# BHARAT HEAVY ELECTRICALS LIMITED

**TRANSMISSION BUSINESS GROUP**
**SUBCONTRACTS MANAGEMENT**
**6TH FLOOR, BHEL SADAN,**
**PLOT NO. 25, SECTOR 16A, NOIDA,**
**DISTT. – GAUTAM BUDDH NAGAR (U.P.) - 201301**

## TENDER DOCUMENTS

**FOR**

**TENDER FOR PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT.**

## CUSTOMER

## POWERGRID CORPORATION OF INDIA LTD.

**TENDER SPEC. NO.: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26**

**DATE: 16.05.2025**

# TRANSMISSION BUSINESS GROUP

## SUBCONTRACTS MANAGEMENT

## INDEX

# BHARAT HEAVY ELECTRICALS LIMITED

**TRANSMISSION BUSINESS GROUP**

**SECTOR-16A, NOIDA -201301**

**e-mail: akmeena@bhel.in**


## NOTICE INVITING TENDER

**REF.: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26** **Date: 16.05.2025**

**SUB: TENDER FOR "PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT".**

**Dear Sirs,**

1. **Sealed tenders are invited for the following:**

| NAME OF WORK | TIME OF COMPLETION | EARNEST MONEY DEPOSIT | TENDER SUBMISSION DATE AND TIME | TENDER OPENING DATE & TIME |
|---|---|---|---|---|
| PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT | 31.05.2027 | NIL | On or before 28.05.2025 11.00 hrs. | 28.05.2025 16.00 hrs. (Technical bid only) |

2. Bidder **has** to submit offer directly through E-PROCURMENT MODE. Bidder may visit **https://eprocurebhel.co.in**

**Procedure for Submission of Tenders through e-tendering:** The tender is also floated online through our E-Procurement Site https://eprocurebhel.co.in . The bidder may respond by submitting their offer online in our e-Procurement platform at https://eprocurebhel.co.in

Offers are invited in two-parts only.

**Documents Comprising the e-Tender**

The tender shall be submitted online above as mentioned below:

**a) Technical Bid (Un priced Tender)**

All Technical details (e.g. Eligibility Criteria requested (as mentioned below)) should be attached in e-tendering module, failing which the tender stands invalid & may be REJECTED. Bidders shall furnish the following information along with technical tender (preferably in pdf format):

i) Technical Bid (without indicating any prices).

**b) Price Bid:**

i) Prices are to be quoted in the attached Price Bid format online on e-tender portal.

ii) The price should be quoted for the accounting unit indicated in the e-tender document.

iii) Note: It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.

iv) A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.

v) A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

**c)** Uploading of the price bid in prequalification bid or technical bid may RESULT IN REJECTION of the tender.

**d)** Tenders shall be uploaded with all relevant PDF/zip format. The relevant tender documents should be uploaded by an authorized person having Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION digital signature certificate (DSC).

3. **EMD is not applicable for this tender.**

4. **Bidders may please note that no other mode of bid submission shall be considered for evaluation apart from Clause no. 02 to 03 mentioned above.**

5. The prospective bidders who have downloaded the tender documents from our website are requested to send their acknowledgement and willingness to participate in the tender to the undersigned, through fax or email.

6. Offers should be strictly in accordance with the Tender Specifications and General Instructions to Tenderer enclosed herewith.

7. Reverse 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 as per RA Guidelines.

   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 price bid along with applicable loading, if any, shall be considered for ranking."

8. All documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder.

9. Clarifications, if any, can be obtained from the undersigned but such requests should be submitted well before the due date for submission of tenders. Due date for submission and opening of tenders will not be extended on such grounds.

10. Drawings & FQP enclosed with the NIT (if provided) are for tender purpose only. Drawings & FQP may get change during execution stage.

11. Construction/ RFC drawing/ Fronts/Inputs (if applicable) shall be furnished progressively as per project requirement and no claim towards idling charges/ project overheads etc. borne by the contractor on account of non-availability of drawings/ fronts/inputs shall be entertained.

12. Completion period of the work has been envisaged under best possible conditions. Any changes/ deviation during execution shall be dealt as per relevant clauses mentioned in terms and conditions of contract.

13. The offers of the bidders who are under suspension 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 web site www.bhel.com.

14. Integrity commitment, performance of the contract and punitive action thereof:

    14.1. Commitment by BHEL:

    BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

    14.2. Commitment by Bidder/ Supplier/ Contractor:

    14.2.1. The bidder/ supplier/ contractor commits to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally

entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

14.2.2. The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

14.2.3. The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on www. bhel.com and/or under applicable legal provisions".

15. Also, offer of the bidders who are suspended (under hold/ delist) for business dealings by BHEL, TBG shall not be considered. Please note that lifting/ restoration of suspension (Ban/Hold/ De-list) of business dealing is not automatic after expiry of specified suspension period. Hence, vendor shall be considered as suspended for business till suspension is lifted by BHEL in writing on specific request of the vendor as per extant guidelines.

16. BHEL Fraud Prevention Policy, "The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice."

17. Offers will be scrutinized based on the qualifying requirements and only those who are technically and financially capable to execute the Job and who fulfil the Pre-Qualifying Requirements (PQR) are eligible to quote against the above NIT. However, final acceptance of the bidder/ offer shall be subject to acceptance of our customer.

18. The evaluation currency for this tender shall be INR.

19. In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

    In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by toss/ draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).

    Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.

20. Technical Bid will be opened in the office of undersigned. If required, technical discussions will be held with only those bidders who have taken any deviations. The price bids will be opened subsequently, after Technical Bids of all the bidders have been evaluated and freezed. Bidders should quote their most competitive rates as there will not be any price negotiation. However, if felt necessary by BHEL, price negotiation will be held with lowest bidder (L-1) only.

21. In case any adverse information is received concerning performance, capability or conduct of the bidder after issue of tender enquiry, BHEL reserves the right to reject the offer at any stage as deemed fit.

22. Integrity Pact (IP) is not applicable for this tender.

23. Any materials (if required) for works have to be procured from Customer approved sources only. It will be the bidder's responsibility to get the approval of materials and vendors for materials.

24. The purchase preference for central P.S.U.s shall be given as per the prevailing Government policy.

25. In case an offer is not being submitted by the prospective bidders against this tender, they may send their "regret" letter to this office, for information.

26. Details of qualifying work(s) executed by the bidder will be forwarded to the principal employer for verification of the work with respect to completion, commencement & completion date and value of the work executed. Performance feedback of the bidder will also be sought from the principal employer.

27. The bidder representative may be called for discussion with the committee. His originals may be verified by the committee. In addition to above their organisation chart and detail list of manpower, tools & plants and technically capability will be discussed and ascertained by the committee.

Thanking you,

Yours faithfully,
For and on behalf of BHEL,

**(Ashok Kumar Meena)**
**Sr. DGM /TBSM**

## TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD

## ANNEXURE - X

**REF.: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26** **Date: 16.05.2025**

**SUB: TENDER FOR "PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT".**

It is certified that General Instructions and Information for tenderer have been read/ complied/ agreed to and each page of tender offer has been initialled and stamped.

Also It is being declares that we ( ……Bidder Name …….) 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 competiveness 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

(Signature of Tenderer)

Name and Designation of Authorised person (s)
Signing the tender on behalf of the tenderer

# ANNEXURE – Z

**REF.: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26** **DATE: 16.05.2025**

**SUB: TENDER FOR "PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT".**

**Subject: Authorization of representative who will participate in the Online Reverse Auction Process:**

| | | |
|---|---|---|
| 1 | NAME & DESIGNATION OF OFFICIAL | |
| 2 | POSTAL ADDRESS (COMPLETE) | |
| 3 | TELEPHONE NOS. (LAND LINE & MOBILE BOTH) | |
| 4 | FAX NO. | |
| 5 | E-MAIL ADDRESS | |
| 6 | NAME OF PLACE / STATE / COUNTRY, WHEREFROM S/HE WILL PARTICIPATE IN THE REVERSE AUCTION | |

# BHARAT HEAVY ELECTRICALS LIMITED
# TRANSMISSION BUSINESS GROUP, NOIDA
# PRE-QUALIFYING REQUIREMENTS

**REF.: .: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26** **DATE: 16.05.2025**

**SUB: TENDER FOR "PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT".**

Tenders (Under two-part bid system) are invited from competent contractors for subject works. Only those who are technically and financially capable to execute the Job and who fulfil the Pre-Qualifying Requirements [PQR] given under are eligible to quote against the above NIT. Tenderers should submit their offer as per the procedure specified in tender documents. The PQR of contractor for tender submission shall be is as under:

| Sl. No. | Criteria | Description |
|---|---|---|
| A | Turn Over | Bidders should have a minimum average annual turnover (Annual Gross Revenue from operations/ Gross operating income as incorporated in the profit & loss account excluding Other Income) of **₹ 50,58,217/- for last three fin. Years (2021-22, 2022-23 & 2023-24)** and should submit audited balance sheet and Profit & Loss Account Sheet of these years.<br>The audited financial statements must be signed by the owner and the auditor. Auditors seal, Name, Membership No., Firm Registration No. & firm name (if applicable), UDIN and the capacity in which he is signing (Proprietor/Partner), must be mentioned on the Profit & Loss A/c and Balance Sheet.<br>In case of proprietorship and partnership firms where Audited Profit & Loss A/c and Balance Sheet is not mandatory as per extant rules, CA certificate certifying turnover and profit for the required financial years must be submitted. CA certificate must be on his letter head mentioning his/her name, Membership No., Firm Registration No. & firm name (if applicable), UDIN, capacity in which he is signing (Proprietor/Partner), date and place of signing. |
| B | Profit & Networth | Bidder should have earned profit in at least one financial year during the period of last three Financial Years as per Sl. No. A above<br>and<br>Net worth of the Bidder based on the latest Audited Accounts as furnished for 'A" above should be positive. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies) |
| C | Similar Work | Bidder should have successfully **designed Steel structures and RCC structures including foundations for any industrial project/power sector project (refer Note-1) including Foundations.during last seven years ending on 30.04.2025** and should be either of the following:<br>i. Three similar jobs costing (except service tax/GST) not less than **₹ 67,44,290/-** each.<br>OR<br>ii. Two similar jobs costing (except service tax/GST) not less than **₹ 84,30,362/-** each.<br>OR<br>iii. One similar job costing (except service tax/GST) not less than **₹ 1,34,88,579/-**<br>In addition to the above, |

| | | |
|---|---|---|
| | | a) bidder should have an experience in design of lattice structures for switchyard/substation/transmission lines of 220kV and above rating.<br>b) The bidder must have a team with:<br>**One Lead Engineer**: Minimum **10 years** in Structure design. and<br>**Four RCC/Steel Structure Specialists**: Certified engineers with minimum 2 years relevant experience. |

Note:

1. Power Sector Projects shall include Substations/Switchyards/Power plants/Converter stations/Transmission lines (220kv or above) and Industrial Projects shall include - Oil & gas (refineries, pipelines)/Chemical & Process Industries/Metallurgical & mining/Cement plants/other Large industrial facilities
2. The bidder shall submit approved design document/Drawings of Switchyard tower/equipment structure and foundations in support of Switchyard rating.
3. The Bidder shall submit the Contract Agreement/Work Order/LOI along with BOQ and Performance/completion/execution certificate issued by customer in support of experience.
4. The word 'executed' means the bidder should have achieved the criteria specified in the PQR even if the total contract has not been completed or closed.
5. In order to technically qualify in this tender, bidder should meet all criteria i.e. A, B & C mentioned above.
6. If the job is completed in the last seven years period, as specified above, even if it has been started earlier, the same will also be considered meeting the qualifying requirements.
7. BHEL reserves the right to:
    a. Accept or reject any bid received at its discretion without assigning any reasons whatsoever.
    b. Postpone the above-mentioned date, split and distribute the work among more than one bidder without assigning any reason whatsoever.
    c. May ask for further qualification during techno commercial scrutiny of bids received.
    d. May ask for further proofs including TDS certificates/ Form 26AS/ Final bill/ payment detail for the said job for cross- verification.
    e. BHEL shall not be responsible for any delay, loss, damage for bids sent by post.
    f. BHEL shall not be liable for any expenses incurred by bidder in preparation of bid irrespective of whether it is accepted or not.
    g. Quotations received from bidders who do not fulfil the PQR shall be summarily rejected without any further evaluation and information to bidders.
    h. Canvassing i.e. soliciting favour, seeking advantage etc. in any form is strictly prohibited and any bidder found to have engaged in canvassing shall be liable to have his bid rejected summarily.
    i. If the bidder deliberately gives any wrong information in his tender to create in circumstances for the acceptance to his bid, BHEL reserves the right to reject such application.
    j. All corrigenda, addenda, amendments and clarifications to this Tender will be hosted in web page, www.bhel.com and https://eprocurebhel.co.in and not in the newspaper. Bidders shall keep themselves updated with all such amendments.

# PROJECT INFORMATION

**1.0 CUSTOMER:**

M/s POWERGRID CORPORATION OF INDIA LTD.

**2.0 PROJECT LOCATION AND DETAILS:**

**TENDER FOR "PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000 MW KHAVDA NAGPUR PROJECT".**

**3.0 CONTACT PERSON: FOR CONTRACTUAL ISSUES**

ASHOK KUMAR MEENA
Sr. DGM (TBSM)
SUBCONTRACTS MANAGEMENT,
TRANSMISSION BUSINESS GROUP,
Plot No. 25, Sector-16A, Noida,
Distt. Gautambudh Nagar, UP-201301

PHONE: 0120-674-8545/ 98310 38136
E-mail: akmeena@bhel.in

4.0 **CONTACT PERSON: FOR ENGINEERING ISSUES**

Ali Abbas
Sr. Manager (TBEM)
TRANSMISSION BUSINESS GROUP,
Plot No. 25, Sector-16A, Noida,
Distt. Gautambudh Nagar, UP-201301
PHONE: 0120-674- 8546/ 8800449777
E-mail: aliabbas@bhel.in

# TERMS AND CONDITIONS OF CONTRACT

The following terms and conditions shall form a part of the tender document.

## A. Terms and Condition of Contract:

### A.1. GENERAL INSTRUCTION

A.1.1. **All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof.** The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages.

A.1.2. Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., tenderer shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the tenderer in his offer. Non-compliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.

### A.2. PROCEDURE FOR SUBMISSION OF SEALED TENDERS

A.2.1. Bidders may please refer Cl no. 02 to Cl no. 03 of the Notice inviting tender.

A.2.2. The tenders received after the specified time of their submission shall be treated as 'Late Tenders' and shall not be considered under any circumstances.

A.2.3. Tenders shall be opened by the officers concerned of BHEL at the time, date and venue as specified in the tender enquiry. Tenderer or their authorized representative may witness the bid opening.

A.2.4. The tenderer shall closely pursue all the clauses, specifications and drawings indicated in the Tender Documents before quoting. Should the tenderer have any doubt about the meaning of any portion of the Tender Specifications or find discrepancies/omission in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, scope of work etc. he shall at once contact the authority inviting the tender for clarification before the submission of the tender.

A.2.5. Before submission of offer, the tenderer is advised to inspect the work & the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, sourcing of material and labour, means of transport and access to site/office, accommodation, etc. No claim will be entertained later on the grounds of lack of knowledge on any of these conditions/ resources.

A.2.6. Tenderer must fill up all the schedules and furnish all the required information as per the instructions given in various sections of the tender specification. Each and every page of the Tender Specification must be SIGNED AND SUBMITTED ALONG WITH THE OFFER by the Tenderer in token of complete acceptance thereof the information furnished shall be complete by itself.

A.2.7. The tenderer shall quote the rates in English Language and international numerals.

Total price offered should be entered in figures as well as in words. For the purpose of the tender, the metric system of units shall be used.

A.2.8. The tenderer shall quote a percentage above/ below/At Par the rates shown in the "Bill of Quantities Cum Price Schedule (Annexure-I)" of subject tender.

A.2.9. The quoted percentage will apply to the individual items of "Annexure-I i.e. Bill of Quantity Cum Price Schedule" uniformly.

A.2.10. All entries in the tender shall either be typed or be written legibly in ink. Erasing and overwriting are not permitted and may render such tender liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.

A.2.11. The tenderer must provide the registered e-mail of their registered office along with the addresses and authorised phone/mobile nos.

A.3. **ADJUSTMENT PRICE DISCREPANCY (IES): - Not Applicable being e procurement.**

A.4. **EVALUATION OF TECHNICAL BIDS**

A.4.1. Technical Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre-Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer.

The bidder's qualification shall be subject to submission of documentary proof. BHEL reserves the right to ask for further proofs including submission of TDS certificates/ for the said job.

A.4.2. In case the qualifying experience is claimed by private organizations based on Work Order and completion certificates from another private organization, BHEL reserves the right to ask for further proofs including submission of TDS certificates/ form 26AS /bills for the said job.

A.4.3. Credentials of all the bidders participating in open tender will be scrutinized thoroughly by the nominated committee w.r.t. the pre-qualifying requirement for the tender.

A.4.4. Details of qualifying work(s) executed by the bidder will be forwarded to the principle employer for verification of the work with respect to completion, commencement & completion date, scope and value of the work executed. Performance feedback of the bidder will also be sought from the principle employer.

A.4.5. BHEL may conduct onsite verification of at least one of the qualifying works to verify completion of the work and evaluate capability and performance of the bidder.

A.4.6. The bidder representative may be called for the discussion with the committee. His originals may be verified by the committee. In addition to above their organization chart and detailed list of manpower, tools & plants and technical capability may be discussed and ascertained by the committee.

A.5. **EVALUATION OF PRICE BIDS**

A.5.1. Price Bids of unqualified bidders shall not be opened.

A.5.2. The offers will be evaluated on the basis of total price basis (refer "BILL OF QUANTITY AND PRICE SCHEDULE) as shown in the price bid.

A.5.3. Reasons for rejection of the bid shall be intimated in due course after issue of LOI/LOA to successful bidder and receipt of unconditional acceptance of LOI /LOA from the successful bidder.

A.6. **DOCUMENTS TO BE ENCLOSED:**

Full information shall be given by the tenderer in respect of the following.

A.6.1. Tenders shall be signed by persons duly authorized/empowered to do so. An attested copy of the Power of Attorney to be submitted in all cases except where the sole proprietor is the signatory to the tender documents.

A.6.2. *PERMANENT ACCOUNT NUMBER:*

Certified copies of Permanent Account Numbers as allotted by Income Tax Department for the Company / Firm / Individual Partners, etc. shall be furnished along with tender.

A.6.3. AUDITED BALANCE SHEET AND INCOME TAX RETURN:

Copy of Audited Balance sheets and income tax return for last three financial years (financial years as specified in PQR).

A.6.4. SOLVENCY CERTIFICATE:

If asked in NIT, bidder should submit solvency certificate (not older than 12 months from date of tender notification) issued by any scheduled bank.

A.6.5. DOCUMENT RELATED TO INCORPORATION OF BUSINESS ENTITY:

A.6.5.1. IN CASE OF INDIVIDUALTENDERER:

His/her full name, address and place & nature of business.

A.6.5.2. *IN CASE OF PARTNERSHIP FIRMS:*

The names of all the partners with address. A copy of the partnership deed/instrument of partnership duly certified by the Notary shall be enclosed.

A.6.5.3. *IN CASE OF COMPANIES:*

Date & place of registration including date of commencement certificate in case of Public Companies and the nature of business carried on by the company. Certified copies of Memorandum and Articles of Association are also to be furnished.

A.6.6. Offer forwarding letter over the letterhead.

A.6.7. *Declaration sheets (As per Prescribed format) over the letter head*.

A.6.8. *No Deviation certificates (As per Prescribed format) over the letterhead.*

A.6.9. GST Registration certificate: -

All the data required to be enclosed with the tender need to be furnished neatly typed, signed & stamped in the given formats only (in the form of separate sheets)

failing which the tender may be considered as incomplete and is liable for rejection. Documentary proof wherever necessary also need to be enclosed.

A.7. **VALIDITY OF OFFER**

The rates in the Tender shall be kept valid for acceptance for a minimum period of **Four Months** from latest due date of offer submission (including extension(s), if any). In case BHEL (Bharat Heavy Electricals Limited) calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderer.

A.8. **REJECTION OF TENDER & OTHER CONDITIONS:**

A.8.1. The decision of acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever:

a) To reject any or all of the tenders.

b) To split up the work amongst two or more Tenderer as per NIT

c) To award the work in part as per NIT

d) In either of the contingencies stated in (b) and (c) above to modify the time for completion suitably.

A.8.2. Conditional tenders, unsolicited tenders, containing abnormally low/ unworkable rates & amounts, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc. are liable to be rejected.

A.8.3. Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL, or tenderer under suspension (hold / banning / delisted) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry / Commissions of Govt. of India. BHEL reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule in line with 'NIT'. The decision of BHEL will be final in this regard.

A.8.4. In case of any adverse information is received concerning performance, capability or conduct of the tenderer after issue of tender enquiry or opening of tender or award of work, BHEL reserves the right to reject the offer at any stage as deemed fit.

A.8.5. If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at its discretion, cancel such tender. If a partner of a firm expires after the submission of the tender or after the acceptance of the tender, BHEL may cancel such tender at its discretion unless the firm retains its character.

A.8.6. BHEL will not be bound by any Power of Attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. BHEL may, however, recognise such Power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.

A.8.7. If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract, if awarded, and forfeit the Earnest Money/Security Deposit/any other moneys due.

A.8.8. Canvassing in any form in connection with the tender is strictly prohibited and the tenders submitted by the tenderer who resorts to canvassing are liable to be rejected.

A.8.9. In case the Proprietor, Partner or Director of the Company / Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting tender shall be informed to the fact as per specified format along with the offer, failing this, BHEL may, at its sole discretion reject the tender or cancel the contract and forfeit the Earnest Money/ Security Deposit.

A.8.10. The successful tenderer should not sub-contract the part or complete work detailed in the tender specifications without written permission of BHEL.

A.8.11. Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-I party, then the awarded price i.e. contract value shall be worked out after considering the discount so offered.

A.8.12. BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

A.9. Consortium/ JV bidding is not allowed under this NIT.

## B. EARNEST MONEY DEPOSIT (EMD)

EMD is not applicable for this Tender.

## C. SECURITY DEPOSIT

Security Deposit means the security provided by the Contractor towards fulfilment of any obligations in terms of the provision of the contract.

C.1. Upon acceptance of Tender, the successful Tenderer should deposit the required amount of Security Deposit for satisfactory completion of work. **The total amount of Security Deposit will be 5% of the Contract Value. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.**

C.2. Mode of Security deposit:

The security Deposit should be furnished **before start of the work** by the contractor.

"Bidders 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 (Repo rate + 4%) 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 defined in NIT / Contract, from the bills along with due interest".

The balance amount to make up the required Security Deposit of 5% of the contract Value may be furnished in any of the following forms:

i) Cash (as permissible under the extant Income Tax Act)

ii) Local cheques of scheduled banks (subject to realization) / Pay Order / Demand Draft / Electronic Fund Transfer, in favour of BHEL.

iii) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format for Security Deposit shall be in the prescribed formats enclosed with general conditions of contract.

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

v) Securities available from Indian Post Offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly endorsed/hypothecated/pledged, as applicable, in favour of BHEL and duly discharged on the back).

vi) Insurance Surety Bonds

**(NOTE:** BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

C.3. Submission of Security Deposit:

i) At least 50 % of the required Security Deposit, including the EMD, shall be submitted before start of work. Balance of the Security Deposit can be submitted by way of deduction of 10% of the gross amount progressively from each running bills of the contractor till the total amount of the required Security Deposit is collected.

ii) In case of delay in submission of performance security, enhanced performance security which would include interest (Repo rate + 4%) for the delayed period, shall be submitted by the bidder

iii) If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or it shall be recovered from payment/s due to the Contractor.

iv) The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, at the discretion of BHEL.

C.4. The BG shall be submitted only through the Banker. Along with the BG, the Bank shall also furnish a letter of confirmation (in the prescribed formats enclosed with general conditions of contract).

C.5. The validity of the Bank Guarantee furnished towards Security Deposit shall be up to three months more than the period of completion of work as stipulated in the LOI and the same will be kept valid by proper renewal till the completion of the work.

C.6. BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the contractor's failure to fulfil any of the contractual obligations or in the event of termination of contract as per terms and conditions of the contract. BHEL reserves the right to set off the Security Deposit, against any claims of any other contracts with BHEL.

C.7. **Conditions for acceptance of bank guarantees**

Contractors are advice to obtain Bank Guarantee preferably from any of the following BHEL consortium banks

| Sl. No. | Name of Bank | Sl. No. | Name of Bank |
|---|---|---|---|
| 1 | State Bank of India | 11 | Punjab National Bank |
| 2 | Canara Bank | 12 | Union Bank of India |
| 3 | IDBI Bank Limited | 13 | Yes Bank Limited |
| 4 | ICICI Bank Limited | 14 | RBL Bank Ltd. |
| 5 | HDFC Bank Limited | 15 | Standard Chartered Bank |
| 6 | Axis Bank | 16 | Indian Overseas Bank |
| 7 | IndusInd Bank Limited | 17 | Kotak Mahindra Bank Limited |
| 8 | Bank of Baroda | 18 | Federal Bank Limited |
| 9 | Exim Bank | 19 | Hongkong and Shanghai Banking Corporation Ltd |
| 10 | Indian Bank | | |

Bank Guarantees from Banks outside BHEL's consortium shall be as below:

The Bank Guarantees of all Public sector banks can be accepted (in addition to consortium banks)

**The Bank Guarantees of Co-operative banks shall not be accepted.**

Bank Guarantees of other than consortium bank and public sector bank can be accepted subject to an overall exposure limit (at New Delhi) of Rs. 10 crores for banks with net worth of more than Rs. 500 crores as on last balance sheet date and Rs 5 crores for banks with net worth between Rs. 350 to Rs 500 crores (A certificate and copy of latest Balance Sheet to be given by the Bank at the time of submission of Bank Guarantees).

In case of private sector banks, a clause to be incorporated in the text of Bank Guarantee that it can be enforceable by being presented at any branch of the bank.

In case of foreign vendors, the bank guarantees issued by foreign banks may be confirmed by our consortium bank in India.

**In case of Bank Guarantees given by Non-Consortium banks (Private sector or Public sector), the Bank Guarantees are to be enforceable in New Delhi or the town/ city in which the sector office is located.**

C.8. **RETURN OF SECURITY DEPOSIT:**

If the contractor duly performs and completes the work in all respects to the entire satisfaction of BHEL and presents an absolute "No demand certificate", returns properties belonging to BHEL, taken, borrowed or hired by him for carrying out the said works, and furnishes performance bond BG in the prescribed proforma, Security Deposit will be released to the contractor after deducting all costs, expenses and other amounts that are to be paid to BHEL under this contract or other contracts entered into with the contractor.

**It may be noted that in no case the Security Deposit shall be refunded/released prior to passing of final bill.**

**D. Bank Account Details for submission of EMD/ Security Deposit through electronic fund transfer mode.**

| | |
|---|---|
| **NAME OF THE COMPANY** | **BHARAT HEAVY ELECTRICALS LTD** |
| **ADDRESS OF THE COMPANY** | **TRANSMISSION BUSINESS GROUP, 5TH FLOOR, BHEL TOWER, PLOT NO. 25, SECTOR-16A, NOIDA – 201301 (U.P.)** |
| **NAME OF BANK** | **STATE BANK OF INDIA** |
| **NAME OF BANK BRANCH** | **CAG-II NEW DELHI (17313)** |
| **CITY** | **NEW DELHI** |
| **ACCOUNT NUMBER** | **00000030206227732** |
| **ACCOUNT TYPE** | **CASH CREDIT** |
| **IFSC CODE** | **SBIN0017313** |

**E. Overall Quantity variation**-

The quantities indicated in "Bill of Quantity" attached with the tender are indicative only and individual quantity may vary up to any extent. However, agreed unit rates shall remain firm up to a variation of + 30% of the total value of the rate contract irrespective of variations in the quantity of individual items.

**F. INCOME TAX/SALES TAX/WORKS TAX**

a. All taxes (except GST), duties, charges, royalties, cess and any other levies by Central/ State/local authorities for the execution of the contract shall be borne by the contractor and shall not be payable extra. Any increase of the same at any stage during execution of the contract shall be borne by the contractor. Quoted price of the same shall be inclusive of all such requirements.

b. GST along with Cess (as applicable) legally leviable & payable by successful bidder as per GST Law shall be paid by BHEL, extra. Hence, bidder shall not include GST along with Cess (as applicable) in their quoted rates/ price.

c. Contractors have to make their own arrangement at their cost for completing the formalities, if required with relevant taxation authorities, for bringing their material, plant and machinery at site for the execution of the contract. Road permits / way bill, if required shall be arranged by the contractor.

d. Contractor shall furnish proof of GST registration with GSTN Portal covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by contractor on BHEL for this project / work. However, in case contractor submits GST Registration of a state other than the state wherein the site is located, then contractor has to submit an undertaking that contractor is not liable to take registration in the state wherein the site is located as per the provision of Place of Supply under CGST/SGST/IGST Act. BHEL will not be held responsible for any non-compliance of the Contractor in respect of GST laws as framed from time to time.

e. Contractor shall comply with all statutory amendment/notifications in this respect

f. Contractor shall submit the tax invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred thereunder). In case of raising any Supplementary Tax Invoice (Debit / Credit Note), contractor shall issue the same containing all the details as referred in Section 34 read with Section 31 of GST Act & Rules referred there under. Contractor shall comply with the Time Limit prescribed under the GST Law and rules thereof for raising the Tax Invoice

g. Goods and Service Tax (GST) will be reimbursed to the Contractor subject to the following conditions: -

i. Submission of valid GST Compliant Tax Invoice as per the GST Invoice Rules.
ii. The Invoice raised by the Contractor should indicate the BHEL GST Registration Number.)
iii. Contractor shall upload the invoices raised on BHEL in IFF/GSTR-1 within the prescribed time as given in the GST Act.
iv. Invoice raised and uploaded in IFF/GSTR-1 by the Contractor should be available to BHEL in FORM GSTR-2B electronically through the common portal.
v. Confirmation of payment of such GST to the Government through filing of GSTR-3B of corresponding month/quarter.

h. The GST amount should get reflected within prescribed time limit in the GSTN for BHEL to avail the input credit. If the GST Credit is reversed/ denied/ delayed to BHEL due to non-receipt/delayed receipt of Services and/or tax invoice or due to expiry of timeline prescribed in GST law or due to any other factor for availing such Input Tax Credit (ITC) or for any other reason arising out of the act directly attributable to the Contractor, GST amount shall be recoverable from Contractor from any dues payable to the Contractor along with any interest levied/ leviable on BHEL.

i. Statutory variation, if any, on account of GST will be payable by BHEL at actuals on submission of documentary evidence.

j. TDS under Income Tax Act/ GST Act shall be deducted as per applicable rates unless Exemption certificate, if applicable, from the appropriate Authority is furnished to BHEL along with the Invoice.

K. **New Taxes & duties (Introduced after tender opening date):**

If any new tax or duty is levied by the Central/State Government/Municipality/Local Authority and becomes directly applicable on items specified in the Bill of Quantities, full reimbursement shall be made subject to submission of documentation as per statute.

**G. "Over run charges"**

No overrun charges are payable under the contract.

**H. "secured advance"**

No advance on materials shall be payable under the contract.

**I. "Price Variation"**

Price Variation Clause in not Applicable for this tender.

**J. <u>LIQUIDATED DAMAGES/PENALTY CLAUSE:</u>**

If the contractor fails to complete the works within the specified time from inputs as mentioned in time schedule in Clause No. 7.0.0 of technical specification or within the amended time schedule/ time extension as granted by the BHEL, then BHEL shall have the right to deduct liquidated damage/penalty @ 0.5% of the contractual value per week of delay or part thereof, subject to a maximum of 10% of the contract price. Once the maximum limit of delay is reached (i.e. 20 week of delay) BHEL may consider termination of the contract and forfeit the Security deposit without prejudice to the other remedies under the contract.

Amended/revised contract value (excluding ORC, Supplementary/ Additional works) shall be considered for calculating LD/ penalty.

**K. TERMS OF PAYMENT:**

| Sl.No. | Condition | Payment |
|---|---|---|
| Item Nos 1, 2, 3 & 4 of Sch./BOQ of Items | | |
| (a) | On approval of design documents / drawings (at least Cat 2 i.e. approved with comments) | 75% of quoted rate |
| (b) | Approval of design documents / drawings in Cat-I | 20% of quoted rate. |
| (c) | Submission of as-built drawings | 5% of quoted rate. |
| Item No 5 | | |
| (a) | On approval (at least Cat 2 i.e. approved with comments) of architectural drawings. | 10% of quoted rate on pro-rata basis. |
| (b) | On approval (at least Cat 2 i.e. approved with comments) of design documents. | 20% of quoted rate on pro-rata basis. |
| (c) | On approval (at least Cat 2 i.e. approved with comments) of construction/ structure / fabrication drawings. | 45% of quoted rate on pro-rata basis. |
| (d) | On approval (at least Cat 2 i.e. approved with comments) of plumbing, sanitary & other miscellaneous drawings. | 10% of quoted rate on pro-rata basis. |
| (e) | Approval of all documents in Cat-I | 10 % of quoted rate. |
| (f) | Submission of as-built drawings | 5% of quoted rate. |
| Item No 6 of Sch./BOQ of Items | | |
| (a) | On submission of claim after completion of visit. | 100 % of quoted rate. |

## L. PROGRESSIVE PAYMENT/ FINAL PAYMENT:

### L.1. Running Account Bills (RA Bills)

i) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).

ii) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents.

iii) Recoveries on account of electricity, water, statutory deductions etc. are made as per terms of contract.

iv) Payment of particular BOQ item for the work done shall be allowed only if the quantum of work has been done as per the specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to redo the work according to the required specifications, without any extra cost.

v) The contractor shall submit his monthly RA bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month.

vi) Mode of payment and measurement of work completed shall be as per relevant clauses of General Conditions of Contract

vii) Release of payment in each running bill including PVC Bills where ever applicable will be as per stages of progressive pro rata payments.

viii) The contractor will be eligible for payment of RA Bills within 30 days of submission of running bill complete in all respects with all documents. It is the responsibility of the contractor to make his own arrangements for making timely payments towards labour wages, statutory payments, outstanding dues etc. and other dues in the meanwhile.
All documents like HR Clearance, Quality and Safety Compliances etc. required for processing the RA Bills should be submitted along with RA Bills.

ix) BHEL shall release payment through Electronic Fund Transfer (EFT)/RTGS. In order to implement this system, Contractor to furnish details pertaining to his Bank Accounts where proceeds will be transferred through BHEL's banker, as per prescribed formats.

**For MSMEs, at the time of submission of first RA bill, the subcontractor has to declare whether it is registered on RXIL portal and wishes to receive the proceeds through RXIL portal throughout the contract duration**

**L.1.1. Documents required for RA Bill** (in addition to documents required as per SCOPE, SPECIFIC TECHNICAL REQUIREMENT AND SCHEDULE OF ITEMS)**:**

a) GST Complied Invoice of the work done as per approved BOQ.
b) Jointly signed Measurement sheet.
c) Validity of SD Bank Guarantees as applicable under the contract.
d) Power of Attorney for representative signing bill etc, if not submitted earlier.
e) Any other documents as per customer/statutory requirement

### L.2. Final Bill:

**L.2.1.** Final Bill' is used for final payment on closing of Running Account for works or for single payment. 'Final Bill' shall be submitted as per prescribed format after completion of works as per scope, approval of final report by customer, removal of temporary structures from site. BHEL shall settle the final bills after deducting all liabilities of Contractor to BHEL.

**L.2.2. Documents required for Final Bill** (in addition to documents required as per SCOPE, SPECIFIC TECHNICAL REQUIREMENT AND SCHEDULE OF ITEMS):

a. GST Complied Invoice of the work done as per approved BOQ.
b. Jointly signed Measurement sheet, WAM-10 (if applicable)
c. Valid Bank Guarantees as applicable under the contract.
d. 'No claim' certificate from the contractor.
e. Deviation statement showing the Executed quantities and quantities as per the contract.
f. Power of Attorney for representative signing bill etc, if not submitted earlier.
g. Final Delay Analysis, if applicable
h. Any other documents as per customer requirement/statutory requirement.

## Annexure A to Terms and Conditions

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| **1** | **RIGHTS OF BHEL** |
| | BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any Compensation. |
| 1.1. | To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons/ BHEL's obligation to its customer.<br>In case of inadequate manpower deployed by the contractor, BHEL reserves the right to deploy additional manpower through any other agency for expediting activities in the interest of the project. Supplied manpower shall be put on job by the contractor and payments and other statutory compliances related to manpower shall be the contractor's responsibility. In case of contractor's failure to fulfil his obligations in respect of such manpower, BHEL reserves the right to take necessary action as per contract conditions. |
| **1.2** | **BREACH OF CONTRACT, REMEDIES AND TERMINATION** |
| **1.2.1** | The following shall amount to breach of contract:<br>I. Non-supply of material/ non-completion of work by the Supplier/Vendor within scheduled delivery/ completion period as per contract or as extended from time to time.<br>II. The Supplier/Vendor 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.<br>III. The Supplier/Vendor delivers equipment/ material not of the contracted quality.<br>IV. The Supplier/Vendor fails to replace the defective equipment/ material/ component as per guarantee clause.<br>V. Withdrawal from or abandonment of the work by the Supplier/Vendor before completion as per contract.<br>VI. Assignment, transfer, subletting of Contract by the Supplier/Vendor without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.<br>VII. Non-compliance to any contractual condition or any other default attributable to Supplier/Vendor.<br>VIII. Any other reason(s) attributable to Vendor towards failure of performance of contract. In case of breach of contract, BHEL shall have the right to terminate the Purchase Order/ Contract either in whole or in part thereof without any compensation to the Supplier/Vendor.<br>IX. Any of the declarations furnished by the contractor at the time of bidding and/ or entering into the contract for supply are found untruthful and such declarations were of a nature that could have resulted in non-award of contract to the contractor or could expose BHEL and/ or Owner to adverse consequences, financial or otherwise.<br>X. Supplier/Vendor is convicted of any offence involving corrupt business practices, antinational activities or any such offence that compromises the |

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| | business ethics of BHEL, in violation of the Integrity Pact entered into with BHEL has the potential to harm the overall business of BHEL/ Owner.<br>Note- Once BHEL considers that a breach of contract has occurred on the part of Supplier/Vendor, BHEL shall notify the Supplier/Vendor by way of notice in this regard. Contractor shall be given an opportunity to rectify the reasons causing the breach of contract within a period of 14 days.<br><br>In case the contractor fails to remedy the breach, as mentioned in the notice, to the satisfaction of BHEL, BHEL shall have the right to take recourse to any of the remedial actions available to it under the relevant provisions of contract. |
| | **<u>LD against delay in executed work in case of Termination of Contract:</u>** |
| | LD against delay in executed work shall be calculated in line with relevant LD clause of GCC, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.<br><br>Method for calculation of "LD against delay in executed work in case of termination of contract" is given below.<br>o Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T1<br>o Let the value of executed work till the time of termination of contract= X<br>o Let the Total Executable Value of work for which inputs/fronts were made available to contractor and were planned for execution till termination of contract = Y<br>o Delay in executed work attributable to contractor i.e. T2=[1-(X/Y)] x T1<br>o LD shall be calculated in line with LD clause of the Contract for the delay attributable to contractor taking "X" as Contract Value and "T2" as period of delay attributable to contractor. |
| **1.2.2** | **REMEDIES IN CASE OF BREACH OF CONTRACT** |
| | i) Wherein the period as stipulated in the notice issued under clause "**BREACH OF CONTRACT, REMEDIES AND TERMINATION"** of GCC has expired and Contractor has failed to remedy the breach, BHEL will have the right to terminate the contract on the ground of "Breach of Contract" without any further notice to contractor.<br><br>ii) Upon termination of contract, BHEL shall be entitled to recover an amount equivalent to 10% of the Contract Value for the damages on account of breach of contract committed by the Contractor. This amount shall be recovered by way of encashing the security instruments like performance bank guarantee etc available with BHEL against the said contract. In case the value of the security instruments available is less than 10% of the contract value, the balance amount shall be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, from the money due to the Contractor etc. with BHEL) or the other legal remedies shall be pursued.<br><br>iii) wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is 10% of the contract value or more, such security instruments to the extent of 10% contract value will be encashed. In case no security instruments are available or the value of the security instruments available is less than 10% of the contract value, the 10% of the contract value or the balance amount, as the case may be, will be recovered in all or any of the following manners: |

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| | iv) In case the amount recovered under sub clause above is not sufficient to fulfil the amount recoverable then; a demand notice to deposit the balance amount within 30 days shall be issued to Contractor.<br><br>v) If Contractor fails to deposit the balance amount within the period as prescribed in demand notice, following action shall be taken for recovery of the balance amount:<br><br>a. from dues available in the form of Bills payable to defaulted Contractor against the same contract.<br>b. If it is not possible to recover the dues available from the same contract or dues are insufficient to meet the recoverable amount, balance amount shall be recovered from any money(s) payable to Contractor under any contract with other Units of BHEL including recovery from security deposits or any other deposit available in the form of security instruments of any kind against Security deposit or EMD.<br>c. In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted Contractor.<br>vi) It is an agreed term of contract that this amount shall be a genuine pre-estimate of damages that BHEL would incur in completion of balance contractual obligation of the contract through any other agency and BHEL will not be required to furnish any other evidence to the Contractor for the purpose of estimation of damages.<br>vii) In addition to the above, imposition of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract.<br><br>**Note:**<br>1) The defaulting contractor shall not be eligible for participation in any of the future enquiries floated by BHEL to complete the balance work. The defaulting contractor shall mean and include:<br>(a) In case defaulted contractor is the Sole Proprietorship Firm, any Sole Proprietorship Firm owned by same Sole Proprietor.<br>(b) In case defaulted contractor is The Partnership Firm, any firm comprising of same partners/ some of the same partners (but not including any new partner); or sole proprietorship firm owned by any partner(s) as a sole proprietor. |
| 1.3 | In case Contractor fails to deploy the resources as per requirement informed by BHEL in writing to expedite the work, BHEL can deploy own/hired/otherwise arranged resources and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC. |
| 1.4 | To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, whatsoever. |
| 1.5 | Whenever any Claim or Claims for payment of any sum of money(s) arises under this or any other contract against the contractor, BHEL shall be entitled to withhold and also have a lien to retain such sum of money(s) in whole or in part from any money(s) payable to contractor and/or security deposits furnished or deducted in cash from the bills of contractor, (if any) under this contract. In the event of the securities or the amounts payable to Contractor, being insufficient to cover BHEL claims, then BHEL shall be entitled to withhold and have a lien to the extent of such claims from any sum or sums found payable or which at any time thereafter may become payable to the contractor under this or any other contract with BHEL.<br>a) Claim or Claims for payment of any sum of money(s) arising from the Contractor under this or any other contract against the contractor, shall mean, the sum of money(s) actually incurred by BHEL in fulfilling the contractual responsibilities of |

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| | contractor under the contract, to which he has failed to fulfil plus applicable overheads (@ 5%) along with interest as applicable under the Contract on total amount (i.e. money actually incurred plus overheads)<br>b) It is an agreed term of the contract that, the sum or sums of money so withheld or retained under the lien by BHEL will be kept withheld or retained as such by BHEL till the claims arising out of this or any other contract are finally adjudicated wither through Arbitration or a Court of competent jurisdiction as the case may be in accordance with the terms of contract. Intimation given by the BHEL Engineer regarding withholding of such money(s) shall be considered as sufficient and relevant date for all purposes. No Interest shall be payable on such sum(s) of money which becomes due or as the case may be adjudged to be due from BHEL to Contractor, whether under contract or otherwise.<br>c) Where the contractor is a partnership firm, BHEL shall be entitled to withhold and also have a lien to retain towards such claims in whole or in part, from any other money(s) payable to any partner, whether in his individual capacity or otherwise.<br>d) If any money(s) shall, as a result of any claim or application made under the relevant provisions of any Labour Welfare Act and/ or Rules, including but not limited to Contract Labour Regulation & Abolition Act, Minimum Wages Act, Payment of Gratuity Act, BOCW (RE&CS) Act, Provident Fund Act, Employee State Insurance Act, be directed to be paid by the BHEL, such money shall be deemed to be moneys payable to the BHEL by the Contractor.<br>**e)** Where the Contractor fails to repay to BHEL such moneys along with applicable overheads (@ 5%) and interest, as aforesaid within seven days of being demanded, BHEL shall be entitled to recover the same from Contractor's bills/ Security Deposit or any other money(s) payable to Contractor under this Contract or any other Contract with BHEL. |
| 1.6 | While every endeavour will be made by BHEL to this end, yet BHEL cannot guarantee uninterrupted work due to conditions beyond its control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract. |
| 1.7 | BHEL may permit or direct contractor to demobilize and remobilize at a future date as intimated by BHEL in case of following situations for reasons other than Force majeure conditions and not attributable to contractor:<br>i) suspension of work(s) at a Project either by BHEL or Customer,<br>or<br>ii) where work comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than three months<br>In such cases, charges towards demobilization and remobilization shall be as decided by BHEL after successful remobilization by contractor at site, and decision of BHEL shall be final and binding on the contractor. After remobilization, all conditions as per contract shall become applicable. In case Contractor does not remobilize with adequate resources or does not start the work within the period as intimated, then BHEL reserves the right to terminate the contract and effect remedies under Clause "**Remedies in case of Breach of Contract"** In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor. |
| **1.8** | In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts etc. due to which inordinate discontinuity of work is anticipated, BHEL on its own or |

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| | contractor's request at its discretion may consider to short close the contract in any of the following cases:<br><br>a) The balance works (including but not limited to Trial Operation, PG Test etc.) are minor vis a vis the scope of work envisaged as per the contract.<br><br>b) There has been no significant work in past 6 months OR no significant work is expected in next 6 months (example in Hydro projects or in projects where work has stopped due to reasons beyond the control of BHEL).<br><br>c) The balance works cannot be done within a reasonable period of time as they are dependent on unit shut down or on other facilities of customer or any other such reasons not attributable to the contractor.<br><br>At the point of requesting for short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work (or estimated value of services to be provided for carrying out milestone/stage payments like Trial Operation/PG Test etc.) as decided by BHEL, shall however be reduced from the final contract value.<br><br>**Note:** The Contractor shall not be eligible for any compensation on account of Quantity Variation arising out of short-closure of contract as per clause above. |
| **2** | **CONFLICT OF INTEREST AMONG BIDDERS/AGENTS** |
| | *"A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests.* ***The bidder found to have a conflict of interest shall be disqualified.*** *A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:*<br><br>a. they have controlling partner (s) in common; **or**<br>b. they receive or have received any direct or indirect subsidy/ financial stake from any of them; **or**<br>c. they have the same legal representative/agent for purposes of this bid; **or**<br>d. they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; **or**<br>e. Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; **or**<br>f. In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorise *only one agent/dealer. There can be only one bid from the following:*<br>i. *The principal manufacturer directly or through one Indian agent on his behalf; and*<br>ii. *Indian/foreign agent on behalf of only one principal;* ***OR*** |

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| | iii. *A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; OR*<br>iv. *In case of it holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business.* " |
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| **3** | **BOCW (CESS):** |
| | Deleted. |
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| **4** | **ROYALTY** |
| | Deleted. |
| | |
| 5 | **ISSUE OF MATERIAL BY BHEL (IF APPLICABLE AS PER BOQ AND SCOPE)** |
| | **Not Applicable** |
| 6 | **CLOSING OF CONTRACTS** |
| | The Contract shall be considered completed and closed upon completion of contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a performance/ experience certificate as per standard format, based on specific request of Contractor as per extant BHEL guidelines through the online portal available at https://siddhi.bhel.in only. |
| | |
| 7 | **SUSPENSION OF BUSINESS DEALINGS** |
| | BHEL reserves the right to act against Contractors who either fail to perform or Tenderers/Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.<br>The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms / principal / agents, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com.<br>If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution stage indulges in any act, including but not limited to, mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or tampers the tendering process or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, or does anything which is actionable under the Guidelines for Suspension of Business dealings, action may be taken against such bidder / supplier / contractor as per extant guidelines of the company available on www.bhel.com and / or under applicable legal provisions. Guidelines for suspension of business dealings is available in the webpage:<br>http://www.bhel.com/vender_registration/vender.php |

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| 8 | **SETTLEMENT OF DISPUTE** |
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| | If any dispute or difference of any kind whatsoever shall arise between BHEL and the Supplier/Vendor, arising out of the contract for the performance of the work whether during the progress of contract termination, abandonment or breach of the contract, it shall in the first place referred to Designated Engineer for amicable resolution by the parties. Designated Engineer (to be nominated by BHEL for settlement of disputes arising out of the contract) who within 60 days after being requested shall give written notice of his decision to the contractor. Save as hereinafter provided, such decision in respect of every matter so referred shall forthwith be given effect to by the Supplier/Vendor who shall proceed with the work with all due diligence, whether he or BHEL desires to resolve the dispute as hereinafter provided or not. |
| | If after the Designated Engineer has given written notice of this decision to the party and no intention to pursue the dispute has been communicated to him by the affected party within 30 days from the receipt of such notice, the said decision shall become final and binding on the parties. In the event the Supplier/Vendor being dissatisfied with any such decision or if amicable settlement cannot be reached then all such disputed issues shall be resolved through conciliation in terms of the BHEL Conciliation Scheme 2018 as per Clause "Conciliation" of GCC. |
| 8.1 | **CONCILIATION** |
| | Any dispute, difference or controversy of whatever nature howsoever arising under or out of or in relation to this Agreement (including its interpretation) between the Parties, and so notified in writing by either Party to the other Party (the "Dispute") shall, in the first instance, be attempted to be resolved amicably in accordance with the conciliation procedure as per BHEL Conciliation Scheme 2018. 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 - "Procedure for conduct of conciliation proceedings" (as available in www.bhel.com)).<br>Note: Ministry of Finance has issued OM reference No. 1/2/24 dated 03.06.2024 regarding "Guidelines for Arbitration and Mediation in Contracts of Domestic Public Procurement. In the said OM it has been recommended that Government departments/<br>Entities/agencies are to encourage mediation under the Mediation Act. 2023. The said Act has not yet been notified by the Government. Therefore, the clause "**Settlement of Disputes**" shall be modified accordingly as and when the Mediation Act 2023 gets notified. |
| **8.2** | **ARBITRATION:** |
| 8.2.1 | Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided in Clause "**Conciliation**" herein above or otherwise) 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 (hereinafter referred to as the 'Dispute'), then, either Party may, refer the disputes to Arbitral Institution i.e. **"India International Arbitration Centre (IIAC) Delhi"** and such dispute to be adjudicated by Sole Arbitrator appointed in accordance with the Rules of said Arbitral Institution. |
| 8.2.2 | A party willing to commence arbitration proceeding shall invoke Arbitration Clause by giving notice to the other party in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice') before referring the matter to arbitral institution. The Notice shall be addressed to the **Executive Director, TBG, BHEL, Noida**, executing the Contract and shall contain the particulars of all claims to be referred to |

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| | arbitration with sufficient detail and shall also indicate the monetary amount of such claim including interest, if any. |
| 8.2.3 | After expiry of 30 days from the date of receipt of aforesaid notice, the party invoking the Arbitration shall submit that dispute to the Arbitral Institutions and that dispute shall be adjudicated in accordance with their respective Arbitration Rules. The matter shall be adjudicated by a Sole Arbitrator who shall necessarily be a Retd. Judge having considerable experience in commercial matters to be appointed/nominated by the respective institution. The cost/expenses pertaining to the said Arbitration shall also be governed in accordance with the Rules of the respective Arbitral Institution. The decision of the party invoking the Arbitration for reference of dispute to a specific Arbitral institution for adjudication of that dispute shall be final and binding on both the parties and shall not be subject to any change thereafter. The institution once selected at the time of invocation of dispute shall remain unchanged. |
| 8.2.4 | The fee and expenses shall be borne by the parties as per the Arbitral Institutional rules. |
| 8.2.5 | The Arbitration proceedings shall be in English language and the seat and venue of Arbitration shall be **Delhi.** |
| 8.2.6 | Subject to the above, the provisions of Arbitration & Conciliation Act 1996 and any amendment thereof shall be applicable. All matters relating to this Contract and arising out of invocation of Arbitration clause are subject to the exclusive jurisdiction of the Court(s) situated at **Delhi.** |
| 8.2.7 | Notwithstanding any reference to the Designated Engineer or Conciliation or Arbitration herein, a. the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree. Settlement of Dispute clause cannot be invoked by the Contractor, if the Contract has been mutually closed or 'No Demand Certificate' has been furnished by the Contractor or any Settlement Agreement has been signed between the Employer and the Contractor. |
| 8.2.8 | The Mechanism of resolution of disputes through arbitration shall be available only in the cases where the value of the dispute is less than Rs. 10 Crores. |
| 8.2.9 | In case the disputed amount (Claim, Counter claim including interest is Rs. 10 crores and above, the parties shall be within their rights to take recourse to remedies other than Arbitration, as may be available to them under the applicable laws after prior intimation to the other party. Subject to the aforesaid conditions, provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment thereof as amended from time to time, shall apply to the arbitration proceedings under this clause. |
| 8.2.10 | In case, multiple arbitrations are invoked (whether sub-judice or arbitral award passed) by any party to under this contract, then the cumulative value of claims (including interest claimed or awarded) in all such arbitrations shall be taken in account while arriving at the total claim in dispute for the subject contract for the purpose of clause 8.2.9. Disputes having cumulative value of less than 10 crores shall be resolved through arbitration and any additional dispute shall be adjudicated by the court of competent jurisdiction. |
| **8.3** | **In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:** |
| | In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD (Administrative Mechanism for Resolution of CPSEs Disputes) as mentioned in DPE OM No. 05/0003/2019-FTS-10937 dated 14-12-2022 as amended from time to time. |
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| **8.4** | **NO INTEREST PAYABLE TO CONTRACTOR** |
| | Notwithstanding anything to the contrary contained in any other document comprising in the Contract, no interest shall be payable by BHEL to Contractor on any moneys or balances including but not limited to the Security Deposit, EMD, Retention Money, RA Bills or the Final Bill, or any amount withheld and/or appropriated by BHEL etc., which becomes or as the case may be, is adjudged to be due from BHEL to Contractor whether under the Contract or otherwise. |
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| **9** | **LIMITATION ON LIABILITY:** |
| | Notwithstanding anything to the contrary in this Contract or LOA or any other mutually agreed document between the parties, the maximum liability, for damages, of the contractor, its servants or agents, shall under no circumstances exceed an amount equal to the Price of the Contract or the Work Order. The Contractor shall not in any case be liable for loss of profit or special, punitive, exemplary, indirect or consequential losses whatsoever. This shall not be applicable on the recoveries made by Customer from BHEL on account of Contractor, any other type of recoveries for workmanship, material, T&P etc. due from the contractor. |
| | |
| 10 | **FACILITIES PROVIDED TO MSEs: -** |
| | Any bidder falling under MSE category shall furnish the following details & submit documentary evidence / Govt. Certificate etc. in support of the same along with their techno-commercial offer. |

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| Type under MSE | |
| Micro | |
| Small | |

Note: If the bidder does not furnish the above, offer shall be processed construing that the bidder is not falling under MSE category.

a) MSE vendors can avail the intended benefits only if they submit along with the offer, attested copies of either EM II certificate having deemed validity (five years from the date of issue of acknowledgement in EM II) or valid NSlC certificate or UDYAM REGISTRATION CERTIFICATE or EM II certificate along with attested copy of a CA certificate (Format enclosed at Annexure -H where deemed validity of EM II certificate of five years has expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bid at par with other bidders. No 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.

b) MSEs shall be exempted from payment of earnest money (if any) at the time of tender submission. However, there is no exemption of security deposit submission.

c) However, credentials of all MSE suppliers will be verified before considering the intended benefits for MSE suppliers at the time of tender evaluation.

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| **11** | **PERFORMANCE MONITORING:** |
| | The Contractors performance shall be continuously monitored during execution of work at site.<br>In case of contractor's performance is found not satisfactory during the execution of work at site, BHEL may take alternate remedial measures and may not consider the contractor for further tenders, if the contractor performance is not improved in spite of opportunities given by BHEL. |
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| **12** | **DELAY AND EXTENSION OF TIME** |
| 12.1 | If, in the opinion of the Engineer, the work is delayed:<br>(i) by reason of abnormally bad weather, or<br>(ii) by reason of serious loss or damage by fire, or<br>(iii) by reason of civil commotion, local combination of workmen, strike or lockout, affecting any of the trades employed on the work, or<br>(iv) by delay on the part of the agency or tradesman engaged by the BHEL in executing work not forming part of the contract, or<br>By reason of any other cause which in the absolute discretion of the Engineer is beyond the contractor's control, then in any such case, the Engineer (or higher authority) may make fair and reasonable extension in the completion dates of the individual items of work of the contract as whole. Such extension which will be communicated to the contractor by the Engineer in writing shall be final and binding on the contractor. No other claim in this respect for compensation, idle labour or otherwise howsoever is admissible. Upon the happening of any such event causing delay the contractor shall immediately give notice thereof in writing to the Engineer but shall nevertheless use constantly his best endeavour to prevent or make good the delay and shall do all that may reasonably be required to the satisfaction of the Engineer to proceed with the work. |
| 12.2 | In case of delay in completion of work BHEL reserve the right to grant time extension under the following options depending upon the performance of the vendor:<br>a) Time extension without levy of LD in case it is found that delay is not attributable to the vendor<br>b) Time extension with deduction of applicable LD in line with Liquidity Damage clause if the delay is solely attributable to the vendor.<br>c) In case facts of delay is not settled, BHEL reserve the right to grant provisional time extension for delay in completion of total work or part thereof and running/ interim payments to the vendor will be released without deduction of LD subject to submission of additional Bank guarantee equivalent to maximum LD amount valid till completion of work under their scope and grant of final time extension.<br><br>During provisional time extension period ORC/ PVC shall not be payable to the contractor. The Final Delay analysis shall be prepared on completion of the work. In case of delay is not attributable to contractor as per final delay analysis the ORC/ PVC shall be released along with the final bill without any interest charges attributable to BHEL.<br><br>In case of delay attributable to contractor, LD shall be deducted for that period in line with clause "Compensation/ LD/ Penalty for delay in execution" of conditions of contract and balance ORC/ PVC (if any) shall be released along with the final bill without any interest charges attributable to BHEL. |
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| 13 | **FORCE MAJEURE** |
| 13.1 | "Force Majeure" shall mean circumstance which is:<br>a) beyond control of either of the parties to contract,<br>b) either of the parties could not reasonably have provided against the event before entering into the contract,<br>c) having arisen, either of the parties could not reasonably have avoided or overcome, and<br>d) is not substantially attributable to either of the parties<br>And<br>Prevents the performance of the contract,<br>Such circumstances include but shall not be limited to:<br>i) War, hostilities, invasion, act of foreign enemies.<br>ii) Rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war.<br>iii) Riot, commotion or disorder by persons other than the contractor's personnel and other employees of the contractor and sub-contractors.<br>iv) Strike or lockout not solely involving the contractor's personnel and other employees of the contractor and sub-contractors.<br>v) Encountering munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the contractor's use of such munitions, explosives, radiation or radio- activity.<br>vi) Natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon, flood, fire, cyclones etc.<br>vii) Epidemic, pandemic etc. |
| 13.2 | The following events are explicitly excluded from Force Majeure and are solely the responsibilities of the non-performing party:<br>a) any strike, work-to-rule action, go-slow or similar labour difficulty<br>(b) late delivery of equipment or material (unless caused by Force Majeure event) and<br>(c) economic hardship. |
| 13.3 | If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 15 (fifteen) days after the occurrence of such event. |
| 13.4 | The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended by a period of time equal to period of delay caused due to such Force Majeure event. |
| 13.5 | Delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall not<br>a) Constitute a default or breach of the Contract.<br>Give rise to any claim for damages or additional cost expense occasioned thereby, if and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure |

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| 13.6 | BHEL at its discretion may consider short closure of contract after 1 year of imposition of Force Majeure in line with extant guidelines. In any case, Supplier/Vendor cannot consider deemed short-closure after 1 year of imposition of Force Majeure |
| | |
| 14 | **All other terms and conditions of Contract shall remain unchanged.** |

# INDEMNITY BOND

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

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This Indemnity Bond executed by <_____name of company> having their Registered Office at <_____> in favour of M/s Bharat Heavy Electricals Limited, a Company incorporated under the Companies Act, 1956, having its Registered Office at BHEL House, Siri Fort, Asiad, New Delhi - 110049 through its unit - TBG, 5th Floor, BHEL Sadan, Plot No. 25, Sector-16A, Noida-201301 (UP). (Hereinafter referred to as the Company)

And whereas the Company has entered into a Contract with M/s_____, the executants of this Deed (hereinafter referred to as the Contractor) as its contractor in respect of the work of "_____".

AND WHEREAS under the provisions of GCC further stipulates that the Contractor shall indemnify the Company against all claims of whatever nature arising during the course of execution of Contract including defects liability period of <_____Months > i.e till <_____>

Now this deed witness that in case the Company is made liable by any Authority including Court to pay any claim or compensation etc. in respect of all labourers or other matters at any stage under or relating to the Contract with the Contractor , the Contractor hereby covenants and agrees with the Company that they shall indemnify and reimburse the Company to the extent of such payments and for any fee, including litigation charges, lawyers' fees, etc, penalty or damages claimed against the Company by reason of the Contractor falling to comply with Central/States Laws, Rules etc, or his failure to comply with Contract (including all expenses and charges incurred by the Company).

The Contractor further indemnifies the Company for the amount which the Company may be liable to pay by way of penalty for not making deductions from the Bills of the Contractor towards such amount and depositing the same in the Government Treasury.

The Contractor further agree that the Company shall be entitled to withhold and adjust the Security Deposit and/or withhold and adjust payment of Bills of Contractor pertaining to this Contract against any payment which the Company has made or is required to make for which the Contractor is liable under the Contract and that such amount can be withheld, adjusted by the Company till satisfactory and final settlement of all pending matters and the Contractor hereby gives his consent for the same.

The Contractor further agrees that the terms of indemnity shall survive the termination or completion of this contract.

The contractor further agrees that the liability of the contractor shall be extended on actual basis notwithstanding the limitations of liability clause, in respect of :

1. breach of terms of contract by the contractor
2. breach of laws by the contractor

3. breach of Intellectual property rights by the contractor
4. breach of confidentiality by the contractor

Nothing contained in this deed, shall be construed as absolving or limiting the liability of the Contractor under said Contract between the Company and the Contractor. That this Indemnity Bond is irrevocable and the condition of the bond is that the Contractor shall duly and punctually comply with the terms and the conditions of this deed and contractual provisions to the satisfaction of the Company.

In witness where of M/s _____ these presents on the day, month and year first, above written at _____ by the hand of its signatory Mr._____.

Signed for and on behalf of

M/s _____

Witness:

1.

2.

# 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.<br>Rs 75,000 (per Conciliator)<br>In cases involving claim and/or counter-claim of more than Rs 10 crores.<br>Rs 1,00,000/- (per Conciliator)<br>Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on<br>Signing of the Settlement Agreement after approval of the Competent Authority or<br>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.<br><br>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<br>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.*

# BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project : ±800kV, 6000MW Khavda-Nagpur HVDC

Name of Work : PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT

Tender Ref. No. TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26 DATE: 16.05.2025

| Item No | Description | Unit | Qty | | | Rate | Amount |
|---|---|---|---|---|---|---|---|
| | | | Khavda (k) | Nagpur (n) | Total (k+n) | | |
| **1** | **Preparation, submission of design documents & line sketches of following switchyard structures as per Specification/Latest IS codes including their approval from BHEL/Customer based on input from BHEL.** | | | | | | |
| ***A*** | ***Lattice/Pipe Structures*** | | | | | | |
| (i) | 765kV Gantry & Towers i/c foundation bolts | Types | 0 | 4 | **4** | ₹ 1,23,350 | ₹ 4,93,400 |
| (ii) | 765kV Switchyard equipment support structures i/c foundation bolts | Types | 0 | 6 | **6** | ₹ 27,333 | ₹ 1,63,998 |
| (iii) | 400kV Switchyard beams | Types | 7 | 7 | **14** | ₹ 24,000 | ₹ 3,36,000 |
| (iv) | 400kV Switchyard towers i/c foundation bolts | Types | 15 | 15 | **30** | ₹ 45,667 | ₹ 13,70,010 |
| (v) | 400kV Switchyard equipment support structures i/c foundation bolts | Types | 8 | 8 | **16** | ₹ 20,667 | ₹ 3,30,672 |
| (vi) | 33kV Switchyard beams | Types | 1 | 1 | **2** | ₹ 17,333 | ₹ 34,666 |
| (vii) | 33kV Switchyard towers i/c foundation bolts | Types | 2 | 2 | **4** | ₹ 19,000 | ₹ 76,000 |
| (viii) | PLC Filter Capacitor | Types | 1 | 1 | **2** | ₹ 14,000 | ₹ 28,000 |
| (ix) | PLC Filter Reactor | Types | 1 | 1 | **2** | ₹ 14,000 | ₹ 28,000 |
| (x) | 33kV Switchyard equipment support structures i/c foundation bolts | Types | 8 | 8 | **16** | ₹ 12,333 | ₹ 1,97,328 |
| (xi) | Valve Hall equipment support structures i/c foundation bolts | Types | 7 | 7 | **14** | ₹ 21,667 | ₹ 3,03,338 |
| (xii) | AC Filter Yard equipment support structures i/c foundation bolts | Types | 12 | 12 | **24** | ₹ 11,333 | ₹ 2,71,992 |
| (xiii) | DC Yard equipment support structures i/c foundation bolts | Types | 69 | 55 | **124** | ₹ 14,000 | ₹ 17,36,000 |
| (xiv) | DC Hall equipment support structures i/c foundation bolts | Types | 16 | 0 | **16** | ₹ 24,333 | ₹ 3,89,328 |
| (xv) | DC Filter equipment support structures i/c foundation bolts | Types | 14 | 14 | **28** | ₹ 17,333 | ₹ 4,85,324 |
| (xvi) | LM Tower i/c foundation bolts | Types | 1 | 1 | **2** | ₹ 62,000 | ₹ 1,24,000 |
| | | | | | | | |
| **2** | **Preparation & submission of fabrication (structure assembly) drawings & BOMs including their approval from BHEL/Customer based on input from BHEL.** | | | | | | |
| ***A*** | ***Lattice type Structures*** | | | | | | |
| (i) | 765kV Gantry & Towers | Types | 0 | 4 | **4** | ₹ 53,667 | ₹ 2,14,668 |
| (ii) | 400kV Beams | Types | 7 | 7 | **14** | ₹ 26,000 | ₹ 3,64,000 |
| (iii) | 400kV Towers | Types | 15 | 15 | **30** | ₹ 40,000 | ₹ 12,00,000 |
| (iv) | LM Tower | Types | 1 | 1 | **2** | ₹ 52,000 | ₹ 1,04,000 |
| (v) | 33kV Beams | Types | 1 | 1 | **2** | ₹ 12,333 | ₹ 24,666 |
| (vi) | 33kV Tower/LM | Types | 2 | 2 | **4** | ₹ 19,000 | ₹ 76,000 |
| (vii) | 765kV Equipment Support Structure except Wave Trap & 3-Ph Isolators | Types | 0 | 4 | **4** | ₹ 12,333 | ₹ 49,332 |
| (viii) | 765kV 3-Ph Isolators | Types | 0 | 3 | **3** | ₹ 16,667 | ₹ 50,001 |
| (ix) | 765kV 1-Ph Isolators | Types | 0 | 3 | **3** | ₹ 16,667 | ₹ 50,001 |
| (x) | 765kV 1-Ph Wave Trap | Types | 0 | 1 | **1** | ₹ 16,667 | ₹ 16,667 |
| (xi) | 400kV Equipment Support Structure except 3-Ph Isolators | Types | 4 | 4 | **8** | ₹ 9,667 | ₹ 77,336 |
| (xii) | 400kV 3-Ph Isolators | Types | 1 | 1 | **2** | ₹ 12,333 | ₹ 24,666 |
| (xiii) | PLC Filter Capacitor | Types | 1 | 1 | **2** | ₹ 7,000 | ₹ 14,000 |

# BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project : ±800kV, 6000MW Khavda-Nagpur HVDC

Name of Work : PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT

Tender Ref. No. TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26 DATE: 16.05.2025

| Item No | Description | Unit | Qty | | | Rate | Amount |
|---|---|---|---|---|---|---|---|
| | | | Khavda (k) | Nagpur (n) | Total (k+n) | | |
| (xiv) | PLC Filter Reactor | Types | 1 | 1 | **2** | ₹ 7,000 | ₹ 14,000 |
| (xv) | 33kV Switchyard equipment support structures | Types | 8 | 8 | **16** | ₹ 7,000 | ₹ 1,12,000 |
| (xvi) | Valve Hall equipment support structures | Types | 3 | 3 | **6** | ₹ 11,333 | ₹ 67,998 |
| (xvii) | AC Filter Yard equipment support structures | Types | 4 | 4 | **8** | ₹ 7,667 | ₹ 61,336 |
| (xviii) | DC Yard equipment support structures | Types | 28 | 22 | **50** | ₹ 9,667 | ₹ 4,83,350 |
| (xix) | DC Hall equipment support structures | Types | 10 | 0 | **10** | ₹ 13,333 | ₹ 1,33,330 |
| (xx) | DC Filter equipment support structures | Types | 6 | 6 | **12** | ₹ 13,333 | ₹ 1,59,996 |
| | | | | | | | |
| **3** | **Preparation, submission of design documents of following switchyard civil works as per Specification/Latest IS codes including their approval from BHEL/Customer based on input from BHEL.** | | | | | | |
| (i) | 765kV tower foundation | Types | 0 | 4 | **4** | ₹ 18,000 | ₹ 72,000 |
| (ii) | 400kV tower foundation | Types | 15 | 15 | **30** | ₹ 12,333 | ₹ 3,69,990 |
| (iii) | 33kV tower foundation | Types | 2 | 2 | **4** | ₹ 18,000 | ₹ 72,000 |
| (iv) | 765kV equipment support structure foundations | Types | 0 | 7 | **7** | ₹ 16,333 | ₹ 1,14,331 |
| (v) | 400kV equipment support structure foundations | Types | 8 | 8 | **16** | ₹ 16,333 | ₹ 2,61,328 |
| (vi) | 33kV equipment support structure foundations | Types | 8 | 8 | **16** | ₹ 16,333 | ₹ 2,61,328 |
| (vii) | AC Filter Yard equipment support structure foundations | Types | 12 | 12 | **24** | ₹ 15,000 | ₹ 3,60,000 |
| (viii) | PLC Filter Capacitor/Reactor Foundations | Types | 2 | 2 | **4** | ₹ 18,000 | ₹ 72,000 |
| (ix) | Cable trench | Types | 4 | 4 | **8** | ₹ 27,667 | ₹ 2,21,336 |
| (x) | Cable Trench Crossing | Types | 4 | 4 | **8** | ₹ 20,667 | ₹ 1,65,336 |
| (xi) | 500MVA Transformer foundation with soakpit including Fire wall | Types | 0 | 1 | **1** | ₹ 34,333 | ₹ 34,333 |
| (xii) | 110/80MVAR Reactor foundation with soakpit including Fire wall | Types | 2 | 2 | **4** | ₹ 34,333 | ₹ 1,37,332 |
| (xiii) | Auxiliary Transformer foundations | Types | 1 | 1 | **2** | ₹ 13,667 | ₹ 27,334 |
| (xiv) | Jacking pad for transformer/reactor | Types | 2 | 2 | **4** | ₹ 21,000 | ₹ 84,000 |
| (xv) | Rail cum road | Types | 2 | 2 | **4** | ₹ 17,333 | ₹ 69,332 |
| (xvi) | Road | Types | 2 | 2 | **4** | ₹ 14,000 | ₹ 56,000 |
| (xvii) | Storm water Drainage | Types | 4 | 4 | **8** | ₹ 19,667 | ₹ 1,57,336 |
| (xviii) | Sump pit for cable trench/drainage | Types | 2 | 2 | **4** | ₹ 8,667 | ₹ 34,668 |
| (xix) | Boundary wall | Types | 1 | 1 | **2** | ₹ 12,333 | ₹ 24,666 |
| (xx) | Oil recovery (including oil water separator) tank | Types | 2 | 2 | **4** | ₹ 28,333 | ₹ 1,13,332 |
| (xxi) | DG set foundation design | Types | 1 | 2 | **3** | ₹ 17,667 | ₹ 53,001 |
| (xxii) | 30m DG support structure/Chimney foundation design | Types | 1 | 2 | **3** | ₹ 24,000 | ₹ 72,000 |
| (xxiii) | Underground diesel tank (15KL)(common underground foundation design for accommodating 2 nos. tanks) | Types | 1 | 1 | **2** | ₹ 5,500 | ₹ 11,000 |
| (xxiv) | DG SET Fuel transfer pump room/PUMP HOUSE | Types | 1 | 1 | **2** | ₹ 11,000 | ₹ 22,000 |
| | | | | | | | |
| **4** | **Preparation, submission of drawings of following switchyard civil works including their approval from BHEL/Customer based on input from BHEL** | | | | | | |
| (i) | Details of Tower foundation bolts ( All Ratings) | Set of Drawings | 2 | 3 | **5** | ₹ 2,150 | ₹ 10,750 |
| (ii) | Details of AIS equipment foundation bolts | Set of Drawings | 1 | 2 | **3** | ₹ 2,150 | ₹ 6,450 |
| (iii) | Details of DC Yard/DC Filter/Valve Hall/DC Hall/AC Filter Equipment foundation bolts | Set of Drawings | 2 | 2 | **4** | ₹ 2,150 | ₹ 8,600 |
| (iv) | Foundation Layouts of 765/400/33kV Switchyard | Set of Drawings | 2 | 2 | **4** | ₹ 2,26,667 | ₹ 9,06,668 |

# BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project : ±800kV, 6000MW Khavda-Nagpur HVDC

Name of Work : PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT

Tender Ref. No. TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26 DATE: 16.05.2025

| Item No | Description | Unit | Qty | | | Rate | Amount |
|---|---|---|---|---|---|---|---|
| | | | Khavda (k) | Nagpur (n) | Total (k+n) | | |
| (v) | Foundation Layout of AC Filter yard | Set of Drawings | 1 | 1 | **2** | ₹ 1,23,333 | ₹ 2,46,666 |
| (vi) | Details of tower foundations | Drawing | 18 | 22 | **40** | ₹ 10,667 | ₹ 4,26,680 |
| (vii) | Details of equipment foundations | Set of Drawings | 31 | 36 | **67** | ₹ 9,667 | ₹ 6,47,689 |
| (viii) | Ground Improvement Layout | Set of Drawings | 1 | 0 | **1** | ₹ 32,000 | ₹ 32,000 |
| (ix) | Details of cable trenches | Set of Drawings | 1 | 1 | **2** | ₹ 21,500 | ₹ 43,000 |
| (x) | Details of cable trench crossings | Set of Drawings | 1 | 1 | **2** | ₹ 24,333 | ₹ 48,666 |
| (xi) | Details of 500MVA Transformer foundation with soakpit including combined Layout of all Transformers & Fire walls etc. | Set of Drawings | 0 | 1 | **1** | ₹ 26,500 | ₹ 26,500 |
| (xii) | Details of 110/80MVAR Reactor foundation with soakpit including combined Layout of all reactors & Firewalls etc. | Set of Drawings | 2 | 2 | **4** | ₹ 32,667 | ₹ 1,30,668 |
| (xiii) | Auxiliary Transformer | Drawing | 1 | 1 | **2** | ₹ 7,667 | ₹ 15,334 |
| (xiv) | Details of Jacking pad for transformer/reactor | Drawing | 2 | 2 | **4** | ₹ 21,667 | ₹ 86,668 |
| (xv) | Details of Rail cum road | Drawing | 2 | 2 | **4** | ₹ 11,333 | ₹ 45,332 |
| (xvi) | Layout of cable trenches | Drawing | 1 | 1 | **2** | ₹ 53,500 | ₹ 1,07,000 |
| (xvii) | Details of Road including Layout | Set of Drawings | 1 | 1 | **2** | ₹ 32,000 | ₹ 64,000 |
| (xviii) | Details of fencing | Set of Drawings | 1 | 1 | **2** | ₹ 17,000 | ₹ 34,000 |
| (xix) | Details of boundary wall | Drawing | 1 | 1 | **2** | ₹ 31,000 | ₹ 62,000 |
| (xx) | Details of gates | Drawing | 2 | 2 | **4** | ₹ 18,667 | ₹ 74,668 |
| (xxi) | Layout of drainage | Drawing | 1 | 1 | **2** | ₹ 32,000 | ₹ 64,000 |
| (xxii) | Details of drains/crossings | Set of Drawings | 1 | 1 | **2** | ₹ 19,333 | ₹ 38,666 |
| (xxiii) | Details of sump pits | Drawing | 1 | 1 | **2** | ₹ 10,333 | ₹ 20,666 |
| (xxiv) | Details of Oil recovery tank including Layout | Set of Drawings | 1 | 1 | **2** | ₹ 24,000 | ₹ 48,000 |
| (xxv) | Rain Water Harvesting | Drawing | 1 | 1 | **2** | ₹ 21,000 | ₹ 42,000 |
| | | | | | | | |
| **5** | **Preparation, submission of design documents & drawings of following RCC buildings as per specification/Latest IS codes including their approval from BHEL/Customer based on input from BHEL.<br>Single Storey: (For working out area, outer wall to outer wall dimensions shall be considered)** | | | | | | |
| (i) | Auxiliary CRB- Greater than 100sqm but less than equal to 650sqm | LS | 0 | 1 | **1** | ₹ 3,66,667 | ₹ 3,66,667 |
| (ii) | SPR- less than equal to 100sqm | LS | 1 | 1 | **2** | ₹ 53,000 | ₹ 1,06,000 |
| | | | | | | | |
| **6** | **Visit to Site / Customer's / Consultant / verification agency** | | | | | | |
| (i) | LS Allowance per day including boarding, lodging, local conveyance, etc., all inclusive. (BHEL shall pay to & fro Ist AC fare from Bidder's headquarters to BHEL office/Customer office/any other place within India for each visit separately.) | day | 5 | 5 | **10** | ₹ 31,000 | ₹ 3,10,000 |

# BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project : ±800kV, 6000MW Khavda-Nagpur HVDC

Name of Work : PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT

Tender Ref. No. TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26 DATE: 16.05.2025

| Item No | Description | Unit | Qty | | | Rate | Amount |
|---|---|---|---|---|---|---|---|
| | | | Khavda (k) | Nagpur (n) | Total (k+n) | | |
| (ii) | LS Allowance per day including boarding, lodging, local conveyance, etc., all inclusive. (BHEL shall pay to & fro economy class Air fare from Bidder's headquarters to Site/Customer office for each visit separately.) | day | 5 | 5 | **10** | ₹ 31,000 | ₹ 3,10,000 |
| | **Total Amount (Excl. GST)** | | | | | | **₹ 1,68,60,724** |

Validate Print Help

# Percentage BoQ

**Tender Inviting Authority: BHEL, TBG- SubContracting Department, Sector 16A Noida, UP**

**Name of Work: TENDER FOR "PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT"**

**Contract No: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26 DATE 16.05.2025**

| Name of the Bidder/ Bidding Firm / Company : | | | | | | |
|---|---|---|---|---|---|---|
| **PRICE SCHEDULE**<br>(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only ) | | | | | | |
| NUMBER # | TEXT # | NUMBER # | TEXT # | NUMBER | NUMBER # | TEXT # |
| Sl. No. | Item Description | Quantity | Units | Estimated Rate in Rs. P | TOTAL AMOUNT Without Taxes in Rs. P | TOTAL AMOUNT In Words |
| 1 | 2 | 4 | 5 | 6 | 53 | 55 |
| 1 | Total amount as per rates in BOQ (as per Annexure-I) for "PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT."- Excluding GST | 1.000 | Nos | 16860724.00 | **16860724.00** | INR One Crore Sixty Eight Lakh Sixty Thousand Seven Hundred & Twenty Four Only |
| **Total in Figures** | | | | | **16860724.00** | INR One Crore Sixty Eight Lakh Sixty Thousand Seven Hundred & Twenty Four Only |
| **Quoted Rate in Figures** | | | **Select** | | **0.000** | INR Zero Only |
| **Quoted Rate in Words** | | **INR Zero Only** | | | | |

# BHARAT HEAVY ELECTRICALS LIMITED
## TRANSMISSION BUSINESS ENGINEERING MANAGEMENT, NOIDA.

| | |
|---|---|
| DOCUMENT No. | **TB-DC-KN800-001** |
| TYPE OF DOC. | **TECHNICAL SPECIFICATION** |
| TITLE | |

**TECHNICAL SPECIFICATION FOR**

**Civil Design Consultancy for HVDC Switchyard**

| | |
|---|---|
| CUSTOMER | **KHAVDA V A POWER TRANSMISSION LIMITED** |
| PROJECT | **±800kV, 6000MW Khavda-Nagpur HVDC** |



## CONTENTS



| Rev No. | Date | Altered | Checked | Approved | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

| Distribution | TO | O/C | | | |
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# SECTION - 1

SCOPE, SPECIFIC TECHNICAL REQUIREMENT &
QUANTITIES

# SCOPE & SPECIFIC TECHNICAL REQUIREMENTS

Doc No: TB-DC-KN800-001 Rev 00

## 1.0.0 INTRODUCTION

1.1.0 Transmission Business Group (TBG) of Bharat Heavy Electricals Limited has been awarded the work of ±800kV, 6000MW Khavda-Nagpur HVDC. The customer is **KHAVDA V A POWER TRANSMISSION LIMITED** & the consultant is **POWERGRID**.

1.2.0 For the purpose of designing, preparation of design, fabrication drawings and Construction drawings of civil works of Control Building, GI structures of Gantry towers, Gantry Beams, Equipment supporting structures for AC yard, DC yard, Valve Hall & DC Hall eqpt indoor Support structures, AC Filters, DC Filters, and other structures including design and drawings of civil foundations and other civil works of the Switchyard, BHEL intends to appoint a competent and experienced Design Agency.

1.2.1 It is expected of the Design Agency to quote their most competitive rates for the items indicated in Annexure - I of this specification.

## 2.0.0 SCOPE

2.1.0 The detailed Scope of work but not limited to is as given below.

2.2.0 Based on Inputs from BHEL/customer specification, Preparation of Layout drawing, Architectural drawings, Designing using latest software such as STAAD or similar approved software, preparing detailed fabrication & construction drawings, submission of softcopies / hard copies as required, obtaining approval from BHEL/Customer/ Consultant of Customer, incorporating correction, updating & resubmission (if required) till appropriate approval by customer of detailed design and drawings of any item or items indicated in Annexure-I. The detailed design & drawing work shall include, but not limited to:

2.2.1 Verification of all data, criteria and information contained in the contract documents.

2.2.2 Generation of all data, criteria and information required for the completion of work including liaison and interfaces with BHEL/Consultant/Customer.

2.2.3 The design of any item shall be most economical.

2.2.4 The Construction drawings prepared shall have sufficient detailing so that no difficulty is faced by site engineers during execution.

2.2.5 Providing quantities of major items like Excavation, PCC, Shuttering, RCC, and Reinforcement Steel (dia-wise), etc. for the purpose of estimates, indents, if required.

2.3.0 Visit to Site or Customer's/Consultant's office: The Design Agency will have to depute their Engineer(s) to BHEL office, Customer's/Consultant's office or Site for any clarification etc. as required by BHEL/Consultant/Customer.

## 3.0.0 SPECIFIC TECHNICAL REQUIREMENTS

3.1.0 The specific technical requirements shall be as per input provided by BHEL from time to time after award of work.

3.2.0 Customer technical specification are enclosed in **Section-3**.

3.3.0 The Design Agency shall interact closely with BHEL engineering group for any input/ clarification and finalize details across the table. There may be certain cases when on account of revision or change of inputs certain design/ drawing may be required to be redone. **No claim on account of this shall be entertained.** Only suitable time extension shall be granted on account of above.

## 4.0.0 SCHEDULE OF ITEMS

4.1.0 The Schedule/BOQ of Items shall be as per Annexure- I. The Design agency is required to quote their most competitive rates for these items. The quantities shown in annexure -I are tentative and may vary to any extent as per project specific BOQs.

## 5.0.0 DOCUMENTATION

5.1.0 All design documents including computer outputs shall be neatly typed, produced on A4 size paper and shall have a 'Cover Sheet' (To be provided later).

5.2.0 All drawings shall be prepared in AutoCAD as per standard sizes (viz. A0, A1, A2, A3 & A4) and shall have a 'Title Block' (To be provided by BHEL).

## 6.0.0 SPECIAL TERMS & CONDITIONS

6.1.0 The consultant/ Consulting Firm shall have dedicated technical staff who will be required to be committed for BHEL's consultancy work. Minimum number of dedicated staffs required and their qualification required are as follows-

6.1.1 03 Nos. Engineers with minimum 5 years Structural design experience

6.1.2 01 No. Architect having minimum 5 years' experience in building designing

6.1.3 06 Nos. Draftsmen with minimum 5 years' experience in preparation of building drawings

6.2.0 During an assignment where, key professionals are named in the contract, if substitution is necessary (for example, because of ill health or because a staff member proves to be unsuitable, or the member is no longer working with the consultant), the consultant shall propose the substitute staff of the same level with intimation to BHEL.

6.3.0 BHEL may visit consultant's registered office for inspection of the firm's technical and managerial strength, overall capacity to perform multiple projects and consultant's capabilities and eligibility to undertake the assignment during the bidding & execution times.

## 7.0.0 TIME SCHEDULE:

7.1.0 After receipt of LOI/Work Order, a detailed schedule giving list of design documents and drawings and their submission dates shall be prepared jointly by BHEL & Design Agency based on concurrent working meeting the construction schedule. This detailed schedule shall be the time schedule of the project. Any delays attributable to agency in any activity shall be counted by this schedule. As the design and drawings will be approved by Customer, therefore time taken by customer in approval is also important for early completion of work. The agency is required to interact with customer and ensure minimum approval time.

| TIME SCHEDULE (FOR EACH BUILDING) | | | | | |
|---|---|---|---|---|---|
| INPUT BY BHEL | | | SUBMISSION BY AGENCY | | |
| **S. No.** | **Description of Input** | **Date of Input** | **S. No.** | **Design /Drawings activity.** | **Submission within time (Days)** |
| TIME SCHEDULE (FOR EACH BUILDING) | | | | | |
| 1 | **1. Conceptual plan of building, technical specification and soil report etc.**<br><br>**2. Customer comments/BHEL instruction.** | | 1 | **Architectural drawings (Lot 1):** Architectural plans, elevations, sections and finishing schedules. Any other sketch, plan/details required for developing architectural drawings/plans. | |
| | | | 1 (a) | **R0 Submission:** (Nos of days from receipt of input) | 20 |
| | | | 1(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| | | | 2 | **Design document:** The agency is required to | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | start the design immediately after getting Cat -2 approval of architectural drawings (Lot1) of building or earlier if instructed by BHEL/Customer. | |
| | | | 2(a) | **R0 Submission:**(Nos of days from cat2 approval/instruction of BHEL) | 15 |
| | | | 2(b) | **Resubmissions:** (Nos of days for each revision) | 10 |
| | | | 3 | **Civil drawings (Lot 1)**: All RCC drawings up to plinth beams i.e. foundations layout & details, column details, plinth beams, tie beams if any and staircase dowel bars details etc. | |
| | | | 3(a) | **R0 Submission:** (Nos of days from Cat 2 approval of Design document). | 15 |
| | | | 3(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| | | | 4 | **Architectural drawings (Lot 2)**: Door & windows, soak pit, septic tank, plumbing, water supply, sanitary, toilet/pantry details, false ceiling drawings and other miscellaneous drawings such as garland drain, plinth protection, ramp, railings, roof treatment etc. Any other drawing required for completion. | |
| | | | 4(a) | **R0 Submission**: The agency is expected to put architectural & structural teams parallelly: Therefore, work on these drawings can be started based on Cat 2 approval of architectural drawings (Lot 1). | 25 |
| | | | 4(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| 2 | **Cut out, panel placement plan, underhung cable racks and layout etc.** | | 5 | **Civil drawings (Lot 2)**: All RCC drawings above plinth beams i.e. floor lintels, floor slabs, staircase and roof slabs. | |
| | | | 5(a) | **R0 Submission:** (Nos of days from Cat 2 approval of Design document). | 30 |
| | | | 5(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| 3 | **Internal cable trench layout** | | 6 | **Civil drawings (Lot3)**: Grade slab, internal cable trenches, cable pull pit etc as per project requirement. | |
| | | | 6(a) | **R0 Submission:** (Nos days from receipt of input) | 10 |
| | | | 6(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| 4 | **Instructions to submit the As Built Drawings and intimation of changes to be incorporated in As Built Drawings** | | 7(a) | **R0 Submission:** (Nos days from receipt of input) | 30 |
| | | | 7(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| | | | | | |

| TIME SCHEDULE (FOR CIVIL WORK SWITCHYARD) | | | | | |
|---|---|---|---|---|---|
| 1 | Structure loading diagram, electrical layout,<br><br>Customer comments /BHEL instruction. | | 1 | ***Structure design Including line diagram and GA drawings (Lot-1)***<br>Switchyard Towers, Beams, trestle | |
| | | | 1(a) | **R0 Submission:** (Nos days from receipt of input) | 45 |
| | | | 1(b) | **Any structure due to hold/change of input** | 7 |
| | | | 1(c) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 3 |
| | | | 2 | ***Foundation design & drawing (Lot-1)*** – Switchyard tower, trestle (after approval/comment of structure design/drawing) | |
| | | | 2(a) | **R0 Submission:** (Nos days from receipt of input) | 30 |
| | | | 2(b) | **Any foundation due to hold/change of input** | 7 |
| | | | 2(c) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| | | | 3 | ***Foundation layout*** | |
| | | | 3(a) | **R0 Submission:** (Nos days from receipt of input) | 7 |
| | | | 3(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| 2 | Equipment GA and other details<br>(to be provided in phase manner/progressively)<br><br>Customer comments /BHEL instruction. | | 4 | ***Structure design including line diagram and GA drawings (Lot-2)***<br>Switchyard equipment support structures | |
| | | | 4(a) | **R0 Submission:** (Nos days from receipt of input) | 25 |
| | | | 4(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| | | | 5 | ***Foundation design & drawing (Lot-2)*** – Switchyard equipment support str. (after approval/comments on structure design / drawings) (for each type of eqpt.) | |
| | | | 5(a) | **R0 Submission:** (Nos days from receipt of input) | 10 |
| | | | 5(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| | | | 6 | **Fabrication Drawings of Beams & Tower (Lot-1)** – Beam & Tower | |
| | | | 6(a) | **R0 Submission:** (Nos days after CAT 1 approval of structure design) | 15 |
| | | | 6(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments | 7 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | from Customer/BHEL. (Nos of days for each revision) | |
| | | | 7 | **Fabrication Drawings of Equipment Support Structure (Lot-2)** – All types of Equipment Support Structures. | |
| | | | 7(a) | **R0 Submission:** (Nos days after CAT 1 approval of structure design) | 7 |
| | | | 7(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments | 3 |
| | | | | from Customer/BHEL. (Nos of days for each revision) | |
| 3 | Transformer /Reactor GA and other details. | | 8 | ***Foundation design & drawing (Lot-3)*** – Transformer/Reactor foundation, rail cum road, fire wall etc (for each type) | |
| | | | 8(a) | **R0 Submission:** (Nos days from receipt of input) | 15 |
| | | | 8(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| 4 | Cable trench details and layout | | 9 | ***Foundation Design & drawing (Lot-4)*** – Switchyard trenches/crossing, sump pits etc. | |
| | | | 9(a) | **R0 Submission:** (Nos days from receipt of input) | 7 |
| | | | 9(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| 5 | Miscellaneous Inputs | | 10 | *Design and drawing (Lot-5)* – Switchyard roads, drain, fencing, gate, boundary wall, oil recovery tank and other civil works required for project. | |
| | | | 10(a) | **R0 Submission:** (Nos days from receipt of input) | 15 |
| | | | 10(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |
| 6 | **Instructions to submit the As Built Drawings and intimation of changes to be incorporated in As Built Drawings** | | 11(a) | **R0 Submission:** (Nos days from receipt of input) | 30 |
| | | | 11(b) | **Resubmissions:** Revised drawings shall be submitted by agency within receipt of comments from Customer/BHEL. (Nos of days for each revision) | 7 |

**Notes:**

1 All inputs shall be provided by e-mails in soft copy. The date of e-mail sent by BHEL shall be considered as date of input.

2 The agency shall immediately acknowledge the receipt of input via return email.

**8.0.0 PAYMENT SCHEDULE:**

| S.No. | Condition | Payment |
|---|---|---|
| **Item Nos 1, 2, 3 & 4 of Sch./BOQ of Items** | | |
| (a) | On approval of design documents / drawings (at least Cat 2 i.e. approved with comments) | 75% of quoted rate |
| (b) | Approval of design documents / drawings in Cat-I | 20% of quoted rate. |
| (c) | Submission of as-built drawings | 5% of quoted rate. |
| **Item No 5** | | |
| (a) | On approval (at least Cat 2 i.e. approved with comments) of architectural drawings. | 10% of quoted rate on pro-rata basis. |
| (b) | On approval (at least Cat 2 i.e. approved with comments) of design documents. | 20% of quoted rate on pro-rata basis. |
| (c) | On approval (at least Cat 2 i.e. approved with comments) of construction/ structure / fabrication drawings. | 45% of quoted rate on pro-rata basis. |
| (d) | On approval (at least Cat 2 i.e. approved with comments) of plumbing, sanitary & other miscellaneous drawings. | 10% of quoted rate on pro-rata basis. |
| (e) | Approval of all documents in Cat-I | 10 % of quoted rate. |
| (f) | Submission of as-built drawings | 5% of quoted rate. |
| **Item No 6 of Sch./BOQ of Items** | | |
| (a) | On submission of claim after completion of visit. | 100 % of quoted rate. |

# BILL OF QUANTITY

| | |
|---|---|
| Name of Project : | ±800kV, 6000MW Khavda-Nagpur HVDC |
| Name of Work : | Civil Design Consultancy for HVDC Switchyard |

| Item No | Description | Unit | Qty | | | Rate (Rs.) | Amount |
|---|---|---|---|---|---|---|---|
| | | | Khavda (k) | Nagpur (n) | Total (k+n) | | |
| 1 | **Preparation, submission of design documents & line sketches of following switchyard structures as per Specification/Latest IS codes including their approval from BHEL/Customer based on input from BHEL.** | | | | | | |
| ***A*** | ***Lattice/Pipe Structures*** | | | | | | |
| (i) | 765kV Gantry & Towers i/c foundation bolts | Types | 0 | 4 | **4** | **123350** | 493400 |
| (ii) | 765kV Switchyard equipment support structures i/c foundation bolts | Types | 0 | 6 | **6** | **27333** | 163998 |
| (iii) | 400kV Switchyard beams | Types | 7 | 7 | **14** | **24000** | 336000 |
| (iv) | 400kV Switchyard towers i/c foundation bolts | Types | 15 | 15 | **30** | **45667** | 1370010 |
| (v) | 400kV Switchyard equipment support structures i/c foundation bolts | Types | 8 | 8 | **16** | **20667** | 330672 |
| (vi) | 33kV Switchyard beams | Types | 1 | 1 | **2** | **17333** | 34666 |
| (vii) | 33kV Switchyard towers i/c foundation bolts | Types | 2 | 2 | **4** | **19000** | 76000 |
| (viii) | PLC Filter Capacitor | Types | 1 | 1 | **2** | **14000** | 28000 |
| (ix) | PLC Filter Reactor | Types | 1 | 1 | **2** | **14000** | 28000 |
| (x) | 33kV Switchyard equipment support structures i/c foundation bolts | Types | 8 | 8 | **16** | **12333** | 197328 |
| (xi) | Valve Hall equipment support structures i/c foundation bolts | Types | 7 | 7 | **14** | **21667** | 303338 |
| (xii) | AC Filter Yard equipment support structures i/c foundation bolts | Types | 12 | 12 | **24** | **11333** | 271992 |
| (xiii) | DC Yard equipment support structures i/c foundation bolts | Types | 69 | 55 | **124** | **14000** | 1736000 |
| (xiv) | DC Hall equipment support structures i/c foundation bolts | Types | 16 | 0 | **16** | **24333** | 389328 |
| (xv) | DC Filter equipment support structures i/c foundation bolts | Types | 14 | 14 | **28** | **17333** | 485324 |
| (xvi) | LM Tower i/c foundation bolts | Types | 1 | 1 | **2** | **62000** | 124000 |
| 2 | **Preparation & submission of fabrication (structure assembly) drawings & BOMs including their approval from BHEL/Customer based on input from BHEL.** | | | | | | |
| ***A*** | ***Lattice type Structures*** | | | | | | |
| (i) | 765kV Gantry & Towers | Types | 0 | 4 | **4** | **53667** | 214668 |
| (ii) | 400kV Beams | Types | 7 | 7 | **14** | **26000** | 364000 |
| (iii) | 400kV Towers | Types | 15 | 15 | **30** | **40000** | 1200000 |
| (iv) | LM Tower | Types | 1 | 1 | **2** | **52000** | 104000 |
| (v) | 33kV Beams | Types | 1 | 1 | **2** | **12333** | 24666 |
| (vi) | 33kV Tower/LM | Types | 2 | 2 | **4** | **19000** | 76000 |
| (vii) | 765kV Equipment Support Structure except Wave Trap & 3-Ph Isolators | Types | 0 | 4 | **4** | **12333** | 49332 |
| (viii) | 765kV 3-Ph Isolators | Types | 0 | 3 | **3** | **16667** | 50001 |
| (ix) | 765kV 1-Ph Isolators | Types | 0 | 3 | **3** | **16667** | 50001 |
| (x) | 765kV 1-Ph Wave Trap | Types | 0 | 1 | **1** | **16667** | 16667 |
| (xi) | 400kV Equipment Support Structure except 3-Ph Isolators | Types | 4 | 4 | **8** | **9667** | 77336 |
| (xii) | 400kV 3-Ph Isolators | Types | 1 | 1 | **2** | **12333** | 24666 |
| (xiii) | PLC Filter Capacitor | Types | 1 | 1 | **2** | **7000** | 14000 |
| (xiv) | PLC Filter Reactor | Types | 1 | 1 | **2** | **7000** | 14000 |
| (xv) | 33kV Switchyard equipment support structures | Types | 8 | 8 | **16** | **7000** | 112000 |
| (xvi) | Valve Hall equipment support structures | Types | 3 | 3 | **6** | **11333** | 67998 |
| (xvii) | AC Filter Yard equipment support structures | Types | 4 | 4 | **8** | **7667** | 61336 |
| (xviii) | DC Yard equipment support structures | Types | 28 | 22 | **50** | **9667** | 483350 |
| (xix) | DC Hall equipment support structures | Types | 10 | 0 | **10** | **13333** | 133330 |
| (xx) | DC Filter equipment support structures | Types | 6 | 6 | **12** | **13333** | 159996 |
| 3 | **Preparation, submission of design documents of following switchyard civil works as per Specification/Latest IS codes including their approval from BHEL/Customer based on input from BHEL.** | | | | | | |
| (i) | 765kV tower foundation | Types | 0 | 4 | **4** | **18000** | 72000 |
| (ii) | 400kV tower foundation | Types | 15 | 15 | **30** | **12333** | 369990 |
| (iii) | 33kV tower foundation | Types | 2 | 2 | **4** | **18000** | 72000 |
| (iv) | 765kV equipment support structure foundations | Types | 0 | 7 | **7** | **16333** | 114331 |
| (v) | 400kV equipment support structure foundations | Types | 8 | 8 | **16** | **16333** | 261328 |
| (vi) | 33kV equipment support structure foundations | Types | 8 | 8 | **16** | **16333** | 261328 |
| (vii) | AC Filter Yard equipment support structure foundations | Types | 12 | 12 | **24** | **15000** | 360000 |
| (viii) | PLC Filter Capacitor/Reactor Foundations | Types | 2 | 2 | **4** | **18000** | 72000 |
| (ix) | Cable trench | Types | 4 | 4 | **8** | **27667** | 221336 |
| (x) | Cable Trench Crossing | Types | 4 | 4 | **8** | **20667** | 165336 |
| (xi) | 500MVA Transformer foundation with soakpit including Fire wall | Types | 0 | 1 | **1** | **34333** | 34333 |
| (xii) | 110/80MVAR Reactor foundation with soakpit including Fire wall | Types | 2 | 2 | **4** | **34333** | 137332 |
| (xiii) | Auxiliary Transformer foundations | Types | 1 | 1 | **2** | **13667** | 27334 |
| (xiv) | Jacking pad for transformer/reactor | Types | 2 | 2 | **4** | **21000** | 84000 |
| (xv) | Rail cum road | Types | 2 | 2 | **4** | **17333** | 69332 |

# BILL OF QUANTITY

| | |
|---|---|
| Name of Project : | ±800kV, 6000MW Khavda-Nagpur HVDC |
| Name of Work : | Civil Design Consultancy for HVDC Switchyard |

| Item No | Description | Unit | Qty | | | Rate (Rs.) | Amount |
|---|---|---|---|---|---|---|---|
| | | | Khavda (k) | Nagpur (n) | Total (k+n) | | |
| (xvi) | Road | Types | 2 | 2 | 4 | 14000 | 56000 |
| (xvii) | Storm water Drainage | Types | 4 | 4 | 8 | 19667 | 157336 |
| (xviii) | Sump pit for cable trench/drainage | Types | 2 | 2 | 4 | 8667 | 34668 |
| (xix) | Boundary wall | Types | 1 | 1 | 2 | 12333 | 24666 |
| (xx) | Oil recovery (including oil water separator) tank | Types | 2 | 2 | 4 | 28333 | 113332 |
| (xxi) | DG set foundation design | Types | 1 | 2 | 3 | 17667 | 53001 |
| (xxii) | 30m DG support structure/Chimney foundation design | Types | 1 | 2 | 3 | 24000 | 72000 |
| (xxiii) | Underground diesel tank (15KL)(common underground foundation design for accommodating 2 nos. tanks) | Types | 1 | 1 | 2 | 5500 | 11000 |
| (xxiv) | DG SET Fuel transfer pump room/PUMP HOUSE | Types | 1 | 1 | 2 | 11000 | 22000 |
| **4** | **Preparation, submission of drawings of following switchyard civil works including their approval from BHEL/Customer based on input from BHEL** | | | | | | |
| (i) | Details of Tower foundation bolts ( All Ratings) | Set of Drawings | 2 | 3 | 5 | 2150 | 10750 |
| (ii) | Details of AIS equipment foundation bolts | Set of Drawings | 1 | 2 | 3 | 2150 | 6450 |
| (iii) | Details of DC Yard/DC Filter/Valve Hall/DC Hall/AC Filter Equipment foundation bolts | Set of Drawings | 2 | 2 | 4 | 2150 | 8600 |
| (iv) | Foundation Layouts of 765/400/33kV Switchyard | Set of Drawings | 2 | 2 | 4 | 226667 | 906668 |
| (v) | Foundation Layout of AC Filter yard | Set of Drawings | 1 | 1 | 2 | 123333 | 246666 |
| (vi) | Details of tower foundations | Drawing | 18 | 22 | 40 | 10667 | 426680 |
| (vii) | Details of equipment foundations | Set of Drawings | 31 | 36 | 67 | 9667 | 647689 |
| (viii) | Ground Improvement Layout | Set of Drawings | 1 | 0 | 1 | 32000 | 32000 |
| (ix) | Details of cable trenches | Set of Drawings | 1 | 1 | 2 | 21500 | 43000 |
| (x) | Details of cable trench crossings | Set of Drawings | 1 | 1 | 2 | 24333 | 48666 |
| (xi) | Details of 500MVA Transformer foundation with soakpit including combined Layout of all Transformers & Fire walls etc. | Set of Drawings | 0 | 1 | 1 | 26500 | 26500 |
| (xii) | Details of 110/80MVAR Reactor foundation with soakpit including combined Layout of all reactors & Firewalls etc. | Set of Drawings | 2 | 2 | 4 | 32667 | 130668 |
| (xiii) | Auxiliary Transformer | Drawing | 1 | 1 | 2 | 7667 | 15334 |
| (xiv) | Details of Jacking pad for transformer/reactor | Drawing | 2 | 2 | 4 | 21667 | 86668 |
| (xv) | Details of Rail cum road | Drawing | 2 | 2 | 4 | 11333 | 45332 |
| (xvi) | Layout of cable trenches | Drawing | 1 | 1 | 2 | 53500 | 107000 |
| (xvii) | Details of Road including Layout | Set of Drawings | 1 | 1 | 2 | 32000 | 64000 |
| (xviii) | Details of fencing | Set of Drawings | 1 | 1 | 2 | 17000 | 34000 |
| (xix) | Details of boundary wall | Drawing | 1 | 1 | 2 | 31000 | 62000 |
| (xx) | Details of gates | Drawing | 2 | 2 | 4 | 18667 | 74668 |
| (xxi) | Layout of drainage | Drawing | 1 | 1 | 2 | 32000 | 64000 |
| (xxii) | Details of drains/crossings | Set of Drawings | 1 | 1 | 2 | 19333 | 38666 |
| (xxiii) | Details of sump pits | Drawing | 1 | 1 | 2 | 10333 | 20666 |
| (xxiv) | Details of Oil recovery tank including Layout | Set of Drawings | 1 | 1 | 2 | 24000 | 48000 |
| (xxv) | Rain Water Harvesting | Drawing | 1 | 1 | 2 | 21000 | 42000 |

# BILL OF QUANTITY

| | |
|---|---|
| Name of Project : | ±800kV, 6000MW Khavda-Nagpur HVDC |
| Name of Work : | Civil Design Consultancy for HVDC Switchyard |

| Item No | Description | Unit | Qty | | | Rate (Rs.) | Amount |
|---|---|---|---|---|---|---|---|
| | | | Khavda (k) | Nagpur (n) | Total (k+n) | | |
| 5 | **Preparation, submission of design documents & drawings of following RCC buildings as per specification/Latest IS codes including their approval from BHEL/Customer based on input from BHEL Single Storey: (For working out area, outer wall to outer wall dimensions shall be considered)** | | | | | | |
| (i) | Auxiliary CRB- Greater than 100sqm but less than equal to 650sqm | LS | 0 | 1 | 1 | 366667 | 366667 |
| (ii) | SPR- less than equal to 100sqm | LS | 1 | 1 | 2 | 53000 | 106000 |
| 6 | **Visit to Site / Customer's / Consultant / verification agency** | | | | | | |
| (i) | LS Allowance per day including boarding, lodging, local conveyance, etc., all inclusive. (BHEL shall pay to & fro Ist AC fare from Bidder's headquarters to BHEL office/Customer office/any other place within India for each visit separately.) | day | 5 | 5 | 10 | 31000 | 310000 |
| (ii) | LS Allowance per day including boarding, lodging, local conveyance, etc., all inclusive. (BHEL shall pay to & fro economy class Air fare from Bidder's headquarters to Site/Customer office for each visit separately.) | day | 5 | 5 | 10 | 31000 | 310000 |
| | **Total Amount** | | | | | TOTAL | **16860724** |

# SECTION - 2

STANDARD TECHNICAL SPECIFICATION
(N.A.)

# SECTION - 3

## ENCLOSURES TO THE SPECIFICATION

(a) Customer's specification

**TECHNICAL SPECIFICATIONS FOR CIVIL WORKS FOR KPS2-NAGPUR HVDC SYSTEM**

**PACKAGE 1**

# Contents

## 8.1 GENERAL

This specification is intended to define the civil works to be carried out by the HVDC vendor for successful execution and commissioning of KPS2-Nagpur HVDC System.

The broad scope of work is as follows:

a.) **Design scope**- Design of all the items required, in each of the converter stations including site and general services, foundations, noise/ fire/ blast walls, design of all buildings like Valve Hall, Valve Cooling & Ventilation Buildings, MV & LV Buildings, Service Buildings, Firefighting pump house etc., Convertor Transformers, all structures and foundations required for AC & DC yard etc. required for the system. Preparation of all drawings for the designs thus developed and preparation of all types of layouts like General arrangement, foundation layouts, building layouts, road & storm water drain layouts, gravel spreading layout, fence layout etc. is also in the scope of the contractor.,

All civil design works shall satisfy the requirements specified in other Sections of this Specification and as detailed below. They shall be designed to the required service conditions/loads as specified elsewhere in this Specification and implied as per national / international Standards.

All civil design works shall be carried out as per applicable Indian Laws, BIS Codes. The Contractor shall furnish all design, drawings (in hard and soft editable versions).

For all buildings, structures, foundations etc. necessary layout and details shall be developed by the Vendor keeping in view the functional requirement of the plant and facilities and providing enough space and access for operation, use and maintenance. Certain minimum requirements are indicated in this Specification for guidance purpose only. However, the Vendor shall provide according to the complete requirements.

The payment for the design of different structures is deemed to be included in the corresponding electrical (HVDC/AC) erection item for which the civil structure is designed. No separate payment for design work shall be made. Other civil items required for the completeness of the system but not associated with any electrical erection item are deemed to be included in the overall scope of work and no separate payment on account of designs/drawings shall be made.

b.) **Execution scope**- The contractor shall execute all the works for Valve Halls from above plinth level to terrace level which shall include structure (pre-engineered columns, beams, purlins, girts, rods, bracings etc. required for successful completion of building), puf/mineral wool panelled walls, deck slab etc. Execution of Civil works of valve halls like concreting, brickworks, plastering etc. is not in present scope of works.

All works pertaining to manufacture, inspection, proto assembling, transportation, storage and erection of galvanized structures for towers/equipment etc. are in the present scope of work.

Electrical wiring, lighting, ethernet wiring, for the buildings as per relevant section is in the present scope of works.

Supply of furniture for effective functioning of Control Room and its associated cabling as per details mentioned at para 8.15.2.2 below, required for working of the system are in the present scope of work.

All quality standards, fabrication and erection check lists, welding standards and other technical requirements as covered in the Specification shall be strictly adhered to by the Contractor.

The words like Contract, Contractor, Vendor, Engineer-in-Charge, Drawings, Owner, works, site used in this Specifications shall be considered to have the meaning as understood from the definition of these terms included in the General Conditions of Contract.

## 8.2 CIVIL WORKS DESIGN BASIS

### 8.2.1 GENERAL

The Contractor shall design the civil works to meet the requirements of the Specification and to be suitable for the intended use at the specified locations. In particular, the Contractor shall be responsible for obtaining all data not specifically detailed herein but which is required to ensure compliance with this Specification.

The foundations and structures shall be designed to ensure that relative movement over the specified life of the installation does not result in stresses in any part of the Works which exceed the maximum design levels.

A design intent memorandum (DIM) to the effect shall be submitted by the Contractor for the Employer's specific approval giving details regarding its assumed data, loading for all civil design.

The foundation of various buildings/structures/equipment/Converter Transformers shall be designed based on the recommendations of the soil report.

In case, the soil is found to be susceptible to liquefaction, the design and recommendation of mitigation measures are in the present scope of the works.

## 8.3 SITE PREPARATION

The contractor shall review the FGLs (terrace levels) of the two HVDC terminals and the AC Switchyards and suggest corrections from the point of view of electrical clearances and other requirements if any required.

## 8.4 ANTIWEED TREATMENT & STONE SPREADING

### 8.4.1 SCOPE OF WORK

Antiweed treatment and stone spreading is not in the scope of the contractor, however, the layout drawing showing the areas where these are to be provided shall

be prepared by the contractor and submitted to employer for approval.

## 8.5 SEWERAGE SYSTEM

Construction of Sewerage System is not in the present scope, however, the design and drawings of the sewerage system shall be developed by the contractor and submitted to the employer for approval. The design considerations and the materials to be used for the drainage system (which is to be shown on the drawings) is mentioned below:

a) Sewerage system (including collection, treatment and disposal) shall be designed for all utility buildings including the converter, and other auxiliary buildings **as necessary as per approved layout.**

b) For treating the sewage, the Contractor shall design septic tank and soak pit system of suitable size within the stations.

c) The sewerage system shall consist of all necessary piping, pumps (if required), fittings, manholes, clean-outs, piping connections and all other materials required for a safe and efficient sewerage system.

d) Sewers shall be designed for a minimum self-cleansing velocity of 0.75 m/sec and the maximum velocity shall not exceed 2.4 m/sec. Pipes of 100, 150 & 200mm diameter shall be used for sewerage.

e) Cement concrete pipes shall be used below ground level. However, stoneware pipes can be used in localized areas not subject to any traffic load. However, all vertical pipes from the building shall only be uPVC pipes.

f) Stoneware pipes grade 'A' shall be provided, laid and jointed with stiff mixture of cement mortar in the proportion of 1:1 (1cement :1 fine sand) including testing of joints etc. complete. SW pipes shall be encased with Cement concrete 1:5:10 (1 cement: 5 coarse sand: 10 graded stone aggregate 40 mm nominal size) including bed concrete as per CPWD standard design and CPWD specifications. In case of non-availability of SW Pipe, contractor may use UPVC Pipe of similar dia with the prior approval of EIC without any financial implication to POWERGRID.

g) Manholes of suitable size and depth as per CPWD standard design shall be provided at all turning points and junction with spacing between 2 manholes not exceeding 30m. Heavy duty covers shall be provided for the manholes in case it comes on the road, and medium duty covers shall be provided at other places.

## 8.6 DRAINAGE

### 8.6.1 SITE DRAINAGE

Construction of Drainage is not in the present scope, however, the layout drawings of the drainage shall be developed by the contractor and submitted to the employer for approval. The drawing[1] for cross sections of the drains is enclosed with the tender documents. Vendor shall submit the drainage layout based on the cross-section drawings and the considerations mentioned below.

The Contractor shall design rainwater drainage system within the switchyard fencing. Connection at one or more locations to the outfall points located outside the station boundary wall shall also be provided. Invert level of drainage system at outfall points shall be decided in such a way that the water can easily be discharged outside the station boundary wall. In case outfall point is more than 50M away from boundary wall, only 50-meter drain outside the boundary wall is to be shown in the design and drawings. While designing the drainage system following points shall be taken care of:

a. The surface of the switchyard shall be sloped to prevent accumulation of water.

b. Suitable drainage system shall be planned considering the rainfall pattern of the respective location. In the switchyard maximum spacing between two drains shall not be more than 100 meters. It shall be ensured that no area is left un- drained.

c. RCC open storm water drains shall be suitably designed with Pre-cast or cast in situ.

d. Pipe drains shall be provided in areas of switchyard where movement of crane shall be necessary in operating phase of the substation. The locations of such drains shall be decided during detailed engineering.

e. For pipe drains, concrete pipe of class NP2 shall be used. For road crossings etc. pipe of class NP3 shall be provided. Design of RCC pipe drain for road crossing shall be provided.

f. Pipe drains shall be connected through manholes at an interval of maximum 30m.

g. If the invert level of outfall point is above the last drain point in the substation boundary, sump of suitable size has to be constructed with in the substation boundary.

## 8.7 RAINWATER HARVESTING

Construction of Rainwater Harvesting is not in the present scope, however, the drawing showing the location of Rainwater Harvesting connected with the drainage layout shall be developed by the contractor and submitted to the employer for approval.

Branch drains from the main drain carrying rainwater from entire switchyard shall be designed such that they are connected to the recharge structures.

## 8.8 ROADS

Construction of Roads is not in the present scope, however, the layout drawings of the roads shall be developed by the contractor and submitted to the employer for approval.

A detailed layout of roads, indicating turning radii, width of road etc. shall be prepared by the contractor based on the below mentioned considerations:

a) All roads shall be bitumen type.

b) Adequate turning space for vehicles shall be provided and bend radii shall be set accordingly. Road to the Converter/Power transformer/ Reactor shall be as short and straight as possible.

c) The width of all the roads including roads around the converter island and the main approach road from station entrance gate shall be as per approved layout. The width of the main rail cum road track for convertor transformers shall also be as per approved layout.

The camber of 1:50 shall be provided all along the road. 100 mm dia RCC Hume pipe (NP-3) shall be placed across the road at every 100m interval along the road. The finished top of road crest shall be 175 mm (minimum) above F.G.L. (switchyard formation level).

d) All the culverts and allied structures (required for road/rail, drain, cable trench crossings etc.) shall be indicated in the corresponding layout drawings.

In case of switchyard roads 600mm wide compacted earthen shoulder shall be provided on both sides of the road without Kerb stones and paver blocks.

e) **Dedicated roads along with drain crossing, for Breaker maintenance are to be provided.**

## 8.9 CABLE & PIPE TRENCHES

Construction of Cable Trenches is not in the present scope, however, the layout drawings of the cable trenches shall be developed by the contractor and submitted to the employer for approval.

The drawing[2] of cable trench sections is enclosed with the tender drawings. Based on the section drawings, the layout of the cable trenches shall be prepared by the contractor and submitted to the employer for approval. The following considerations shall be adopted in preparation of the layout drawings:

1. Trenches shall be drained. Necessary sumps and sump pumps shall be shown at appropriate location in the layout drawing for easy drainage of water from the trenches.

2. All metal parts inside the trench shall be connected to the grounding system by the contractor under present scope.

3. Cables from trench to equipment shall run in hard conduits that are heavy duty PVC pipe by the contractor under present scope.

4. Trench wall shall not foul with the foundation. Suitable clear gap shall be provided.

5. Placing of cable trench on filled up soils shall be accepted. However, the layers of soil for a depth of 500 mm below such cable trench shall be compacted to a proctor density of 95%.

## 8.10 FOUNDATIONS AND OTHER RCC CONSTRUCTIONS

### 8.10.1 GENERAL

Construction of foundation and other RCC Structures is not under present scope, however, the contractor shall develop designs and drawings of all the required RCC foundations and structures. The considerations to be adopted for design and drawing are as follows:

1. Work covered under this Clause comprises the design of foundations and other RCC constructions for all AC & DC switchyard structures, equipment supports, trenches, drains, jacking pad, pulling block, control cubicles, bus supports, converter transformer, auto-transformers, reactors, marshalling kiosks, auxiliary equipment & systems, buildings, tanks, rail tracks or for any other equipment or service and any other foundation/RCC construction required to complete the work. This clause is as well applicable to the other RCC constructions.

2. Reinforced Concrete of design mix (M-25) shall be used for all works, unless otherwise noted elsewhere.

3. The switchyard foundations plinth and building plinth shall be minimum 300 mm and 750 mm above finished ground level respectively. In the case of Valve Halls, the plinth level shall be decided based on electrical clearances and maintenance requirements.

4. Minimum 75 mm thick lean concrete 1:4:8 (1 cement: 4 coarse sand: 8 stone aggregate 40mm nominal size) shall be provided below all underground structures, foundations, trenches etc. to provide a base for construction.

5. Precast foundations for tower and equipment shall also be accepted.

6. In line with provisions of IS 13920 high strength deformed steel bars, produced by thermo-mechanical treatment process, of grades Fe 500D/Fe 550D, having elongation more than 14.5% and conforming to other requirements of IS 1786:2008 may also be used for the reinforcement.

### 8.10.2 DESIGN

1. All the foundations shall be of reinforced cement concrete. The design of RCC structures shall be carried out as per IS-456.

2. The design of steel-concrete composite beam shall be carried out as per IS-11384.

3. For detailing of reinforcement IS-5525 and SP: 34 shall be followed. However, in

specific areas, mild steel (Grade I) conforming to IS-432 can also be used with specific approval of the Employer. Clear cover to reinforcement shall be as per IS: 456 (latest).

4. RCC water retaining structures like storage tanks, cooling water basin etc. shall be designed as un-cracked section in accordance with IS-3370 (Part-I to IV) by working stress method. However, water channels and substructure of pump house shall be designed as cracked section with limited steel stresses as per IS-3370 (Part I to IV) by working stress method.

5. The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and/or equipment and/or super structure, and other conditions, which produces the maximum stresses in the foundation or the foundation component and as per relevant IS codes.

6. The design and detailing of foundations shall be done based on the approved soil data and sub-soil conditions as well as for all possible critical loads and the combinations thereof. The spread footings foundation or pile foundation as may be required based on soil/sub-soil conditions and superimposed loads shall be provided.

7. When pile foundations are adopted, the same shall be cast-in-situ/driven/bored type as per relevant IS. Only RCC piles shall be provided. Suitability of the adopted pile foundations shall be justified by way of full design calculations. Detailed design calculations shall be submitted by the Contractor showing complete details of piles/pile groups proposed to be used. Necessary initial load test shall also be carried out by the employer through its civil agency, to establish the piles design capacity. Only after the design capacity of piles has become established, the job of piling shall be taken up. All the work (design & testing) shall be planned in such a way that these shall not cause any delay in project completion. RCC for pile works shall be Design Mix of minimum grade M-25 and minimum cement content shall be 400Kg/ cu.m as per IS:2911 (Latest revision).

8. All foundations shall extend to a depth of at least 500 mm below virgin ground level as stipulated in IS 1904.
   Foundations for equipment other than main block for Reactor, CB and Transformers may also be placed on filled soil provided the net intensity of soil pressure does not exceed 5 t/sqm.

   All R.C.C. piles (including short piles) shall be suitably anchored into hard virgin strata. The friction resistance of back fill earth shall be neglected for calculation of pile capacity for design purposes, however negative friction due to earth fill, if any, must be duly considered for deciding pile capacity.

9. Designs shall consider any sub-soil water pressure that may be encountered following relevant standard strictly.

10. Necessary insulation shall be provided in reinforcement steel to avoid closed

loops, wherever required e.g. reactor foundations.

11. Necessary protection to the foundation work, if required, shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any other type of soil which is detrimental/ harmful to the concrete foundations.

12. RCC columns shall be designed with rigid connection at the base.

13. All building sub-structures including pump houses shall be checked for sliding and overturning for stability during both construction and operating conditions for various combinations of loads. Factors of safety for these cases shall be taken as mentioned in relevant IS Codes or as stipulated elsewhere in the Specifications. For checking against overturning, weight of soil vertically above footing shall be taken and inverted frustum of pyramid of earth on the foundation should not be considered.

14. Earth pressure for all underground structures shall be calculated using coefficients of earth pressure at rest; co-efficient of active or passive earth pressure (whichever is applicable). However, for the design of substructure of any underground enclosures, earth pressure at rest shall be considered.

15. In addition to earth pressure and ground water pressure etc., a surcharge load of minimum 2 T/sq.m shall also be considered for the design of all underground structures including channels, sumps, tanks, trenches, substructure of any underground hollow enclosure etc., to account for the vehicular traffic in the vicinity of the structure.

16. Following conditions shall be considered for the design of substructure of pump house, channels, sumps, tanks, trenches, and other underground structures: -

a) Full water pressure from inside and no earth pressure & ground water pressure & surcharge pressure from outside (applicable only to structures which are liable to the filled up with water or any other liquid).

b) Full earth pressure, surcharge pressure and ground water pressure from outside and no water pressure from inside.

c) Design shall also be checked against buoyancy due to the ground water during construction and maintenance stages. Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the superimposed loadings.

17. Base slab of the any underground enclosure/tank shall also be designed for its empty condition during construction and maintenance stages with maximum ground water table (GWT). Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the super-imposed loadings.

18. Base slab of any underground enclosure like water storage tank shall also be designed for the condition of different combination of pump sumps being empty during maintenance stages with maximum GWT. Intermediate dividing piers of such enclosure shall be designed considering water in one pump sump only and the other pump sump being empty e.g. for maintenance.

19. The foundations shall be proportioned so that the estimated total and differential movements of the foundations are not greater than the movements that the structure or equipment is designed to accommodate. Foundation settlements shall, in no case, exceed the permissible limits specified in relevant Indian Standard Specification.

20. All machine foundations shall be designed in accordance with the provisions of the relevant parts of IS-2974, IS-456 and IS-2911. The provisions of DIN-4024 (latest) shall also be followed.

    For the foundations of rotating machines, detailed static and dynamic analysis shall be done. A fatigue factor of at least 2.0 shall be considered for dynamic forces. Minimum reinforcement shall be governed by IS-2974 as well as IS-456. RCC design shall be done by working stress method.

    For the foundations supporting minor equipment weighing less than one ton or if the mass of the rotating parts is less than one- hundredth of the mass of the foundation, dynamic analysis is not must. However, if such minor equipment is to be supported on building structures, floors etc. suitable vibration isolation shall be provided by means of springs, neoprene pads etc. and such vibration isolation system shall be designed suitably.

21. All other foundations shall be designed in accordance with the provisions of the relevant parts IS-2911 and IS-456.

22. The gantry / tower foundations shall be designed for factor of safety of 1.5 for normal and broken wire condition and 1.5 for combined short circuit and broken wire condition.

23. Minimum two piles shall be provided in any pile group.

24. Equipment foundations shall be designed for a factor of safety of 1.5 for normal and 1.5 for short circuit condition.

## 8.11 CONVERTER AND POWER TRANSFORMER / REACTOR FOUNDATION, RAIL TRACK/ ROAD CUM RAIL TRACK

The contractor shall develop designs and drawings of the convertor transformers showing the details of all the associated systems like rail tracks, oil pits, rails tracks, firewalls, welding details etc. and submit the same for approval of the employer. The design shall incorporate the following considerations:

The Contractor shall design an RCC Rail cum road system integrated with the transformer foundation to enable installation and the removal of any failed unit. The transfer track system shall be designed suitable to permit the movement of any failed unit fully assembled (including OLTC, bushings) with oil. The rail cum road track of required width shall be provided all along the length of the transformer area covering

all the poles so that any failed unit can be moved from its foundation to the nearest road.

Minimum reinforcement in these foundations shall be as per the provisions of IS 456 and IS 2974.

If trench/drain crossings are required in the design, then suitable R.C.C./Pipe culverts shall be provided in accordance with I.R.C. standard / relevant IS. The permanent transfer track system shall have RCC raft type foundation integrated with the converter/POWER transformer foundations. The road cum rail track shall be of RCC construction and suitable drainage system shall be provided.

The Contractor shall design a pylon support system for supporting the firefighting system in the design.

Each converter/ POWER transformer, auto transformer and smoothing reactor (if oil filled) **excluding Standby unit** including oil conservator tank and cooler banks etc. shall be designed to be placed in a self-sufficient pit surrounded by retaining walls (Pit walls). The clear distance of the retaining wall of the pit from the converter/ POWER transformer shall be 20% of the transformer height or 0.8m whichever is more. The oil collection pit thus formed shall have a void volume equal to minimum 20% volume of total oil in the converter/ POWER transformer. The oil collection pits below the converter/ POWER transformers shall be suitably connected through RCC pipes on pole basis.

The pipes shall be placed in such a way so that oil can flow from one pit to the main collection sump pit. One main collection sump pit **per Bipole** per station shall be provided at one convertor station. The volume of main oil collection pit shall be 220% of the largest transformer oil volume. (for example, large transformer oil volume is 100 kL, then the main collection pit oil volume shall be 220 kL). Similarly, separate pipe connection shall be made from individual pole to the main collection sump pit. The minimum height of the retaining walls shall be 15 cm above the finished level of the ground to avoid outside water pouring inside the pit. The bottom of the pit shall have a uniform slope towards a main collection sump pit. While designing the oil collection sump pit, the movement of the transformer must be taken into account.

In the design, the pits shall be covered with a grating made of MS flat of minimum size 30mmx 5mm placed at 30mm centre to centre and 6mm dia MS bar at spacing of 150mm at right angle to each other. Maximum length of grating shall be 2000mm and width shall not be more than 500mm. The gratings at intermediate location shall be supported on ISMB 150, shall be placed at the formation level and shall be covered with 100mm thick layer of broken/ crushed/ non-crushed stone having size 40mm to 60mm. All steel work used for grating and supports shall be painted with epoxy-based zinc phosphate primer (two packs) confirming to IS: 13238- 1991, thereafter with two or more coat of bituminous paint of approved quality shall be applied. Contractor shall have option to provide factory made electro forged MS grating made of specified size MS flat and round bars without any extra cost to employer.

Each oil collection pit shall be drained towards a sump pit within the collection pit whose role is to drain water and oil within the collection pit so that collection pit remains dry.

Complete foundation shall be made of reinforced cement concrete.

In the drawing a pump of 5HP rating (rating as per BOQ Item) with auto start and auto stop features shall be shown to be placed in the main collection sump pit to drain out the fire fighting & rainwater and oil if any from the sump pit in to the nearest drain.

## 8.12 FIRE WALLS

### 8.12.1 GENERAL

Fire protection walls shall be designed, where required, in accordance with Tariff Advisory Committee (TAC) recommendations.
A fire wall shall be erected between each oil filled transformer and reactor unit to protect each one from the effects of fire on another.
Also, if the free distance between the nearby buildings (Valve Hall, Service building and aux. buildings) and the oil filled transformer and reactor unit is less than 10 m, a fire wall shall be erected between the building and the equipment, or otherwise the building walls shall be constructed as firewall.

### 8.12.2 DESIGN

All fire walls shall be of RCC framed structure with filler walls of RCC construction which shall comply to TAC norms for specified fire resistance. The sections in the RCC firewall required for bushing entry may be constructed using sandwiched wall panels for specified fire resistance

The firewall shall extend 600 mm on each side of the transformer/ reactor and 600 mm above the conservator tank or safety vent.

These dimensions might be reduced in special cases, as per the approval of Employer where there is lack of space. A minimum of 2.0-meter clearance shall be provided between the firewall and the equipment.

### 8.12.3 FIRE RESISTANCE

The firewalls around transformers and reactors and walls of the building which are used as fire walls, shall have a minimum fire resistance of 4 hours as per IE rules.

The firewall shall be designed to protect against the effect of radiant heat and flying debris from an adjacent fire.

**These walls shall comply with TAC norms. All openings in between different segregated fire zone areas shall be suitably sealed.**

## 8.13 STEEL STRUCTURES

### 8.13.1 GENERAL

1. The scope of specification covers design, fabrication, proto-assembly, supply and erection of galvanised steel structures for towers, girders, lightning masts and

equipment support structures. **The steel structures like tower, gantry etc can either be lattice or tubular sections.** The scope shall include design and supply and erection of all types of structures including bolts, nuts, washers, hangers, shackles, clamps anti-climbing devices, bird guards, step bolts, inserts in concrete, gusset plates, equipment mounting bolts, structure earthing bolts foundation bolts, spring washers, fixing plates and any other items as required to complete the job.

2. Structural steel conforming to Grade A of E250 for MS and E350 for HT shall be acceptable for lattice structures.

3. The connection of all structures to their foundations shall be by base plates and embedded anchor/foundation bolts.

4. All steel structures and anchor/foundation bolts shall be fully galvanized. The weight of the zinc coating shall be at least 610 g/$m^2$ for anchor bolts / foundation bolts and for structural members. However, in coastal areas, the weight of zinc coating shall be 900 g/$m^2$. In case structural members are under 5 mm, but not less 2 mm, weight of zinc coating shall be 460 g/m2. One additional nut shall be provided below the base plate which may be used for the purpose of leveling. **A lock nut shall be provided on top of the nut.**

5. For filter equipment and valve cooling towers etc. anchor fasteners may be used.

### 8.13.2 REQUIREMENTS

For design of steel structures loads such as dead loads, live loads, wind loads etc. shall be based on IS:875, Parts I to V. For materials and permissible stresses IS: 802, Part-I, Section-2 shall be followed in general. However, additional requirements given in following paragraphs shall be also considered.

1. The minimum thickness of members shall be as follows:

| | |
|---|---|
| Leg members | 6 mm |
| Bracing members | 5 mm |
| Redundant members | 4 mm |

2. The maximum slenderness ratios for leg members, other stressed members and redundant members for compression force shall be as per IS-802.

3. The minimum distance from hole centre to edge shall be 1.5 x bolt diameter and the minimum distance between centre to centre shall be 3.0 x bolt diameter.

4. The minimum bolt diameter shall be 16 mm.

5. In order to facilitate inspection and maintenance, the structures shall be provided with climbing devices.

6. Following design criteria shall be adopted for design of switchyard structures:

a) All structures shall be designed for the worst combination of dead loads, live loads, wind loads and seismic as per IS-875, Wind and seismic data shall be as per the latest NBC 2016, loads due to deviation of conductor, load due to unbalanced tension in conductor, torsional load due to unbalanced vertical and horizontal forces, erection loads, short circuit forces including "snatch" in the case of bundled conductors etc. Short circuit forces shall be calculated in accordance with IEC-865 considering a fault level mentioned elsewhere in this document.

b) Switchyard gantry structures shall be designed for the condition of all the three wires on one side being broken. The design of all structures shall be based on the condition where stringing is done only on one side i.e. all the three (phase) conductors broken on the other side.

A factor of safety of at least 1.5 under normal as well as broken wire conditions and 1.2 under combined short circuit & broken wire conditions shall be considered for the design of switchyard structures.

c) For purpose of design, static tension pull & transverse reaction on the gantries as calculated for each individual span shall be considered. Vertical load of half the span of conductors/string and the earth wires on either side of the beam shall be considered. Weight of man with tools shall be considered at least 150 kgs for the design of structures.

d) **Non-standard structures like** Terminal/linetake off gantries shall be designed for a minimum conductor tension of 4 MT per phase or as per above requirement, whichever is more for 400 kV switchyard. The design of the terminal gantries shall also be checked considering +/- 30 degrees deviation of conductor in both vertical and horizontal planes.

7. The girders shall be connected with lattice columns by bolted joints.

8. All equipment supports shall be designed for the worst combination of dead loads, erection load, wind load/seismic forces, short circuit forces and operating forces acting on the equipment and associated bus bars as per IS- 806 or IS-802.

9. The design of steel structures for buildings shall be done by limit state method based on IS: 800.

10. Editable Soft copies of designs and drawings shall be submitted for approval along with hard copies for all structures.

### 8.13.3 BOLTING

i) Every bolt shall be provided with a washer under the nut so that no part of the threaded portion of the bolt is within the thickness of the parts bolted together.

ii) All steel items, bolts, nuts and washers shall be hot dip galvanized.

iii) 2% extra nuts and bolts shall be supplied for erection.

### 8.13.4 WELDING

The work shall be done as per approved fabrication drawings (To be approved by vendor only) which clearly indicate various details of joints to be welded, type of weld, length and size of weld, whether shop or site weld etc. Symbols for welding on erection and shop drawings shall be according to IS:813. Efforts shall be made to reduce site welding so as to avoid improper joints due to constructional difficulties.

### 8.13.5 FOUNDATION BOLTS

Foundation bolts for the towers and equipment supporting structures and elsewhere shall be embedded in first stage concrete while the foundation is cast.

The foundation bolts shall be handed over to the civil agency for casting into the concrete pedestals. The Contractor shall, however, ensure the proper alignment of these bolts to match the holes in the base plate.

The Contractor shall be responsible for the correct alignment and leveling of all steel work on site to ensure that the towers/structures are plumb.

All foundation bolts for lattice structure, pipe structure are to be supplied under the present scope of works.

All foundation bolts shall be fully galvanized so as to achieve 610 g per $m^2$ of Zinc Coating as per specifications. However, in coastal areas, the foundation bolts shall be galvanized to achieve 900 g per $m^{2.}$

All foundation bolts shall conform to IS: 5624 but the material however, shall be MS conforming to IS: 2062 **and shall be provided with a leveling & locking nut.**

### 8.13.6 STABILITY OF STRUCTURE

The Supplier shall be responsible for the stability of the structure at all stages of its erection at site and shall take all necessary measures by the additions of temporary bracings and guying to ensure adequate resistance to wind and also to loads due to erection equipment and their operations.

### 8.13.7 PROTO-ASSEMBLY

The bidder shall carry out the proto assembly of the standard and non-standard structures as per the issued fabrication drawings. Proto-corrected drawings shall be approved by contractor and submitted to Owner for information only.

### 8.13.8 GROUTING

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### 8.13.9 GALVANISING

All structural steel works and pipe supports shall be galvanized after fabrication. Zinc required for galvanizing shall have to be arranged by the manufacturer. Purity of zinc to

be used shall be 99.95% as per IS: 209. Structure shall be hot dip galvanized as per IS: 4759.

The Contractor shall be required to make arrangement for frequent inspection by the Purchaser as well as continuous inspection by a resident representative of the Purchaser, if so desired for fabrication work.

#### 8.13.10 TOUCH-UP PAINTING

Touch painting if required shall be done as per the direction of Engineer in charge.

## 8.14 BARBED WIRE FENCING AND GATE

### 8.14.1 AREAS REQUIRING FENCING

The contractor shall show the fence and the location of entry gates clearly in the layout drawings so that the same can be issued to the civil agency for construction.

Fencing shall be provided for the complete converter stations. Fencing shall also be provided for equipment mounted on ground or at a height lower than 2.5m. Necessary gates shall be provided for each area so fenced.

## 8.15 BUILDINGS

### 8.15.1 GENERAL

Valve Hall Shall Be Pre-Engineered Building as per details mentioned below. All other buildings shall be RCC framed with brick infill walls as detailed in the subsequent paras.

#### 8.15.1.1 DIMENSIONS

The building design shall take into consideration the layout of the panels, equipments, etc, in order to allow enough area for maintenance.

An open space as per IE rules shall be provided on the periphery of the rows of panels, and equipment generally, in order to allow easy operator movement and access as well as maintenance.

#### 8.15.1.2 ELECTROSTATIC/RADIO INTERFERENCE SHIELDING

The buildings inside the energized area of the stations shall be designed to be electro statically shielded to limit the exposure of the equipment & personnel to specified electric field strengths. The shielding system shall be grounded properly.

The valve halls shall be provided with interference screening. In addition, the control and cable termination rooms shall be suitably screened to minimize radio interference.

#### 8.15.1.3 DESIGN

The buildings shall be designed:

1. To the requirements of the National Building Code of India, and the standards

quoted therein, and as specified in this Specification.

2. For the specified climatic & loading conditions.

3. To adequately suit the requirements of the equipment and apparatus contained in the buildings and in all respects to be compatible with the intended use and occupancy.

4. With a functional and economical space arrangement.

5. For a life expectancy of structure, systems, and components not less than that of the equipment which is contained in the buildings.

6. Should be aesthetically pleasing. Different buildings shall show a uniformity and consistency in architectural design.

7. To allow for easy access to equipment and maintenance of the equipment; wherever access to roof is required, RCC staircase shall be provided in case of service building and for all other buildings, **RCC or steel staircase shall be provided depending on the type of the building**.

8. With, wherever required, fire retarding materials for walls, ceilings, doors etc., which would prevent supporting or spreading of fire.

9. With material preventing dust accumulation.

10. Suitable expansion joints shall be provided in the longitudinal direction wherever necessary with a provision of twin columns.

11. Individual members of the buildings frame shall be designed for the worst combination of forces such as bending moment, axial force, shear force, torsion etc.

12. Permissible stresses for different load combinations shall be taken as per relevant IS Codes.

13. All steel buildings shall be designed in accordance with IS 800:2007 by Limit stress method only.

    Limit state method of Concrete design shall be adopted unless specified otherwise in the specification.

14. Design of RCC floor/roof slab shall be carried out either by limit state method or working stress method.

15. Sunken RCC slab shall be provided in false flooring area so as to keep the finished floor level of these areas same as that of the surrounding area.

16. Minimum height of skirting above finished floor level shall be 150 mm.

17. All up stands and parapet walls on roof shall be of RCC construction for buildings wherever technically required. Minimum height of parapet walls shall be 750 mm.

18. With anti-termite treatment, plinth protection, DPC, peripheral drain, sanitary, water supply, electrification etc.

19. With the building lighting, in accordance with the requirements of relevant section.

20. With the building auxiliary services like air conditioning and ventilation systems, fire protection and detection systems and all other miscellaneous services, in accordance with the requirements specified in relevant section or elsewhere in this Specification.

21. All structures and its components must be designed and detailed as per latest BIS standards incorporating ductile detailing. List of reference codes are e.g IS 456-2000 (latest), IS 875 all parts, IS 1893 all parts, IS 4326, IS 13920,SP34 etc.

22. RCC columns shall be designed with rigid connection at the base.

23. Clear cover to reinforcement shall be as per IS: 456 (latest).

24. Expansion joints wherever necessary with provision of twin columns shall be as per the provisions of relevant IS or National building codes.

25. Any sub-soil water encountered at founding level, same shall be considered in the design.

**26. All Cable trenches, wherever required inside the building, shall be covered with minimum 6 mm thick chequered plate.**

### 8.15.1.4 DESIGN LOADS

Building structures shall be designed for the most critical combinations of dead loads, super-imposed loads, equipment loads, erection loads, crane loads, wind loads, seismic loads, short circuit loads and temperature loads.

i) The critical load combinations for design of RCC structures shall be computed or generated by using IS: 875 Part-5 (latest), IS: 456 (latest), IS: 1893- part 1 (latest).
ii) The critical load combinations for design of Steel structures shall be computed or generated by using IS: 875 Part-5 (latest), IS: 800, IS: 1893- part 1 (latest).

For Wind loads and Seismic loads, the map of NBC 16 shall be referred.

Wind and Seismic forces shall not be considered to act simultaneously.

**DEAD LOADS:**
Dead loads shall include the weight of structures complete with finishes, fixtures and partitions and shall be taken as per relevant IS codes.
In addition, beams shall be designed for incidental point loads of 20 kN to be applied at any point along the beams. The floor loads shall be subject to the Employer's approval.

**IMPOSED LOADS:**
Super-imposed loads in different areas shall include live loads, minor equipment loads, cable trays, small pipe racks/hangers and erection, operation & maintenance loads. Equipment loads shall constitute, if applicable, all loads of equipment to be supported on the building frame including those expected during erection.

Floors/slabs shall be designed to carry loads imposed by equipment, cables, piping, travel of maintenance trucks (if required) and equipment and other loads associated with the building. In general, floors shall be designed for live loads as per relevant IS and cable and piping loads, if applicable, of not less than 5 kN/sq.m hanging from the underside.

For consideration of loads on structures, IS-875, "Code of practice for structural safety of buildings" shall be followed. The following minimum superimposed live loads shall, however, be considered for the design:

| | |
|---|---|
| a) For accessible roofs | 150 kg/$m^2$ |
| b) For non-accessible roofs | 75 kg/$m^2$ |
| c) RCC Floors: | 500 kg/$m^2$ or actual requirement, if higher than 500 kg/$m^2$, based on equipment weight and layout plans but 1000 kg or more shall be taken for GIS floor. |
| d) Stairs & balconies | 500 kg/$m^2$ |
| e) Toilet Rooms | 200 kg/$m^2$ |
| f) Chequered plate floor | 400 kg/$m^2$ |
| g) Walkways | 300 kg/$m^2$ |

For crane loads an impact factor of 30% and lateral crane surge of 10% of (lifted weight + trolley weight) shall be considered in the analysis of frame according to provisions of IS-875. The horizontal surge shall be 5% of the static wheel load.

**WIND LOADS:**
The wind loads shall be computed as per IS 875 – 2015 (Part-3) latest. ***The class of structure for design, k1 factor, shall be considered under the category as 'important buildings and structures like hospitals, communication buildings/ towers, power plant structures' for buildings, Towers, Gantries, equipment structure.***

**SEISMIC LOAD:**
Seismic Coefficient method/Response Spectrum method shall be used for the seismic analysis as per IS 1893 (Part-I) for all buildings. However, for valve hall and all stack-like

structures, IS 1893 (Part-IV) shall be used. Response spectrum method shall be used for the seismic analysis using at least first 14 modes of vibration.

**TEMPERATURE LOADING:**

For temperature loading, the total temperature variation shall be considered as 2/3 of the average maximum annual variation in temperature. The average maximum annual variation in temperature for the purpose shall be taken as the difference between the mean of the daily minimum temperature during the coldest month of the year and mean of daily maximum temperature during the hottest month of the year. The structure shall be designed to withstand stresses due to 50% of the total temperature variation.

**8.15.1.5 SUBMISSIONS**

The following information shall be submitted for review and approval to the Employer:

1. The architectural drawings, layout of all buildings such as the Valve Halls, the service building, addl. Service building, ventilation, cooling building, MV & LV Building and others.

2. Design criteria for structural steel and reinforced concrete design. The criteria shall comprise the codes and standards used, applicable climatic data including wind loads, earthquake factors and maximum and minimum temperatures applicable to the building locations, assumptions of dead and live loads, including equipment loads impact factors, safety factors and other relevant information.

3. Structural design calculations and drawings (including construction/fabrication) both hard and soft copies for all reinforced concrete and structural steel structures.

4. Fully dimensioned floor plans, cross sections, longitudinal sections and elevations of each building identifying the major building components.

5. Fully dimensioned drawings showing details and sections drawn to scales of sufficient size to clearly show sizes and configuration of the building components and the relationship between them.

6. Product information of building components and materials, including walls, partitions, flooring, ceilings, roofing, doors, wall paneling and windows and building finishes.

7. A detailed schedule of building finishes including colour schemes.

8. A door & window schedule showing door & window types and locations, lock sets and latch sets and other door hardware.

Approval of the above information shall be obtained before ordering materials or starting fabrication or construction as applicable.

## 8.15.2 DETAILS OF BUILDINGS

### 8.15.2.1 VALVE HALL

The design and erection of valve halls as detailed in the subsequent paras, are in the present scope of works.

The valve halls shall have ample clearances such that the inspection of the valves can be possible and allow access of mobile valve servicing equipment without any dismantling. **If required,** the valve hall shall (**for installation and maintenance of highest indoor equipment)** also have provision for monorail/rolling bridge suitable for the hoists/ chain pulley blocks, as applicable, as described in relevant section. The valve hall building shall be pressurized to prevent the ingress of unfiltered air. In addition, the building shall be properly sealed to minimize the flow of outside air into it and vice versa. Openings for equipment and services shall be weatherproof. The building environment shall be controlled as specified in corresponding Section Project.

The valve halls shall be arranged so that each valve hall can be fully maintained from the service block with the other valve hall in operation. Necessary key interlocking scheme for restricted area of valve halls shall be employed for safe operation.

Observation windows (**one for star bridge and one for delta bridge)** in each valve hall shall be provided so that almost whole area of the valve hall is within line of vision when looked from control room floor **(first floor). It shall be rated for at least 3-hour fire rating.**

The lifting arrangement for equipment shall be installed in the roof to carry out the maintenance etc. of the equipment. Maintenance of valve auxiliaries which are located at ground potential including valve base electronics, cooling equipment and cabling shall be possible with the valve group energized.

Doors, windows and walls between service block and valve shall be of fireproof type. All trenches leading out shall be sealed with fireproof material. The doors shall be perfectly airtight.

Separate fire escape doors shall also be provided in the valve halls. Faraday cage/**Inspection gallery** of approximately 2mtr x 5 meters for each valve hall shall be made.

An attenuation of minimum 60 dB of the radiation emanating from the valve hall equipment shall be achieved by suitably shielding the valve hall.

Facilities shall be provided in each valve hall above the anchoring points of valve structure for regular inspection & maintenance of facilities like ventilation system, lighting fixtures, fire detection etc., as applicable. Catwalk for maintenance if required shall be provided inside the valve hall. The floor of the catwalk shall be of closed type so that nothing can drop accidentally in the valve.

a) STRUCTURE:

The Valve Hall building shall consist of steel framed structure with moment connection in transverse direction and with bracings in longitudinal direction to transfer the horizontal forces. The steel building shall be pre-engineered building fabricated in the factory and shall be assembled at site. Columns shall have fixed connection at the base. Auxiliary structure shall be of steel consisting of moment resistant 3-D frames having braced connection provided to transfer the horizontal load to the foundation. Design shall be carried out as per IS 800:2007 by Limit stress method.
Structures shall have shop fabricated part with welded joints. Erection joints can be bolted joints with high strength friction grip bolts.
Either low carbon mild steel or high strength low alloy steel can be used for all steel work.
All steel structures in the valve hall shall be coated with one coat of primer followed by one coating of epoxy paint and final coating of PU (min. 100 microns).

**DESCRIPTION**

**PRIMARY MEMBERS:**

Primary structural framing shall include the transverse rigid frames, columns, corner columns, end wall wind columns and crane gantry girders and Frames at Door openings. Primary members fabricated from plates and sections with minimum yield strength of 340 Mpa to suit design by continuous double side welding.

**SECONDARY MEMBERS:**

Secondary structural framing shall include the purlins, girts, eave struts, wind bracing, flange bracing, base angles, clips, flashings and other miscellaneous structural parts. Suitable wind bracings sag rods to be reckoned while designing the structure. Secondary members for Purlins and Girts shall conform to the physical specification of ASTM or equivalent IS Standards, having a minimum yield strength of 340 MPa. The minimum thickness of secondary members shall be 2.5mm.
Rod /ANGLE bracing shall conform to the physical specification IS 2062 or equivalent of minimum 245Mpa Yield Strength.
All structural hollow pipe sections shall conform to the physical specification of IS: 1161 with YSt 240 as minimum grade.

**Material Specification**
All hot rolled sections shall conform to the physical specifications IS 2062 or equivalent. All other miscellaneous secondary members shall have minimum yield strength of 250 MPa.

Manufacturing of various parts of the Pre-engineered steel structure shall start only after approval of “Manufacturing Quality Plan”. Complete material shall be offered for inspection before dispatch. Inspection shall be carried out based on design and structural drawings approved by Employer and “BILL OF MATERIAL” & Shop drawing prepared by the manufacturer and certified by the Contractor for its correctness.

b) WALLS:

For valve hall Cast-in-situ RCC wall of M-25 grade concrete shall be provided up to a height as per electrical requirement towards facing the oil filled equipment (e.g. converter transformer) to take care of fire accidents (Refer clause 8.11 & 8.12). On all the other sides, Brickwork of minimum height of 3.0 m shall be provided. For remaining height, sandwiched Steel panels consisting of steel sheets on inner and outer side and thermal insulation in between (rated for fire resistance of **2 hours**) shall be provided above the 3.0 m wall. These panels shall be factory fabricated/**assembled** and shall be type tested for **2-hour** fire rating.

The material details for the panels shall be as under Sheet & Insulation Specification
1. Outer Sheeting: Minimum 0.5 mm thick High Tensile Steel or 0.6 MS steel having Troughed Zinc Aluminium alloy hot dip coating of approximately 55% Al. 43.5% Zn & 1.5% Silicon alloy. Total coating mass of minimum 200gm/SQM inclusive of both sides). Exposed surface with PVF@ coating (20-micron DFT) over corrosion inhibitive primer. The material should confirm to ASTM A 792M Grade 345B (or equivalent) coating AZM 200 (or equivalent) having a minimum yield of 345N/sqmm.

2. Inner Sheeting: Minimum 0.5 mm thick High Tensile Steel or 0.6 MS Steel having Troughed Zinc Aluminum alloy hot dip coating of approximately 55% Al. 43.5% Zn & 1.5% Silicon alloy. Total coating mass of minimum 200gm/SQM inclusive of both sides). Exposed surface with PVF@ coating (20 micron DFT) over corrosion inhibitive primer. The material should confirm to ASTM A 792M Grade 345B (or equivalent) coating AZM 200 (or equivalent) having a minimum yield of 345N/sqmm.

3. Insulation: Mineral Wool Insulation conforming to IS:8183. **Thickness shall be adequate to meet the fire rating specified above.**

Internal Wall Cladding:

Aluminum metal wall cladding (minimum 1 mm thick) or **Galvalume metal wall cladding (minimum 0.5 mm thick)** shall be provided on the inside of the valve hall walls as a wall liner to cover the columns and Girts and for maintenance free construction and speedy execution.

c) ROOF:

The Valve halls and their roofs must be simple and sealed, wind and watertight to avoid ingress of dust and moisture from outside. The valve hall roof shall be given adequate slope to ensure that the rainwater does not accumulate on the roof. A parapet with gutter shall be provided around the roof. Special care must be taken to ensure sealing to prevent ingress of dust/moisture from ventilation/air conditioning/smoke ventilation openings, etc.

Roof of valve hall building shall consist of roughed metal sheet decking of minimum 0.8 mm thickness with phosphate coating **or GI sheet with zinc coating of 275 gm/m$^2$** on both sides to act as a permanent shuttering for cast-in-situ RCC slab. Underside of metal roof decking shall be painted with epoxy paint.

Water proofing of the roofs of valve hall shall be constructed by the civil agency with 30 mm thick polyurethane foam for thermal insulation and 1.5 mm thick layer of isothane elastomeric membrane 'EMA' with polyurethane primer as water proofing treatment. A wearing course of 25 mm thick PCC (1:2:4) laid in panel of 1.2X1.2 metre with 0.56 mm dia galvanised chicken wire mesh interposed shall also be provided over elastomeric membrane.

d) FLOOR:
150mm thick Grade slab shall be provided with top & bottom reinforcement of 8 dia bars @ 200 c/c bothways. 50 mm thick ironite (Surface hardener) flooring shall be laid over RCC slab. Two coats of polyurethane coating (total thickness 300 microns) shall be provided over the flooring. The final coat of PU shall be applied after installation of thyristors/equipment.
Final floor shall have a mild gradient and Sump pit alongwith proper drainage arrangement shall be provided to facilitate drainage of water from leakage of cooling pipes

e) NUTS & BOLTS:
All nuts and bolts used for connections in pre-engineered valve hall building shall be of grade 8.8 as per IS: 1367 and shall be hot dip galvanised.
The foundation bolts shall be fully galvanised with 900 gm per $m^2$ (for coastal areas) and 610 gm per $m^2$ (for other areas) of Zinc. All foundation bolts shall conform to IS: 5624 but the material however shall be MS conforming to IS: 2062.

f) DOORS AND WINDOWS
Fire doors for valve halls shall be rated for 3 hours according to BS 476 Part 22 / IS 3614 Part 2 shall be provided under present scope.

g) DRAINAGE
For Valve Halls, the drainage pipes shall be located outdoor to avoid any possible leakage inside Valve Hall. However, these shall be suitably camouflaged to appear aesthetically pleasing. The drainage pipes to be provided for draining out water from the roof of the valve hall to the external drains is under present scope of works.

The works covered under Cl (d) above and the works pertaining to and RCC/Brick walls and roof concreting & waterproofing, plastering shall be executed by the civil agency/ Employer. However, the details shall be mentioned in the drawings of the valve hall so that the same may be issued to the civil agency for construction.

### 8.15.2.2 SERVICE BUILDING

The contractor shall design the service building based on the considerations mentioned below, however, the construction of the building shall be carried out by the civil agency. The works pertaining to Conduiting shall be done by the civil agency. Drawing for Conduiting shall be prepared by Contractor under present scope. Further, other illumination, cabling, wiring etc. of the entire service building is under the present scope of works which shall be executed as per the corresponding sections of the Technical Specifications.

While designing the layout of the building, it shall be ensured that ventilators of the toilets are camouflaged so as to give a good aesthetic view. No ventilator/ small window shall be provided in the front view of building.

The service building shall have ample space to accommodate the following:

1. **STATION CONTROL ROOM**

The station control room shall house the equipment for the control of the HVDC System as well as all other panels like fire alarm panel, BMS etc.

The control room area shall be suitably planned and designed to accommodate all the facilities as mentioned in these specifications. Adequate space shall be provided for operator consoles, fault recorders, the chronological event recorders, printers etc. The nearby rooms (for each pole) on adjoining side shall house the alarm, protection, and valve control electronics as well as the control and protection panels associated with the valves.

Viewing windows for the valve halls shall be designed in each of the control rooms enabling viewing of the valve halls, while energized.

The arrangement of rooms shall be such that the coming and going of personnel or visitors does not disturb the operators.

Supply of furniture for control room including tables suitable for placing monitor, server, UPS, printer and other electronic accessories of the control room, and executive chairs for seating of four persons is included in the present scope of works. The ethernet wiring through this furniture necessary for operation of the control room is also under the present scope of works.

2. **BATTERY ROOM/ BATTERY CHARGER ROOMS**

These rooms house the batteries, chargers and DC distribution boards shall be located as per approved layout plan. The room shall be air conditioned. The dimensions shall be as required to suit the equipment.

3. **AIR CONDITIONING ROOMS**

These rooms shall contain equipment pertaining to ventilation and air conditioning for the service building. The dimensions shall be as required to suit the equipment.

4. **MAINTENANCE WORKSHOPS AND STORAGE FACILITIES**

The service building shall be provided with the following workshops:

**(a) Mechanical-Electrical Maintenance Workshops**

The workshop shall be used for maintenance of heavy equipment such as pumps, fans, electric motors etc. It shall contain all special tools and spare parts. A lifting system of

adequate capacity shall also be provided.

**(b) Controls and Protection (Electronics) Workshop**

**5. OFFICES**

Each converter building shall be designed so as to have minimum area required for an offices for a staff of 15 people. One Incharge Room with Toilet shall also be provided.

6. **MISCELLANEOUS ROOMS**

The service building shall be designed to have at least the following miscellaneous rooms/facilities:

- Control and Protection cubicle rooms
- ACDB & DCDB Rooms
- AHU Room
- Service Room cum Workshop
- Corridor
- Provision of shaft for electrical, sanitary, water supply facilities.
- AC C&P Room in lieu of SPR if Digital substation is adopted.
- Restrooms (separate for male, female & handicapped)
- Any other room/ facilities as per functional requirement.
- Portico shall also be provided in Main Service Building.
- One pantry
- Storage of plant documentation
- Loading dock/lifting area - as required
- Maintenance area between the valve halls- This area shall have a lifting beam with monorail fitted with minimum 5MT chain pulley system with all accessories.
- Conference room for 10 persons
- In-charge room with toilet
- Office rooms for 15 persons
- Normal as well as fire escape staircases shall be located as per TAC /NATIONAL BUILDING CODE requirements.

Additional Service Building shall be designed to accommodate the following facilities:

- Control and Protection cubicle rooms.
- Battery and Battery Charger Rooms.
- Office room for 5 persons
- Any other room/ facilities as per functional requirement.

7. **PASSENGER ELEVATORS**

Passenger elevators shall be provided in the service building at all the converter stations.

**8 EXTERNAL WATER SUPPLY FROM BORE-WELL TO SERVICE BUILDING**

The drawing for the water supply from bore-well to fire water tank and service building through pump house shall be developed by the Contractor.

A scheme shall be prepared by the Contractor indicating the layout and details of water supply which shall be got approved from the Employer before actual start of work including all other incidental items not shown or specified but as may be required for complete performance of the works.

The scheme shall show water drawal point from a bore-well at any one location within the sub-station. 80 mm dia CPVC pipe shall be shown for supplying the water from the borewell to the water tank. The ball valve, NRV etc. shall be shown as per requirement. From this main pipeline a tap off of suitable diameter pipe shall be connected.

**8.15.2.2.1. WALLS**

The following details pertaining to walls shall be incorporated in the drawings of the service building:

1. All walls shall be non-load bearing in filled panel walls.

2. External walls of all buildings shall either be with solid concrete block masonry (minimum 200 mm thick) or with brick masonry (minimum 230 mm thick) in cement sand mortar 1:6. The common wall between the Valve Halls and the Service Building shall be fire rated 230 mm brick wall.

3. All internal walls shall be either with solid concrete block masonry (minimum 200 mm thick except the internal partition walls for office area and toilets which shall be 150 mm thick) or with brick masonry (Minimum 230 mm thick including internal partition walls for office area and toilets) in cement sand mortar 1:6.

4. All half brick masonry walls shall be provided with cement mortar 1:4 (1 cement: 4 coarse sand) and reinforcement consisting of 2 nos. of 6 mm diameter bars every third course.

5. A 50 mm thick DPC shall be provided at plinth level before starting the masonry work.

**8.15.2.2.2. ROOF**

The following details pertaining to roof shall be incorporated in the drawings of the service building:

Roof of service building shall consist of cast-in-situ RCC slab. It shall be provided with 30 mm thick polyurethane foam for thermal insulation and 1.5 mm thick layer of isothane elastomeric membrane 'EMA' with polyurethane primer as water proofing treatment. A wearing course of 50 mm thick RCC (M25) with 8 dia reinforcement bars at 300mm center to center (both ways) shall also be provided over elastomeric membrane.

For sufficient disposal of rainwater, the runoff gradient for the roof shall not be less than 1:100.

**8.15.2.2.3. FLOOR**

The following details pertaining to floor shall be incorporated in the drawings of the service building:

1. 150mm thick Grade slab shall be provided with top & bottom reinforcement of 8 dia bars @ 200 c/c bothways.

2. Sunken RCC slab shall be provided in false flooring area so as to keep the finished floor level of these areas same as that of the surrounding area.

3. Minimum height of skirting above finished floor level shall be 150 mm.

4. The nominal total thickness of floor finish shall be 50 mm.

5. Wherever cables are required to be run under the floor (like VPS room) suitable cable raceways shall be provided below the flooring.

6. Control room shall be provided with false flooring as specified.

7. The floor of entrance lobby, staircase, control room, VPS room, visitor area, conference room and the passage connecting two Valve halls through the Service Building shall have mirror polished 16 mm thick (minimum) granite stone slab flooring over 20mm thick base of cement mortar 1:4 (1 cement: 4 coarse sand). Office areas and electronic workshop shall be provided with vitrified tiles of size 600x 600mm (minimum) laid over 20mm thick base of cement mortar 1:4 (1 cement: 4 coarse sand). The vitrified tiles of best quality as per the direction of engineer-in-charge shall be provided.

8. The floors of rooms having heavy mechanical equipment like Air Conditioning and Valve Cooling shall have concrete metallic hardener floor finish. The floor shall be further coated with PU.

9. Glazed Ceramic floor tiles 300x300mm (thickness to be specified by the manufacturer) of 1st quality conforming to IS:15622 of approved make and colours as approved by Engineer in-charge shall be provided in toilet and pantries area on 20mm thick min. cement mortar 1:4 (1 cement: 4 coarse sand) including grouting the joints with white cement and matching pigments etc. complete.

10. The floors of building/room other than those mentioned above shall have vitrified tiles minimum 600 X 600 mm size.

11. Risers and treads of staircases shall be provided with 16 mm thick mirror polished granite stone slab except external staircases leading to roofs of buildings. Steel staircases shall have grating or chequered plates as per the requirement.

**8.15.2.2.4. PLASTERING**

The following plastering details shall be incorporated in the drawings of the service building:

1. External surface of buildings shall have 18mm thick plaster in two layers, with under layer 12mm thick 1:5 cement sand (coarse) plaster and top layer 6mm thick 1:6 cement sand plaster. Inside wall surfaces at all locations shall have 12/15 mm thick cemented sand plaster. Rough surface shall have 15mm and smooth surface shall be provided with 12mm thick cement sand plaster (1:4).

2. Inside surface of all walls shall be provided with plaster of Paris punning over the plastered surface except for areas where wall paneling is provided.

3. All RCC ceilings shall be provided with 6 mm thick cement sand plaster (1:3) except areas with false ceiling.

**8.15.2.2.5. PAINTING**

The following painting details shall be incorporated in the drawings of the service building:

1. Outside face of the service building shall have exterior grade textured paint applied as per manufacturer's specification as per the direction of Engineer-in-charge.

2. Acrylic emulsion paint shall be provided above putty for all rooms except for areas where wall paneling is provided.

3. All ceilings shall have oil bound distemper over a layer of putty.

4. Fire resisting transparent paint shall be provided on all woodwork over French polish or flat oil paint.

5. All fire exits shall be painted in fire red colour shade, which shall not be used anywhere else except to indicate emergency or safety measures.

**8.15.2.2.6. DOORS AND WINDOWS:**

The details pertaining to doors and windows of the service building are as below. The same need to be incorporated in the drawings:

1. All the doors, windows and ventilators of buildings and windows/ventilators provided on the outer face shall be of uPVC Frames with 5.5mm thick Glazing. Main entrance shall have frameless glazed door as required during approval of architectural drawings. Doors shall be of double swing type. Glazed wall panels with uPVC frame shall be provided between control room and adjacent two rooms behind the operator seat to have a clear view. Glazing shall have fire rating of minimum 1 hour.

2. WC/toilets shall have uPVC solid door shutter with uPVC frame as per DSR It Nos.

3. Fire-proof doors shall be provided at all fire exit points as per the recommendations of Tariff Advisory Committee. These shall be as per IS-3614 with minimum 1-hour fire rating.

4. All windows shall be of uPVC frame with 5.5mm thick Glazing.

5. Rolling shutters with suitable operating arrangement (manual/mechanical gear operated or electrical according to size shall be provided in buildings to facilitate handling and transportation of equipment.

6. All doors/shutters/windows shall be provided with all standard accessories such as handles, tower bolts, locks, stoppers, floor mounted spring type door closure etc. of best quality as approved by the Employer.

7. Automatic fireproof sliding doors shall be provided wherever required for segregating and preventing the spread of fire.

8. Generally, no door shall be more than 3 m in height. If still a bigger door is required, considering type & size of equipment, then the door shall be made in two leaves.

9. Two or more coats of French spirit polishing with a coat of wood filler shall be provided on the wooden doors and frames.

**8.15.2.2.7. GLAZING:**

The details pertaining to glazings in the service building are as below. The same need to be incorporated in the drawings:

**1.** Minimum thickness of glazing shall be 5.5 mm (toughened).

**2.** Glazing between air-conditioned (A/C) and non-A/C areas shall be provided with hermetically sealed double glazing having Toughened glass of minimum 5.5 mm thickness for thermal insulation & clear view. Doors shall be provided with Toughened 5.5mm thick single glazing only.

**3.** Ground glass of minimum 5.5 mm thickness shall be used in toilets.

**4.** Fire prone area shall be provided with wired glass with minimum 6 mm thickness.

**8.15.2.2.8. SPECIAL PROVISIONS**

The service building shall be designed to incorporate the following features. The designs and drawings for the same shall be submitted to the employer for approval.

(a) Single height 4.5 m Canopy at entrance with aesthetically pleasing design shall be provided for the Service Building.

(b) The façade of the service building shall be aesthetically pleasing consisting of 60% glass

(c) For an unobstructed view of the switchyard from the Service building, min 60% frameless glass shall be provided on the first floor.

### 8.15.2.3 VALVE COOLING EQUIPMENT BUILDING

These buildings shall be designed by the contractor; however, the construction of these buildings shall be done by the civil agency. The design considerations for these buildings are as follows:

These buildings shall be provided on per pole basis and shall contain the required cooling equipment for the valves. The dimensions shall be as required to suit the equipment. The cooling towers may be located outside the room. This building shall be located adjacent to respective valve hall. **Partitions shall be made to house electrical panels and batteries**. Two coats of PU shall be provided above the flooring of the valve cooling building. The final coat of PU shall be applied after installation of equipment.
The minimum height of the building shall be 5.5 m.
For details of roof, walls, flooring etc. refer clause 8.16 Finish schedule.

### 8.15.2.4 VALVE HALL VENTILATION BUILDING

These buildings shall be designed by the contractor; however, the construction of these buildings shall be done by the civil agency. The design considerations for these buildings are as follows:

This building shall be located adjacent to the valve halls and house all equipment pertaining to valve hall ventilation system. The rooms shall have ample space for maintenance, removal of equipment etc. The Contractor may use a double storied building to house both the valve cooling and valve hall ventilation equipment.
The minimum height of the building shall be 5.5 m.
For details of roof, walls, flooring etc. refer clause 8.16 Finish schedule.

### 8.15.2.5 SWITCHYARD RELAY ROOM

These buildings shall be designed by the contractor; however, the construction of these buildings shall be done by the civil agency.

A panel room of suitable size shall be provided with uPVC glass door. It should be fully air-conditioned.

The minimum height of the building shall be 3 m.

For details of roof, walls, flooring etc. refer clause 8.16 Finish schedule.

### 8.15.2.6 LV/MV SWITCHGEAR ROOM

These buildings shall be designed by the contractor; however, the construction of these buildings shall be done by the civil agency.

For 415 V, LV switchgear Room and for 33 kV switchgear, MV Switchgear room of suitable size shall be provided. Each pole shall have a separate switchgear room.

The minimum height of the building shall be 3.5 m.

For details of roof, walls, flooring etc. refer clause 8.16 Finish schedule.

### 8.15.2.7 PUMP HOUSE & FIRE WATER TANK

**PUMP HOUSE**

This building shall be designed by the contractor; however, the construction of this buildings shall be done by the civil agency.

The water pumps for the service/domestic water system as well as for fire protection shall be housed in a pump house. The raw water tank(s) also may be located next to this pump house. The pump foundations shall be vibration free and independent of building foundation. Suitable ventilation & exhaust shall be designed. In Fire Fighting Water tank aluminum ladder shall be shown on the inside of the tank and on the external side hot dip galvanized M.S. ladder shall be shown.

The finishing details to be incorporated in the drawing of the pump house as follows:

| AREA DESIGNATION/ PARTICULARS | FLOORING | WALLS | CEILING | REMARKS |
|---|---|---|---|---|
| Main Pump House Area | (40+ 12) Mm Thick Concrete Flooring With Metallic Hardener Topping | Non-VOC acrylic emulsion paint over 2mm POP putty upto false ceiling over approved primer | Non-VOC Acrylic Emulsion paint over approved primer | 150mm High Skirting in 12mm smooth plaster with neat cement finish |
| EXTERNAL AREA | NA | Acrylic Emulsion Exterior Paint over approved primer over 1 mm white cement-based putty | NA | |
| WATER PROOFING | As per Cl No. 8.16.2 | | | |
| ROLLING SHUTER | As per requirement | | | |
| DOORS | MS Door Frame with MS Sheet double shutter | | | |
| WINDOWS | Aluminium Sliding Glazed Windows with aluminium grill. Glazing shall be 4mm thick | | | |
| VENTILATORS | Aluminium Ventilators Top/Side Hung with 4mm thick glazing | | | |

**FIRE WATER TANK**

The contractor shall provide structural design and drawings of the water tank including walls, columns, foundations etc. for approval of the employer. The design considerations of the Fire water tank are as given in Cl. No. 8.10.2.

## 8.16. FINISH SCHEDULE

The finishing schedule is given below **unless otherwise specified elsewhere in the TS**.

### 8.16.1 FLOORING

1. The nominal total thickness of floor finish shall be 50 mm.

2. Wherever cables are required to be run under the floor (like VPS room) suitable cable raceways shall be provided below the flooring.

3. All corridors, staircases, entrance foyer etc. shall be provided with 16mm thick (minimum) mirror polished granite stone flooring over 20mm thick base of cement mortar 1:4 (1 cement: 4 coarse sand). All Toilets and Pantries, including dados shall be provided with Glazed Ceramic Tiles of 1st quality conforming to IS : 15622 of approved make and colour as approved by Engineer-in-Charge. The ceramic tiles shall be laid over 20mm thick base of cement mortar 1:4 (1 cement: 4 coarse sand). The floors of building/room other than those mentioned above shall have vitrified tiles minimum 600 X 600 mm size.

4. Risers and treads of staircases shall be provided with 16 mm thick mirror polished granite stone slab except external staircases leading to roofs of buildings. Steel staircases shall have grating or chequered plates as per the requirement.

5. Entire area around the valve hall, valve ventilation and cooling building (including transformer & reactor area) shall be provided with PCC (1:2:4) paving of minimum 100 mm thick over a sand/ moorum suitably consolidated/compacted cushion of minimum 150 mm, starting from the building edge upto 2 m clear distance for the full length of the building. All other buildings shall be provided with 750 mm wide plinth protection all around with plain cement concrete of 1:2:4 over under bed arrangements as specified above.

### 8.16.2 ROOF

1. Type of Roof of Valve Hall Buildings are mentioned in the corresponding clause. Roof of other buildings shall consist of cast-in-situ RCC slab.
2. For sufficient disposal of rainwater, the runoff gradient for the roof shall not be less than 1:100. Screed concrete 1:2:4 or cement sand mortar 1:3 shall be used to provide the gradient.
3. The water proofing treatment of roof of buildings except service building and valve hall shall consist of the following operations:

a) Applying and grouting a slurry coat of neat cement using 2.75 kg/m2 of cement admixed with proprietary water proofing compounds conforming to IS:2645 over the RCC slab including cleaning the surface before treatment.

b) Laying cement concrete using broken bricks/brick bats 25mm to 100mm size with 50% of cement mortar 1:5 (1 cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to IS: 2645 over 20mm thick layer of cement mortar of min 1:5 (Cement: 5 coarse sand) admixed with

proprietary water proofing compound conforming to IS:2645 to required slope and treating similarly the adjoining walls upto 300mm height including rounding of junctions of walls and slabs.

c) After two days of proper curing applying a second coat of cement slurry admixed with proprietary water proofing compound conforming to IS: 2645.

d) Finishing the surface with 20mm thick joint less cement mortar of mix 1:4 (1 cement: 4 course sand) admixed with proprietary water proofing compound conforming to IS: 2645 and finally finishing the surface with trowel with neat cement slurry and making of 300 x 300 mm square.

e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer-in-charge

**8.16.3. WALLS**

1. All buildings shall have framed super-structure. All walls shall be non-load bearing in filled panel walls.

1. External walls of all buildings shall either be with solid concrete block masonry (minimum 200 mm thick) or with brick masonry (minimum 230 mm thick) in cement sand mortar 1:6 (1 Cement: 6 Coarse Sand).

2. All internal walls shall be either with solid concrete block masonry (minimum 200 mm thick except the internal partition walls for office area and toilets which shall be 100 mm thick) or with brick masonry (Minimum 230 mm thick including internal partition walls for office area and toilets) in cement sand mortar 1:6 (1 Cement: 6 Coarse Sand).

3. All half brick masonry walls shall be provided with cement mortar 1:4 (1 cement: 4 coarse sand) and reinforcement consisting of 2 nos. of 6 mm diameter bars every third course.

4. A 50 mm thick DPC shall be provided at plinth level before starting the masonry work.

**8.16.4. PLASTERING**

1. External surface of buildings shall have 18mm thick plaster in two layers, with under layer 12mm thick 1:5 cement sand (coarse) plaster and top layer 6mm thick 1:6 cement sand plaster. Inside wall surfaces at all locations shall have 12/15 mm thick cemented sand plaster. Rough surface shall have 15mm and smooth surface shall be provided with 12mm thick cement sand plaster (1:6).

2. Inside surface of all walls shall be provided with plaster of Paris punning over the plastered surface except for areas where wall paneling is provided.

3. All RCC ceilings shall be provided with 6 mm thick cement sand plaster (1:3) except areas with false ceiling.

### 8.16.5. PAINTING

1. Outside face of all buildings and pump houses shall have exterior grade textured paint applied as per manufacturer's specification as per the direction of Engineer-in-charge.

2. Acrylic emulsion paint shall be provided for all rooms except for areas where wall paneling is provided.

3. All ceilings shall have oil bound distemper

4. Fire resisting transparent paint shall be provided on all woodwork over French polish or flat oil paint.

5. All fire exits shall be painted in fire red colour shade, which shall not be used anywhere else except to indicate emergency or safety measure.

### 8.16.6. DOORS & WINDOWS

1. All the doors, windows and ventilators of buildings and windows/ventilators provided on the outer face shall be of uPVC frames with glazing of minimum 5.5mm thick. Main entrance shall have uPVC framework with glazing or frameless as required during approval of architectural drawings. Doors shall be of double swing type. Glazed wall panels with uPVC frame shall be provided between control room and adjacent two rooms behind the operator seat to have a clear view. Glazing shall have fire rating of minimum 1 hour.

2. WC/toilets shall have wooden panel doors.

3. Fire-proof doors shall be provided at all fire exit points as per the recommendations of Tariff Advisory Committee. These shall be as per IS-3614 with minimum 1-hour fire rating.

4. All windows shall be of uPVC frame with 5.5mm thick glazing.

5. Rolling shutters with suitable operating arrangement (manual/mechanical gear operated or electrical according to size shall be provided in buildings to facilitate handling and transportation of equipment.

6. All doors/shutters/windows shall be provided with all standard accessories such as handles, tower bolts, locks, stoppers, floor mounted spring type door closure etc. of best quality as approved by the Employer.

7. Automatic fireproof sliding doors shall be provided wherever required for segregating and preventing the spread of fire.

8. Generally, no door shall be more than 3 m in height. If still a bigger door is

required, considering type & size of equipment, then the door shall be made in two leaves.

9. Two or more coats of French spirit polishing with a coat of wood filler shall be provided on the wooden doors and frames.

### 8.16.7. GLAZING

1. Minimum thickness of glazing shall be 5.5 mm (toughened).
2. Glazing between air-conditioned (A/C) and non-A/C areas shall be provided with hermetically sealed double glazing having Toughened glass of minimum 5.5 mm thickness for thermal insulation & clear view. Doors shall be provided with Toughened 5.5mm thick single glazing only.
3. Ground glass of minimum 5.5 mm thickness shall be used in toilets.
4. Fire prone area shall be provided with wired glass with minimum 6 mm thickness.

### 8.16.8. FALSE CEILING

The control room and all other air-conditioned areas shall have a closed aluminum ceiling system comprising 84mm wide, 12.5mm deep panels of approved colour with a recessed flange of 23.9mm roll formed out of 0.5mm thick aluminum alloy AA 5050/5052/3003 chromatised and stove enameled. The panels shall be fixed on roll formed carriers 32mm wide, 39mm deep made out of minimum 0.9mm thick aluminum alloy strip with cut outs to hold panels in a module of 100mm minimum at 1.6 m c/c maximum. The carrier will be suspended from roof by 4mm diameter galvanized steel wire rod hangers with special height adjustment springs/clips made out of spring steel at maximum spacing of 1.5m c/c hangers. 25mm thick resin bonded mineral wool of approved quality encased in 100-micron black polythene shall be laid over the top of the placed panels.

### 8.16.9. FALSE FLOORING

The false floor system to be installed shall provide a maximum finished floor height of 750mm from the existing floor level. The system shall provide for suitable pedestal and under structure design to withstand various static loads and rolling loads. The entire access floor system shall provide for adequate fire resistance, acoustic barrier and air leakage resistance. The system shall be able to accept an independent floor covering i.e. antistatic PVC/ Laminate with PVC beading. The under structure should be able to withstand a UDL of 1080 Kg/$m^2$ and a point load of 360kg. The under structure should be able to accept a pedestal axial load of 2200kg. Panels should be made from steel. The bottom of panel shall be embossed in hemispherical shape to give strength and flexural rigidity. The top sheet shall be plain and resistant welded at various locations after the top and bottom sheets have been degreased and phosphated. The above hollow panel shall have an infill of light weight cementitious material. The entire panel shall be coated with epoxy coating on the exposed surface. The surface shall have factory laminated anti – static PVC/ Laminate with PVC beading on all sides for edge protection. Panel shall provide for impact resistance top surface minimal deflection, corrosion resistance properties and shall not be combustible or aid surface spread of flame. Panel shall be free standing on to the under structure with stringers. Pedestal installation to support the panel shall be

suitable to achieve a minimum finished floor height of 750mm height of 750mm from the existing floor level. Pedestal shall support an axial load of 3500kg.

### 8.16.10 WATER PROOFING IN SUNKEN AREAS:

Water proofing treatment shall be done in sunken portion of WCs, bathroom etc. by applying cement slurry mixed with water proofing cement compound consisting of:

a. First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/ sqm. This layer will be allowed to air cure for 4 hours.
b. Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours.

Treatment and sealing of joints, corners, junction of pipes and masonry with polymer mixed slurry shall be carried out as per CPWD specifications.

## 8.17 BUILDING SERVICES

### 8.17.1 PLUMBING & SANITATION

Plumbing and Sanitation works shall be executed by the civil agency, however, the design for the same is under present scope of works. The pipes/fittings/fixtures as mentioned below shall be shown in the plumbing drawings so that the same may be issued to the civil agency for construction.

1. Chlorinated Polyvinyl chloride (CPVC) pipes having thermal stability for hot and cold-water supply including all CPVC plain and brass threaded conforming to IS:15778 shall be used for internal piping works for water supply. All internal CPVC pipe shall be concealed including cutting of chases and making good the wall. ISI approved CPVC ball valve, non-return valves shall be provided and fixed in position as per requirement and direction of Engineer-in-charge

2. Unplasticised rigid PVC pipes of 75mm for waste & 110mm dia for soil shall be provided conforming to IS:13592 type B and all its fittings like bends, sockets, door bend, Y-tee etc. as per requirement with seal ring conforming to IS: 5382 including jointing with cement solvent conforms to IS:14182. All underground or under floor pipes shall be encased with 1:3:6 concrete. Minimum concrete cover shall be 75 mm thk.

3. Sanitary fittings of best quality as per direction of Engineer-in-charge shall be provided. Each toilet shall have the following minimum fittings:

    a. **WC (Western type) (Wall hung)**: Coloured vitreous china extended wall mounting water closet of approved size and shape including providing & fixing white vitreous china cistern with dual flush fitting, of flushing capacity 3 litre/6 litre (adjustable to 4 litre/8 litres), including seat cover, and cistern fittings, nuts, bolts and gasket etc complete.
    b. **Squatting Pan:** (Indian type W.C. pan ) (white vitreous china Orissa pattern W.C. pan of size 580x440mm with integral type foot rests) shall be with 100mm sand cast iron P or S trap. 10 litre low level white P.V.C flushing

cistern with manually controlled device (handle lever) conforming to IS:7231, with all fittings and fixtures complete including cutting and making good the walls and floors wherever required.

c. **Urinal:** White vitreous china battery based infrared sensor operated urinal of approx. size 610 x 390 x 370 mm having pre & post flushing with water ( 250 ml & 500 ml consumption), having water inlet from back side, including fixing to wall with suitable brackets all as per manufacturers specification and direction of Engineer-in-charge.
d. **Urinal Partition:** 10mm thk toughened glass partition with frosted film to be fixed in position for urinals on appropriate stainless steel patch fittings of desired shape and size.
e. **Wash basin**: Providing and fixing coloured wash basin counter type of (approximate size 630x450mm size under counter or over counter type), in case flat bash hand is required the approximate size shall be 550x400mm and shall be provided with C.P. close basin mixer (ISI approved) with CI. Brackets taps with battery based infrared sensor, 32mm C.P. brass waste and bottle trap of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever required. Other details shall be as per the drawings.
f. **Bathroom mirror:** 6mm thick beveled edge mirror approximate size 1000x600mm made of superior glass of approved make complete with a backing of 6 mm thick water proof hard board fixed to wooden cleats with 25mm dia SS studs, washers etc complete for each wash basin.
g. CP brass towel rail : C.P. brass towel rail of approved make of 600mm length, 25mm dia with a pair of brackets or flanges provided and fixed to wall beside each wash basin/set of wash basin with necessary screws, plugs, etc.
h. Soap holder and liquid soap dispenser.: C.P. brass liquid soap holder of approved make fixed with each wash basin to the wall with necessary CP brackets, CP screws, washers, plugs etc.
i. Automatic hand dryer.
j. Bib Cock: C.P. brass short body and long body bib cock 15mm nominal bore shall be of approved quality conforming to IS: 8931.
k. Angle valve: C.P. brass angle valve of 15mm nominal bore provided and fixed in position for basin and cistern points of approved quality conforming IS :8931.
a) Hooks: Double type coat & hat hooks with flanges, fixed to wall / shutter, etc. with necessary screws, washers & plugs.

4. Provisions for installation of water cooler shall be kept at suitable location.

5. One no. stainless steel kitchen sink for pantry shall be provided. Stainless steel AISI 304 (18/8) Kitchen sink of 510x1040 mm bowl with depth of 178mm with drain board shall be provided and fixed as per IS 13983 with C.I brackets, and stainless steel plug 40mm with provision of 2 nos. CP brass long body bib cock conforming to IS Standard and weighing not less than 650 gm for CP bottle trap etc. including painting of fittings and brackets, cutting and making good the wall.

6. The platform of kitchen sink and wash basin shall be provided with 18 mm thk. Mirror polished approved granite stone.

7. CP Brass or SS Cockroach Trap: Approved C.P. Brass cockroach trap shall be provided in the Kitchen, Toilets and pantry.

8. Floor Traps: PVC floor traps of self-cleansing design shall be provided & fixed in position with 100 mm dia. inlet and 75mm dia. outlet of approved make, including making connection with PVC soil/waste pipes using rubber gaskets, embedding the trap in 150 mm thick PCC 1:2:4.

9. Water Storage Tank: Triple layered Polyethylene water storage tanks shall be provided of approved brand and manufacture with cover and suitable locking arrangement, float valve and making necessary holes for inlet, outlet and overflow pipes. Capacity of water tank shall be 2x1500 litres for Service Building, 2X2000 litres for Transit Camp.

10. Sluice valve chamber: Masonry chamber for sluice valve shall be 600x600mm size in plan and depth 750mm, or matching with the site condition inside with 50 class designation brick work in cement mortar 1:5 (1 cement : 5 fine sand) with CI surface box 100 mm. Top diameter, 160 mm bottom dia and 180 mm deep (inside) with chained lid and RCC top slab 1:2:4 mix (1cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) necessary excavation foundation concrete 1:5:10 (1 cement : 5 fine aggregate : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick finished with a floating coat of neat cement complete as per standard design with FPS bricks of class 75.

### 8.17.2. BUILDING STORM WATER DRAINAGE

Building storm water drainage works shall be executed by the civil agency, however, the design for the same is under present scope of works. The design considerations for the same is as mentioned below:

The building design shall provide for the collection of storm water from the roofs. This water shall be drained to the main drainage system of the station.

Cast Iron (conforming to IS-1230) with watertight lead joints/ medium class galvanized mild steel pipes conforms to IS-1239/IS-3589/uPVC Pipes (Type A) confirming to IS 13592 rain water down comers shall be provided to drain off the rain water from roof. These shall be suitably concealed with masonry work of cement concrete or cladding material.

The number and size of down comers shall be governed by IS-1742 and IS-2527.

All drains inside the buildings shall have minimum 40 mm thick grating covers and in areas where heavy equipment loads would be coming, pre-cast RCC covers shall be provided in place of steel grating.

For all buildings, suitable arrangement for draining out water collected from equipment blow downs, leakages, floor washings, firefighting etc. shall be provided for each floor.

Building storm water drainage arrangement shall be clearly shown in the corresponding drawings so that the same may be issued to the civil agency for construction.

## 8.18 MISCELLANEOUS GENERAL REQUIREMENTS

8.18.1 All steel sections and fabricated structures which are required to be transported on sea shall be provided with anti-corrosive paint to take care of sea worthiness.

8.18.2 A screed of concrete layers not less than 100 mm thick and of grade not weaker than M10 shall be provided below all water retaining structures. A sliding layer of bitumen paper or craft paper shall be provided over the screed layer to destroy the bond between the screed and the base slab concrete of the water retaining structures.

8.18.3 Monorails, monorail girders and fixtures shall be provided, wherever required.

8.18.4 Doors and windows on external walls of buildings (other than areas provided with insulated metal cladding) shall be provided with RCC sun-shade over the openings with 300 mm projection. Projection of sunshade from the wall shall be minimum 450 mm over window openings and 750 mm over door openings.

8.18.5 All stairs shall have a maximum riser height of 150 mm and a minimum tread width of 300mm. Minimum clear width of stairs shall be 1500 mm. Adequate landings should be provided as per relevant clause of NBC/IS codes.

Steel staircase with canopy shall be provided to approach
(a) service building roof to valve hall roof
(b) valve hall LV side roof to Valve hall HV side roof.
(c) HV/LV switchgear **and** Fire Fighting Pump House roof.

Steel staircases in service buildings/ valve halls etc. shall be sand blasted and coated with one coat of primer followed by two coats of enamel paint.

8.18.6 Angles with lugs shall be provided for edge protection all round cut-outs and openings in floor slabs, edges of manholes supporting covers and any other place where breakage of corners of concrete is expected. However, no edge protection angles are required for precast cable trenches and drains.

8.18.7 Hand railing minimum 1200 mm high shall be provided around all floor/roof openings, projections/balconies, walkways, platforms, steel stairs etc. All handrails and ladder pipes shall be 32 mm nominal bore MS pipes (medium class) and shall be galvanized (medium-class as per IS-277). All rungs for ladder shall also be galvanized as per IS-277 medium class.

Stairs within the service building shall be provided with 50mm dia stainless steel hand rail and, 20 mm dia stainless steel balustrades with suitable flats.

8.18.8 The proper coordination & execution of all interfacing civil works activities like fixing of conduits in roofs/ walls/ floors, fixing of foundation bolts, fixing of lighting fixtures, fixing of supports/embedment, provision of cut-outs etc. shall be the sole responsibility of the Contractor. He shall plan all such activities in advance and execute in such a manner that interfacing activities do not become bottlenecks and dismantling, breakage etc. is reduced to minimum.

8.18.9 The fabricated steel work/ pre-fabricated buildings shall be inspected as per approved Manufacturing quality plans and certified by the owner or his authorized representative as satisfactory before it is dispatched to the erection site. Such certification shall not relieve the contractor from his responsibility regarding adequacy and completeness of fabrication.

8.18.10 The pre-engineered structure manufacturers shall be approved by POWERGRID. Manufacturing Quality Plan (MQP) of Pre-engineered Buildings shall be finalized after award of work and finalization of sub vendor for this package.

8.18.11 Items/ components of buildings not explicitly covered in the specification but required for completion of the project shall be deemed to be included in the scope.

## 8.19 MODE OF MEASUREMENT

Mode of measurement for different items is given below, however, in case of any ambiguity relevant part of IS: 1200 (latest) shall be referred.

**i. BUILDINGS:**

**VALVE HALL**–

Valve Hall shall be paid in lump sum which shall include all the works to be carried out under the present scope.

**FURNITURE OF THE SERVICE BUILDING –**

The design of the service building is under present scope of works; however, the construction of the service building shall be carried out by the civil agency.

The supply of furniture of the control room of service building is under present scope of works. The rate for this furniture is included in the overall scope of work and no extra payment for this furniture is applicable.

## 8.20 STATUTORY RULES

1. The Contractor shall comply with all the applicable statutory rules pertaining to Factories Act, Fire Safety Rules of Tariff Advisory Committee, and Water Act for pollution control etc.

2. Provisions for fire proof doors, number of staircases, fire separation wall, lath plastering on structural members (in fire prone areas) etc. shall be made according to the recommendations of Tariff Advisory Committee.

3. Statutory clearance and norms of State Pollution Control Board shall be followed as per Water Act for effluent quality from plant.

4. Foundation system adopted by the Contractor shall ensure that relative settlement shall be as per provisions in IS-1904 and other Indian Standards.

5. Water retaining structures designed as un-cracked section shall also be tested for water tightness at full water level as per clause no. 10 of IS-3370 (Part-I).

## 8.21 COPYRIGHT CLAUSE

a. The copyright in all drawings, documents and other materials containing data and information for such design(s), pertaining to Civil design, calculations, and drawings (except Valve Hall building) to be developed by the Contractor or through any third party under this Contract shall remain vested in the Employer for a period of 5 years from the date of Completion of the Contract.
In case the Contractor intends to use these design(s) for any purpose other than for project(s) to be executed by POWERGRID prior to the period of 5 years as above, the Contractor shall obtain a written permission from POWERGRID to this effect. The permission shall be granted or otherwise by POWERGRID keeping in view the specifics of the case and POWERGRID shall be sole judge in this regard.

b. The Contractor may also use previous structure designs and associated foundation designs meeting specification requirements, which have been designed by them for any other project of POWERGRID, having copyright retained thereof with POWERGRID, without any financial implication and without any written permission from POWERGRID as per para (a) above.

c. In case the Contractor uses previously designed structure and associated foundation designs meeting specification requirements, developed by the Contractor for any other utility/developer, POWERGRID shall be free to use designs and reproduce all drawings, documents and other material for the purpose of the Contract including, if required, in its any other project and for operation and maintenance, without any financial implication. The contractor shall ensure to submit only those documents for which they hold copyright.

d. Also, all the drawings indicated at (a) & (b) above shall carry the following statement and shall be displayed conspicuously on the drawing:

"WARNING: THIS IS PROPRIETORY ITEM AND DESIGN RIGHT IS STRICTLY RESERVED WITH POWERGRID UNDER NO CIRCUMSTANCES THIS DRAWING SHALL BE USED BY ANYBODY WITHOUT PRIOR PERMISSION FROM POWERGRID IN WRITING"

# FORMAT OF NO DEVIATION CERTIFICATE

**(To be submitted in the bidder's letter head)**

**REF**: …….  **Dated**…….

**BHARAT HEAVY ELECTRICALS LIMITED,**
**TRANSMISSION BUSINESS GROUP,**
**6th Floor, BHEL SADAN,**
**Plot No- 25, Sector- 16A, Noida,**
**Distt. Gautambudh Nagar, UP-201301**

**TENDER REF.: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26 DATE: 16.05.2025**

**SUB: TENDER FOR "PROVIDING DESIGN CONSULTANCY SERVICES FOR HVDC Yard OF +/- 800kV 6000MW KHAVDA NAGPUR PROJECT".**

Dear Sir,

With reference to above, this is to confirm that as per tender conditions, we have visited subject site before submission of our offer and noted the job content & site conditions etc.

We also confirm that we have not changed / modified the tender documents as appeared in the website and in case of observance at any stage, it shall be treated as null and void. We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT and we hereby convey our unqualified acceptance to all terms and conditions as stipulated in the tender and NIT. In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer strictly in accordance with tender instructions.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)

# DECLARATION FOR RELATION IN BHEL

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder failing which the offer of Bidder is liable to be summarily rejected)

**Ref:** **Date…….**

**To,**
**Sr. DGM/TBSM**
**Transmission Business Group,**
**Bharat Heavy Electricals Limited,**
**6th Floor, BHEL SADAN,**
**Plot No. 25, Sector-16A, Noida,**
**Distt. – Gautam Buddh Nagar, UP-201301**

Dear Sir,

Sub: Declaration for relation in BHEL

**Ref: 1) NIT/Tender Specification No.: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26 DATE: 16.05.2025**

I/We hereby submit the following information pertaining to relation/relatives of Proprietor/ Partner(s)/Director(s) employed in BHEL

**Tick (√) any one as applicable:**

1. The Proprietor, Partner(s), Director(s) of our Company/Firm DO NOT have any relation or relatives employed in BHEL

OR

2. The Proprietor, Partner(s), or Director(s) of our Company / Firm HAVE relation / relatives employed in BHEL and their particulars are as below:

a)

b)

Signature of the Authorized Signatory

**Note:**

1) Attach separate sheet, if necessary.
2) If BHEL Management comes to know at a later date that the information furnished by the Bidder is false, BHEL reserves the right to take suitable against the Bidder/ Contractor.

# DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

---

**To,**

**Sr. DGM/TBSM**
**Transmission Business Group,**
**Bharat Heavy Electricals Limited,**
**6th Floor, BHEL SADAN,**
**Plot No. 25, Sector-16A, Noida,**
**Distt. – Gautam Buddh Nagar, UP-201301**

Dear Sir,

**Sub: Declaration by Authorized Signatory regarding Authenticity of submitted documents**.

Ref: 1**) NIT/Tender Specification No: TBSM/KN/DESIGN CONSULTANCY SERVICES/TENDER/25-26 DATE: 16.05.2025**
2) **All other pertinent issues till date.**

I/We, hereby certify that all the documents submitted by us in support of possession of "Qualifying Requirements" are true copies of the original and are fully compliant required for qualifying / applying in the bid and shall produce the original of same as and when required by Bharat Heavy Electricals Limited.

I / We hereby further confirm that no tampering is done with documents submitted in support of our qualification as bidder. I / We understand that at any stage (during bidding process or while executing the awarded works) if it is found that fake / false / forged bid qualifying /supporting documents / certificates were submitted, it would lead to summarily rejection of our bid / termination of contract. BHEL shall be at liberty to initiate other appropriate actions as per the terms of the Bid / Contract and other extant policies of Bharat Heavy Electricals Limited.

Yours faithfully,

(Signature, Date & Seal of Authorized
Signatory of the Bidder)

Date:

Place

**FORMATS FOR EPAYMENTS**

To,

~~Sr.~~DGM (Finance)
Transmission Business Group
BHEL, TBG Finance,
Plot no. - 25, Sector - 16A
Noida - 201301; U.P.

Subject: E-Payments vide RTGS/NEFT

I/We request and authorise you to effect Epayment vide any of the above two modes to my/our bank account as per the details given below:

| | |
|---|---|
| Vendor Name | : |
| Title/Name of Account in the bank | : |
| Account Type(Saving /current) | : |
| Bank Account Number | ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ |
| Name & address of Bank | |
| Bank /Branch contact person's name | : |
| Bank /Branch Tele Numbers with STD code | : |
| Bank Branch MICR code | ☐☐☐☐☐☐☐☐☐ |
| | (please enclose a copy of a cheque. This cheque should not be a payable at par cheque) |
| Bank Branch RTGS IFSC code | ☐☐☐☐☐☐☐☐☐☐☐ |
| Bank Branch NEFT IFSC code | ☐☐☐☐☐☐☐☐☐☐☐ |
| | (you can obtain this from branch where you have your account) |
| Your Email address | : **(not more than 20 character)** |
| Name of the Authorised Signatory | : (Please mention here name of person from your organization signing this letter.) |
| Contact Person's name | : (please mention here the name of a person in your company/organization) |

I/We confirm that information provided above is correct & any consequences due to any mistake in above will be borne by us.

Thanking you

For
(Autorised Signatory)

We confirm that we are enabled for receiving RTGS/NEFT credits and we further confirm that the account number of ( Please mention here name of the account holder), the signature of the authorised signatory and the MICR and IFSC Codes of our branch mentioned above are correct.

Bank's Verification
(Manager's/Officers signature under
bank Stamp)

**Note:- Please attach cancelled original Cheque leaf.**