, on these quality assurance test requirement, raised by bidder shall be discussed and resolved during pre-bid meeting.

After the award of contract, the contractor shall submit the detailed Manufacturing & Field Quality Assurance Plans for complete equipment / material during detailed engineering in the format attached hereto (format of quality plan F-060-02 issue 2.0 rev. 01, Total 1 Page) for

approval and acceptance by SAPDC/Consultant in line with technical specification, Quality Assurance – General & Test Requirements and detailed engineering.

Manufacturing Quality Assurance Plans shall detail out for all the components and equipment & various tests/inspection, to be carried out in conformity with relevant latest IEC/IS/ISO etc, quality practices and procedures to be followed by Contractor's / Subvendor's Quality Control Organization, the relevant reference documents, standards and acceptance norms etc. during all stages of material procurement, manufacture, assembly and final testing / factory acceptance tests.

The Field Quality Assurance Plans shall detail out the various tests/inspection to be carried out in conformity with relevant latest IEC/IS/ISO, quality practices and procedures etc. to be followed by the contractor's / sub-contractor's site Quality Control Organisation during various stages of site activities from receipt of material/equipment at site till final commissioning/ acceptance/handover.

All major items/ equipment/ components to be manufactured in house as well as procured from sub-vendors (Bought out Items, BOI) to be listed in the bid. Bidder shall submit Quality Assurance Plan submission schedule in the bid for above listed items in attached Format (duly filled in the format F-060-05 Issue 2.0 Rev. 00, Total 1 Page) in line with L2 Schedule.

For components / equipment / Bought out Items procured by the contractor for the purpose of the contract, the Contractor's purchase specifications and inquiries shall call for quality plans to be submitted by the sub-vendors.
The quality plans called for from the sub-vendors shall detail out, during the various stages of manufacture and installation, the quality practices and procedures followed by the sub-vendor's quality control organisation, the relevant reference documents/standards used, acceptance level, inspection of documentation raised, etc.

Such quality plans of the successful sub-vendors shall be finalized with the SAPDC/Consultant in line with requirement mentioned above and such approved Quality Plans shall form a part of the purchase order/contract between the contractor and his sub-vendor.

Within three weeks of the release of the purchase orders /contracts for such bought out items /components, a copy of the same without price details but together with the detailed purchase specifications and other related documents such as data sheet, drawings, quality plans and delivery conditions shall be furnished to the SAPDC/Consultant by contractor along with a report of the Purchase Orders placed, on the monthly basis, so far for the contract.

The Quality Plans shall be submitted on electronic media e.g. CD or E-mail in addition to hard copy, for review and approval of SAPDC/Consultant. After approval, the same shall be submitted in compiled form on CD-ROM by contractor.

For all spares, replacement items and additional similar items, the quality requirements/Quality Plans as agreed for the main equipment supply shall be applicable.

All material of construction shall be as per technical specification / approved drawings / GTP.

Contractor's Plant internal standards must be traceable to acceptable International / National standards & salient points of difference (if any) shall be clearly stated with submission of plant standards. The contractor shall furnish copies of reference documents, plant standards, acceptance norms, test and inspection procedure etc. as referred in Quality Plans along with Quality Plan to SAPDC/Consultant. These Quality Plans and reference documents/standards etc. will be subject to approval of SAPDC without which manufacturer shall not proceed. These documents shall form a part of the contract.

Tests on components and sub-assemblies shall be carried out at various stages of manufacturing, till the product undergoes the final tests in conformity with the relevant standards.

The Customer Hold Points (CHPs), identified in approved quality plan, i.e. testing checks which shall be carried out in the presence of the SAPDC, beyond which the work will not proceed without written consent of SAPDC's authorized representative.
The contractor / sub-vendor shall carry out routine test on 100% items at his works. The quantum of check / test for routine and acceptance test by SAPDC/Consultant shall be generally as per criteria / sampling plan defined in referred standards. Wherever standards have not been mentioned, quantum of check / test for routine / acceptance test shall be as agreed during detailed engineering.
The quantum of check when specified in percentage (%) / sampling basis shall be treated as per lot per sub-vendor. When the quantum of check is indicated to in whole no., then same quantum of check shall be applicable to each sub-vendor supplying the same equipment.

For sub-vendors identified during pre-award stage for submission of vendor details/ credentials (category "DR"), contractor shall submit documents in format F-060-01 after placement of award in the manner as specified as under prior to any procurement and within a month after placement of award or a period as agreed at the time of pre-award discussions.

The proposed sub-vendors should be registered vendors of the bidder and must have proven experience for successful operation for similar equipment / items / processes as mentioned elsewhere in technical specification.

Before assigning any portion of work to the sub-vendor, other than one specified and duly accepted in the contract, the contractor will take prior approval of BHEL/SAPDC.

Normally no request for change of sub-vendors or inclusion shall be entertained by SAPDC. But in exceptional circumstances, if the request for change of sub-vendors or inclusion is found reasonable and justified, then the same shall be entertained and the decision of SAPDC in this respect shall be final and binding. The time consumed for the change / inclusion of sub-vendors shall not be excluded from the stipulated time of the completion of the contract. This change shall not relieve the contractor from the responsibility to complete the work within stipulated time in any manner.

The contractor's proposal shall include sub-vendor's facilities established at the respective works, the process capability, process stabilization, Q.C. system followed, experience list etc. along with his own technical evaluation of sub-vendor. (Format F- 060-01 issue 2.0 rev. 01, Supplier / Sub-vendor Assessment Sheet, Total 14 pages).
However, whenever felt necessary, sub-vendor assessment will also be carried out by SAPDC/Consultant in accordance with the above procedure and by factory visits; for existing/proposed vendors/sub-vendors. This approval shall not relieve the contractor from any obligation, duty or responsibility under the contract & SAPDC shall not be responsible for any complications arising between the contractor and his subcontractor(s) / sub-vendor (s) and / or any other liabilities.

SAPDC/Consultant reserves the right to carry out quality audit and quality surveillance of the system and procedures of the contractor / or their sub-vendor. The contractor shall provide all necessary assistance to enable SAPDC/Consultant to carry out such details & surveillance including Quality Manuals, if required by SAPDC/Consultant.

All welding and brazing shall be carried out as per procedure drawn and qualified in accordance with requirement of ASME section-VIII/IX or other International equivalent standard acceptable to SAPDC/Consultant. All welding/brazing procedures shall be submitted to SAPDC/Consultant/BHEL for review / verification prior to carrying out the welding/brazing. However, wherever required by the SAPDC/Consultant, tests shall be conducted in presence of SAPDC's authorized representative.

All Brazers, Welders and welding operators employed on any part of the contract either in Contractor/his sub-vendor's works or at site or elsewhere shall be qualified as per ASME section-VIII/IX or other equivalent International Standards acceptable to SAPDC/Consultant.

Unless otherwise proven and specifically agreed with SAPDC/Consultant, welding of dissimilar material and high alloy materials shall be carried out at shop only.

All non-destructive examination shall be performed in accordance with written procedures as per International Standards. The NDT operator shall be qualified as per SNT-TC-IA (of the American or Indian Society of non-destructive examination). NDT shall be recorded in a report, which include detail of methods and equipment used, result/evaluation, job data and identification of personnel employed and details of correlation of the test report with the job.

All material used for equipment manufacture including castings and forgings, etc. shall be of tested quality as per relevant codes/standards. Details of results of the tests conducted to determine the mechanical properties; chemical analysis and details of heat treatment procedure recommended and actually followed shall be recorded on certificates and time temperature chart. Tests shall be carried out as per applicable material standards and/or agreed details.

Contractor shall submit Field Welding Schedule for field welding activities like field welding location, numbers, welding procedure to be used, requirements, codes and NDT requirement along with all supporting documents, like welding procedures, heat treatment procedures,

NDT procedures, etc. to SAPDC/Consultant for review at least ninety days before schedule start of erection work at site.
Any other statutory requirements as applicable for the equipment / systems shall also be complied with.

The inspection calls (duly filled in the format F-060-06 Issue 2.0 Rev. 00, total 1 Page) shall be placed at least 06 weeks in advance for overseas inspections excluding India and 15 days in advance for inspections within India and Nepal.
Before submitting the inspection call to SAPDC for witnessing the Customer Hold Points (CHP's) and/or requesting SAPDC for issuance of Material Dispatch Clearance Certificate (MDCC) based on Test Certificate (TC) review / Certificate of Conformance (COC), the contractor shall ensure that all Drawings / documents / GTP / technical data sheet, relevant to respective CHP / MDCC requirement, has been duly approved /accepted / noted by SAPDC.
Contractor shall ensure readiness of offered equipment by all means, before raising such call to SAPDC to attend CHP inspections. In case, SAPDC engineer (s) on reaching at a place of inspection found that material is not ready for inspection due to whatsoever reason, the complete inspection expenditure of SAPDC engineer(s) as per actual shall be chargeable to the contractor.

Only calibrated testing & measuring instruments shall be used while performing tests during manufacturing and erection, testing & commissioning at site by the contractor. Copy of the calibration certificates will be submitted to SAPDC/Consultant by the contractor during inspection as an evidence.

Non-conformities observed during manufacturing, shop testing, handling, packaging, transportation, storage, preservation, erection, testing & commissioning are required to be intimated by the contractor (Format for reporting, F-060-04 issue 2.0 rev 01, Total 5 pages). The acceptance/rejection of the non-conformities will be at the discretion of SAPDC.

Repair/rectification procedures to be adopted to make the job acceptable shall be subject to the acceptance of SAPDC. Action taken in accordance with decision of disposal of non-conformity for repair / rework / modification of the item / equipment and to prevent re-occurrence. The corrective and preventive action may involve modification of item / equipment, change in procedure and system etc. to achieve quality improvement at all stages and levels.

Quality audit/surveillance/approval of the results of the tests and inspection will not, however, prejudice the right of the SAPDC to reject the equipment if it does not comply with the specification when erected or does not give complete satisfaction in service and the above shall in no way limit the liabilities and responsibilities of the Contractor in ensuring complete conformance of the materials/equipment supplied to relevant specification, standard, data sheets, drawings etc.

No material shall be dispatched from the manufacturer's works before the same is duly accepted, subsequent to pre dispatch/final inspection including verification of records of all

previous tests/inspection by SAPDC and duly authorised for Dispatch by issuance of Material Dispatch Clearance Certificate (MDCC).

The test reports of type tests conducted as per contract, in line with requirement stipulated in the technical specification / quality plan should be got accepted from SAPDC/Consultant before final inspection / issuance of MDCC.

All materials used or supplied shall be accompanied by valid and approved material certificates and tests and inspection reports. These certificates and reports shall indicate the heat numbers or other such acceptable identification numbers of the material. The material certified shall also have the identification details stamped on it to ensure physical correlation and traceability of material vis-a-vis test certificate. Such identification no. shall remain same and verifiable for all stages of manufacturing and installation.

3.8.1.2 QA DOCUMENTATION

The contractor shall be required to submit the QA Documentation in two hard copies and two CD ROMs, as identified in respective quality plan.

Each QA Documentation shall have a project specific Cover Sheet bearing name and identification number of equipment including index of its contents with page control on each document. The QA Documentation file shall be progressively completed by the Contractor/sub-vendor to allow regular reviews by all parties during the manufacturing.

The final quality document will be compiled and issued at the final assembly place of equipment before despatch. However CD-ROM may be issued not later than three weeks.

Before dispatch / commissioning of any equipment, the Contractor shall make sure that the corresponding quality document or in the case of protracted phased deliveries, the applicable section of the quality document file is completed. The Contractor will then notify the Inspector regarding the readiness of the quality document (or applicable section) for review.

The contractor shall be required to submit copies of the following quality assurance documents in original duly reviewed and accepted by contractor along with the request letter for issuance of MDCC (Material Dispatch Clearance Certificate):

- QUALITY PLAN CHECK LIST.
- MATERIAL MILL TEST REPORTS ON COMPONENTS AS SPECIFIED IN QUALITY PLAN.
- SKETCHES AND DRAWINGS USED FOR INDICATING THE METHOD OF TRACEABILITY OF THE
- RADIOGRAPHS TO THE LOCATION ON THE EQUIPMENT.
- NON-DESTRUCTIVE EXAMINATION RESULTS REPORTS INCLUDING INTERPRETATION REPORTS.
- CALIBRATION CERTIFICATE OF ALL METERS & MEASURING INSTRUMENTS PROPOSED TO
- BE SUPPLIED AS PART OF RELEVANT BILLING BREAKUP ITEM.
- ROUTINE TEST REPORTS FOR TESTING REQUIRED AS PER APPLICABLE CODES AND
- STANDARDS REFERRED IN THE SPECIFICATIONS.
- INSPECTION REPORTS DULY SIGNED BY AUTHORIZED REPRESENTATIVE OF SAPDC AND

- CONTRACTOR FOR THE AGREED CUSTOMER HOLD POINTS.
- ALL THE ACCEPTED DEVIATIONS SHALL BE INCLUDED WITH COMPLETE TECHNICAL DETAILS.
- LIST OF BALANCE POINTS IF ANY.
- CERTIFICATES IN RESPECT OF CALIBRATION, WELDERS & BRAZERS QUALIFICATION ETC.
- COPY OF ALL REFERENCE DRAWINGS AND REFERENCE TECHNICAL DOCUMENTS
- ACCEPTANCE OF TYPE TEST REPORTS BY SAPDC/CONSULTANT.

Similarly, the Contractor shall be required to submit two sets (two hard copies and two CD ROMs), containing QA Documentation pertaining to field activities as per Approved Field Quality Plans and other agreed manuals/procedures, within 2 weeks after commissioning of individual system.

On release of QA Documentation by Inspector, one set of quality document shall be forwarded to Consultant and other set to SAPDC. For the particular case of phased deliveries, the complete quality document to the SAPDC/Consultant shall be issued not later than 3 weeks after the date of the last delivery of equipment.

ASSOCIATED DOCUMENTS / FORMATS
- F-060-01 VENDOR / SUB-VENDOR ASSESSMENT SHEET
- F-060-02 QUALITY PLAN SUBMISSION BY CONTRACTOR.
- F-060-04 NON-CONFORMANCE REPORT (NCR)
- F-060-06 INSPECTION CALL REQUEST.

3.8.1.3 Safety

Safety of personnel

All equipment and services provided under this contract shall abide by international standards commonly accepted in the hydroelectric utility industry for safety of personnel whether involved with operation or maintenance.

Safety of operation

All equipment and services provided under this contract shall abide by commonly accepted standards for safety of operation.
The various system and sub-systems supplied under this contract shall be designed to follow and operate under a clear hierarchical structure:
- Plant control level,
- Unit control level,
- Functional control level, functional drive group level,
- Local drive level.

Each hierarchical control level shall perform its specific tasks and always depend on the subordinate lower control levels. In general, should a higher control level failure occur, the lower control level shall not be affected and shall be able to control the power plant with full safety.

The Contractor shall accordingly build into the "Electrical & Mechanical System" adequate levels of autonomy, independence, redundancy and functional distribution to insure that safety is maintained at all times.

3.8.1.4 Earthing

Earthing terminals for equipment of these specifications shall form part of equipment supplies. The contractor shall connect the earthing conductors to these terminals as required.

Risers from earthing bus shall be in the scope of purchaser. However, extension from these risers to the equipment shall be in the scope of supplier in the Power House, Transformer Hall, Switchyard and Butterfly Valve House.

However, overall earthing arrangement required for HT panel, LT panel, DG set, motor & motor control panels etc. at isolated location such as Dam Site, TRT Outfall area and Surge Shaft either by pit earthing or counter poise etc. shall be in the scope of supplier including civil works, design, material supply (for main earthing risers, interconnection, charcoal, salt, Bentonite etc.), erection, testing & commissioning etc.

A copper ground bus, sized to carry maximum short circuit current, shall run along the entire length of panel structure and shall have terminal connector at each end for connection to station ground grid (50 X 6 mm G.I. flat).

Tests

Each panel shall be completely assembled, wired, adjusted and tested at the factory prior to shipment. The test shall include wiring continuity tests, insulation tests and functional tests to ensure satisfactory operation and control of individual equipment.

Special Cables

Special cables for specific purpose, as required, shall be supplied and installed by the Bidder.

3.8.1.5 Completeness of the specification

Any fittings, accessories, equipment or any other things required for successful commissioning of Arun-III Hydro Electric Project, though may not have been specifically mentioned in the specification but are usually necessary for the completeness of the equipment shall be deemed to be included in the specification and shall be supplied by the contractor without any extra cost to the Employer.

3.8.1.6 Packaging and Shipment

The Contractor shall provide such packing of the Goods as it is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the final destination of Goods and the absence of heavy handling facilities at all points in transit.

The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to any subsequent instruction ordered by the Employer consistent with the requirements of the Contract.
After unpacking of Goods the packing material shall become the property of Employer

The contractor shall wrap, pack and crate all plant included in the work or part thereof, suitable for shipment to a tropical location, facilitating proper handling and protection from damage in rail, truck, ocean or air shipment as applicable. An approved drying agent, such as Silica Gel, shall be packed in containers or packages holding plant which may be adversely affected by moisture or excessive humidity.

All packing crates shall be clearly marked before shipping to indicate the contract number, shipping address, volume, weight, name, number and unit number of the contents, slinging and weight bearing points.

All plant parts shall be marked to facilitate erection. Each packing crate shall contain a packing list in a waterproof envelope. Parts shall be described and also identified by their numbered marking in the packing list.

Three copies of the packing list shall be forwarded to the purchaser prior to dispatch. The ownership of packaging materials shall be of Employer. All wooden packaging crates and steel support structures shall be dumped to the designated area within 5kms of the power house as per the direction of Engineer in charge.

The supplier shall be entirely responsible for the insurance, shipment, handling and transportation.

The equipment shall not be dispatched by the Bidder from the place of manufacture to the site until the dispatch instructions are issued by the Owner.

3.8.1.7 PACKAGING, HANDLING AND SITE STORAGE

The Contractor shall pack all the consignment in sea worthy packaging strong enough to withstand rough handling during transit. Machine surface shall be suitably protected against scratches, corrosion, shocks, impact etc. Packages shall be suitably and distinctly identified for type of handling and kind of storage.

Electronic equipment shall be packaged, shipped and stored in anti-static packing. All packages shall be stored indoor. Packages containing electronic equipment shall be stored in humidity controlled environment.
The Bidder shall indicate the number of packages of consignment together with the size (L x W x H) and weight for transporting the equipment in the Bidding Document.

3.9 SPECIAL INSTRUCTIONS TO BIDDERS

General

The Bidder shall base the equipment design on the information given in this specification. The equipment shall be complete in all respects. Any item which is not specifically mentioned herein but found essential for safe and efficient operation and maintenance and satisfactory performance of the system shall be deemed to have been included in the scope of the Bidder. It shall be presumed that the Bidder has studied the site, all the drawings, tender documents and is fully aware of the scope of work involved and the site conditions prevailing.

3.10 Codes and Standards

a) All equipment, systems and works covered under this specification shall comply, in all respect, with requirements of applicable latest statutes and that of latest editions of codes and standards. Latest regulations and safety & environmental requirements as applicable in India / state of installation shall also be complied with.

b) All codes and standards mentioned shall mean as relevant and applicable to a particular equipment / system.

c) All other codes/standards not covered in Section 1 / Section 2 but required for the plant and system offered shall also be referred / followed by the Bidder. The Bidder, along with the bid, shall submit a comprehensive list of codes and standards to be followed for various equipment / system.

d) In all cases where IBR does not govern, German, American, British, ISO or other international standards established to be equivalent or superior to the codes specified are also acceptable. In the event of any conflict between the requirements of equivalent codes and standards and the requirements of Indian standards / regulations, the latter will govern unless specified otherwise in the specifications.

e) The Bidder shall be responsible to be in possession of all the specified Codes / Standards and ensure reference to the same before submitting the offer/ bid.

f) Mandatory codes / local regulations to be followed for safety, design, fabrication and operation of the switchyard shall be, followed:

g) If the equipment supplied does not conform to the codes and standards mentioned in this specification, but is manufactured to the Bidder's own standard, developed as a result of his experience, is also acceptable provided the same is found to be superior to the above mentioned codes and standards. The Bidder shall identify such equipment and shall also present sufficient data to the Owner / Consultant to support his design and to establish the superiority. The design may be accepted by Owner/ his Consultants only if the Purchase / his consultant is satisfied that sufficient experience exists with the design proposed.

h) Design not meeting the stipulations of the codes and standards will not be acceptable.

i) Apart from various codes and standards mentioned in Section 1/2, the Manufacturer shall comply with other requirements of codes and standards mentioned in this Specification for detailed design, manufacture, testing, erection, construction etc.

Control System	IEEE – 122 , 1992
Metering / Dosing pumps	API 675 – 1987 (Positive displacement pumps – controlled volume) API 676 – 1987 (Positive displacement pumps – Rotary).
Centrifugal pumps	API 610 – 1990, ASME PTC 8.2 – 1965
Gear Box	API 613 – 1993 & AGMA 420 & 421
Coupling	API 671 – 1993
Structural	IS 1893 – 1991, IS 875-1992 & IS 800 – 1991
Pressure Vessel	ASME Sec. VIII, Div. 1 – 1995
Piping	ANSI B 31.1-1995 / 31.3 – 1993, IBR
Valve	API
Instrument	ISA, API
Electrical	As per specification attached & relevant
	IS/IEC
Tanks	API 650- 1993
Electrodes	AWS, IS
Painting	IS Standards
Performances Tests	
Overload test of crane and hoists	IS 3177

3.11 Deviations and Assumptions

Bidders requested to carefully examine and understand the specifications and seek clarifications, if required, to ensure that they have understood the specifications. The Bidder's offer should not carry any sections like clarifications, interpretations and/or assumptions. In the event of conflict between the Technical Specifications and the condition of contract, the requirements as indicated in the technical specification shall govern, unless confirmed otherwise by the Owner in writing before the award of contract, based on written request from the bidder for such a clarification.

In the event of conflict between requirements of any two clauses of the specification documents, the more stringent requirements shall apply, unless otherwise confirmed by the Owner in writing before the award of this contract, based on a written request from the Bidder for such clarification.

The Bidders are advised that while making their Bid Proposals and quoting prices, all terms and conditions of bidding documents may appropriately be taken into consideration. Bidders are required to furnish a certificate indicating their full compliance to the terms and conditions of the bidding documents.

3.12 Limit of Contract

Equipment furnished shall be complete in all respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/ or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the respective specifications, unless included in the list of exclusions. All similar standard components/ parts of similar standard equipment provided shall be interchangeable with one another.

This review by the Owner's Engineer / Consultant may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicative of the accuracy of the information submitted. This review and/ or approval by the Engineer shall not be construed by the Bidder, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements specified under these specifications and documents.

3.13 Latent Defects

Notwithstanding the issue of the Take Over Certificate, the Contractor shall be responsible for making good with all possible speed any Latent Defect in any Works /equipment of the plant which appears at any time before the expiry of defect liability period. And shall remedy such defect at its own cost and expense. The latent defect liability period shall be a minimum of 5 years from the end of defect liability period. The defects to which this applies are defects in design, materials or workmanship or defects arising from any act or omission of the Contractor done or omitted prior to Take-over of the portion of the Plant affected by the defects or during the Warranty Period which a reasonable examination at the end of the Warranty Period would not have disclosed.

3.14 Defect Liability

The Contractor warrants that all the facilities or any part thereof are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.
The Contractor further warrants that the Plant and equipment shall be free from defects arising from any act or omission of the Contractor or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the
If during the Defect Liability Period any defect should be found in the design, engineering, materials and workmanship of the Plant and equipment supplied or part thereof, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good (as the Contractor shall, at its discretion, determine) such defect as well as any damage to the Facilities caused by such defect. The Contractor shall not be responsible for the repair,

replacement or making good of any defect or of any damage to the Facilities arising out of or resulting from any of the following causes:
(a) Improper operation or maintenance of the Plant and equipment by the Employer
(b) Operation of the Facilities outside specifications provided in the Contract
(c) Normal wear and tear.

3.15 Completion Schedule

The Bidder shall submit Time Bar chart indicating completion date of major activities such as submission of design data / calculations and drawings for approval, manufacturing of components / units, supply, inspection etc. without which the Tender shall not be considered. Time Bar Chart furnished shall afterwards form part of the contract and cannot be altered arbitrarily except Force Majeure conditions as may be agreed with the Owner.

3.16 Drawings & Documents for Owner's use and Archives

The Bidder shall submit all final drawings, documents, manuals for Owner's use and for reference / record required during course of operation and maintenance of the plant. Numbers of copies and their form (hard copy, electronic form, reproducible) to be submitted and the details of the documents, drawings, manual etc. to be furnished by the Bidder are described elsewhere in the specification.

Drawings, documents, calculation, data & Information to be submitted by the Bidder along with the offer:

Technical Data to be submitted with the Tender

1) List of performance tests proposed by the Bidder to demonstrate the guaranteed parameters for generator and other electrical equipment.
2) Specific energy consumption.
3) Type test certificates for major categories of equipment, issued by independent testing authority.
4) Guaranteed Technical Parameters.
5) Technical catalogues.
6) Manufacturing Quality Plan

Operation & Maintenance Manuals

Instruction manuals, presenting the basic categories of information for the operating and/or maintenance personnel, as detailed herein below shall be furnished by Bidder.
The instruction manuals shall present the following basic categories of information in particular complete and comprehensive manner and prepared for the use by operating and/or maintenance personnel.

i. Instructions for initial commissioning, short duration and long duration shut down.
ii. Instruction for operation, routine inspection and maintenance including preventive maintenance.

iii. Recommendation for inspection points, method of inspection and period of inspection.
iv. Information on detection, cause and rectification of troubles and faults.
v. Instructions on normal repairs and overhaul.
vi. Complete parts list with proper and complete identification (Tag nos./Serial nos. as shown in the respective approved drawings) and ordering information for all replaceable parts. The identification details of equivalent and alternative makes for these spare parts which are not manufacturer's own product shall also be listed.
vii. List of all special tools and tackle & spares and instructions for use of such tools and tackle & spares.
viii. One complete set of as built drawings of the entire systems.
ix. The information shall be organized in a logical and orderly sequence. A general description of equipment including significant technical characteristics shall be included to familiarize operating and maintenance personnel with the equipment. Such description and technical characteristics shall not differ from the approved data.
x. Necessary drawings, curves and other illustrations shall be included or copies of appropriate approved drawings shall be bound in the manuals. Tests, adjustment and calibration information, as appropriate, shall be included. Safety and other warning notices and installation, maintenance and operating cautions shall be emphasized.
xi. Write-up, figures, part list etc., shall be clearly legible. The manuals shall be prepared on good quality paper securely bound in durable folders.
xii. The instruction manuals shall be subject to Consultant's approval in the same fashion as that for drawings.
xiii. Instruction manual shall give step by step procedure for Erection, testing and commissioning
xiv. Operation, Maintenance and Repair Instruction manual shall also contain:
xv. List of spare parts with ordering specifications and manufacturer's catalogues
xvi. List of consumables, lubricants, chemicals with specifications, brand names and annual consumption figures.
xvii. Drawings relevant for erection, operation, maintenance and repair of the equipment.
xviii. Procedure for ordering spares.
xix. Maintenance Manual shall also include:
xx. Diagnostic trouble shooting / fault location charts
xxi. Tests for checking of proper functioning.

Drawings / documents for approval

Quality Control & Quality Assurance plan.
G.A. and Cross Sectional drawings of all equipment indicating weights, material of construction, bill of material, dimension, specification etc.
Final design calculations and assumptions.
Actual performance data and characteristic curves based on the testing at site.

Technical specification of all equipment, motors, for all system and all other accessories.
Final list of drawings.
As built drawings.

Miscellaneous

i. General arrangement and cross sectional drawings of all major components with bill of material.

ii. Foundation drawings, load data & design calculation for all equipment.

iii. Erection drawings for all equipment and structures showing complete erection details.

iv. Engineering and design calculations of installations and units.

v. QAPs

vi. Detailed procedures of shop testing of all the items applicable shall be submitted to the Owner/ Consultant for approval before conducting tests.

vii. Following shop test certificates/test curves/data, shall be furnished.

- Materials and components test certificates.
- Performance test results and characteristic curves of all fans, pumps, and electric drive motors etc.
- Non-destructive test results as applicable.
- Reports and test certificates of shop tests.
- Type test & routine test certificates.

viii. Detailed quality assurance program along with quality plan shall be submitted.

Following data shall be furnished:-

a) Technical data of all the plant, equipment, drive motors, instruments, panels, etc. shall be furnished.

b) Following lists/tables / write ups shall be furnished, complete with tag nos. and brief specification. Proper numbering system as approved by Consultant/Owner shall be adopted.

i) Instrument schedule (with service, range, make of instrument).
ii) Flow element schedule.
iii) Valve schedule.
iv) Pipe schedule.
v) Cable schedule (Power & Control).
vi) Schedule of actuators (electric/pneumatic)

The scheduled dates for the submission of these as well as for, any data/information to be furnished by the Employer would be discussed and finalized at the time of award. The supplier shall also submit required no. of copies as mentioned in this specification of all drawings/design documents/test reports for approval by the Employer.

Note: The contractor may please note that all resubmissions must incorporate, all comments given in the submission by the Employer failing which the submission of documents is likely to be returned. Every revision shall be a revision number, date and subject, in a revision block provided in the drawing, clearly marking the changes incorporated.

3.17 Workmanship and Quality Control

All moving parts of equipment, which can conceivably cause injury to the operator and otherwise authorized personnel within the vicinity of working area shall be suitably guarded and warning displays shall be put at prominent places.

The Bidder shall clearly indicate and identify the plans and procedures, which shall be followed in the design, manufacture and installation of plant and equipment to control and assure to the Owner of the desired quality.

FUNGI STATIC VARNISH

Besides the space heaters, special moisture and fungus resistance varnish shall be applied on parts which may be subjected or predisposed to the formation of fungi due to the presence or deposit of nutrient substances. The varnish shall not be applied to any surface of part where the treatment will interfere with the operation or performance of the equipment. Such surfaces or parts shall be protected against the application of the varnish.

3.17.1 Equipment Mounting

All instruments, switches etc. mounted on the front face of the panels shall be of flush type.

All equipment shall be so mounted that removal and replacement may be accomplished individually without interruption of service to others.

All equipment inside the panel shall be so located that their terminals and adjustments are readily accessible for inspection and maintenance. Adequate ventilation shall be provided in enclosed panel.

Each of the LV switchboards shall be designed for 1.1 times the required rating as a spare capacity. Further all LV Switchboard shall be provided with 20 % spare modules of each rating and type of module.

3.18 Title Block :

<table>
<tr><td>Project</td><td colspan="4">4x225MW Arun-3 (HEP),Nepal</td></tr>
<tr><td>Customer</td><td colspan="4">SJVN Arun-3 Power Development Company (P) Ltd. (SAPDC)</td></tr>
<tr><td>Consultant</td><td colspan="4">SJVN Ltd</td></tr>
<tr><td rowspan="4">BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP
NOIDA</td><td></td><td>Name</td><td>Sign</td></tr>
<tr><td>Drawn</td><td></td><td></td></tr>
<tr><td>Checked</td><td></td><td></td></tr>
<tr><td>Approved</td><td></td><td></td></tr>
<tr><td colspan="2">Title</td><td colspan="2">Drawing Number :</td><td>Rev</td></tr>
</table>

----------xxxx----------

ANNEXURE - A

SCHEDULE OF TECHNICAL DEVIATIONS

Bidder shall list out all technical potential deviation/ change request (s) along with clause with respect to technical specifications.

Sl. No.	Page No.	Clause No.	Deviation	Reason / Justification

Any deviation not specifically brought out in this section shall not be admissible for any commercial implication at later stage. Except to the technical deviations listed in this schedule, bidder's offer shall be considered in full compliance to the tender specifications irrespective of any such deviation indicated / taken elsewhere in the submitted offer.

Date: Bidder's Stamp & Signature

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION PROJECTS ENGINEERING MANAGEMENT

DOCUMENT No.	TB-405-316-006	Rev. No.	02		Prepared	Checked	Approved
TYPE OF DOC.	DESIGN DOCUMENT			NAME	Vyom	SKS	SKS
TITLE DESIGN MEMORANDUM FOR STATION LIGHTING SYSTEM (GIS AREA)				SIGN	-sd-	-sd-	-sd-
				DATE			
				GROUP	TBEM	W.O. No	

CUSTOMER	SJVN ARUN-3 POWER DEVELOPMENT COMPANY (P) LTD. (SAPDC)
CONSULTANT	SJVN LTD.
PROJECT	4 x 225 MW ARUN-3 HYDRO ELECTRIC PROJECT, NEPAL

1. DESIGN DOCUMENT

Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS

Distribution	To	TBCM	TBMM	TBQM	Vendor
	Copies				

1.0 PURPOSE

The purpose of this design document is to cover basic approach for designing lighting system for switchyard. The document covers various types of lighting system, lighting system design, and illumination levels for various areas, luminaries type and low voltage power services for various areas of the switchyard.

The Zone of Switchyard comprises of the various room in the GIS Building ,Pothead yard , 400kV Reactors and the Roads of the switchyard.

2.0 LIGHTING SYSTEM DESIGN

2.1 Lighting system shall be designed to ensure adequate visual performance, safety & reliability and shall be free from excessive glare and flicker from discharge lamp.

2.2 Fluorescent fixtures shall be used in control room building. The ballasts shall be copper wound, inductive, heavy-duty type filled with thermosetting insulating moisture repellent polyester. All fixtures shall be of a proven design for applications in switchyard environment, and materials shall be long life, non- corrosive type. Acrylic covers/louvers shall be of non-yellowing type. For switchyard illumination HPSV lamp flood lights shall be used.

The IP of the fittings, junction box, control gear box, conduits etc. shall be as under:-

S.No	Area	IP
1	Indoor & outdoor type luminaries/junction boxes/ TBs	IP 65
2	Out door panels	IP55
3	Indoor panel	IP54
4	Drainage/ dewatering sump & gallery, area under turbine pit and turbine	IP 67
5	recessed type luminaries	IP 21

2.3 The lighting fixtures in the control room shall be group controlled from lighting panel by miniature circuit breakers. The lighting fixtures in office areas, etc. shall be controlled in groups by Piano switches.

2.4 The outdoor lighting system shall have timer arrangement in lighting DB for controlling lights with a provision for manual control also.

2.5 All Lighting Panel and Lighting Distribution Board shall be painted inside and outside with shade 631 of IS-5

2.6 Occupancy sensors shall be installed in office, store, toilets, conference room and pantry to turn off or on the lights depending upon occupancy for the purpose of power saving.

2.7 Outdoor street lighting shall be designed having combination of solar lights and conventional lights in such a way that 50% lux level should be maintained in case of prolonged non availability of the sun.

2.8 Civil Works associated to Indoor and Outdoor Lighting system shall be in scope of BHEL.

3.0 ILLUMINATION DESIGN CALCULATION

3.1 Lighting design for indoor areas shall be done by LUMEN method.

For a given indoor area, number of Luminaires is calculated as follows:

$$\text{Number of luminaires} = \frac{L \times W \times \text{LUX LEVEL (Average)}}{\text{LUMEN} \times \text{COU} \times \text{MF}}$$

Where

L = Length of room (Restricted to Max. 5 times of width)

W = Width of room

COU = Coefficient of utilisation

LUMEN = Lumen output of each lamp

MF = Maintenance Factor

Coefficient of Utilisation (COU) is determined from the COU chart for a particular luminaire of the manufacturer, corresponding to selected reflection factors and calculated Room Index. The Room Index is calculated by the following formula:

$$\text{Room Index} = \frac{L \times W}{(L+W) \times MH}$$

Where MH = Mounting height of luminaire.

The Reflection Factor (RF) for indoor shall be considered as given below:

Ceiling (rc)	Wall (rw)	Floor (rf)
60	40	20

Values of Maintenance Factor (MF), which includes the luminaire depreciation factor also as per IS-3646, shall be considered as given below:

a) Indoor area - non AC : 0.7

b) Control room & air conditioned area : 0.8

c) Outdoor switchyard and Road : 0.6

2

Illumination Design Calculation for indoor area shall ensure uniformity in lux level throughout the area at floor level and the calculation shall be vetted during detailed engineering.

3.2 Lighting design for outdoor switchyard shall be done by computer programme as per standard norms for lighting design to meet the specified lux level.

4.0 LIGHTING SYSTEM DESCRIPTION:

a) Lighting system shall be provided with AC Normal, AC Emergency and DC Emergency lighting as listed below against various areas.

b) The sources of power supply are as below:

i) 415V AC Normal (ACN) Supply from different station/Unit Boards.

ii) 415V AC Emergency (ACE) Supply from Emergency Board.

iii) 220V DC Emergency Supply from 220V DC Distribution Board.

For switchyard control room building normally all AC luminaries (approximately 80% on ACN and 20% on ACE) shall be in service and DC luminaries shall be off. On failure of AC normal supply, DC luminaries shall be automatically switched 'ON'. On restoration of AC Emergency supply through DG, DC luminaries shall be put-off automatically after a time gap of about three minutes following the restoration of supply to normal AC or emergency AC lighting system.

For outdoor switchyard approximately 80% of luminaries shall be connected on normal AC and 20% on emergency AC. No. DC lighting envisaged for outdoor.

Emergency AC shall be provided in the following areas of control room building.

Control room, PLCC room, AE room, office, Maintenance room, Battery room, LT switch board & Charger room & corridor.

DC Emergency lighting shall be provided in the following areas for the safe movement of personnel during emergency.

i) Control room

ii) LT switch board & charger room

iii) Battery Room

vi) Corridor

v) GIS Room

2

For safe movement of personnel during emergency 2Nos. self-contained sealed maintenance free lead acid battery operated emergency lighting units (ELU) with 4 hours duration is envisaged.

1200 mm Sweep ceiling fans/Wall mounted fans shall be provided in office, Pantry, record room & maintenance room.

4.1 A.C Normal Lighting Systems:

AC Normal lighting fixtures are fed through a conveniently located AC Lighting panel (ACNLP) which are fed from Lighting Distribution Board (LDB).

LDB shall consist of 100 kVA / 50 kVA dry type isolation transformers & distribution panels shall have TPN switch fuse unit for incoming & outgoing feeders. The ACNLPs shall be provided with 3-phase switch fuse unit for incoming and MCBs for outgoing.

4.2 AC Emergency Lighting System:

AC Emergency lighting fixtures fed through conveniently located AC Emergency Lighting panel (ACELP) which is fed from AC Emergency Lighting Distribution Board (ACELDB). ACELDB consist of 50 kVA dry type isolation transformer & distribution panels, shall have 3-phase switch fuse unit for incoming & outgoing feeders. The ACELPs shall be provided with TPN switch fuse unit for incoming and MCB for outgoing.

4.3 220V D.C Emergency Lighting System:

DC Emergency lighting fixtures fed through conveniently located DC Lighting Distribution Board (DCLDB). Each DCLDB shall have 2-pole switch fuse unit and contactor for incoming. For outgoing feeders 2-pole MCB shall be provided, suitable for DC.

4.4 All LPs & LDBs shall be powder coated with outside shade No: 631 of IS-5 & inside glossy white.

4.5 Emergency exit lamps backed up by battery shall be provided at strategic locations of the building for safe exit of personnel. These exit lamps will remain ON all the time and normally received power supply from AC lighting panel.
Ni-Cd battery with 4 hrs battery back-up shall be provided at standalone system where DC battery backup is not available. However, wherever DC battery is available, same shall be used for backup supply.

2

Further strategic locations shall include all exit doors and routes in GIS Building. However, exact location will be finalized during detailed engineering.

5.0 SWITCHYARD OUTDOOR LIGHTING

5.1 400 watt HPSV flood lights mounted on lightning masts shall be used for switchyard lighting. Philips type RVP 301/2 X SONT 400 watt flood lighting luminaries or similar shall be used in switchyard.

5.2 For street lighting, street light pole will be used. For outdoor area lighting if required flood light pole will be used. Pole type shall be as below:

Pole height: 9 / 11 / 13 meter for roads

Pole construction type: Fabricated, swaged, steel tubular poles

1

Pole type: Aluminium Painted

5.3 The pole shall be coated with bituminous preservative paint on inside as well as embedded outside surface. Exposed surface shall be coated with two coats of metal primer (comprising of red oxide and zinc chromate in synthetic medium). The technical details of poles will be as per IS-2713. The poles shall be equipped with junction boxes and all other required accessories.
The poles will be located 1.5 M away from the road edge. The buried cable will run in hume pipe (100 mm dia) wherever it is crossing the roads.
Lighting High Mast shall be of continuously tapered polygonal cross section, at least 20 sided, hot dip galvanized. The structure shall be suitable for wind loading as per IS-875 Part-III, 1987. The masts dimensions shall be as per standards. The Mast shall be of 30M height with lantern carriage to enable raising/lowering for ease of maintenance, including the Head Frame, Double Drum Winch, continuous stainless steel wire rope, in built power tool, luminaries, suitable aviation warning light, lightning along with necessary power cables within the mast. The mast shall be delivered only in three sections & shall be joined together by slip stressed fit method at site. No site welding or bolted joints shall be done on the mast. High mast shall be complete with feeder pillar panel for power distribution to lighting fixtures and winch motor. Feeder pillar panel shall be outdoor type stand mounting with dust and vermin proof, IP 55 and constructed of 14 swg sheet steel. Lantern carriage shall be provided with 8 nos. LED fixtures.
The location of high mast will be decided during detailed engineering.
Two number of earthing pits along with earthing connection for each tower mast shall be provided.

1

6.0 LOW VOLTAGE POWER SERVICES:

In Control room and maintenance room 2Nos. 5 /15 A universal sockets shall be provided.

One number 240V AC, 5/15A universal socket shall be provided in other rooms of control building. 20A, 240V AC industrial type receptacles shall be provided as given below

1. LT boards & Charger room-2 Nos.
2. Controlroom-1 No.
3. AC room-1 No.
4. Maintenance room-1 No.

All receptacles shall be 3-pin type and shall be controlled with a switch.

2 Nos. of 63A, 3 phase, 415 V industrial receptacle with switch shall be provided in switchyard & 1 No. in AC room for welding purposes.

7.0 WIRING / CONDUITS:

7.1 Wiring shall be by multi-stranded, PVC insulated, colour coded wires laid in G.I conduits.

7.2 The copper conductor shall be composed of plain annealed high conductivity copper wire complying with class 2 of IS: 8130.

7.3 All wiring shall be made with the Colour Codes specified below:

a) 3 phase AC Connections

Phase I (R)	Red
Phase 2 (Y)	Yellow
Phase 3 (B)	Blue
Neutral	Black

b) 1 phase AC Connections

Phase	Red / Yellow / Blue (as per associated circuit)
Neutral	Black

c) DC Connections

Positive	White
Negative	Grey

d) Earth Connection Green

7.4 Following minimum sizes of copper conductor wires shall be used.

a) 2.5 sq. mm, 1100V grade, PVC insulated, single core, stranded copper conductor, for lighting fixtures.

2

From Lighting Panel to Junction box /Switches	: 2.5 sq. mm.
From Junction box to fixture	: 2.5 sq. mm.
Panel to First Receptacle	: 4 sqmm
First Receptacle to looping other receptacles	: 4 sqmm
Panel/JBs to Flood Light fixtures	: 2x2.5 sqmm

b) 2.5 / 4 sq. mm, 1100V grade PVC insulated, single core, stranded copper conductor for 5/15A & 20A sockets.

7.5 For switchyard lighting from LDB to LPs and from LPs to JBs cable of suitable size shall be laid in Trench / buried in GI conduits. From JB to luminaries it shall be 3 core 2.5 sq. mm copper conductor PVC insulated cable.

7.6 Wiring of lighting system shall be done as follows:

i) Wiring installation shall be by multi-stranded, PVC insulated, colour coded wires laid in GI conduits of 20mm / 25mm dia. min size.

ii) Conduits shall be heavy-duty type hot dip galvanised.

iii) Conduits in control room and other air-conditioned areas shall be surface mounted on the roof above false ceiling. However vertical drops of conduits shall be through column flanges, finally covered for better aesthetics.

2 Conduits in control room, office, conference room and other air-conditioned areas will be surface mounted on the roof above false ceiling, however vertical drops of conduits will be concealed along walls and finally plastered for better aesthetics. Placement of vertical drops of conduits shall be finalized later as wall treatment will be finalized during detailed engineering in consultation with civil architect contractor

iv) Conduit fill criteria: 40%.

v) Flexible conduit shall be used as and where required.

vi) Wiring for AC Normal, AC Emergency, and DC Emergency services shall run in separate conduits.

vii) Lighting and receptacles shall be fed from separate circuits. No two different phase circuits shall be run in the same conduit. However, different circuits of same phase may be laid in the same conduit.

8.0 EARTHING:

8.1 Earthing of lighting system shall be done by using following sizes:

i) 16 SWG GS wire for earthing of lighting fixtures, receptacles, conduits & Switch boxes.

ii) 8 SWG GS wire for earthing of junction boxes.

iii) 25x6 /50x6 mm size Galvanised MS flat for earthing of lighting panels.

iv) 50x6 mm size Galvanised MS flat for earthing of LDBs.

v) Electrode for Pole/ High mast earthing: 40mm dia MS rod, 3mtr long

ANNEXURE-1

AVERAGE LUX LEVEL

General Areas

S.No	Area	Lux level
1)	Changing rooms, washrooms and toilets	150 Lux
2)	Staircases	150 Lux
3)	All lift landing	150 Lux
4)	Pantry/canteen	150lux

Office Areas

S.No	Area	Lux level
1)	Offices	300 Lux
2)	Conference room	300 Lux
3)	Data processing areas	300 Lux
4)	Control room	300 Lux

Equipment Areas

S.No	Area	Lux level
3	GIS building	200lux

Outdoor Areas

S.No	Area	Lux level
1	Various approach road of Switchyard Area	50 lux
2	Pot head yard	50 lux

Note :

For type of Fixture refer Document number : PE-DC-437-558-E001 Rev00

Annexure 1

Annexure 2

----------xxx----------

SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS
(To be filled by Bidder)

For each type of luminaries following guaranteed technical particulars are required to be furnished with the offer:

SL. No.	Description	Details to be filled by Bidder
A.	**LUMINAIRE (For Each Type)**	
1	Manufacturer name	
2	Type	
3	Catalogue reference No./model no .	
4	Catalogue attached or not.	
B.	**MOULDED CASE AIR CIRCUIT BREAKERS**	
1	Manufacturer name	
2	Type	
3	Catalogue reference No./model no .	
4	Catalogue attached or not.	
C.	**INDICATING LAMPS**	
1	Manufacturer name	
2	Type	
3	Catalogue reference No./model no .	
4	Catalogue attached or not.	
D.	**RECEPTACLES (For each type)**	
1	Manufacturer name	
2	Type	
3	Catalogue reference No./model no .	
4	Catalogue attached or not.	
E.	**SWITCHES (For each type)**	
1	Manufacturer name	
2	Type	
3	Catalogue reference No./model no .	
4	Catalogue attached or not.	
F.	**LIGHTING PANEL/SUB-DISTRIBUTION BOARD/Junction box**	
	Manufacturer name	

	Model no .	
	Dimesions	
G.	**BALLASTS**	
1	Manufacturer name	
2	Type	
3	Catalogue reference No./model no .	
4	Catalogue attached or not.	

Note:-

1. The tenderer shall furnish the Guaranteed Technical Particulars for each luminaries and various items of luminaries separately (i.e. ballasts, lamps, capacitors, igniter etc.)

2. For items not listed above but mentioned in the contract required to complete the system, contractor has to submit the performance/ compliance certificate before supply (refer clause no 22.7.2 of TS)**.**

Date: Signature of bidder

Name:

Place: Status:

Whether authorized attorney of tendering company

Name of tendering Company

ANNEXURE- D

CHECK LIST FOR ILLUMINATION SYSTEM

TO BE FILLED AND RETURNED WITH THE OFFER DULY SIGNED

Please mark “YES” if the specified requirement is met or put a mark “NO” if the specified requirement is not met and give reason in column 5
BHEL Enquiry no :
Bidder offer reference :

Sl.no	Parameter	Data (Where possible shall be filled before issue of Spec.)	Bidder’s conformation	Reason for non-compliance
(1)	(2)	(3)	(4)	(5)
1.	Provision of illumination for specified areas as per spec.		YES / NO	
2.	Guaranteeing the illumination lux levels specified as per spec.		YES / NO	
3.	Type of lighting luminaries included as per spec.		YES / NO	
4.	Lighting DBs & LPs included as per spec.		YES / NO	
5.	Lighting transformer included company with specification requirements		YES / NO	
6.	Lighting poles included as per spec.		YES / NO	
7.	Sockets, Plugs & other items included as per spec.		YES / NO	
8.	Supervision of ETC of Package included in the offer		YES / NO	
9.	Supply of all Cables / earthing material required for the package other than the items supplied by BHEL included in the package.		YES / NO	
10.	Flood light luminaries in switchyard for maintenance of equipment specified in specification included in offer.		YES/ NO	
11.	Type and lumen output of lamps included in the offer are as per specification.		YES / NO	

12.	Whether any new item other than the BOQ given required to meet the specification requirement.		YES/ NO	
13.	If new item is required whether these are listed with quantities in the offer		YES/ NO	
14.	Equipment included suitable for operation on voltage & frequency Variation limits specified in the specification without effecting their performance			
15.	Power factor of lamp circuit is as per specification		YES/NO	
16.	Fully filled in GTP enclosed		YES/NO	
17.	Auto change over arrangement for emergency AC/ emergency DC included in EAC & DC boards			
18.	Auto switching arrangement for outdoor flood lighting / street lighting through Timer / Photo call included		YES / NO.	
19.	Spares included in the offer (a) Mandatory (b) Commissioning		YES/ NO YES/ NO	
20.	Activity Schedule enclosed		YES /NO	

Bidder's

Sign :

Date :

Name :

Design :

Annexure –E

QA&I Formats

SJVN	FORM NO.: F-060-01 PAGE: 1 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

VENDOR / SUB-VENDOR ASSESSMENT SHEET

TO BE FILLED-IN BY SUPPLIER / SUB-VENDOR

NAME OF SUPPLIER / SUB-VENDOR IN FULL		
	REGISTERED OFFICE	FACTORY / WORKS
ADDRESS		
TELEPHONE NO.		
FAX NO.		
EMAIL ID		
PERSON(S) TO BE CONTACTED (NAME & DESIGNATION & MOBILE NO.)		
WEEKLY OFF		

SHIFT WORKING		Type of Company (Pl. Tick)		Type of Industry (Pl. Tick)	
OFFICE	WORKS	Pvt. Ltd	Public Ltd.	MSME	Large Scale
ONE ☐	ONE ☐	Proprietary ☐	Partnership ☐	Govt. ☐	Contractor ☐
TWO ☐	TWO ☐	Public Sector ☐			
THREE ☐	THREE ☐				

SJVN	FORM NO.: F-060-01 PAGE: 2 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

Sr. No.	Items / Services / Process for which Approval is desired for	Rating / Size & Type	Applicable Standards IS/DIN/BS/IEC Etc.

REGISTRATION DETAILS #			
PAN / TAN NO.	CENTRAL SALES TAX REG. NO.	STATE SALES TAX / TIN NO.	EXCISE DUTY REGISTRATION NO.
EXCISE CONTROL CODE NO.	SERVICE TAX REG. NO.	CATEGORY OF INDUSTRY	REGSISTRATION NO. & VALIDITY DATE
		Micro ☐ Small ☐ Medium ☐ Large ☐	

SJVN	FORM NO.: F-060-01 PAGE: 3 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

A.	ORGANISATIONAL SOUNDNESS			
Sr. no.	DESCRIPTION		DETAILS TO BE FURNISHED	
1.	Nature of Business (Strike whichever is not applicable)		Manufacturing Unit / Engineering Consultant / Agents / Distributors / Stockists / Dealers / Traders / Indian Subsidiary / EPC contractor / Channel Partner (Attach authorization certificate of principal) / Erection contractor / Other	
2.#	Year of commencement of Business / Factory Establishment			
3.	Year of Commencement of Manufacture / Services			
4.	Total Area/Covered Area in Sq. m.		Total Area	Covered Area
5.	Electric Power-Connected Load			
6.#	Electric Power Standby Load & System			
7.	Details of Directors			
Sr. No.	Name	Designation	Qualification	Experience
8.	Details of Employees			

Pleases attach copy of Company's Organization Chart (For Unit)

Division Status	Graduate		Diploma	Skilled	Un-Skilled	Remarks
	Technical	Non-Technical				
Production						
Engineering & Quality Control						
Administration & Other Supporting activities.						

SJVN	FORM NO.: F-060-01 PAGE: 4 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

9.	Brief Details of Product and Manufacturing Capability				
Sr. No.	Item & Material	Description (Type, Size Rating)	Annual Production for Last Three Years		
			I	II	III

10.#	Details of Foreign or Indigenous Collaborator				
Sr. No.	Product	Name & Address of Collaborator	Collaboration		
			Scope	Year	Valid up to

11#	Have your product been type tested by any external agency? If so, give details			
Sr. No.	Product	Test (Size / Type & class	Test Report No.	Next Due date

SJVN	FORM NO.: F-060-01 PAGE: 5 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

12.#	Have you been approved by any Statutory agency / third party agency like LLOYD, ASME, NTPC, PGCIL, EIL, Railways etc. ? If so, indicate details and enclose copies of approval letters				
Sr. No.	Item / Material / Service / Process	Description (Size, Type & Class)	Agency	Date of approval	Next Due date

13.#	Indicate Approval / Certification by National / International Standards / Agencies applicable for the subject product.		
Sr. No.	Product	Codes / Standards	License No. & Date

14.#	Reference List (Experience in Particular Type of Equipment / Service / Process). Please indicate since how many years similar type of item / equipment / service / process provided (please furnish documentary evidence).				
Sr. No.	Item / Material / Service / Process	Type & Capacity / Rating	Customer (End User with Address)	Date of Supply / Service provided	Under Operation since year / Month

#Note: Please furnish the performance feedback certificate for proposed item / equipment / process / service form end user in line with requirement stipulated in Technical Specification.

SJVN	FORM NO.: F-060-01 PAGE: 6 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

15.#	Business Commenced with SAPDC/SJVN in past		
Sr. No.	Year	Name of Department / Project Dealt with	Item Supplied / Services Offered.

16.A#	Machinery, Instrument & other Equipment Specific to Process & Product Facilities / service				
Sr. No.	Description of Machine	Capacity & Nos.	Location Shop	Make	Year of Manufg.

16.B#	Other General Facilities				
Sr. No.	Description of Machine	Capacity & Nos.	Location Shop	Make	Year of Manufg.
i	Material Handling Mobile Crane Fork Lift Over Head Cranes				
ii	Metal Cutting &				

SJVN	FORM NO.: F-060-01 PAGE: 7 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

	Bending				
iii	Casting				
iv	Forging				
v	Fabrication				
vi	Welding				
vii	Machining				
viii	Heat Treatment				
ix	Sheet Metal				
x	Fettling & Cleaning, Sand Blasting, Shot Blasting & Pickling				
xi	Painting				
xii	Metal Coating				
xiii	Protection before packing				
xiv	Packing				
xv	Other				

17.#	If In-House Manufacturing Facilities not available, inform source of manufacturing details along with their facilities and experience			
Sr. No.	Process outsourced	Name of the company	Description of machine / Equipment	Remarks

18. A#	Facilities for In-house Testing & Inspection				
Sr. No.	Description	Capacity & Nos.	Make & Year of Mfg.	Calibration Status	Approval Qualificati on

SJVN	FORM NO.: F-060-01 PAGE: 8 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

18.B#	If In-house testing facilities are not available, indicate source of testing with relevant details.					
Sr. No.	Source of Testing	Description	Capacity & Nos.	Make & Year of Mfg.	Calibration Status	Approval Qualificati on

Note: In case of outsourcing of major testing such as NDT, Electrical & Mechanical testing, no marks will be awarded. However, material composition testing by chemical method from NABL Lab shall not attract negative marking.

18 C #	Details of any Government Laboratory facility available in area	
	Product related testing facility (type / Performance / Routine / Acceptance Test)	

19	Sources of Raw Material and Bought out Items	
Sr. No.	Description of Raw Material / Bought Out Items	Source

20 #	Storage Area Availability	
	Storage for finished goods (Open / Close)	
	Raw Material storage and identification	

SJVN	FORM NO.: F-060-01 PAGE: 9 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

21 #	Do you have in-house Design / R&D departments?	
22 #	Details of pending legal issues on contractual aspects with customers, if any.	
23 #	Please furnish details of Labour problems in the last three years, if any?	

B.	FINANCIAL SOUNDNESS OF ORGANIZATION			
	Financial Information for last Three Years (Please furnish copy of annual report)			
Sr. No.	Parameters	Year 20	Year 20	Year 20
1#	Please furnish annual turnover of the company.			
	Growth in annual turnover w.r.t. previous years (%)			
2#	Please furnish Profit before tax (PBT) of the company.			
	Growth in PBT w.r.t. previous years (%).			
3#	Please indicate the net worth (Net current assets – Net current liabilities) of the company?			
4#	Whether the vendor has been referred to BIFR / NCLT / any other similar Govt. agency.			
5#	Whether the supplier is a potentially sick company.			
6	Please mention current order book position, as on date in terms of Value and time			

C.	QUALITY SYSTEM	
SR. NO.	DESCRIPTION	Sub-vendor response (along with supporting document)
1#	Are you an ISO 9001 company? If yes, please furnish the certificate and what is your quality policy?	
2#	Is the company an ISO 14000 approved?	
3#	Is the company an OHSAS approved?	
4#	Have your company won any Quality award like Rajeev Gandhi National Quality Award, IMC Ramkrishna Bajaj National Quality Award, Golden Peacock National Quality Award etc? If yes provide documentary evidence.	
5#	Have you received appreciation letter from your customer. Please provide evidence.	
6	To whom your Q.C./Q.A. Chief reports to ? (Please furnish your organization structure)	
7#	If you have a written quality control manual/procedure, then please furnish the same.	

SJVN	FORM NO.: F-060-01 PAGE: 10 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
FORM	

7 (i)#	Incoming Material Control System (Furnish a copy of system and organization)	
7 (ii)#	Process Control: Are written procedure defining stage wise operations and functions on shop floor established and followed? (Furnish copy of work instruction and record of process control parameter)	
7 (iii)#	Manufacturing/Testing Procedure Qualification & Personnel Qualification (Procedure qualification specification & Record of personnel qualification (PQR) to be submitted).	
7 (IV)#	Are written Quality Control Instruction sheets prepared & properly used? (Please furnish evidence)	
7 (V)#	Are records generated during inspection maintained & available for review? (Please furnish evidence)	
7 (VI)#	Are quality control checks / procedure adequate to maintain desired quality level right from the incoming stage to final stage? Please furnish copy of such control checks / procedure.	
8.#	**Documentation Control**	
8 (i)	Does a system for clear and precise stipulation of responsibilities for documentation issue & change control exists?	
8 (ii)	Are changes made in writing?	
9#	**Control of Inspection, measuring and testing equipment**	
9 (i)	Are necessary gauges, testing and measuring equipment's, available and used?	
9 (ii)	Are testing and measuring equipment properly maintained?	
9 (iii)	Is recorded control on calibration of equipment available?	
10#	System of Identification & Traceability of materials, tools, jigs, fixtures & processed components, etc. (Copy of procedure to be submitted).	
11#	System of Storage / Preservation / Painting and Packing (copy of Procedure to be submitted)	
12#	Do you have written procedure for disposing off the non-conformities? If yes, please furnish the copy of the same also furnish three copies of NCR & CAPA.	
13#	Safety measures (Submit copy of safety system & record of accidents for last two years)	
14#	What type of Sampling Inspection Plan is used in your factory/company? Please furnish details.	
15	How good are you in keeping your dispatch commitments? Please give details of last ten deliveries stating details as below (Provide documentary evidence) Within delivery period:	

	SJVN FORM	FORM NO.: F-060-01 PAGE: 11 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016

	Delayed but accepted by user: Delayed but accepted with penalty:	
16#	Have you ever been de-listed or put in under temporary suspension by any customer / contractor.	
D.	**AFTER SALES SERVICE**	
SR. NO.	DESCRIPTION	Sub-vendor response (along with supporting document)
1#	For overcoming product deficiencies what are the analytical methods used at Customer's premises?	
2#	What is the strength of your "after-sales service" team?	
3#	What is the response time after receiving complaints from the customers? Provide evidence.	
4#	Customer complaints handling system (Submit list of customer complaints & status for the last three years) Please furnish complete list of complaints attended to during last one year.	
5#	How do you keep your "after-sales service" team updated?	
6#	Provide certificate from 02 customers (end user) for satisfactory after sails services.	

Declaration by Director/ Partner/ Proprietor

I declare that the information furnished above and attached documents are correct to the best of my knowledge, I undertake to inform you at the earliest any change(s) in the details mentioned above.

Signature and Date

Name & Designation

	SJVN FORM	FORM NO.: F-060-01 PAGE: 12 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016

TO BE FILLED BY MAIN CONTRACTOR FOR SUB-VENDOR (MC)

Sr. No.	Parameters	Supplier response (along with supporting document)
1	Name and address of sub-vendor:	
2 (a)	Type of equipment / item / process / service for which approval is sought:	
2 (b)	Details of equipment / item / process / service for which approval is sought (i.e. Rating, capacity, type, size, weight, etc.):	
3	Experience of main contractor with sub-vendor:	
(a)#	Since how many years sub-vendor is registered with you for proposed type of equipment / item / process / services (furnish documentary evidence):	
4#	Whether sub-vendor is meeting the qualification criteria indicated in the technical specification (furnish documentary evidence).	
5#	Sub-vendor rating as per contractor's internal procedure in the scale 0-10 or 0-100% (furnish documentary evidence).	
6#	Any dispute of main contractor with vendor during execution of last 05 contracts.	
7#	Have you ever de-listed or put in temporary suspension the proposed sub-vendor? If yes, please provide the reason for same.	
8	Please indicate the reason for re-approving / re-listing the sub-vendor.	

I declare that the information furnished by Sub-vendor has been verified and found in order / minor changes which have been marked and initialed on this form itself / observed the following discrepancies.

(Signature & Designation)

	SJVN	FORM NO.: F-060-01 PAGE: 13 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
	FORM	

GUIDELINES TO SUPPLIERS FOR FILLING-UP VENDOR/SUPPLIER REGISTRATION FORM

1. All columns are to be filled up properly in the space provided for. Wherever it is not applicable / not available, please mention "Not Applicable" / "Not Available". All pages of the form are to be signed along with seal by the authorized signatory.
2. A separate sheet may be attached if the space provided is insufficient or additional information is to be given, Please put proper identification tag on the separately attached sheet.
3. Any information / clarification required by SAPDC/ Consultant during evaluation must be given expeditiously.
4. Please ensure that all required enclosures are attached with the filled up Vendor Registration Form.
5. Marks shall be awarded on the basis of documentary evidences submitted by Vendor / sub-vendor wherever called in vendor / sub-vendor assessment form.
6. Incomplete or incorrect forms will be rejected.
7. Please fill up the check list given below and send along with the vendor registration forms to SAPDC/Consultant.
8. In case any information found incorrect / false, the vendor shall be rejected / de-listed at any stage.
9. Information with # marks is score able.
10. Accepting or rejecting a vendor is sole discretion of SAPDC.
11. Product catalogue / manual for the proposed item / equipment / process / service, if available, shall be submitted alongwith other documents.

	SJVN	FORM NO.: F-060-01 PAGE: 14 of 14 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
	FORM	

Furnish following information/Documents:-

Sr. No.	Description	Yes / No	Page No / Annexure
1	Latest audited annual account.		
2	Balance Sheet.		
3	Valid Income Tax Clearance Certificate.		
4	Details of Pending Arbitration cases.		
5	Details of pending disputes with Statutory Authorities.		
6	Organization chart		
7	Copy of Performance certificate (minimum 03)		
8	Copy of minimum three (03) completion certificates of similar work / service.		
9	Letter of approval from ASME / NTPC/ EIL / Railway / Lloyds / Power Grid etc. if any.		
10	ISO: 9001 certificate		
11	Quality Manual		
12	ISO: 14000 certificate		
13	OHSAS, ISO 18000 certificate		
14	Experience list		
15	Type test report & approval certificate		
16	Product Approval certificate from national / international agency.		
17	Quality award certificate		
18	Process and Personnel qualification certificates		
19	Copy of registration / enlistment with reputed / large organizations		
20	Detail of existing clients and details such as address, contact number and mail address.		
21	List of works / projects of similar nature executed with documentary evidences of works executed in last 02 years.		
22	Other documents mentioned elsewhere in vendor / sub-vendor assessment form.		

(Signature & Designation)

	SJVN	FORM NO.: F-060-02 PAGE: 1 of 1 ISSUE: 2.0 REV. 01 DATE: 30/06/2016
	FORM	

PROJECT NAME (MW)	MANUFACTURING / FIELD QUALITY ASSURANCE PLAN				CONTRACTOR NAME, ADDRESS & LOGO
ITEM DESCRIPTION	SUB-ITEM	QAP NO.	REV. NO	ISSUE DATE	SUB-CONTRACTOR NAME, ADDRESS & LOGO

SR. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M/C	S				M	C	S	
1	2	3	4	5	6		7	8	9	10			11

LEGENDS

M	MANUFACTURER	C	CONTRACTOR	S	SAPDC LTD.
P	PERFORM	V	VERIFICATION OF RECORDS	W	WITNESS / CHP
IR	INSPECTION REPORT	DRG	DRAWING	CHP	CUSTOMER HOLD POINT
MA	MAJOR	MN	MINOR	CR	CRITICAL
ME	MEASUREMENT	NDT	NON DESTRUCTIVE TESTING	HT	HEAT TREATMENT
TR1	CERTIFICATE OF COMPLIANCE TO TS/STANDARD REQUIREMENT WITHOUT ANY CHECK LIST OF TESTS CARRIED OUT.	TR2	CERTIFICATE OF COMPLIANCE TO TS/STANDARD REQUIREMENT WITH CHECK LIST OF TESTS CARRIED OUT.	TR3	TEST REPORT/TEST CERTIFICATE WITH TEST RESULTS BASED ON SPECIFIC INSPECTION & TESTING AT MANUFACTURER FACILITY/NABL APPROVED LAB.

NOTE: QAP SHALL BE READ IN CONJUNCTION WITH QUALITY ASSURANCE REQUIREMENT GIVEN AS PART OF TECHNICAL SPECIFICATION.

MANUFACTURER / SUB-CONTRACTOR:		CONTRACTOR:	FOR SAPDC USE:	REFERENCE DOC NO. OF SJVN:	
PREPARED BY:	REVIEWED BY	REVIEWED & RECOMMENDED BY	REVIEWED BY	RECOMMENDED BY	APPROVED BY
NAME, DESIGNATION & SIGNATURE	NAME, DESIGNATION & SIGNATURE	NAME, DESIGNATION & SIGNATURE	NAME & SIGNATURE	NAME & SIGNATURE	SIGNATURE & SEAL

Prepared By:	Reviewed By:	Approved By: Process Owner

SJVN	FORM NO.: F- 060-04 PAGE: 1of 5 ISSUE: 2.0 REV. 01 DATE: 28/06/2016
FORM	

NON-CONFORMITY REPORT FOR MANUFACTURING, TRANSPORTATION, STORAGE & ERECTION STAGES	FOR SAPDC USE ONLY NC NO. Date: PAGE 1 of 5

PART-A (Proposal of Disposition of Non Conformity)

Please read instructions carefully before filling up the form and attach separate sheet wherever required.

Contract No.	CATEGORY OF NON CONFORMITY (Please refer instruction no.1 & Tick appropriate)
Package Unit No.	
Supplier/ Contractor	MAJOR ☐
Sub-Vendor	
Place of Manufacture	MINOR ☐

DETAILS

ITEM DESCRIPTION: _____ IDENTIFICATION NO._____

RANGE/SIZE/TYPE: _____ QUALITY PLAN NO.: _____
& CLAUSE NO._____

STAGE OF NON-CONFORMITY ☐

DESIGN (A) /RAW MATERIAL (B) /ASSEMBLY (C) / IN PROCESS (D)-Specify_____/
TESTING (E)/ STORAGE (F) /HANDLING & TRANSPORTATION (G) /ERECTION &
COMMISSIONING (H) /ANY OTHER (I) (SPECIFY) _____

NON CONFORMITY-DESCRIPTION WITH CAUSE (Attach Relevant Drawings/ Details):

PROPOSED DISPOSITION WITH JUSTIFICATION(For Correction): **Disposition Code** ☐
(Note: Attach Details including design calculation)

SJVN	FORM NO.: F- 060-04 PAGE: 2of 5 ISSUE: 2.0 REV. 01 DATE: 28/06/2016
FORM	

NON-CONFORMITY REPORT FOR MANUFACTURING, TRANSPORTATION, STORAGE & ERECTION STAGES	FOR SAPDC USE ONLY NC NO. Date: PAGE 2 of 5

STEPS TO PREVENT RECURRANCE (For Corrective Action):

ENCLOSURE SUBMITTED BY CONTRACTOR:-
☐ DRAWINGS/ DETAILS ☐ INSPECTION REPORT ☐ ROOT CAUSE ANALYSIS
☐ PROCEDURE OF DISPOSAL OF NCR ☐ ANY OTHER (Please specify)_____

DATE NAME & DESIGN SIG.OF CONTRACTOR SEAL

FINAL DISPOSITIONING BY SAPDC **Disposition Code** ☐

INCHARGE of RIO or FQA (In case of Minor)
SAPDC (In case of Major)

DATE NAME & DESIG. SIGNATURE

SJVN	FORM NO.: F- 060-04 PAGE: 3of 5 ISSUE: 2.0 REV. 01 DATE: 28/06/2016
FORM	

NON-CONFORMITY REPORT FOR MANUFACTURING, TRANSPORTATION, STORAGE & ERECTION STAGES	FOR SAPDC USE ONLY NC NO. Date: PAGE 3 of 5

FOR SAPDC INTERNAL USE ONLY

RECOMMENDATION of INCHARGE of RIO or FQA (In case of Major)/ **CONCERNED SAPDC 's INSPECTION/ SITE ENGINEER** (In case of Minor) — **Disposition Code** [ ]

DATE NAME & DESIG. SIGNATURE

RECOMMENDATION OF SAPDC CONCERNED ENGINEER — **Disposition Code** [ ]

DATE NAME & DESIG. SIGNATURE
GROUP HEAD

DATE NAME & DESIG. SIGNATURE

RECOMMENDATION OF SAPDC (FOR MAJOR CATEGORY)
(Comments of Engineering / Others deptt as applicable to be considered)

DATE NAME & DESIG. SIGNATURE

SJVN	FORM NO.: F- 060-04 PAGE: 4of 5 ISSUE: 2.0 REV. 01 DATE: 28/06/2016
FORM	

NON-CONFORMITY REPORT FOR MANUFACTURING, TRANSPORTATION, STORAGE & ERECTION STAGES	FOR SAPDC USE ONLY NC NO. Date: PAGE 4 of 5

PART B (Verification of Corrections of Non- Conformity)
(Filled after Completion of corrections of Non-Conformity)

ACTION TAKEN BY SUPPLIER/ CONTRACTOR (Attach Report of verification)

DATE NAME & DESIGN SIG.OF SUPPLIER/ CONTRACTOR SEAL

VERIFICATION BY SAPDC'S SITE ENGINEER/ INSPECTION ENGINEER

DATE NAME & DESIG. SIGNATURE
IN-CHARGE of RIO/ FQA

DATE NAME & DESIG. SIGNATURE

COMMENTS OF SAPDC ENGINEER

DATE NAME & DESIG. SIGNATURE
GROUP HEAD

DATE NAME & DESIG. SIGNATURE
HOD

DATE NAME & DESIG. SIGNATURE

	SJVN	FORM NO.: F- 060-04 PAGE: 5of 5 ISSUE: 2.0 REV. 01 DATE: 28/06/2016
	FORM	

NON-CONFORMITY REPORT FOR MANUFACTURING, TRANSPORTATION, STORAGE & ERECTION STAGES	FOR SAPDC USE ONLY
	NC NO.
	Date:
	PAGE 5 of 5

INSTRUCTIONS

1. 'MAJOR' NONCONFORMITY IS DEFINED AS DEPARTURE FROM SPECIFICATION WHICH AFFECTS PERFORMANCE RELIABILITY. SAFETY INTERCHANGEABLITY. ERECTION, COMMISSIONING OR WORKING LIFE ALL OTHER NON-CONFORMITIES SHALL BE TREATED AS CATEGORY 'MINOR'.
2. ACCEPTANCE OF DISPOSITIONED NO N-CONFORMANCE IS WITHOUT PREJUDICE TO SAPDC RIGHT TO CLAIM COMMERCIAL REBATE AND DOES NOT ABSOLVE CONTRACTUAL OBLIGATIONS.
3. OBTAINING APPROVAL OF STATUTORY AUTHORITY IF ANY W.R.T. ABOVE NON CONFORMANCE IS THE RESPONSIBILITY OF SUPPLIER/ CONTRACTOR.
4. DISPOSITIONING OF THIS NON-CONFORMANCE IS FOR THIS SPECIFIC CASE ONLY AND NOT TO BE REGARDED AS PRECEDENCE.
5. **DISPOSITION CODE** THE NON-CONFORMANCE SHALL BE DISPOSITIONED AS UNDER BY SAPDC AND SUPPLIER. (GIVE CODE AT APPROPRIATE BOXES):-
   (01) NC-REJECTED **(02)** NC- CONDITIONALLY ACCEPTED (SPECIFY CONDITION) **(03)** NC-ACCEPTED AS-IT-IS **(04)** NC-ACCEPTED WITH REPAIR.
6. **NC NUMBER** - THIS NO. SHALL BE ALLOTTED BY SAPDC AND SHALL HAVE SAPDC,PROJECT NAME, PACKAGE, FOLLOWED BY RUNNING SERIAL NO. & ENTER TO NC REPORT BY RIO / FQA / CQAI.

RESPONSIBILITIES OF CONTRACTOR

1. ASCERTAIN EXACT NATURE OF NON-CONFORMANCE AND ALONGWITH SUPPORTING DRAWING OF ITEMS/ EQUIPMENT ETC WITH WHICH NON-CONFORMANCE EXISTS.
2. IDENTIFY THE CAUSE OF NON CONFORMITY.
3. DECIDE ON CODE OF DISPOSING.
4. FINALISE THE CAUSE OF NON-CONFORMITYAND PROPOSE CORRECTIVE ACTION.
5. ENSURE AND CERTIFY THAT THE PRODUCT QUALITY PERFORMANCE. RELIABILITY AND WORKING LIFE IS NOT AFFECTED FOR MINOR NON-CONFORMITIES AND QUANTIFY THE EXTENT TO WHICH IT IS AFFECTED IN THE CASE OF CATEGORY 'MAJOR' NON-CONFORMITIES.
6. IMPLEMENT AGREED CORRECTIVE ACTION IN A TIME BOUND PROGRAMME AND PROVIDE FEEDBACK AS PER PART-B OF THE FORMAT

RESPONSIBILITIES OF RIO/ FQA

1. IDENTIFY THE PRODUCT APPROPRIATELY.
2. ANALYSE THE CAUSE OF NON-CONFORMITYAND PROPOSE RECOMMENDATION

	SJVN	FORM NO.: F-060-06 PAGE: 1 of 1 ISSUE: 2.0 REV. 00 DATE: 30/06/2016
	FORM	

INSPECTION CALL REQUEST

Inspection Call No.			Date:			
Project:			Contract No. :			
Contractor/Supplier's Name & Address:			Sub-vendor/Sub-Supplier's Name & Address:			
Contact Person:			Contact Person:			
Telephone/Mobile No.:			Telephone/Mobile No.:			
Fax No.			Fax No.			
email ID:			email ID:			
Details of Equipment with Unit No.:						
Sr. No.	Equipment/Item Description and Sr. No.	Unit No.	BBU Ref.	QAP No. & Rev. No.	Relevant QAP Clause No.	Approved Drawing No. & Rev. No.
Status of Type Tests	Approved / Not Approved / Not Applicable		Place of Inspection:			
Proposed date of Inspection:			Anticipated Working Days Required			
Status of internal inspection by Vendor/sub-vendor			Completed ☐	In-progress ☐	Yet to be done ☐	
Tentative date of completion of internal inspection in case inspection is in-progress/yet to be done:						
Note: Readiness status is to be submitted separately after completion of internal inspection by Manufacturer.						

Date:
Place:

Signature
Name
Designation
Department
Company

ANNEXURE-E: Manufacturing Quality Assurance Test Requirements

	Project Name (MW): ARUN-III HEP (4X225 MW)	**Doc. No.:** QAI/A/M/EM/IS/01	**Rev. No.:** 02
	Item Description: Illumination System	**Issue Date:** 30.05.2017	**Page No.** 2

Sr. No.	Component, Operation & Characteristics	Applicable Standard	Remark
1	2	3	4
A	**Conduit (Heavy duty)**		
	Surface Finish, Durability of marking, Outside diameter, Thickness, Screw thread length, Bending Test, Condition of pipe & seam, Ball test, Quantity of zinc coating, Test for External Influence	IS 9537	V
B	**Earthing Wire/ Strip/ Flat**		
	Dimensional Check, Galvanising	DRG/TS/REL STD	V
C	**Luminaries of all types including for tower mast**		
1	**Type Test**	IS 10322	V
2	**Acceptance Test**		
	Visual Examination, Resistance to dust and moisture, Insulation Resistance and Electric Strength, Photometric Test, IP Class Verification	IS 10322	W
3	**Routine Tests**		
	Visual Examination, Insulation Resistance & Electric Strength, Operational & Functional Checks	IS 10322	W
4	**Marshalling Box**		
	Visual Check, Continuity Check, Operational & Functional Check, HV/ IR test, Paint Shade and Thickness, Adhesion test, Degree of Protection	DRG/TS/REL STD	V
D	**LED Luminaries of all types including for tower mast**		
1	**Routine tests**		
	IR & HV Test, Measurement of Leakage Current, Visual Check & Verification of Marking	DRG/Data sheet/TS/IS: 16107 (Part 2, Sec 1	W
2	**Acceptance Test**		

	Verification of IP class, Humidity Test, Mechanical strength test, Luminaire Power, Luminous Flux, Lighting Intensity, Angular Beam Distrubiton, Luminaire Efficacy, Chromaticity co-ordinates and correlated color temperature, Color Rendering Index	DRG/Data sheet/TS/IS: 16107 (Part 2, Sec 1	W
E	**Junction Boxes**		
	Size (LxBxH), Make of terminal blocks, Gasket arrangement, Earthing terminal, Zinc Coating	TS/ DRG/ REL STD	V
F	**Receptacles (Industrial)**		
	Size (LxBxH), Thickness of sheet steel for enclosure, Paint shade, Gasket arrangement, Make of switches/ sockets	TS/ DRG/ REL STD	V
G	**Switches/ Sockets/ Switchboards**		
	Dimension, Make	TS/ DRG/ REL STD	V
H	**Lighting Poles of all types including for tower mast**		
1	**Incoming Material**		
	Mechanical & Chemical Properties	DRG/ Rel Std	V
2	**In process Stage**		
	Dimensional Check, Cleanliness, Straightness,Corrosion resistance, NDT testing (if	DRG/ Rel Std	V
3	**Final Inspection**		
	Wind tunnel test for high mast	DRG/ Rel Std	V
	Visual & Dimensional Check, Cleanliness, Deflection test, Drop test, Freedom from defects, Painting/protection system , Lighting protection system	DRG/ Rel Std	V
I	**Winch Mechanism**		
	Type Test	DRG/Rel Std	V
	Visual & Dimensional Check, Cleanliness, Functional check, Load Test, Proof Test	DRG/ Rel Std	V
J	**Lighting Wires/ Cables**		
1	Routine Tests	TS/ DRG/ REL STD	V
2	Acceptance Tests	TS/ DRG/ REL STD	V
K	**Switchboards/ Panels**		
1	Check for incoming material/ bought out items	TS/ DRG/ REL STD	V
2	Visual check as per OGA, DRG & verification of BOM	TS/ DRG/ REL STD	V
3	Dimension check for height, width & sheet thickness of panel	TS/ DRG/ REL STD	V
4	Dimension check for busbar & check phase to phase, phase to earth clearance	TS/ DRG/ REL STD	V

5	Visual check of alignment of boards, operation of doors, locks, shutters, base grouting & gland plates	TS/ DRG/ REL STD	V
6	Verification of correct wiring, ferruling, dressing, routing, bunching, continuity check, colour coding and earthing	TS/ DRG/ REL STD	V
7	Insulation resistance measurement before and after HV test	TS/ DRG/ REL STD	V
8	Dielectric tests on auxiliary and control circuits	TS/ DRG/ REL STD	V
9	Functional test on all AC and DC circuit including heating, Lighting, Fan & Thermostat	TS/ DRG/ REL STD	V
10	Verification of protection against electrical shock	TS/ DRG/ REL STD	V
11	Operational & functional test	TS/ DRG/ REL STD	V
12	Verification of IP class	TS/ DRG/ REL STD	V
13	Surface protection coating, paint shade & finish, adhesion test	TS/ DRG/ REL STD	V

LEGENDS	
TS: TECHNICAL SPECIFICATIONS	REL. STD.: RELEVENT STANDARD
V: VERIFICATION OF REPORTS/TCs	DRG: DRAWING
W: CUSTOMER HOLD POINT	W*: WITNESS BY SAPDC/ MAIN CONTRACTOR

NOTES	
1	Any test at any stage not covered in Quaility Assurance Test Requirement (QATR), but part of technical specification of contract, shall also be carried out by Contractor/ firm.
2	QATR shall be read in conjunction with General Quality Assurance Requirement given as part of Technical Specification
3	Responsibitiy for witnessing (W*) at site shall be decided mutually at the time of finalization of FQAP as per the criticality of test.

ANNEXURE-E: Field Quality Assurance Test Requirements

	Project Name (MW): ARUN-III HEP (4X225 MW)	**Doc. No.:** QAI/A/F/EM/IS/01	**Rev. No.:** 02
	Item Description: Illumination System	**Issue Date:** 30.05.2017	**Page No.** 2
Sr. No.	**Component, Operation & Characteristics**	**Applicable Standard**	**Remark**
1	2	3	4
1.1	**Receipt of Material**		
	External conditions of Equipment free from Damages etc	TS/ Rel Std	W*
	Number of packages in each Equipment and physical condition of each package	TS/ Rel Std	W*
1.2	**Storage of Material**		
	Proper Placement of equipment as per the Instruction Manual.	TS/ Rel Std	W*
	Ensure that no damage or rusting takes place during storage	TS/ Rel Std	W*
	Ensure that all delicate Equipment are stored in protected area.	TS/ Rel Std	W*
2	**Pre Installation Checks**		
	Site survey if all location before installation works	TS/ DRG/ STD	W*
3	**Installation Check**		
3.1	**Lighting Panels/ Marshalling Box**		
	Check for proper alignment of panel, Ensure proper earthing of equipment,Healthiness of component, Tighteing of busbar and terminals, checking internal cable connections with dressing, check healthiness and rating of fuses & MCB, Insulation resistance measurement, incoming/ outgoing voltage at feeders, plugging of remaining unused cable entry holes	TS/ DRG/ STD	W*
3.2	**Conduiting**		
	Size/ route of conduit as per layout, alignment of conduit, interfaces with other installation, proper fixing of cleats/ supports/ spacers, hangers for conduit, check mechanical continuity of conduit, check electrical continuity of conduit, check earthing of conduit during installation	TS/ DRG/ STD	W*
3.3	**Wiring inside conduit**		

	Check for rubber bushing provide bush every end of conduit, check for colour code of wires, continuity and IR check	TS/ DRG/ STD	W*
3.4	**Lighting Fixtures**		
	Alignment of row of fixtures, interface with other installation, type of fixture as per layout, mounting height of fixtures as per layout	TS/ DRG/ STD	W*
3.5	**Switchboards/ Junction Boxes**		
	Mounting height from Finished Floor Level (FFL), alignment with adjecent switchboards, earthing of ground pin of socket & enclosure, alignment with adjecent switchboards, Earthing of ground pin of socket & enclosure	TS/ DRG/ STD	W*
3.6	**Receptacles**		
	Mounting height from FFL, earthing of ground pin of socket & enclosure	TS/ DRG/ STD	W*
3.7	**Cables**		
	Cable tray route, IR, depth of cable trench, depth of sand filing, check for proper laying of bricks, check for proper refilling, fixing of cable route marker	TS/ DRG/ STD	W*
3.8	**Poles/ Mast**		
	Foundation design as per BS 8004	TS/ DRG/ STD	W*
	Check depth of foundation pit, Proper location of poles as per drawing	TS/ DRG/ STD	W*
	Check for proper ratio for mixing concrete for pole foundation	TS/ DRG/ STD	W*
	Correct alignment of poles	TS/ DRG/ STD	W*
	Check for proper painting if MS	TS/ DRG/ STD	W*
	Bolt tightness between sections and with foundationplates	TS/ DRG/ STD	W*
3.9	**Tests on Winch & Mast**		
	Check suitability of foundation and site condition to accept the physical location & fit of mast	TS/ DRG/ STD	W*
	Assembly of mast and equipment, wiring & cabling as per installation procedure and drawing	TS/ DRG/ STD	W*
	Operational test for all electrcial equipment & check for safety equipment and locking arrangement	TS/ DRG/ STD	W*
	Operational & Functional test of raising & lowering gear as per drawing for full height of mast with test load not less than 1.25 times the required load	TS/ DRG/ STD	W*
	Completion of works as per drawing	TS/ DRG/ STD	W*
3.10	**Finish Checks for any particular area**		
	Check the quantity of lumaniraies & others equipments as per approved drawing	TS/ DRG/ STD	W*

	Check all the site format records for installation of equipment in the area	TS/ DRG/ STD	W*
4	**Commissioning Test**		
	Verification of electrical continuity between exposed conductive parts and the general earth circuit.	TS/ DRG/ STD	W*
	Blank operational, tests, in co-ordination with other Contractors.	TS/ DRG/ STD	W*
	Testing of main and auxiliary circuit insulation.	TS/ DRG/ STD	W*
	Complete functional testing of illumination system.	TS/ DRG/ STD	W*
	Lux level test in Various areas.	TS/ DRG/ STD	W*

LEGENDS	
TS: TECHNICAL SPECIFICATIONS	REL. STD.: RELEWENT STANDARD
V: VERIFICATION OF REPORTS/TCs	DRG: DRAWING
W: CUSTOMER HOLD POINT	W*: WITNESS BY SAPDC/ MAIN CONTRACTOR

NOTES	
1	Any test at any stage not covered in Quaility Assurance Test Requirement (QATR), but part of technical specification of contract, shall also be carried out by Contractor/ firm.
2	QATR shall be read in conjunction with General Quality Assurance Requirement given as part of Technical Specification

Annexure F - Export Worthy Packing

SEA WORTHY PACKING FOR E PORT JOBS

1.0 SCOPE:

For export jobs, sea worthy packing capable of performing all necessary functions like prevention of damage to the contents, sufficient to support frequent handling and lengthy periods of outdoor storage in adverse weather conditions are required. Workmanship and material used shall meet the technical requirements and be in accordance with best commercial export packing practices. Vendor shall be responsible for the packing, however, it shall meet the minimum requirements specified herein. Equivalent or better packing methods may be deployed subject to approval of the purchaser. Vendor shall submit the packing procedure for its equipment for purchaser's approval during detailed engineering.

2.0 TECHNICAL SPECIFICATION OF WOOD:

The wood shall be Fir, Chir, Silver Oak (Grevillea Robusta) or chemically treated mango with moisture content not exceeding 50 %. The wood shall have flextural & compressive strength, stiffness, shock absorption and nail retention properties. The wood shall be free from common defects such as warp, bone, twist, knot, cracks, splits, end splits, bend, visible sign of infection and any kind of decay caused by insects, fungus etc. Surface cracks with a maximum depth of 3 mm are permissible. A continuous crack of any depth all along the length is not allowed.

The wood shall be chemically treated to provide protection against deterioration due to fungi and attack by termites, borers, marine organism and any other kind of infection. It shall be treated only after final processing like cutting, planing, joint grooving etc.

3.0 TYPE, DESIGN & DIMENSION OF WOODEN PACKING CASES:

3.1.1 PACKING OF EQUIPMENTS:

Various mechanical, electrical and C&I equipment e.g. pumps, motors, equipment skids, heat exchangers, control panels, switch gears, transformers etc. shall be wrapped in weather proof packing and then secured in wooden packing cases. The construction of wooden packing cases shall be as per details given below and also in figures 1 to 11.

3.1.1 BOTTOM FRAME:

The construction of bottom frame shall be as per fig. 2. The number of slides/runners for bottom frames shall be selected depending upon the weight and overall dimension of the load to be carried. The equipment shall be secured by fixing their base frame/plate with the help of bolt & nuts etc to the bottom frame of the wooden packing cases. The equipment not provided with the base frame/plate like

cylindrical vessels etc. to be secured to the bottom frame of the wooden case with 'C' clamps fabricated from steel channels/angle irons.

3.1.2 TOP FRAME:

The construction of top frame shall be as per fig. 3.

3.1.3 END PANELS:

The dimensions of the end and lateral panels shall be calculated according to overall dimensions of the items to be packed.

Diagonal braces shall be used for packing cases having height exceeding 500 mm. Detail of bracing shall be as per figure 5 to 8.

3.1.4 SLING PLATE:

To facilitate lifting of cases, longitudnal under slide boards shall be fixed. To avoid damage to the box while lifting sling plates shall be provided. Refer fig. 11.

3.1.5 ANGLE IRON CLEATS :

Angle iron cleats shall be used for strengthening the joints as indicated in fig. 10.

3.1.6 OTHER REQUIREMENTS:

The thickness of planks for top, bottom, side and end panels shall be atleast 25 mm. Planks used for this purpose shall be joined with each other by tongue & groove joint. The groove dimension shall be such that tongue fits tightly into groove to make good joint.

Runners/slides, traverse bars etc. shall be of single length i.e. without any joint. Planks for sheathing, diagonal bracing etc shall also be of single length upto 2400 mm. For sizes larger than 2400 mm, proper jointing is permitted for planks for sheathing and diagonal bracing.

Each equipment to be individually covered with double polyethylene petticoat. Sheet thickness of polyethylene sheet shall not be less than 0.175 mm (175 microns). The sealing shall be such so as not to allow moisture inside.

The inner surface of 4 sides of shooks shall be nailed with bituminised water proof kraft paper. Whereever 2 pieces of kraft paper are used, the joint shall have an overlap of minimum 20mm.

All the inner sides of the box shall be nailed with bitumen coated hessian polyethylene kraft paper. For top frame it shall project on all sides by 100mm and shall be nailed on sides. Wherever 2 pieces of kraft paper are used, the joint shall have an overlap of minimum 20mm.

For delicate equipment like control panels, switchgears etc suitable cushioning material like rubberized coir shall be provided on their bottom support. The thickness of coir shall be 50 mm (minimum) and width 100 mm (minimum).

For control panels and switchgears, the gap between the panel and casing shall be filled with rubberized coir with distance between consecutive supports less than 500 mm (ref fig 15). For other equipment suitable support from sides of the casing to be provided.

Switchgear cubicles, control panels and control desks shall be packed and shipped in separate convenient sections. The components e.g. circuit breakers relays and instruments etc. which are removed from panels for shipping purpose shall be separately packed and shipped as per packing instructions in clause 3.2.

Packing case for control panels & switchgear panels shall be finally covered with GI sheet of minimum thickness of 0.4 mm.

Packing cases shall be bound at edges by nailing MS clamps/brackets at sufficient intervals. Further, heavier boxes shall be strapped with 'C' clamps (ref fig 4) fabricated from steel channels/angles and lighter boxes shall be strapped with hoop iron strips.

3.1.7 ALTERNATIVE PACKING CASES FOR CONTROL PANELS AND SWITCHGEARS

If required, for control and switchgear panels, construction of wooden packing cases may be provided as per fig 14 & 15 and as detailed below:

Thickness of planks for all sides, binding and jointing battens shall be atleast 25 mm. Width of planks shall be at least 125mm and that of binding and jointing planks shall be at least 100 mm.

Top frame shall be suitable so that it does not collapse due to sandwitching between slings while lifting. Longitudnal and traverse bars for the bottom wooden pallet to be suitably selected.

Diagonal bracings shall be as per clause 3.1.3 and All other requirements shall be as per clauses 3.1.4 to 3.1.6.

3.2 PACKING OF LOOSE ITEMS:

Loose mechanical, electrical and C&I items eg valves, fittings, pressure/temperature gauges/switches, circuit breakers, relays etc shall be individually wrapped using polyethylene sheets/U foam/thermocole sheets/air bubbled sheets depending upon the item and then packed in wooden boxes. The left out spaces and top of the boxes shall be filled with rubberized coir to get proper cushioning effect. Special attention is to be paid to relays, instruments etc for arresting the movement of their operating mechanisms during transportation.

The construction of wooden packing case shall be as per clause 3.1 retaining its all features concerning strength of box. The construction of wooden packing case for loose electrical and C&I items shall be as per fig. 16.

Inner surface of 6 sides of the box shall be lined with Bitumen coated hessian polyethylene kraft paper. Rubberized coir of min. 25 mm thickness and 100 mm width shall be nailed to inner surfaces of bottom and 4 sides of the box.

Loose items such as Galvanised Steel Structure, Cable support racks, Cable Trays and GI Pipes etc. shall be individually wrapped using polyethylene sheets and further lots may be wrapped in Bitumen coated hessian cloth.

4.0 MOISTURE ABSORBER:

Silica gel is used for this purpose to protect contents over sufficiently long time from corrosion. Silica gel shall be of indicating type conforming to IS-304-1979 packed in cotton bags placed at different positions inside the packing for absorbing moisture and shall not come directly into contact with the equipment / material inside the package. The quantity of silica gel shall be enough for storage period of one (1) year, however, it shall not be less than 4 gms per litre volume of case subject to minimum of 400 gms per case.

5.0 INDICATION MARKS ON THE BO ES:

Markings shall be provided on the boxes indicating position of boxes for handling, storage and nature of consignment. For guidelines refer figure 12. The ink used for this purpose as well as for marking despatch instruction shall be indelible/nonwashable marking ink.

6.0 DESPATCH DETAILS:

External front and rear sides of the boxes to be planed for writing instructions.

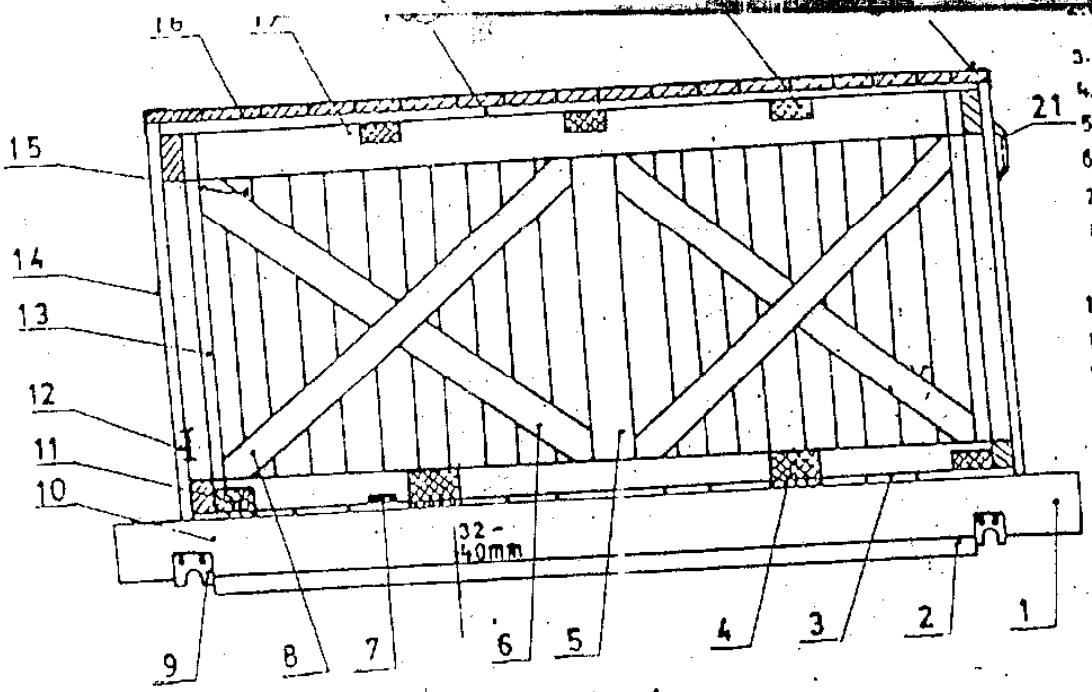
Dispatch details such as consignor/consignee address, contract and case details, country of origin , port of delivery, stacking instructions shall be written on one of the side of boxes. An anodised aluminium plate shall be provided on one side of the boxes.

One copy of packing slip wrapped in polyethylene bag covered with aluminium packing slip holder to be nailed on the external surface of the box. One more copy of the packing slip wrapped in polyethylene bag to be kept inside the box at the prominent place.

7.0 INSPECTION:

There shall be a Customer Hold Point (CHP) for inspection of final assembly of packing. During above inspection, the records for Chemical Treatment shall be reviewed.

- - x x - -



F1 -1

2. BOARD
3. BOTTOM BOARD
4. CARRIER TRAVERSE BAR
5. INTERMEDIATE VERTICAL SUPPORT
6. DIAGONAL BRACING
7. DRAINAGE HOLES
8. BATTEN
9. SLING PLATE
10. NUT, BOLT, WASHER
11. END TRAVERSE BAR
12. WATER PROOF LINING OF BITUMANISED PAPER
13. VERTICAL SUPPORTS
14. END SHEATING BOARD
15. SIDE SHEATING BOARD
16. TOP SHEATING BOARD
17. LONGITUDINAL SUPPORT
18. TOP HORIZONTAL BEAM
19. TOP TRAVERSE BARS
20. TOP CORNER STRIPS (FOR STRENGTHENING)
21. OUT SIDE DOCUMENTS CONTAINER.

NOMENCLATURE OF PARTS OF PACKING CASES

FIG.-1

BOTTOM FRAME ARRANGEMENTS

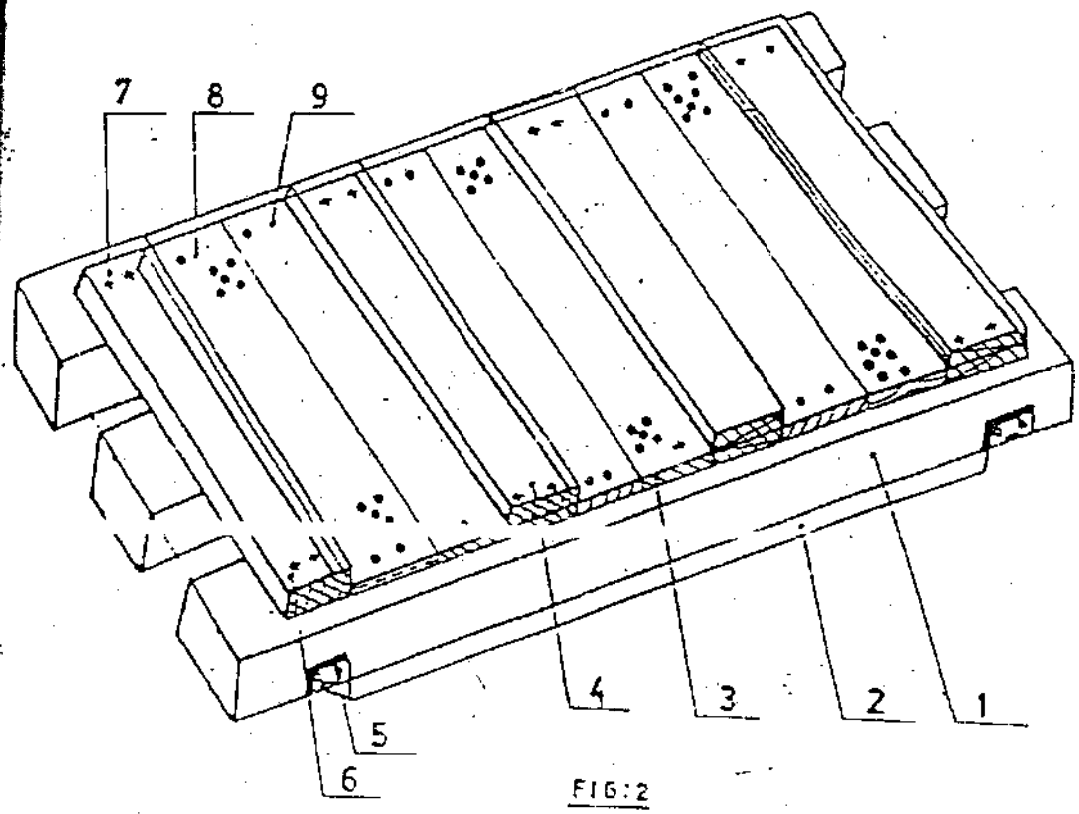


FIG:2

Nos. of slides : Minimum 2 nos.
For length more than 1800 mm or load more than 1000 kg, nos. of slides shall be minimum 3 nos.
For dimensions of slides, refer Table 1
Cross section of end traverse bolt; 100 X 100 mm (minimum)

1. SLIDE
2. UNDER SLIDE BOARD
3. BOTTOM BOARD
4. CARRIER TAVERSE BAR
5. SLING PLATE (END)
6. TRAVERSE BAR
7. BOLT, NUT & WASHER
8. DRAINAGE HOLES
9. NAILS

TOP FRAME ARRANGEMENT

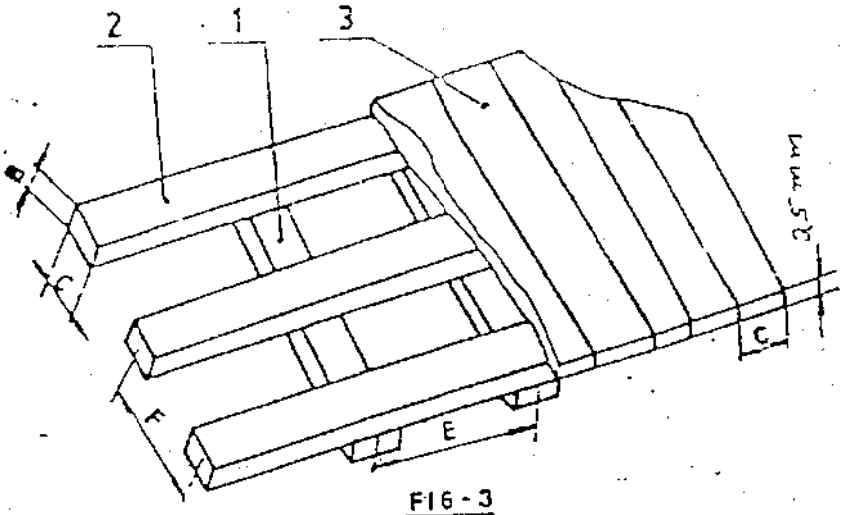
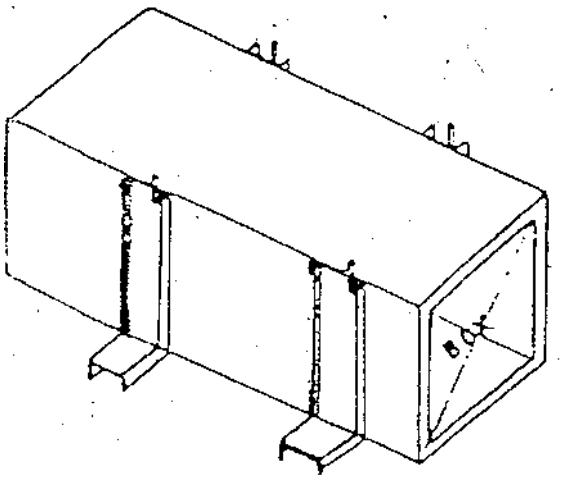


FIG-3

Dim F : 700 t. 1000 mm
Dim E : 500 t 900 mm
B X C : 30 X 100 mm.

1 – Treverse Bars
2 – Horizontal Beams
3 – Top Board

ARRANGEMENT OF C-CLAMPS AROUND CASES



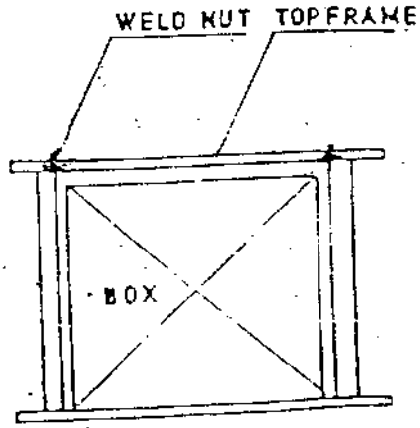


FIG: 4

ARRANGEMENT OF DIAGONAL BRACING AND HORIZONTAL SUPPORT

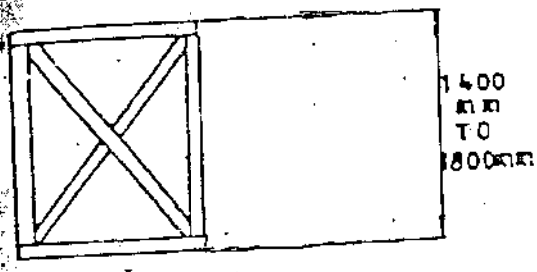


FIG: 6

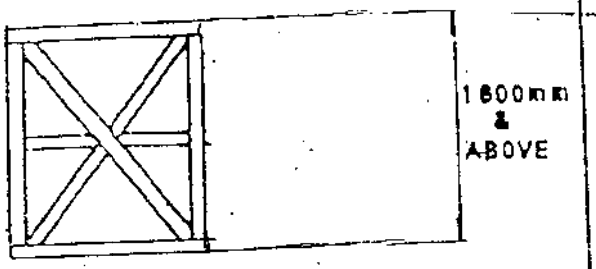


FIG: 8

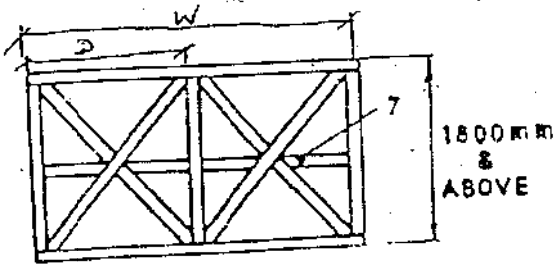


FIG: 9

7- Middle Horizontal Support

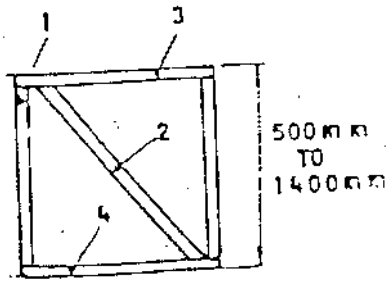


FIG: 5

1- Vertical Support
2- Diagonal Bracing
3- Upper Horizontal Support
4- Lower Horizontal Support

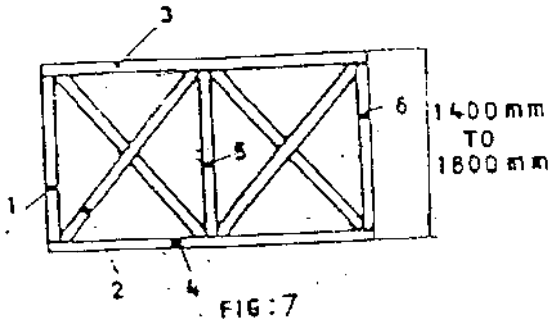
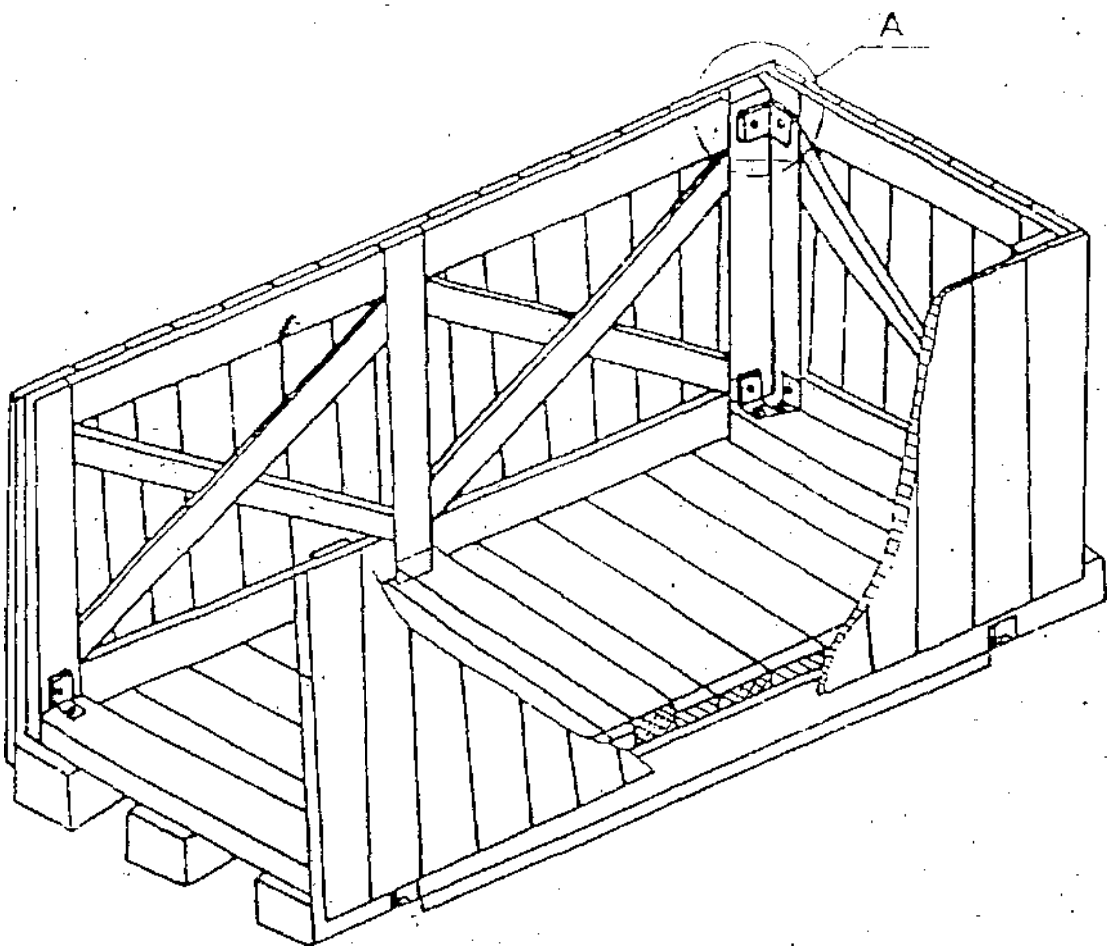


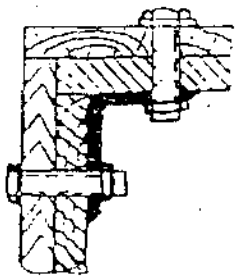
FIG: 7

1, 5, 6 - Vertical Support
2 - Diagonal Bracing
3 - Upper Horizontal Support
4 - Lower Horizontal Support

The dimensions of various items shall be as Table - 2

ARRANGEMENT OF PACKING CASE





DETAIL-A

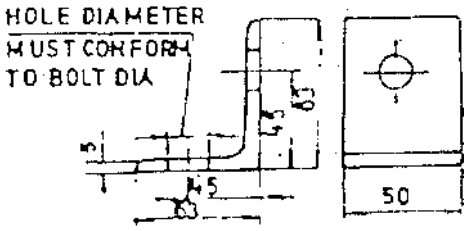


FIG:10

ARRANGEMENT OF SLING - PLATE ON CASES

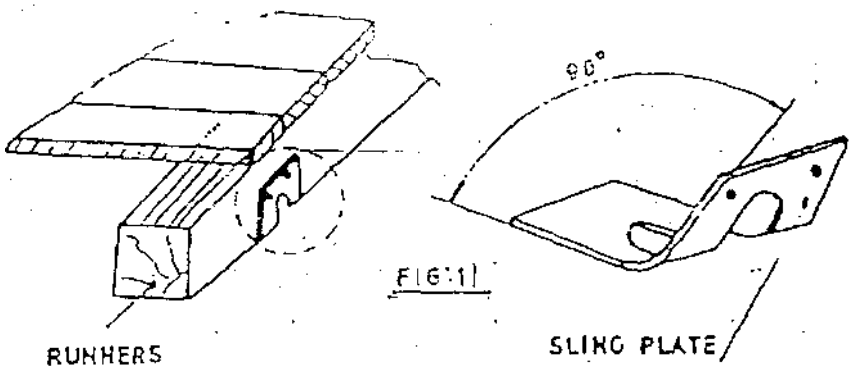


FIG:1

Table 1

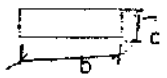
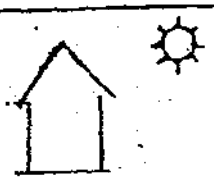
Load	Length of Slides 600	800	1000	1200	1300	1500	2000
	Cross Section b × c 						
500	50 × 100	50 × 100	50 × 100	50 × 100	75 × 100	75 × 100	100 × 100
800	50 × 100	50 × 100	75 × 100	75 × 100	75 × 100	75 × 100	100 × 100
1000	75 × 100	75 × 100	75 × 100	100 × 100	100 × 100	100 × 110	100 × 150
1500	75 × 100	75 × 100	100 × 100	100 × 100	100 × 100	100 × 150	100 × 150
2000	75 × 100	100 × 100	100 × 100	100 × 150	100 × 150	100 × 150	150 × 150
2500	75 × 100	100 × 100	100 × 150	100 × 150	100 × 150	150 × 150	150 × 150
3000	100 × 100	100 × 150	150 × 150	150 × 150	150 × 150	150 × 150	

Table 2

End and side Panels	Width of the panel W	Distance between longitudinal support DIM 'D'						
		600	800	1000	1200	1400	1600	1800
		Cross Section (b : c)			Item 1 to 7			
Fig 5	600 to 1200	30 x 100	30 x 100	30 x 100	30 x 130	30 x 130	30 x 130	30 x 130
to	1201 to 1600	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130
	1601 to 2000	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130
Fig 9	2001 to 3000	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	40 x 150
	3001 to 4000	30 x 130	30 x 130	40 x 150	40 x 150	40 x 150	40 x 150	40 x 150

INDICATION MARKS ON CASES

SL NO	INDICATION MARK	MEANING
1		TOP SIDE
2		KEEP AWAY FROM HEAT
3		SLINGING POSITION
4		FRAGILE MATERIAL TO BE HANDLED WITH CARE
5		CENTRE OF GRAVITY
6		KEEP DRY

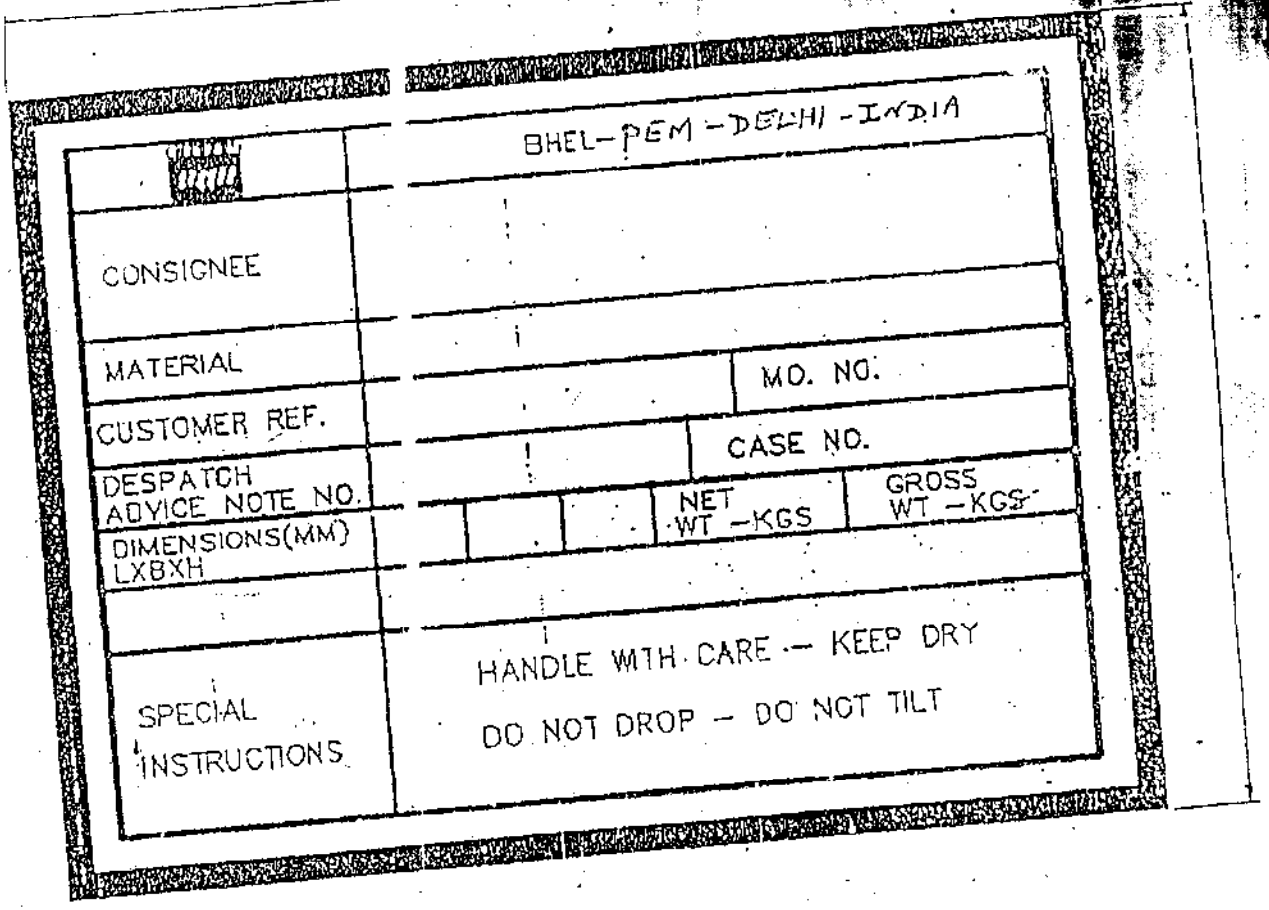
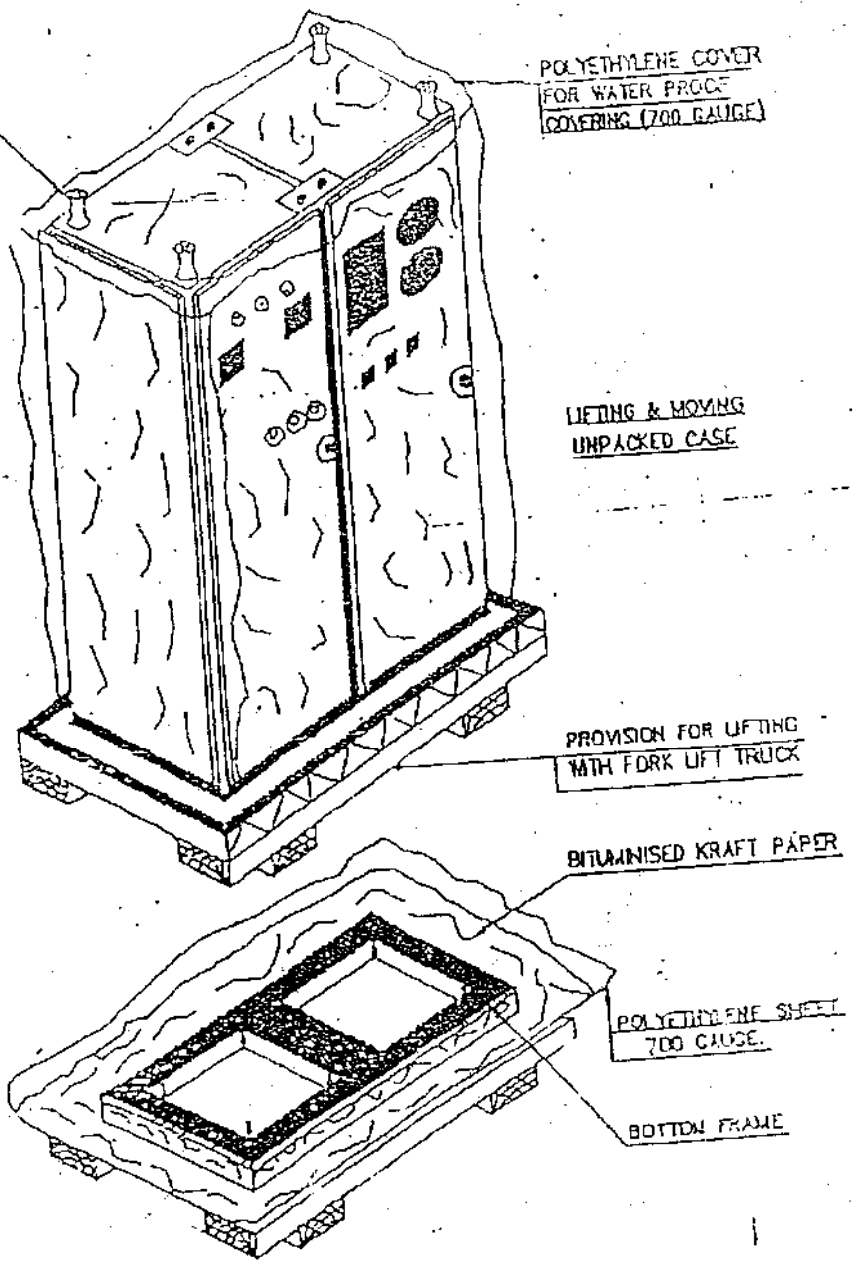


FIG-13: MARKING PLATE


EYE BOLT
POLYETHYLENE COVER
FOR WATER PROOF
COVERING (700 GAUGE)
LIFTING & MOVING
UNPACKED CASE
PROVISION FOR LIFTING
WITH FORK LIFT TRUCK
BITUMINISED KRAFT PAPER
POLYETHYLENE SHEET
700 GAUGE.
BOTTOM FRAME

FIGURE–14

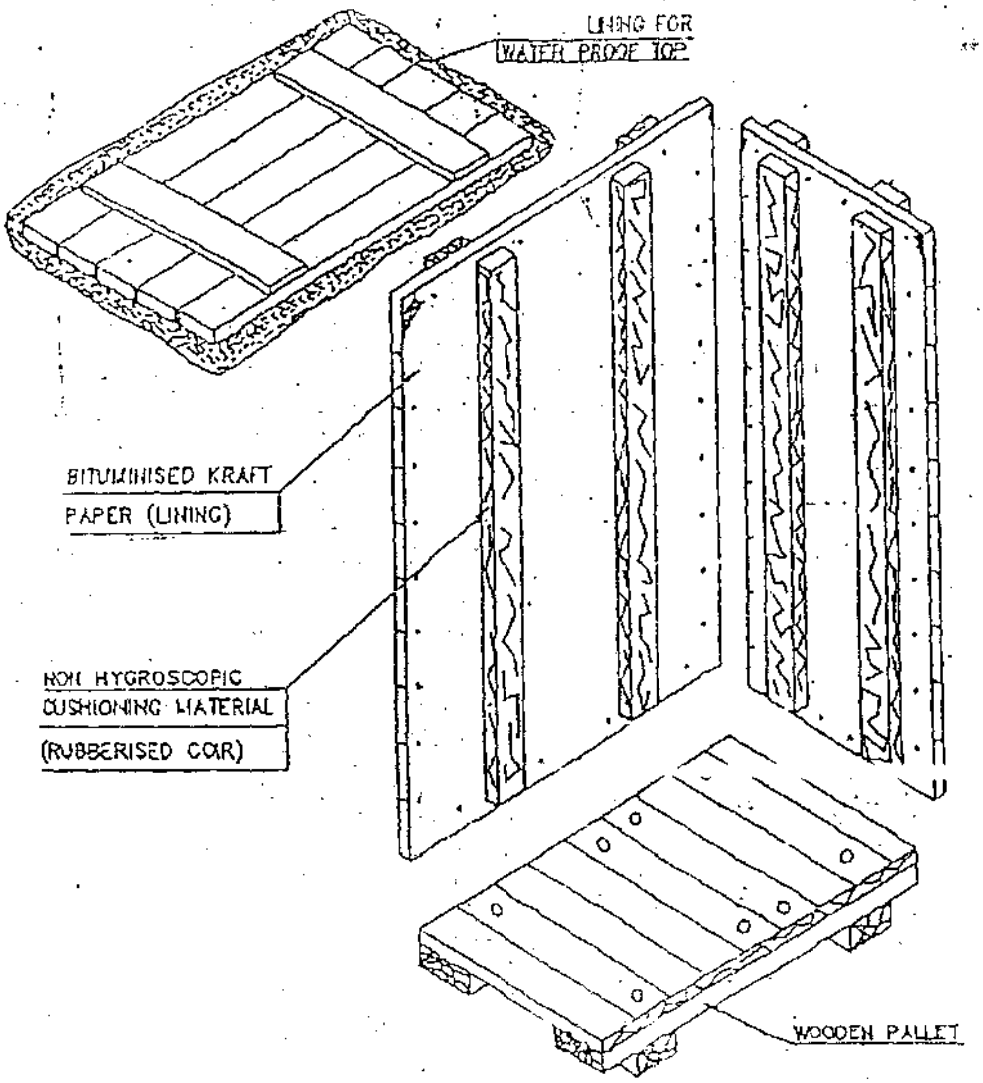

LINING FOR
WATER PROOF TOP
BITUMINISED KRAFT
PAPER (LINING)
NON HYGROSCOPIC
CUSHIONING MATERIAL
(RUBBERISED COIR)
WOODEN PALLET

FIGURE-15

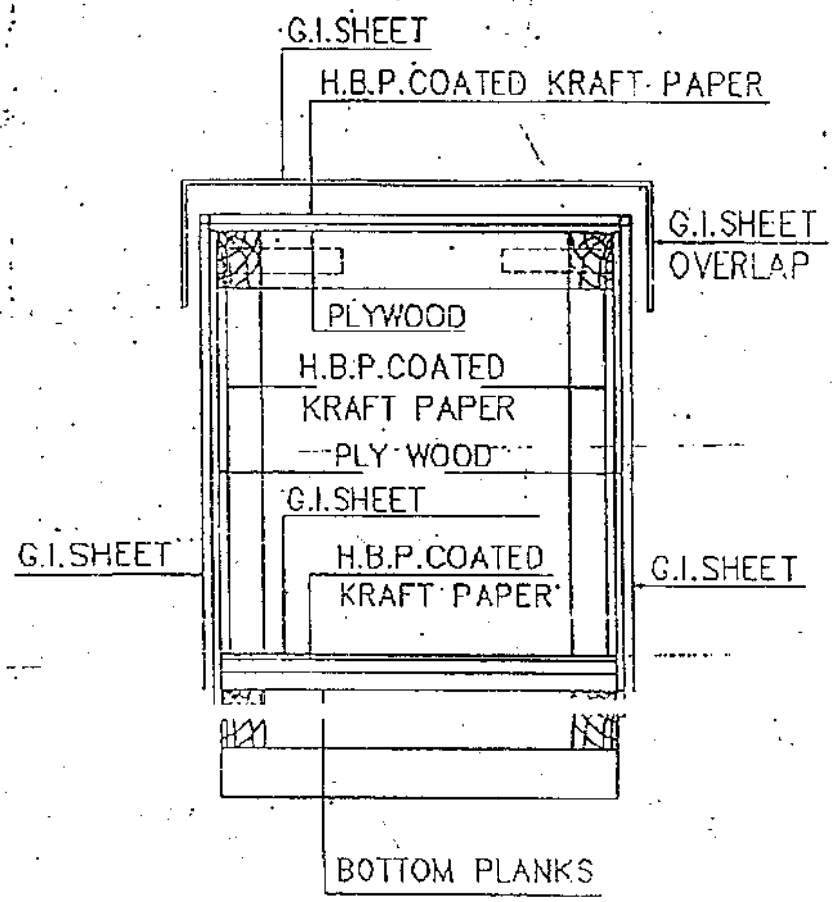


FIG-16 : CLOSED PACKING CASE WITH G.I.SHEET SHOWING LAYERS OF PACKING MATERIALS.