ASSAM ELECTRICITY GRID CORPORATION LIMITED

OFFICE OF THE MANAGING DIRECTOR
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MINUTES OF PREBID MEETING

Bid Identification No.:	**AEGCL/MD/Tech-32/400kV Umrangshu/2026/BID Dated: 16.09.2026**
NIT No.:	**AEGCL/MD/Tech-32/400kV Umrangshu/2026/NIT Dated: 08.09.2026**
Name of the Work	**Construction of new 400/132kV Umrangshu Grid Substation along with Associated Transmission System at Dima Hasao District, Assam**
Date of Pre- Bid Meeting	**05/10/2026**
Venue of Pre-Bid Meeting	**Conference Room O/o the MD, AEGCL, 1st Floor, Bijulee Bhawan, Paltan Bazar, Guwahati-01**

OPENING REMARKS:

Smt. Jayashree Devi, CGM (PP&D), AEGCL extended a warm welcome to all the prospective bidders and introduced his team.

Sri Bikram Bordoloi DGM (BD&T), AEGCL briefed on tender "Construction of new 400/132kV Umrangshu Grid Substation along with Associated Transmission System at Dima Hasao District, Assam". It was assured to the prospective bidders that comprehensive reply/clarifications shall be prepared and uploaded in the AEGCL site as well as e-tender portal in response to their raised queries on the bid document.

NAMES OF THOSE PRESENT (Attendance Sheet enclosed herewith):

1. FROM EMPLOYER:

1. Smt. Jayashree Devi, CGM (PP&D), AEGCL
2. Sri Ashish Hazarika, GM (M&PR), AEGCL
3. Sri Rituparna Khargharia, GM (P&D), AEGCL (Through VC)
4. Sri Bikram Bordoloi, DGM (BD&T), AEGCL
5. Sri Dhriti Lochan Hazarika, AGM (BD), AEGCL
6. Sri Prantik Pran Saikia, AGM (AGM(P&D)), AEGCL
7. Sri Bedanta Dutta, DM (P&D), AEGCL

8. Smt. Bidisha Taye, DM (Civil)
9. Sri Anup Jyoti Dutta, AM(PR), AEGCL

2. FROM PROSPECTIVE BIDDERS:

A. BIDDERS THAT WERE PRESENT AT THE PRE-BID MEETING:

1. M/s BNC Power Projects Limited. (Through VC)
2. M/s Kalpataru Projects International Limited (Through VC)
3. M/s Lumino Industries Limited (Through VC)
4. M/s GVPR Engineers Limited (Through VC)
5. M/s Rithwik Projects Private Limited (Through VC)

MEMBERS OF THE PRE-BID COMMITTEE:

1. CGM (PP&D), AEGCL
2. CGM O&M, (CAR), AEGCL
3. CGM (F&A), AEGCL
4. GM (M&PR), AEGCL
5. GM (P&D), AEGCL
6. GM (Civil), AEGCL
7. DGM (EAP-II), AEGCL
8. DGM (BD&T), AEGCL
9. DGM (P&D), AEGCL
10. AGM (BD), AEGCL

The queries submitted by the prospective bidders were discussed by the Pre-Bid Committee and the observations made are **as follows in Table-1.**

Table-1				
Sl. No.	**Clause of Specification/Reference Clause No.**	**Tender Provision/details on tender**	**Queries on Specification/clarification sought/Request**	**Clarification from AEGCL**
1	Section III, Bid Data Sheet (BDS), ITB 2.5.1	JV not allowed	JV may be allowed	**Refer to Addendum-I, Sl.No. 1**
2	Tenderer's Experience 4.2.1 (a) Contracts of similar size and nature	PART A (For 400/220kV GIS) : The tenderer must have designed, supplied, erected, tested and commissioned including Civil works complete atleast one (1) no. GIS of 400 kV or above voltage class. The above credential shall be from any state/central power utility and the same should have been in successful operation for at least one (1) year within last 12 years on the originally scheduled date of bid opening	PART A (For 400/220kV GIS) : The tenderer must have designed, supplied, erected, tested and commissioned including Civil works complete atleast one (1) no. **GIS/AIS** of 400 kV or above voltage class. The above credential shall be from any state/central power utility and the same should have been in successful operation for at least one (1) year within last 12 years on the originally scheduled date of bid opening	**Refer to Addendum-I, Sl.No. 3**
3	4.2.2 (b) Average Annual Turnover	Minimum average annual turnover of Rs 558 Crore calculated as total certified payments received for contracts in progress or completed within the last 5 years	Minimum average annual turnover of **Rs 250 Crore** calculated as total certified payments received for contracts in progress or completed within the last 5 years. (**Reference:** Typically the requirement is set at 50% of the estimated project cost, in line with earlier tenders.)	**Refer to Addendum-I, Sl.No. 2**
4	ITB Clause 2.5.1	JV not allowed	JV may be allowed (**Refernce**: For the Project 400 kV Sarusajai upgradation, JV was allowed)	**Refer to Addendum-I, Sl.No. 1**
5	Vol-I -Section - III - Bid Data Sheets BDS (ITB 2.37.1)	Contract shall be for a period of 2 (Two) years from the date of its signing.	As the handing over of encumbrance free land is the primary requirement for the construction of substation, we request that the project commencement date be considered from providing access to and handing over of the encumbrance free land for the substation completion period. Please confirm.	**As per Bid**
6	Vol-I -Section - VIII - Special Conditions of Contract (SCC) SCC Clause No 11	The Contract Price shall be firm.	Considering the prevailing geopolitical uncertainty in the middle east & Europe and amidst fluctuating market dynamics, the commodity prices have reached multi-year highs, especially Copper, Steel & Aluminium. Hence, to deal with such fluctuation, we request that the price variation be permitted for Transformer, Reactor, CB, ITR, LA, Cables, Conductors, Steel Structures and Installation works incl Civil as per IEEMA formula and indices without any ceiling which is followed by other utilities also. Request your acceptance.	**As per Bid**
7	Vol-I -Section - IX - Contract Forms APPENDIX 1:TERMS AND PROCEDURES OF PAYMENT	**(A) Terms of Payment** Schedule No. 1 & 2 - Plant and Mandatory Spare Parts Supplied from Abroad and Within the Employer's Country respectively. In respect of plant and mandatory spare supplied from abroad and within the Employer's country, the following payments shall be made: **A. Progressive payments for supply items:** 1. Within 60 (sixty) days from the date of submission of the invoice against supply, not more than 75% (seventy percent) payment of the total supply invoice value would be made, on receipt and acceptance of materials in full and good conditions (subject to availability of fund). However, GST amount on invoice would be paid 100% or as per Govt. Rules. 2. Remaining 25% (Twenty Five percent), retention amount of that item would be released subject to fulfillment of the following conditions – (a) 15% supply amount would be paid on completion of 50% of the total erection works of that particular item (b) within 60 (sixty) days after receipt of invoice out of remaining 10% of the supply amount 5% would be paid upon issue of the Completion Certificate and balance 5% upon issue of the Operational Acceptance Certificate as per clause 25, 26 & 27 of GCC, which should be certified by the Project Authority.	Kindly amend the Payment Terms as per Anneuxre B Enclosed inline with other state / central utilities	**As per Bid**

8	Vol-I -Section - IX - Contract Forms APPENDIX 1:TERMS AND PROCEDURES OF PAYMENT	In respect of installation services, the following payments shall be made: A. Progressive payments for Erection Works: 1. Within 60 (sixty) days from the date of submission of invoice against foundation, erection & civil works, not more than 90% (ninety percent) of the total verified invoice would be made. However, GST amount on invoice would be paid 100% or as per Govt. Rules. 2. Within 60 (sixty) days after receipt of invoice out of remaining 10% of the supply amount 5% would be paid upon issue of the Completion Certificate and balance 5% upon issue of the Operational Acceptance Certificate as per clause 25, 26 & 27 of GCC, which should be certified by the Project Authority. In the event that the Employer fails to make any payment on its respective due date, the Employer shall not pay any interest to the Contractor.	Kindly amend the Payment Terms as per Anneuxre B Enclosed inline with other state / central utilities	**As per Bid**
9	Vol-I -Section - IX - Contract Forms APPENDIX 1:TERMS AND PROCEDURES OF PAYMENT	In the event that the Employer fails to make any payment on its respective due date, the Employer shall not pay any interest to the Contractor.	In line with prevailing terms of payment in majority of PSUs / power utilities, please include the provision of payment of interest on delayed payment by the employer beyond 30 days from the date of Invoice certification.	**As per Bid**
10	General	Source of Fund	Please provide the source of fund for this project	**Term Loan/GEC-III. However, in case of funding under GEC-III, the payment terms and conditions shall be governed by the applicable guidelines issued by MNRE, Government of India.**
11	Vol-I -Section - VIII - Special Conditions of Contract (SCC) SCC Clause No 26.22	0.5% for each week to maximum of 10% of the contract Price	**Kindly amend the clause as below,** The tenderer should note that the completion time allowed for carrying out the work should be strictly observed. Any delay that may take place in achieving Completion of the works beyond Contractual Time of Completion in the Contract shall be subject to Liquidated Damages (LD), and not by way of penalty, at the rate of 0.5% for each week or part thereof, of the value of **unexecuted works.** The aggregate amount of such liquidated damages shall in no event exceed **5%** of the value of **unexecuted works** (inclusive of GST).	**As per Bid**
12	Vol-I -Section - VI - General Conditions of Contract (GCC) Vol-II: Information to Bidders (ITB) Clasue - 10.2 & 10.3 / Clause 2.7	As per BID VOL-I GCC ROW, Statutory Approvals including forest and tree cuttings are in AEGCL scope. As per BID VOL-II ITB ROW, Statutory Approvals including forest and tree cuttings are in Contractor scope.	GCC Clause 10.2 & 10.3 and ITB Clause 2.7 of Bid Vol-II appear to be contradictory regarding the responsibility for ROW clearance and statutory approvals. Considering GCC provisions, ROW clearance, statutory approvals, forest clearance and tree cutting permissions are in the scope of AEGCL in line with state / central utilities. Please confrim.	**As per BID VOL-II, Clause 2.7: Right of Way for Transmission Lines:**
13	Vol-I -Section - II - INSTRUCTIONS TO BIDDERS (ITB) Vol-II: Chapter 2: Information to Bidders (ITB)	Two ITB's available in the tender	We observe that two different versions of the Instructions / Information to Bidders (ITB) are provided in the Tender Documents and both are cointracting each other. Request you to kindly remove the Vol-II CHapter 2 ITB to avoid confusion.	**As per Bid**
14	Vol-I -Section - VII - General Conditions of Contract (GCC) SCC Clause No 25.3	**and** (d) any minor items mentioned in GCC Subclause 24.7 hereof relevant to the Facilities or that part thereof have been completed.	~~**and**~~ ~~(d) any minor items mentioned in GCC Subclause 24.7 hereof relevant to the Facilities or that part thereof have been completed.~~ Since DLP is in bidder scope, minor punch points will be attended during the DLP. Request to delete the above clause.	**As per Bid**
15	Vol-I -Section - VIII - Special Conditions of Contract (SCC) Clasue -27.10.b	The Tenderer shall furnish performance guarantee for an amount of 20% of the ex-works cost of GIS equipment(s) for a period of five (5) years to cover the extended defect liability period	We request AEGCL to kindly remove the 20% additional performance guarantee for GIS equipment.	**Refer to Addendum-I, Sl.No.: 5**
16	Vol-I -Section - III - Bid Data Sheets Clause No ITB 2.11.1 (xv)	iv. Undertaking between the GIS Manufacturer and authorised agents in India to provide service facility as per clause V of 4.2.1(c) (Subcontractor-GIS) of section IV (Evaluation and Qualification requirement)	We presume that the undertaking is required from manufacturer of GIS during detail engineering. Kindly confirm.	**As per Bid**

17	Vol-I -Section - VIII - Special Conditions of Contract (SCC) SCC Clause No 7.3	The Contractor agrees to supply spare parts for a period of years: Ten (10) Years. **An undertaking to the effect that the spare parts shall be made available to AEGCL by the contractor for a period of ten (10) years should be furnished by the contractor. The undertaking shall be under ought by the contractor executed through non-judicial stamp paper of Rs. 100/- or above to be notarized in India.** The Contractor shall carry sufficient inventories to ensure an ex-stock supply of consumable spares for the Plant. Other spare parts and components shall be supplied as promptly as possible, but at the most within 6 months of placing the order. In addition, in the event of termination of the production of spare parts, advance notification will be made to the Employer of the pending termination, with sufficient time to permit the Employer to procure the needed requirement. Following such termination, the Contractor will furnish to the extent possible and at no cost to the Employer the blueprints, drawings and specifications of the spare parts, if requested.	Please confirm the said clause is applicable only for Transformers, Reactors & GIS Equipment	**As per Bid**
18	Volume-I, Section VII - General Conditions Of Contract (GCC) GCC Clause No 41	**SUSPENSION OF WORK BY CONTRACTOR ON EMPLOYERS DEFAULT'S**	We request the inclusion of a provision granting the Contractor the right to suspend the Works if: (a) the Employer has failed to pay the Contractor any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause pursuant to the Payment terms to the Contract Agreement, or commits a substantial breach of the Contract, the Contractor may give a notice to the Employer that requires payment of such sum, requires approval of such invoice or supporting documents, or specifies the breach and requires the Employer to remedy the same, as the case may be. If the Employer fails to pay such sum together with such interest, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, or fails to remedy the breach or take steps to remedy the breach within 14 days after receipt of the Contractor's notice; or (b) the Contractor is unable to carry out any of its obligations under the Contract for any reason attributable to the Employer, including but not limited to the Employer's failure to provide possession of or access to the Site or other areas in accordance with contract , or failure to obtain any governmental permit necessary for the execution and/or completion of the Facilities,then the Contractor may by 14 days' notice to the Employer suspend performance of all or any of its obligations under the Contract, or reduce the rate of progress If the Contractor's performance of its obligations is suspended, or the rate of progress is reduced , then the Time for Completion shall be extended and any and all additional costs or expenses incurred by the Contractor as	**As per Bid**
19	Volume-I, Section VII - General Conditions of Contract (GCC) GCC Clause No 14	BOCW	We understand that BOCW is applicable only on the Erection contract value. Please confirm. Also, please indicate the % of BOCW.	**As per Bid**
20	General	Order of Procedence	In case of contradictions among BOQ, scope of works & technical specifications, kindly confirm the order of precedence.	**As per Bid**
21	Vol-I -Section - II - Instructions to Bidders (ITB) Clause No 2.2	Bid Security: EMD Bank Guarantee	Please provide the Bank details for SFMS confirmation	**Provided below with this document**
22	Volume-II, Ch.2, Cl.2.2; Ch.4, Cl.4.6/4.8, Cl.4.12.2 (referring to Volume-III – Bid Purpose Drawings, Schedule of Quantities & Misc. Documents)	Site layout/topographic drawings, soil investigation report, geotechnical data, ESIA report and the mandatory spares list are stated to be contained in 'Volume-III'.	Volume-III has not been received/made available along with the Bidding Document (only Volume-I & Volume-II furnished). Kindly upload/issue Volume-III including site layout drawing, GAD Drawings of Buildings, boundary wall, Cable Trenches, Roads, drain along with soil investigation/geotechnical report, topographic data and ESIA report, as these are essential for civil quantity verification and accurate price bid preparation, particularly given the hilly terrain at Umrangshu.	**Sample drawings shall be provided**

23	BOQ-4 (Civil Works, 400 kV New Substation), Item 2.01 – 400 kV GIS cum Control Room/CRP/DB Building (PEB) alongwith GIS bay foundations complete [90m x (16+8)m]	The BOQ item describes only the overall plinth dimensions [90m x (16+8)m] of the PEB building; no architectural layout, floor plan or General Arrangement (GA) drawing showing room wise sub-division (GIS hall, CRP room, DB room, control room, SAS/SCADA room, battery room etc.), floor levels, column grid or GIS bay foundation layout has been furnished.	Kindly furnish the detailed Layout Plan and General Arrangement (GA) Drawing of the 400 kV GIS cum Control Room/CRP/DB Building, including room-wise areas, column grid, floor-to-floor heights and GIS bay foundation layout, as these are essential for accurate assessment of civil quantities (foundation, flooring, finishing, electrical/HVAC services etc.) and for structural/PEB design coordination	**Refer GIS hall drawing. Sample drawings shall be provided however final detailed layout shall be under EPC scope**
24	BOQ-4 (Civil Works, 400 kV New Substation), Item 1.02 – Site Clearance including necessary excavation and dismantling of existing structure (Qty 1)	The BOQ item provides a lump-sum provision for site clearance including dismantling of existing structures at the new 400 kV Umrangshu substation site.	During the site visit, it was observed that the land marked for the new 400 kV Umrangshu Grid Substation (approx. 10 acres, fenced) is vacant and free of any existing structures. The Employer is requested to kindly confirm that no dismantling of existing structures is involved under this item, and that the scope is limited to general site clearance (vegetation/shrub removal, minor excavation and grading) only	**As per Bid**
25	BOQ-8 (Civil Works, 132 kV Umrangshu Old Substation – Remote End), Item 2.01 (G+4 Quarter) and Item 4.05 (Steps from Colony to CRB)	The civil BOQ for the remote-end bay-extension package at the existing 132 kV Umrangshu (Old) substation includes construction of a G+4 (Ground + 4 Floor) staff quarters building, along with steps connecting a 'colony' to the Control Relay Building.	Kindly clarify the purpose, built-up area, number of units and design drawings for the proposed G+4 Quarter building, and confirm that construction of residential staff quarters forms part of the Contractor's turnkey EPC scope for this bay-extension package (as opposed to being a separate civil works contract of AEGCL).	**Under EPC scope as per BOQ**
26	BOQ-4 (Civil Works, 400 kV New Substation), Item 1.04 (Earthfilling with Compaction, Qty 40,000 CuM) & Item 1.05 (Earthcutting & Levelling, Qty 1,50,000 CuM); Volume-I, Cl.5.1(b) (Quantity Variation ±15%)	In the absence of the site layout/topographic drawing and soil investigation report (Volume-III), the basis for the earthfilling and earthcutting quantities cannot be independently verified by the Tenderer	Kindly furnish the site layout/contour drawing with existing and finished ground levels, or confirm that the above quantities are provisional estimates governed solely by the ±15% variation clause (Cl.5.1(b)), without any separate claim/verification right for the Bidder.	**Contour drawing provided however detailed drawing shall be under EPC scope. Quantity as per BOQ**
27	BOQ-4, Item 1.02 (Site Clearance including necessary excavation and dismantling of existing structure, Qty 1); BOQ-8, Item 1.01 (same description, Qty 1 for 132 kV Umrangshu Old Substation Remote End)	Both civil BOQ schedules provide a lump-sum item for 'dismantling of existing structure' at the respective sites, without identifying the nature, extent or location of such existing structures.	Kindly furnish details/drawings of the existing structures to be dismantled at (a) the new 400 kV substation site and (b) the 132 kV Umrangshu (Old) substation, and clarify the responsibility for transportation and disposal of dismantled material. Also provide the lead for disposal of the material	**Under EPC scope**
28	BOQ-4 (Civil Works), Item 5 – HVWS with Water Reservoir and Pumphouse	The tender provides for a deep tube-well, submersible pump, CPVC piping and construction of a water reservoir/pump house for fire-fighting, under BOQ-4 Item 5.01.	The requisite drawings/layout and sizing basis for the HVWS reservoir and pump house have not been provided. The Employer is requested to kindly provide the relevant drawings/details to enable proper assessment of scope and cost.	**Under EPC scope during detailed engineering**
29	BOQ-4, Item 4.02 (Fire Protection Wall for 80 MVAr Reactor, Qty 3 Nos.); BOQ-1, Item 24.01 (Supply of 80 MVAR Bus Reactor, Qty 2 Nos.)	The civil BOQ provides for 3 (three) Nos. of Fire Protection Walls for the 80 MVAr Bus Reactor, whereas the electrical supply schedule (Item 24.01) indicates only 2 (two) Nos. of 80 MVAR Bus Reactors in the overall scheme	Kindly clarify/correct the required quantity of Fire Protection Walls for the Bus Reactor bays, so that the civil BOQ is consistent with the number of reactors actually being supplied	**Refer to revised BOQ**
30	BOQ-4, Item 1.06 (RCC Retaining Wall with Counterfort, Qty 1,600 RM) & Item 1.07 (Boulder Pitching with 100 mm PCC, Qty 200 RM); BOQ-8, Item 1.05 (RCC Retaining Wall, Qty 220 RM)	Significant quantities of RCC counterfort retaining wall and boulder pitching are provided for slope protection at both the new substation and the old substation remote-end sites, consistent with the hilly terrain of Dima Hasao District	Kindly furnish the geotechnical investigation report, cross-sections and design basis (soil/rock parameters, slope angles, retaining wall heights) used to arrive at the above quantities, and confirm whether these are final design quantities or provisional, subject to detailed geotechnical investigation and design at execution stage.	**Soil investigation report provided. Final quantities shall be as per design.**
31	Volume-II, Chapter on Structural Design Criteria (Loads on Structures – Seismic Design); cross-reference Clause on Equipment Design (seismic zone V)	The structural design clause states that 'all structures shall be designed for Seismic Zone VI' (also repeated for RCC structures – 'earthquake zone VI'), whereas the equipment design clause elsewhere in the same Volume specifies 'seismic zone V'; Seismic Zone VI does not exist under the current IS 1893 seismic zoning (which covers Zones II to V only).	Kindly clarify and confirm the correct seismic zone (Zone V, as per IS 1893, which is understood to be the applicable zone for Dima Hasao District, Assam) to be adopted for the structural/civil design of all buildings, equipment foundations and steel structures under this Contract, and amend the Volume-II clause accordingly.	**Shall be as per latest applicable codes**
32	BOQ-4 (Civil Works, 400 kV New Substation), Item 1.07 – Boulder Pitching with 100 mm PCC on top, Qty 200.00, Unit: RM	The BOQ specifies the unit of measurement for Boulder Pitching with 100 mm PCC on top as 'RM' (Running Metre). Boulder pitching is a slope/surface protection work normally measured and paid by area (Sqm) or, where thickness/depth is specified, by volume (CuM) – a running-metre unit does not capture the width or thickness of pitching being provided.	Kindly confirm the correct unit of measurement for Item 1.07 (Sqm or CuM, as applicable), and furnish the applicable cross-section (width and thickness of boulder pitching and PCC) corresponding to the stated quantity of 200, so that the item can be correctly assessed and priced.	**Refer to revised BOQ**
33	BOQ-9 to BOQ-14 (400 kV Misa–Silchar D/C LILO & 132 kV Umrangshu New–Old D/C Line – Towers, Conductor & Hardware); Volume-II (Scope & Design of Transmission Towers)	Neither the route length, number of towers, tower-spotting schedule nor the alignment profile for the 400 kV LILO line or the new 132 kV D/C line is furnished (also covered under the missing Volume-III drawings).	Kindly furnish the transmission line route plan/alignment drawing indicating the number and type of towers, span lengths and termination points for both lines, to enable correct assessment of tower, conductor, insulator and hardware quantities, particularly given the hilly/forested terrain along the alignment.	**Refer 400kV LILO tower schedule**

34	Bid_Volume_I Section VIII SCC-8.2	The Time for Completion of the whole of the Facilities shall be **36 (Thirty-Six)** months from the Effective Date as described in the Contract Agreement.	Considering the climatic conditions prevailing at the project site, it is observed that approximately five months of the year are affected by the monsoon season, during which the execution of civil and associated works is significantly hampered due to heavy rainfall and adverse site conditions. Consequently, only about seven months in a year remain practically available for effective execution of the works. In view of the above site-specific climatic constraints and to ensure proper planning, execution, testing, and commissioning of the works without compromising quality and safety, we kindly requestr to **consider providing a completion period of 48 months for the project**	**As per Bid**
35	Bid_Volume_I SECTION-I	As per NIT Completion time - **24 Months**		**As per Bid**
36	Bid_Volume_I ITB – Bid Security - Clause No. 2.20.6	The Bid Security must remain valid for Forty-Five (45) days beyond the original or extended validity period of the bid.	Validity period of the Bid Security to be considered over and above the validity of the bid **28 days or 45 days**. Please confirm and issue the revised EMD BG format.	**45 Days**
37	Bid_Volume_I FORMAT-B3-Bank Guarantee (Bid Security)	(ii)twenty-eight days after the end of the Bid Validity Period.		**45 Days**
38	Bid_Volume_I Section VIII SCC- 11	11.2 (a) The Contract Price shall be **firm.**	Prices are increasing rapidly, so, request to include **Price Variation** Clause.	**As per Bid**
39	Bid_Volume_I Section V - 5.1 Scope of Supply of Plant and Services (b)	BOQ quantities are provisional and may vary by ±15% of the Total Contract Price.	Whether the **±15% variation** is applicable to individual BOQ items, individual schedules, or only to the overall Contract Price.Please confirm.	**As per Bid**
40	Bid_Volume_I Section V - 5.3 Drawings	Tender drawings are indicative and the successful bidder is responsible for final detailed engineering.	Whether quantity/scope changes arising solely from approved detailed engineering shall be treated as variations under the Contract. Please confirm	**As per Bid**
41	Bid_Volume_I Appendix 6	The tender indicates that personnel, facilities, works or supplies are not to be provided by the Employer.	Please clarify the facilities to be made available by the Employer, including land/site possession, approach road, construction power, construction water, storage area and site office area.	**As per Bid**
42	Bid_Volume_I Appendix 5	The tender requires compliance with specified/approved manufacturers and subcontracting provisions.	Please provide the final approved manufacturer list and clarify whether equivalent makes proposed by the bidder will be considered subject to Employer approval.	**As per Bid**
43	Bid_Volume_I SECTION – II -Instructions to Bidders - 2.13.3 / BDS -ITB 2.13.2	Hardcopy of the EMD BG, POA and LOTT and Additional Documents	Please confirm the complete list of documents required in hardcopy, the number of copies.	**As per Bid**
44	Bid_Volume_I GCC 26 / SCC	LD is stated at 0.5% per week, subject to a maximum of 10% of the Contract Price.	Please confirm whether LD will be calculated on the total Contract Price or only on the value of the delayed portion/schedule, and how sectional delays will be treated, consider the LD maximum of 5% of contract price.	**As per Bid**
45	Bid_Volume_I Appendix 1	No provision of advance.	Request to provide the mobilization advance 15% on supply and 10% on ETC.	**Mobilization advance amounting Ten percent (10%) of the total Supply amount shall be released on submission of security in the form of Bank Guarantee for the equivalent amount made out in favour of the AEGCL. The Mobilization Advance will be provided on interest basis at the rate charged by the funding agency for the Project to AEGCL. The advance amount will be adjusted at the rate of 10% of the taxable invoice value from each subsequent supply bill till the complete amount of advance is adjusted. The advance payment security may be reduced in proportion to the value of the amount adjusted from the Invoices, as evidenced by delivery documents.**

46	BOQ1 - 25 - Supply of Battery & Battery Chargers, DCDB & ACDB as per specification	25.03- 220V, DCDB, 25.06-48V DCDB 25.07 - Main ACDB 2508 - Sub ACDB 25.09 - MLDB with 415V/415V, 100kVA isolation transformer	Request to provide complete specifications and drawing clearly indicating the details of all the required incoming, buscoupler and outgoing feeders, including their ratings and technical specification with other relevant requirements, like metering, indication, protection, etc	**Refer LT SLD**
47	Vol-II (Technical Specification) & BOQ – All schedulesCh-2, Cl. 2.2, 2.6.14.2, Ch-4 Cl. 4.12.2, Ch-5 Cl. 5.2, 5.15; Ch-15, Ch-16, Ch-29 Cl. 29.33	Tender stipulation (Vol-II): Site information, schedule of quantities, mandatory spares, bid drawings, soil investigation report and ESIA are stated to be in 'Volume III – Bid Purpose Drawings, Schedule of Quantities and Misc. Documents'. BOQ provision: BOQ issued; Volume-III not available with the bid documents. Observation: Vol-II repeatedly relies on Vol-III for SLD, layout, building drawings, cable trench drawing, contour/soil data and mandatory spares. Without it the BOQ cannot be validated or priced.	Please issue Volume-III: SLD, GA/layout, earth-mat layout, contour survey, building drawings, cable-trench type drawings A–D (stated as "attached" in Ch-5 Cl. 5.15 but not enclosed), soil investigation report, ESIA, and the item-wise mandatory spares schedule (or confirm that no mandatory spares are to be quoted). Kindly also extend the bid due date proportionately after issue.	**Refer updated drawings**
48	Vol-II (Technical Specification) & BOQ – Sch-1/2/3 Item 24.01; Sch-4 Item 3.02, 4.02Ch-2, Cl. 2.6.11 (A)	Tender stipulation (Vol-II): Scope table lists 'Transformer: 2x315MVA, 3-ph; Transformer: 2x80MVA, 3-ph; Station transformers 2x630kVA'. BOQ provision: Sch-1 Item 24.01: 80 MVAR, 420 kV Bus Reactor – 2 Nos. Observation: Scope table describes the second item as '2x80 MVA transformer' whereas BOQ and GIS bay list (Bus Reactor bays: 2) indicate 2 x 80 MVAR bus reactors.	Please confirm that the item is 2 x 80 MVAR, 420 kV bus reactors (and not 2 x 80 MVA transformers) and correct Cl. 2.6.11.	**2x80 MVAR Reactors**
49	Vol-II (Technical Specification)Ch-2, Cl. 2.6.14.2	Tender stipulation (Vol-II): Fault level table: '400/132kV Agia New GSS – 63 kA (400 kV), 40 kA (132 kV)'. No fault level given for 33 kV tertiary system. BOQ provision: Tertiary equipment in BOQ at 72.5 kV with 31.5 kA (isolator) and 40 kA (CB). Observation: Fault level table refers to a different substation (Agia) and omits the tertiary (33 kV) fault level needed to rate tertiary CB/CT/isolators.	Please confirm design fault levels for Umrangso GSS: 400 kV – 63 kA/3 s, 132 kV – 40 kA/3 s and specify the 33 kV tertiary fault level.	**400kV-63kA/3s, 132kV- 40kA/3s, 33kV- 31.5kA/3s**
50	Vol-II (Technical Specification)Ch-2, Cl. 2.3	Tender stipulation (Vol-II): Climatic data: 'Outdoor temperature 35°C' and 'Design Ambient Temperature 50°C'; 'Minimum outdoor temperature 15°C' and 'Minimum temperature 0°C'; 'Max relative humidity 86%'. Observation: Two different maximum and minimum temperatures are given in the same table.	Please confirm design ambient 50°C, minimum 0°C and max. RH (typically 100% for Assam) to be used for equipment rating, conductor sag and HVAC design.	**Design ambient 50°C, Minimum 0°C and Maximum RH 100%**
51	Vol-II (Technical Specification) & BOQ – Sch-1 Items 16.02, 10.01, 10.03, 21.01; Sch-9 to 11Ch-2, Cl. 2.6.11 (A) 400 kV & 132 kV bays; Cl. 2.6.11 (B) Transmission lines	Tender stipulation (Vol-II): Present scope: 400 kV GIS line bays – 6 Nos.; only line work is 'D/C LILO of 400 kV Misa–Silchar D/C line' (4 circuits). BOQ provision: 6 x 400 kV line bays, 6 line CRPs, 18 CVTs, 12 wave traps. Sch-1 Item 3.01 has only 24 quad tension strings (= 4 line terminations). Observation: LILO of a D/C line yields 4 line feeders. Termination of the remaining 2 x 400 kV line bays (and their CVT/WT/CRP/PLCC) is not defined.	Please confirm which feeders will be connected to the 5th and 6th 400 kV line bays and whether bay equipment (CVT, WT, LA, gantry, PLCC) for these 2 bays is to be supplied under present scope.	**400kV D/C from PSP shall be connected to 5th and 6th 400kV bays and bay equipments are in scope as per BoQ**
52	Vol-II (Technical Specification) & BOQ – Sch-1 Items 12.01, 14.01, 17.01, 10.02, 10.04Ch-2, Cl. 2.6.11 (A) & (B)	Tender stipulation (Vol-II): Present scope: 132 kV AIS line bays – 6 Nos.; only 132 kV line in scope is Umrangso(New)–Umrangso(Existing) D/C (2 circuits). BOQ provision: 6 line bays: 18 line CTs, 18 CVTs, 12 wave traps, 6 line CRPs (with line differential). Observation: Only 2 of the 6 x 132 kV line bays have a line in scope.	Please confirm the destination of the other four 132 kV line bays. Please also confirm whether the 132 kV feeder presently under construction for Dalmia Cement (at the existing 132/33 kV substation) is to be shifted to one of these bays.	**Refer updated SLD and Layout**
53	Vol-II (Technical Specification) & BOQ – Sch-9/10/11 (400 kV LILO) — no remote-end scheduleCh-2, Cl. 2.6.11 (B)	Tender stipulation (Vol-II): D/C LILO of 400 kV Misa–Silchar D/C (Quad Moose) line at Umrangso 'along with PLCC and OPGW link'. BOQ provision: No price schedule for works at Misa and Silchar ends (relay setting revision, PLCC re-tuning/replacement, WT, OPGW/FOTE integration). Sch-1 Item 26.02 has 16 x 400 kV PLCC panels and 26.04 has 8 protection couplers. Observation: PLCC and teleprotection must be re-engineered at the Misa and Silchar ends after LILO. The BOQ quantity of PLCC panels (16) suggests remote-end panels are included, but the location and erection scope are not defined.	Please confirm (a) owner of the existing Misa–Silchar line and the agency responsible for outage/shutdown and remote-end works and (b) whether PLCC/protection coupler/WT/FOTE at Misa and Silchar ends are in bidder's scope.	**(a) Indigrid (b) In bidder's scope**
54	Vol-II (Technical Specification) & BOQ – Sch-4 Item 1.02; Sch-8 Item 1.01Ch-2, Cl. 2.6.5, 2.6.6	Tender stipulation (Vol-II): Dismantling of existing structures of existing distribution/transmission systems and existing buildings, and transportation to location designated by employer. BOQ provision: Single 'Job' item for site clearance and dismantling. Observation: Quantity/type of existing lines, structures and buildings to be dismantled and lead of transport are not specified, so a lump-sum cannot be priced.	Please furnish list/quantity of existing lines, structures and buildings to be dismantled, and the designated store location/lead distance. Please confirm whether any diversion of existing 33 kV/11 kV lines crossing the site is in scope.	**Bidder may visit work site and clarify the same**
55	Vol-II (Technical Specification)Ch-2, Cl. 2.6.3, 2.7.4, 2.7.5	Tender stipulation (Vol-II): Statutory approvals (forest, PTCC, NHAI/SH, aviation, railways) and ROW compensation are contractor's responsibility; fees/compensation 'at actual' to be paid directly or reimbursed by AEGCL. BOQ provision: No provisional/reimbursable item in BOQ. Observation: Payment mechanism for tree/crop/zirat compensation and statutory fees is not reflected in BOQ.	Please confirm that all compensation (land, tree, crop, zirat) and statutory fees will be reimbursed at actuals by AEGCL and are excluded from quoted rates.	**As per Tender**

56	Vol-II (Technical Specification) & BOQ – Sch-1/3 Items 32–35 (cables, earthing, structures); Sch-5/7; Sch-9/12Ch-2, Cl. 2.6.12 D ; BOQ unit basis	Tender stipulation (Vol-II): 'In the bid price schedule, the structures including fasteners & foundation bolts are indicated in the form of LS.' BOQ provision: Structures, cables, earthing and tower steel are given in MT / m with fixed quantities (Item-rate BOQ). Observation: Vol-II says LS; BOQ is item-rate with quantities. Basis of payment for quantity variation after detailed engineering is unclear.	Please confirm that payment for structures, cables, earthing materials, tower steel and civil items will be on measured actual quantities at quoted unit rates (item-rate), and not lump-sum.	**As per Bid and BOQ**
57	Vol-II (Technical Specification) & BOQ – Sch-1/2/3 Item 21.08Ch-2, Cl. 2.6.12.1 B	Tender stipulation (Vol-II): GIB: 'This outdoor bus duct shall be measured from outer edge of the wall. SF6 gas duct inside GIS building is part of respective GIS Module.' BOQ provision: Item 21.08: GIB 3500 m 'for both indoor and outdoor of GIS'. Observation: BOQ includes indoor duct in the metre-rated item while Vol-II includes indoor duct in the bay module price. Also not clear whether 3500 m is phase-metre or 3-phase run.	Please confirm (a) indoor GIB is priced within bay modules (Items 21.01–21.05) and Item 21.08 covers only outdoor GIB beyond the wall, and (b) the unit 'Mtr.' means single-phase metre.	**(a) As per BoQ (b) Mtr means single phase metre**
58	Vol-II (Technical Specification) & BOQ – Sch-1 Items 21.03, 21.04Ch-2, Cl. 2.6.12.1 (e), Ch-16	Tender stipulation (Vol-II): Tie bay 'with/without CSD'; CSD required for breakers switching transformers and reactors. BOQ provision: Tie bays: 3 without CSD + 2 with CSD. Observation: Number of tie breakers requiring CSD depends on diameter formation (which diameters carry ICT/BR). SLD not provided.	Please confirm the 400 kV diameter formation (which diameters carry ICTs and bus reactors) to justify the CSD split of tie bays (2 with + 3 without).	**Refer SLD**
59	Vol-II (Technical Specification) & BOQ – Sch-1/3 Item 21.09Ch-16, Cl. 16.5.1.22 / 16.5.1.25.1, 16.5.1.25.6	Tender stipulation (Vol-II): EOT crane capacity 'shall be sized to lift the heaviest GIS component'; capacity calculation with FOS 5 to be submitted; min. hook height 10.5 m. BOQ provision: 10 Ton EOT crane – 1 No. Observation: BOQ fixes 10 T while spec requires capacity by calculation. Heaviest 420 kV CB module may exceed 10 T.	Please confirm whether 10 T is the minimum, with higher capacity to be provided at the quoted rate if the OEM's heaviest module requires it.	**As per BoQ**
60	Vol-II (Technical Specification) & BOQ – Sch-1/3 Item 21 – no PDM itemCh-16, Cl. on On-line PDM	Tender stipulation (Vol-II): 'An on-line continuous Partial Discharge Monitoring (PDM) system shall be designed to monitor the entire GIS installation' incl. future bays. BOQ provision: No separate item for on-line PDM system; UHF sensors are part of modules. Observation: On-line PDM (hardware, software, PD server) is a significant cost with no BOQ line.	Please confirm whether on-line PDM system is in scope; if yes, add a BOQ item or confirm it is to be loaded in bay module rates.	**PD not in scope**
61	Vol-II (Technical Specification) & BOQ – Sch-4 Item 2.01Ch-2, Cl. 2.6.12.1 G ; Ch-5 Cl. 5.10	Tender stipulation (Vol-II): GIS building to accommodate present + future modules plus 3 extension modules and 3 maintenance bays; relay room for present and future CRP, PLCC, FOTE; battery & SAS room 'as per attached building drawing'. BOQ provision: '400 kV GIS cum Control Room/CRP/DB Building (PEB) with GIS bay foundations [90 m x (16+8) m]' – 1 Each. Observation: Building drawing is not attached. Future scope (2 line + 2 switchable line reactor + 1 ICT bay) and '3 extension + 3 maintenance bays' may not fit 90 m. Pile foundation is mandatory for GIS building (Ch-5 Cl. 5.6 d).	Please confirm whether the building size of 90 m x 24 m is fixed. If the OEM GIS layout (present + future + 3 extension + 3 maintenance bays) needs a larger building, will the price be adjusted?	**Refer revised BoQ and Building Layout**
62	Vol-II (Technical Specification) & BOQ – Sch-1/2/3 Item 16.01Ch-14, Cl. 14.17 (b)	Tender stipulation (Vol-II): '2 sets of bus bar differential panels have been considered in the BPS for 400kV. Each set shall have 2 numbers of bus bar differential relays.' BOQ provision: 400 kV Bus Bar Protection Panel – 4 Sets. Observation: Spec says 2 sets (4 relays total); BOQ says 4 sets.	Please confirm the quantity of 400 kV busbar protection panels (2 or 4 sets) and the number of relays per set.	**As per BoQ. 400kV Busbar Protection shall be as per BID: (1+1) for Both Bus 1 and Bus 2.**
63	Vol-II (Technical Specification) & BOQ – Sch-1 Items 12.01, 14.03, 17.03Ch-2, Cl. 2.6.12.1 II ; Ch-14 Cl. 14.17(c), 14.32	Tender stipulation (Vol-II): '132 kV switchyard shall be AIS and shall have all feeders in Double Main cum Transfer bus arrangement.' BOQ provision: Only 1 Bus Coupler bay (CB 9 = 6 line + 2 ICT + 1 BC). No Transfer Bus Coupler (TBC) CB, CT, CRP or isolators. Observation: A DMT scheme needs a TBC bay (or combined BC-cum-TBC). BOQ has no TBC equipment.	Please confirm the 132 kV bus scheme (DMT or DM). If DMT, please add TBC bay equipment (CB, CT, isolators, CRP) to the BOQ or confirm a combined BC/TBC arrangement.	**Refer SLD and as per BoQ**
64	Vol-II (Technical Specification) & BOQ – Sch-1/2/3 Items 1.01–1.04; Sch-5/6/7 Items 1.01–1.02Ch-10, Cl. 10.0 table & Cl. 10.2	Tender stipulation (Vol-II): 132 kV isolator: Horizontal Centre Break; rated current 2000 A (Cl.10.2: 2000/1600/1250 A); 40 kA. BOQ provision: 145 kV 'Horizontal Double Break' isolators, including 3150 A (Item 1.03) and 'Tandem' isolators (Item 1.04, 16 sets). Observation: Type (double break vs centre break) and 3150 A rating are not covered by spec; 'Tandem isolator' is not defined in Vol-II.	Please confirm the isolator type for 132 kV (double break or centre break), accept 3150 A rating for bus coupler, and define 'Tandem Isolator' (pantograph/two-in-one?) with its GTP.	**Isolators shall be double break. For Tandem refer layout drawing**
65	Vol-II (Technical Specification) & BOQ – Sch-1 Item 14.01; Sch-5 Item 13.01Ch-2, Cl. 2.6.12.1 II ('132 kV Bus Quad Moose, interconnections Twin Moose')	Tender stipulation (Vol-II): Line interconnections Twin Moose; isolators 2000 A; CB 3150 A. BOQ provision: 132 kV line CT ratio 600-300/1 A. Observation: 600 A CT limits line bay loadability far below Twin Moose / 2000 A equipment ratings; also inconsistent with 40 kA dynamic withstand for low ratio CTs.	Please confirm line CT ratio. Suggest 1200-600/1 A (or 1600-800/1 A) for 132 kV line bays.	**As per BoQ**

66	Vol-II (Technical Specification) & BOQ – Sch-1 Item 17.01; Sch-5 Item 15.01Ch-14, '132 kV Line Panel' & Cl. 14.16.1	Tender stipulation (Vol-II): 132 kV line panel: Main protection – Distance (numerical); Line differential only 'if applicable'. BOQ provision: '132 kV Line CRP (with line differential)' – 6 sets (new end) + 2 sets (remote end). Observation: Protection philosophy differs. Line differential needs a dedicated fibre/channel at both ends for each line.	Please confirm the scheme: Main-I line differential + Main-II distance, or distance only. Confirm communication channel (OPGW direct fibre/E1) for differential.	**132kV Main relay shall have both Line Differential with Distance Protection. Dedicated fibre channel shall be established for 132kV line.**
67	Vol-II (Technical Specification) & BOQ – Sch-1/2/3 Item 23.01Ch-17, Annexure-A 1.0 and Annexure-A 1.1.0	Tender stipulation (Vol-II): Annexure-A 1.0 gives parameters for '500 MVA, 400/220/33 kV Auto transformer'; Annexure-A 1.1.0 gives 315 MVA 400/132/33 kV. BOQ provision: 315 MVA, 400/132/33 kV ICT – 2 Nos. Observation: 500 MVA annexure is not applicable to this project.	Please confirm that only Annexure-A 1.1.0 (315 MVA, 400/132/33 kV) applies and delete the 500 MVA annexure.	**Confirmed**
68	Vol-II (Technical Specification) & BOQ – Sch-1 Item 23.01Ch-17, Annexure-A 1.1.0, Items 1.10–1.12	Tender stipulation (Vol-II): OLTC: '±10% in 1.25% steps for IV voltage variation using variable flux, at neutral end'. Impedance shown for both 'Constant ohmic' and 'Constant percentage' types. HV–LV impedance given as '30.0 (minimum) 25.0' and '45.0 (minimum) 40.0'. Observation: Type of impedance and HV–LV / IV–LV impedances are ambiguous; these affect design and tertiary fault level.	Please confirm (a) transformer type (constant ohmic or constant percentage impedance), (b) HV–IV impedance at principal tap, and (c) HV–LV and IV–LV impedances.	**As per Bid**
69	Vol-II (Technical Specification) & BOQ – Sch-1 Items 1.05–1.06, 8.03, 12.02, 14.04, 14.06, 18.01Ch-17, Annexure-A (Tertiary: 5 MVA, ungrounded delta, LV bushing 72.5 kV); Ch-11 Cl. 11.4.1; Ch-22 table; Ch-32 Cl. 9.3.2; Ch-10 & Ch-22 tables (72.5 kV: 31.5 kA)	Tender stipulation (Vol-II): Tertiary is 33 kV ungrounded delta. Ch-11 station transformer: 36 kV, 'neutral effectively earthed'. Ch-32: 36 kV indoor VCB, 'solidly earthed'. Ch-12 SA for 36 kV: 30 kV rating. BOQ provision: Tertiary equipment in BOQ is 72.5 kV class: isolators 31.5 kA, CB 40 kA, SA 60 kV, CT 50-25/1 A, PT 72.5 kV. Observation: Voltage class and earthing of tertiary system are inconsistent across chapters. 60 kV SA on 33 kV ungrounded system and 36 kV/solidly-earthed assumptions conflict. Within the same tertiary bay, isolators are 31.5 kA (Items 1.05/1.06) but the CB is 40 kA (Item 12.02).	Please confirm: (a) insulation class of tertiary equipment (36 kV or 72.5 kV), (b) SA rating (30 kV per Ch-12 or 60 kV per BOQ), (c) tertiary earthing (unearthed or via earthing transformer); and (d) a uniform short-time rating for all tertiary bay equipment (31.5 kA suggested, subject to the tertiary fault level asked in Sl 3).	**As per BoQ**
70	Vol-II (Technical Specification) & BOQ – Sch-1 Item 14.04Ch-23 CT table; Ch-2 Cl. 2.6.14.2	Tender stipulation (Vol-II): CT short-time current as per system fault level. BOQ provision: 72.5 kV CT 50-25/1-1-1-1-1 A, 5 cores (0.2S-5P20-PX-PX-PX). Observation: A 50-25 A primary CT cannot practically meet 31.5/40 kA thermal & dynamic withstand; 5 cores (3 PX) seem excessive for a station-transformer feeder.	Please confirm ratio and cores. Suggest 100-50/1 A with 3 cores, or allow bar-primary design with higher ratio.	**As per BoQ**
71	Vol-II (Technical Specification)Ch-32 (36 kV indoor VCB), Ch-3 item 8 ('33 kV Switch Gear Room')	Tender stipulation (Vol-II): Chapter 32 specifies 33 kV indoor VCB panels; Ch-3 refers to a 33 kV switchgear room. BOQ provision: BOQ has outdoor 72.5 kV AIS CB (Item 12.02) for tertiary; no 36 kV indoor panels. Observation: It is not clear whether the tertiary feeds station transformers through outdoor AIS or indoor 33 kV switchgear.	Please confirm that Chapter 32 is not applicable and tertiary switching is by outdoor AIS as per BOQ. Please also confirm how the station transformer HV is connected (overhead or 33 kV XLPE cable), as no 33 kV cable/termination is in BOQ.	**Refer layout drawing**
72	Vol-II (Technical Specification) & BOQ – Sch-1/2/3 Item 7.01Ch-11 Cl. 11.2 ; Ch-11 Cl. 11.31 xx ; Ch-27 Cl. 27.5 (i)	Tender stipulation (Vol-II): Ch-11: standard ratings 1000/500/250 kVA; 'Energy Efficiency Level 2'. Ch-27: '2 Nos. 1000 kVA, 33/0.415 kV station service transformers'. Ch-2 scope: 2 x 630 kVA. BOQ provision: 630 kVA, 33/0.4 kV, Energy Efficiency Level-3 – 2 Nos. Observation: Three different ratings (630/1000 kVA) and two efficiency levels (2/3) are stated.	Please confirm station transformer rating (630 or 1000 kVA) and energy efficiency level (Level-2 or Level-3 as per IS 1180). ACDB incomer ACB rating (2000 A, Ch-27) shall be matched accordingly.	**As per BoQ**
73	Vol-II (Technical Specification) & BOQ – Sch-1 Items 25.09–25.11Ch-27, Cl. 27.5 (ii), (vii)	Tender stipulation (Vol-II): Lighting transformer for MLDB min. 100 kVA; 'One number 100 kVA for ELDB' in (ii) but '50 kVA' for ELDB in (vii); HVAC DB – 1 No. BOQ provision: MLDB with 100 kVA isolation transformer (1); ELDB with 50 kVA (1); HVAC DB – 2 Sets. Observation: ELDB transformer rating (100 vs 50 kVA) and HVAC DB quantity (1 vs 2) are inconsistent.	Please confirm ELDB isolation transformer rating and quantity of HVAC DB.	**As per BoQ**
74	Vol-II (Technical Specification) & BOQ – Sch-1/2/3 Item 24.01Ch-21, Cl. 21.2	Tender stipulation (Vol-II): Shunt reactor 'shall be of either gapped core type or magnetically shielded air core type'. BOQ provision: 80 MVAR 420 kV 'ONAN coreless' bus reactor. Observation: BOQ restricts construction to coreless type; spec allows gapped core.	Please confirm that gapped-core reactors are also acceptable against Item 24.01.	**As per Bid. Refer revised BoQ**
75	Vol-II (Technical Specification) & BOQ – Sch-1 Item 19.01Ch-14, PMU clause	Tender stipulation (Vol-II): PMUs 'as per CEA Guidelines on Unified Philosophy for Placement of PMUs'. BOQ provision: Phasor Measurement Unit – 1 Set. rvation: CEA guideline requires PMU inputs for 400 kV lines, ICTs and reactors; '1 set' does not define number of PMUs/analog channels. PDC location not defined for Item 20.16.	Please specify number of PMUs (or feeders to be monitored) and the PDC/CDCS location for integration.	**Refer the revised BoQ.PMU integraration at the PDC of SLDC and RLDC both**

76	Vol-II (Technical Specification) & BOQ – Sch-1 Items 10.03–10.04, 26.02–26.05; Sch-5 Items 9.02, 17.02–17.03Ch-19	Tender stipulation (Vol-II): PLCC and teleprotection for all lines in scope. BOQ provision: 400 kV: WT 12, PLCC panels 16, couplers 8. 132 kV (new end): WT 12, PLCC panels 2, couplers 2 (50 km). 132 kV (remote end): WT 4, panels 2, couplers 2 (100 km). Observation: Quantities do not reconcile per line (2 panels/couplers per line). 132 kV coupler range differs between ends (50 vs 100 km) for a ~3 km line. PLCC is redundant for a 3 km line with OPGW and line differential.	Please give a line-wise PLCC/WT/coupler requirement. Please confirm whether PLCC is required on the 3 km 132 kV line, or whether OPGW-based teleprotection alone is acceptable.	**The details:** **400kV: Plcc Panel Misa TL (local+ Remote)=8 nos, same for Silchar TL, DPC Misa TL (local+ remote)= 4 nos, same for Silchar TL.** **132kV: Old Umranshu TL PLCC Panel (local)= 2 nos, DPC(local)=2nos.** **WT: per Circuit 2 phase** **Yes PLCC is envisaged for the 3km 132kV TL.**
77	Vol-II (Technical Specification) & BOQ – Sch-1 Items 20.01, 20.09Ch-15, VDU clause	Tender stipulation (Vol-II): '70mm VDU high resolution screen'; three display units (station HMI, redundant HMI, DR workstation). BOQ provision: VDU 75 inch – 2 Nos.; Station HMI 3 sets + Maintenance HMI 1 set. Observation: VDU size is ambiguous ('70mm') and quantities differ.	Please confirm VDU size (75 inch?) and the HMI/VDU configuration.	**As per BoQ**
78	Vol-II (Technical Specification) & BOQ – Sch-5/6/7 Item 16.03Ch-2, Cl. 2.6.11 (C)	Tender stipulation (Vol-II): Construction of 2 x 132 kV AIS bays at Umrangso (existing) 'along with integration with the existing SAS'. BOQ provision: 'Integration of two new CRP's with the existing SAS' – 1 Job. Observation: OEM/model/protocol of existing SAS, availability of spare licences/ports, and whether the OEM's engineering support is to be arranged by bidder are not stated.	Please provide existing SAS make/model, gateway protocol, spare licences, and the existing 132 kV bus arrangement, DC/AC capacity and earth mat drawing at the remote end.	**Existing SAS is ERL make. Rest shall be shared during detail engineering**
79	Vol-II (Technical Specification) & BOQ – Sch-5/6 Items 12.01, 21.01–21.02Ch-2, Cl. 2.6.11 (C)	Tender stipulation (Vol-II): Construction of 2 nos. 132 kV AIS bays at 132 kV Umrangso (existing). BOQ provision: 132 kV BMK – 1 No.; gantry steel 64 MT (columns) + 20 MT (beams) = 84 MT. Observation: Two bays normally need 2 BMKs. 84 MT of gantry steel for 2 bays (≈42 MT/bay) is much higher than the new substation (243 MT for 9 bays ≈ 27 MT/bay).	Please confirm the BMK quantity for the 2 remote-end bays and whether the 84 MT gantry steel includes extension of the existing bus/gantry. Please provide the existing switchyard layout at the remote end.	**One BMK shall be used for 2 bays. Extension of Busbar is required at remote end.**
80	Vol-II (Technical Specification) & BOQ – Sch-4 Item 1.02; Sch-5/6/7 (2 bays); Sch-8 Item 1.01Ch-2, Cl. 2.6.5, 2.6.6, 2.6.11 (C)	Tender stipulation (Vol-II): Remote end: 2 nos. 132 kV AIS bays at 132 kV Umrangso (Existing). Cl. 2.6.5/2.6.6: dismantling of existing structures/buildings and site clearance. No mention of any existing 132/33 kV substation or third-party bay at or near the site. BOQ provision: No item for interfacing, protecting, shifting or taking outages of an existing 132/33 kV substation, or of the 132 kV bay under construction for Dalmia Cement. Observation: At site there is one existing 132/33 kV substation and one 132 kV bay under construction dedicated to Dalmia Cement. Neither appears in Vol-II or the BOQ. Bay space, bus extension, earth-mat tie-in and shutdowns at the existing substation depend on this.	Please confirm (a) whether the existing 132/33 kV substation at site is the "132 kV Umrangso (Existing)" remote end, (b) whether the Dalmia Cement 132 kV bay under construction (by others) occupies any of the space or bus sections meant for the 2 new bays, and (c) whether any dismantling, shifting or interfacing of the existing substation or the Dalmia bay is in the bidder's scope. Please provide the existing substation layout and SLD showing the Dalmia bay.	**(a) Confirmed (b) (c) Refer updated SLD**
81	Vol-II (Technical Specification) & BOQ – Sch-1/3 Item 37.01Ch-6, Cl. 6.3 ; Ch-3 item 8	Tender stipulation (Vol-II): 'The ductable AC for Control Panel Room of GIS building…'; split ACs with (N+1)/(N+2) controller. BOQ provision: 2 TR split AC units – 15 Nos. for CRP/PLCC/DB rooms. Observation: Spec calls for ductable AC in control panel room; BOQ provides only hi-wall splits.	Please confirm the AC system type for the control/relay room (ductable or hi-wall split) and whether 15 x 2 TR is the minimum, subject to heat-load calculation.	**As per BoQ**
82	Vol-II (Technical Specification)Ch-20 (EHV/HV XLPE cable), Ch-36 (Selective level meter cum generator)	Tender stipulation (Vol-II): Technical specifications for EHV/HV XLPE cable with termination and for selective level meter are included. BOQ provision: No corresponding BOQ items. Observation: Chapters appear to have no scope.	Please confirm that Chapters 20 and 36 are not applicable (or add BOQ items).	**As per BoQ**
83	Vol-II (Technical Specification) & BOQ – Sch-1 Items 25.01–25.02Ch-18, Cl. 18.1 ; Ch-2 Cl. 2.6.12 II B	Tender stipulation (Vol-II): DC system: 'a Float charger and a Float cum Boost charger (minimum 60 A)'; capacity to be calculated by bidder, not less than BPS. BOQ provision: 220 V 1600 AH VRLA – 2 sets; 'Dual Float cum Boost chargers 350 A' – 2 sets. Observation: Charger configuration (FC + FCBC vs dual FCBC) differs; if calculated battery capacity exceeds 1600 AH, price adjustment is unclear.	Please confirm charger configuration and that 1600 AH / 350 A are minimum values. If sizing calculation needs more, will the BOQ quantity/unit be revised?	**As per BoQ**
84	Vol-II (Technical Specification) & BOQ – Sch-1/3 Item 34.01–34.02Ch-2 Cl. 2.6.12 F (63 kA, 3 s) ; Ch-35 (current density ≤ 45 A/mm², 40-yr corrosion) ; Ch-7 Cl. 7.27 (40/50 mm MS rod)	Tender stipulation (Vol-II): Earth mat for 63 kA for 3 s; 40 mm dia MS rod (Ch-35) or 40/50 mm (Ch-7); max. current density 45 A/mm² with 40-year corrosion allowance. BOQ provision: 40 mm dia MS rod – 15,000 m (mat) + 5,000 m (risers). Observation: 63,000 A ÷ 45 A/mm² = 1,400 mm² before corrosion allowance; 40 mm rod = 1,257 mm². 40 mm rod does not satisfy spec criteria for 63 kA.	Please confirm that the earth-mat conductor size shall be as per design calculation (likely 50 mm dia MS rod) and that the BOQ item description/rate will be revised accordingly.	**As per BoQ**

85	Vol-II (Technical Specification) & BOQ – Sch-5/6/7 Item 20.01 (remote end); Sch-1 Items 34.03–34.04Ch-7, Cl. 7.27 ; Ch-35 Table A; Ch-5 Cl. 5.18	Tender stipulation (Vol-II): Ch-7: 75x12 GI flat for 132 kV substations; fence earthing 75x10 flats and 50x6 strip. Ch-35: main mat 40 mm MS rod for all. Ch-5: fence bonding 50x6 GI flat. BOQ provision: Remote end main mat 75x12 GS flat. Observation: Conductor sizes for remote-end mat and fence earthing differ between chapters.	Please confirm the earth-mat conductor for the 132 kV remote end extension (matching the existing mat) and the fence earthing conductor size.	**As per BoQ**
86	Vol-II (Technical Specification) & BOQ – Sch-1/3 Item 41.01; Sch-5/7 Item 23.01/22.01Ch-2, Cl. 2.6.12 D (b)	Tender stipulation (Vol-II): 'The cost for provision of lightning masts… shall deemed to be included under the respective switchyard bay structures. The civil works shall be payable as per relevant item of BPS.' BOQ provision: Separate item: 50 m lightning masts – 4 Nos. (new S/S) + 1 No. (remote end). No foundation item for LM. Sch-3 Item 41 describes 'illumination cables'. Observation: Vol-II says LM cost is part of bay structures; BOQ prices them separately. No civil item for LM foundations.	Please confirm LM will be paid under Item 41.01 (not deemed included), and indicate the BOQ item for LM foundations (pile/open). Please correct the Sch-3 Item 41 description.	**Refer revised BoQ**
87	Vol-II (Technical Specification) & BOQ – Sch-4 Items 2.01, 3.01, 3.02, 4.01, 4.02Ch-5, Cl. 5.2 & Cl. 5.6 (d)	Tender stipulation (Vol-II): Transformer, reactor, firewall, GIS building, CRB, kiosk and residential buildings 'shall be on pile foundation only'; initial pile load tests at contractor's cost. BOQ provision: No separate item for piling or pile load tests; only Item 4 (firewalls) mentions piles. Observation: Pile length/diameter depends on the soil report (not provided). Lump-sum pricing is a major risk in seismic Zone V.	Please confirm whether piling is to be included in the 'Each' rates, or add a separate item (per metre of pile and per pile load test).	**As per BOQ**
88	Vol-II (Technical Specification) & BOQ – Sch-4 Items 1.04–1.07; Sch-8 Items 1.03–1.05Ch-5, Cl. 5.9 Boundary/Retaining wall ; Cl. 5.5 (f) (disposal within 5 km)	Tender stipulation (Vol-II): Retaining wall height as per geotech/levels; counterfort where height > 4 m. Surplus earth to be disposed within 5 km at contractor's cost. BOQ provision: Earth cutting 1,50,000 m³; filling 40,000 m³; RCC counterfort retaining wall 1,600 RM; boulder pitching 200 RM (per RM, height not given). Observation: (a) Retaining wall/pitching rate per RM cannot be priced without height/section. (b) About 1,10,000 m³ surplus – disposal site & lead not defined.	Please provide finished ground level (FGL), retaining wall heights/sections, and designated disposal area. Please consider converting retaining wall to m³ of RCC, or specify the height range for the RM rate.	**As per attached contour drawing and BOQ however final contour drawing shall be under EPC scope**
89	Vol-II (Technical Specification) & BOQ – Sch-4 Items 4.01, 4.02Ch-5, Cl. 5.14 Fire Protection Walls	Tender stipulation (Vol-II): Fire walls between transformers/reactors per clearance; extend 2 m beyond equipment. BOQ provision: Firewall for 315 MVA – 2 Nos.; for 80 MVAr reactor – 3 Nos. (only 2 reactors). Observation: 3 firewalls for 2 reactors is inconsistent without layout.	Please confirm firewall quantities and sizes with the layout drawing.	**As per BOQ**
90	Vol-II (Technical Specification) & BOQ – Sch-4 Items 1.08, 1.09Ch-5, Cl. 5.18 Fencing, Cl. 5.9 Boundary wall	Tender stipulation (Vol-II): Site fencing for complete station plus internal fence around ground-mounted equipment; boundary wall 2.5 m with concertina coil. BOQ provision: Brick boundary wall 950 RM; security fencing 100 RM only. Observation: 100 RM of fencing seems insufficient for the switchyard perimeter (PCC/gravel area 35,000 m²).	Please confirm switchyard fencing length and whether the boundary wall rate includes concertina coil and barbed tape.	**Boundary wall rate includes concertina coil and barbed tape and switchyard fencing is separate as per BOQ**
91	Vol-II (Technical Specification) & BOQ – Sch-4 (new S/S) – only GIS building; Sch-8 (remote end) Item 2.01 'G+4 Quarter'; Sch-1 Items 36.02, 39.01Ch-3 Item 7 ; Ch-5 Cl. 5.10 (Residential/Colony buildings, security barrack, store, transit camp, RE residence)	Tender stipulation (Vol-II): Civil scope includes officer/staff hostels, security barrack, transit camp, RE residence, store building, security booth, pump house. BOQ provision: New S/S: no residential/store/security buildings. 'G+4 Quarter', slow-sand filter, 35,000 L reservoir and 'steps from colony to CRB' are in the remote-end civil schedule. Fire extinguishers & lighting include 'Security Barrack, Guard room, Colony area, Store shed'. Observation: Location and extent of buildings are unclear. A G+4 quarter at an existing 132 kV bay-extension site is unusual.	Please confirm the list, location (new Umrangso GSS or existing Umrangso S/S), plinth area and drawings of all buildings in scope (quarters, security barrack, store, guard room).	**As per Drawing and BOQ**
92	Vol-II (Technical Specification) & BOQ – Sch-4 Item 5.01; Sch-1/3 Item 38.01Ch-17 Cl. 17.38 ; Ch-5 Cl. 5.22	Tender stipulation (Vol-II): Hydrant/HVWS system with pump house and water reservoir. BOQ provision: Sch-4 5.01: deep tubewell, fire water reservoir and pump house; Sch-1/3 38.01: hydrant system 'with pumping arrangement & associated civil works'. Observation: Fire water reservoir/pump-house civil works appear in two schedules.	Please clarify the split between Sch-4 Item 5.01 and Sch-1/3 Item 38.01 to avoid double pricing. Please also give the required fire-water storage capacity.	**As per Bid**
93	Vol-II (Technical Specification) & BOQ – Sch-9/10/11Ch-38, 400 kV line parameters Item 4 ; Ch-2 Cl. 2.6.11 (B)	Tender stipulation (Vol-II): 400 kV line: ACSR Moose, 'No. of conductor per phase: 2'. BOQ provision: Quad ACSR Moose (Sch-9 Items 3.01, 4.04, 9, 10). Observation: Tower design data are given for Twin Moose; line is Quad Moose.	Please confirm Quad Moose and issue tower design parameters (spans, tensions, clearances) for a 400 kV D/C Quad Moose line matching the existing Misa–Silchar line.	**Confirmed for Quad Moose**

94	Vol-II (Technical Specification) & BOQ – Sch-9 Items 9.01–9.02, 10.01–10.02Ch-38, 400 kV line Item 9 ; Ch-44 Quad hardware	Tender stipulation (Vol-II): Insulators: suspension 120 kN (14 discs), tension 160 kN (15 discs). Quad hardware: suspension double-I 240 kN; quad tension 640 kN (4 x 160 kN). BOQ provision: Discs: 210 kN – 4,050 Nos.; 320 kN – 7,400 Nos. Hardware: double suspension (pilot) '210x2 kN' – 14 sets; double tension '160X4 kN' – 24 sets. Observation: (a) Disc ratings (210/320 kN) don't match spec (120/160 kN) or the hardware ratings in the same schedule. (b) 38 string sets need about 3,100 discs (at 23–25 discs/string), not 11,450.	Please confirm the insulator type (porcelain disc/long-rod/composite), EMS rating, number of discs per string, and corrected quantities of discs and hardware for the LILO.	**1. Porcelain Disc insulator as per BOQ** **2. Suspension-24 nos, tension-25 nos** **3. EMS ratings, quantities as per revised BOQ**
95	Vol-II (Technical Specification) & BOQ – Sch-9 Items 6.01, 7.xCh-38, 400 kV line Item 5 ('No. of earth wire: 2 – GS 7/4 mm, OPGW')	Tender stipulation (Vol-II): Two earth wires: galvanised steel 7/4 mm and OPGW. BOQ provision: 96F OPGW – 4 km; no GS earthwire or earthwire hardware. Observation: GS earthwire and its suspension/tension clamps and dampers are missing, or BOQ assumes 2 OPGWs.	Please confirm the earthwire configuration (1 OPGW + 1 GS earthwire, or 2 OPGW) and add GS earthwire items if required.	**Two OPGW**
96	Vol-II (Technical Specification) & BOQ – Sch-9/10 Item 3.01 (ACSR Moose 55 km); Sch-11 Items 1.01–1.02, 6.01 (2 route km)Ch-2, Cl. 2.6.11 (B)	Tender stipulation (Vol-II): Only line named for LILO: 'D/C LILO of 400kV Misa–Silchar D/c (Quad Moose) line at Umrangso'. No route length or LILO point given. BOQ provision: Survey and stringing: 2 route km; 4 towers. Observation: An existing 400 kV line runs about 1–2 km from the proposed site. Vol-II does not confirm whether this is the Misa–Silchar line or another 400 kV line (e.g. a line towards Nagaland/Tripura), nor where the LILO point is.	Please confirm (a) that the existing 400 kV line about 1–2 km from the site is the Misa–Silchar D/C line to be LILOed, (b) the LILO tapping point (tower number) and route length of each LILO leg, and (c) whether 2 route km in the BOQ covers both D/C legs.	**Refer updated tower schedule**
97	Vol-II (Technical Specification) & BOQ – Sch-9 Items 1.01–1.02; Sch-11 Items 2.01–2.02, 4.01–4.02Ch-38, Cl. 38.1.2.2 Type of Towers	Tender stipulation (Vol-II): Standard tower types A/B/C/D with deviation limits. BOQ provision: Only DD+3 (186.08 MT, 2 Nos.) and DD+6 (121.04 MT, 2 Nos.). Foundation concrete: DD+3 372.57 m³, DD+6 186.26 m³. Route length 2 km. Observation: (a) 'DD' type is not defined in Vol-II. (b) DD+6 (taller) is lighter and has half the concrete of DD+3, which is illogical. (c) LILO of a D/C line normally needs two D/C lines (4 circuits); 4 towers over 2 route-km seems insufficient.	Please confirm the LILO configuration (number of D/C lines, route length per line), tower types/extensions, and unit weights & concrete quantities.	**400kV D/C LILO to be considered as per BoQ and TS**
98	Vol-II (Technical Specification) & BOQ – Sch-9 Items 4.01, 4.04, 4.05Ch-44 (spacer and damper particulars for twin bundle only) (Pg. 905+)	Tender stipulation (Vol-II): Vibration damper and bundle spacer GTPs are given only 'for twin bundle conductor line'. BOQ provision: Stock-bridge vibration dampers 900 Nos.; bundle spacers (Quad) 175; rigid jumper spacers 90. Observation: No spec for quad spacer/spacer-damper; 900 dampers for ~2 route-km looks high. Quad lines usually use spacer-dampers.	Please issue the specification for quad spacer-dampers/rigid spacers, and confirm the quantity and type of vibration dampers.	**During detail engineering**
99	Vol-II (Technical Specification) & BOQ – Sch-9/12 Item 1 (supply); Sch-11/14 Item 8.01 (erection)Ch-38, Cl. 38.1.17.5	Tender stipulation (Vol-II): Painted parts: two coats primer + aluminium paint. BOQ provision: Supply: 'black bituminous paint… three coats up to 500 mm above the coping'. Erection: 'bituminous paint up to 5 metres from ground level'. Observation: Painting height differs between supply (0.5 m above coping) and erection (5 m) items. Spec calls for aluminium paint.	Please confirm painting requirement (type of paint, height) and the schedule under which it is paid.	**As per Bid. It is paid under Erection Schedule**
100	Vol-II (Technical Specification) & BOQ – Sch-11, Sch-14 – no benching/revetment/pile itemCh-39, Cl. 39.2.9, 39.2.10	Tender stipulation (Vol-II): Benching 'at no extra cost' but 'volume… approved for payment'; revetment unit rates 'quoted in price schedule', quantities provisional. BOQ provision: No item for benching, revetment, breast wall or tower pile foundation. Observation: Hilly terrain in Dima Hasao will need benching/revetment; spec contradicts itself on payment and BOQ has no items.	Please add BOQ items for benching (m³), RRM revetment (m³), and special/pile foundations for towers, or confirm they are deemed included in foundation rates.	**Any incidental item shall be included in the foundation rate**
101	Vol-II (Technical Specification) & BOQ – Sch-14 Items 1.01–1.02, 6.01, 9.01 (3 route km); Sch-12/13 Item 3.01 (AAAC 25 km), 6.01 (OPGW 5 km)Ch-2, Cl. 2.6.11 (B) ; Ch-29 Cl. 29.7.0 ; Ch-47	Tender stipulation (Vol-II): 'Construction of 132kV Umrangso–Umrangso (Existing) D/c (Single Panther) line along with PLCC and OPGW link' – no route length given. Ch-29: route lengths 'as specified in appendices/BoQ'; price adjusted after survey. BOQ provision: Survey, stringing and OPGW stringing: 3 route km. Conductor 25 km; OPGW 5 km. Observation: Line length is not stated in Vol-II and has to be inferred from the BOQ (3 route km). Conductor 25 km is about 35% more than a 3 km D/C single-conductor line needs (3 × 6 × 1.03 ≈ 18.5 km). If the existing substation is next to the new site, a 3 km line may not be needed at all.	Please confirm (a) the route length of the 132 kV Umrangso (New)–Umrangso (Existing) D/C line and the location of the existing substation relative to the new site, (b) that 3 route km in Sch-14 is the bid basis, with quantities adjusted on the surveyed length, and (c) the basis of 25 km conductor and 5 km OPGW for this length.	**Refer tower schedule**
102	Vol-II (Technical Specification) & BOQ – Sch-12 Item 3.01 (AAAC); Sch-14 Item 6 ('Stringing of ACSR'); Sch-5/6/7 Items 3.01–3.04, 4.01; Sch-1 Item 3.04Ch-38, 132 kV line Item 4 (AAAC Panther 37/3.15) ; Ch-2 Cl. 2.6.11 (B) ('Single Panther')	Tender stipulation (Vol-II): 132 kV line conductor: AAAC Panther, single per phase. BOQ provision: Line: AAAC Panther 25 km. Remote end: 'ACSR Panther' 3,000 m and strings for 'Twin Panther' (Items 3.01, 3.02). New S/S: strings for 'Single AAAC Panther'. Observation: Conductor material (AAAC vs ACSR) and bundle (single vs twin) are inconsistent between line, remote end and new S/S schedules.	Please confirm conductor as AAAC Panther single for line and gantry spans, and correct remote-end conductor and string descriptions.	**AAAC Panther**

103	Vol-II (Technical Specification) & BOQ – Sch-12 Items 1.01–1.07, 9.01–9.02, 10.01–10.03Ch-38, 132 kV line Item 9 ; Ch-38 Cl. 38.1.2.2 (tower types)	Tender stipulation (Vol-II): Insulators: suspension 90 kN (9 discs), tension 120 kN (10 discs). Tower types A/B/C/D. BOQ provision: Discs 70 kN (600) and 90 kN (2,600). Hardware: 65 single suspension (pilot) + 60 double tension + 200 single tension sets. Towers: B+6, DD+0, DD+3, DD+12, '220 kV DD+12', '220 kV DD+18', 132 kV crossing gantry (16 stub sets). Observation: (a) EMS ratings differ from spec. (b) 16 D/C towers allow at most ~192 tension strings; BOQ has 320. (c) Use of 220 kV towers on a 132 kV line and the crossing gantry are not explained.	Please confirm EMS ratings, string quantities and the purpose/design basis of the 220 kV DD towers and the 132 kV crossing gantry (what is being crossed?).	**1. EMS rating- as per BOQ 2. As per BOQ 3. As per BOQ and uploaded tower schedule due to higher wind span**
104	Vol-II (Technical Specification) & BOQ – Sch-12 Items 6.01, 6.02, 8.01, 8.02; Sch-14 Items 10.01, 11.01–11.02Ch-47 OPGW; Ch-38 132 kV Item 5	Tender stipulation (Vol-II): OPGW and approach cable with identical fibres. BOQ provision: 48F OPGW, but approach cable described '48 Fibre… (DWSM96F)', FODP 96F and 'installation hardware for 96 Fibre'. Observation: Fibre count is inconsistent (48 vs 96).	Please confirm fibre count for the 132 kV OPGW, approach cable and FODP.	**For 400kV TL: 96F OPGW For 132kV TL: 48F OPGW**
105	Vol-II (Technical Specification) & BOQ – Sch-12 Items 5.01–5.03; Sch-14 Items 3.01, 7.01, 8.01; Sch-9 5.x / Sch-11 7.xCh-39 (tower earthing)	Tender stipulation (Vol-II): Tower earthing: pipe/counterpoise per tower. BOQ provision: 132 kV: 16 stub sets & 16 towers painted, but grounding for 20 towers and counterpoise 20. 400 kV: 4 towers, 12 pipe electrodes, 4 counterpoise. Observation: Number of towers is inconsistent across items.	Please confirm the number of towers per line and the earthing type (pipe/counterpoise) per tower.	**Refer tower schedule**
106	Vol-II (Technical Specification) & BOQ – Sch-1 Items 32, 33 (LT power & control cables); Sch-3Ch-2, Cl. 2.6.1–2.6.4 (turnkey)	Tender stipulation (Vol-II): Complete cabling for the substation, including future-bay provisions in the building. BOQ provision: Control cable 41 km and LT power cable about 21 km for a 15-bay 400 kV GIS + 9-bay 132 kV AIS substation; no separate item for cable trays/racks in GIS building. Observation: The erection schedule has no separate cable laying/tray item.	Please confirm that cable laying, termination and cable trays/racks inside the GIS building are included in the respective equipment erection items, or add separate items.	**Cable laying and trays included with equipment. Cable trench and trays inside GIS building included with building itself.**
107	BOQ	3- Ø 400 kV, 4000 A, 63 kA-3 sec, metal enclosed SF6 Gas Insulated Switchgear - Line bay Module as per technical specification	We understand there is no requirement of PIR for Line Bays.Kindly confirm our understanding.	**Confirmed**
108	BOQ	400kV, 63kA for 3 sec, SF6 Gas Insulated Bus Duct (GIB) single phase from respective GIS bay module up to SF6 to Air bushings including required support structures, jointing elements and other accessories for Transformer bays, line bays and bus reactor bays as per site requirement. (for both indoor and outdoor of GIS)	We request to provide the AutoCAD copy indicating the clear location of Line Gantries and Power transfer to estimate the exact busduct length.	**Refer layout drawing**
109	GIS Specifications16.4.7	100 micro-meter or smaller sintered stainless-steel particle filtered disc shall be provided in gas filling port.	Gas filling shall be done using particle filter, hence we do not envisage such filter. However separate filter unit can be used with supplied filling ports during gas handling in future.	**As per bid**
110	GIS Specifications16.4.9	Continuous bus length without segregation shall not be acceptable for any voltage level.	Please note that, proposed busbar design is passive. We meet the requirement of service continuity, maintenance & repair without provision of any barrier in busbar. In addition to that by putting additional gas compartment/ barrier in busbar we are indirectly increasing gas leakage points in GIS. This type of passive non segregated busbar design is type tested as per IEC 62271-203 and accepted by various state & central utilities. hence we request your acceptance on this design.	**As per Bid**
111	GIS Specifications16.4.9	The devices shall provide continuous and online monitoring (Display at SAS) of the density of the gas.	Kindly confirm whether an output of 6-20mA from the density monitors will be required for the monitoring requirement.	**(6-20mA) output from Gas density monitors are required up to LCC panel along with all necessary arrangement/equipment for online Gas density monitoring through SAS**
112	GIS Specifications16.4.11.3	As minimum flexibility in the layout arrangement,it shall be possible to remove the circuit breaker with both bus bar remaining in service.	We infer the requirement call for withdrawl for CB interrupter during repair and maintenance and not the circuit breaker enclosure as it is not subjected to any faults	**As per bid**
113	GIS Specifications16.4.12	The material and thickness of the enclosures shall be such as to withstand an internal flashover without burns through for a period of 30ms at rated short time withstand current.	The Value shall be in line with the requirement of IEC 62271-203 Table 4. Request a concurrence on the same.	**As per Bid**
114	GIS Specifications16.4.14	Inspection windows (View Ports) shall be provided for Disconnect Switch and both type of earth switches i.e Maintenance and fast operating.Stroboscopic port shall also be provided.	View ports for DS & ES shall be provided. No stroboscopic port is available in market for GIS.Request your acceptance on the same.	**Accepted**
115	GIS Specifications16.4.17	In case the leakage under the specified conditions is found to be greater than 0.5% after one year of commissioning,the manufacturer will have to supply free of cost,the total gas requirement for subsequent ten (10) years,based on leakage observed during the first year of operation after commissioning.	We infer that an additional 10% extra gas shall be required to be supplied as spare to meet out any contigency requirements	**As per Bid**

116	GIS Specifications16.4.19	The switchgear when installed and operating under the ambient conditions shall perform satisfactorily and safely under all normal and fault conditions.Even repeated operations up to the permissible servicing intervals under 100% rated and fault conditions,shall not diminish the performance or significantly shorten the useful life of the switchgear.	The switchgear is equipped with all necessary arrangements for protection from any internal and external faults without deteriorating its performance below recommended level. However, it is requested to inform the manufacturer in the event of any abnormal condition during its operation, so that suitable solution can be given.	**As per Bid**
117	GIS Specifications16.4.24	To access the PT module suitable ladder shall be provided as necessary with grounding provision.		**As per Bid**
118	GIS Specifications16.4.35	In addition to above suitable portable scissor lift shall be provided for access of distant portion of GIS installation.		**As per BoQ**
119	GIS Specifications16.4.39	Any other alarm necessary to indicate deterioration of the gas insulating system.	Not applicable for offered GIS.Request your acceptance on the same.	**Accepted**
120	GIS Specifications16.4.39	The ambient temperature varies between 0 degree-C and 50 degree-C.	At Ambient temperature of 55 Deg C. for outdoor and 50 deg C for indoor application,there shall be derating as per IEC 62271-203.The derating value shall be communicated during detail engineering.	**As per Bid**
121	GIS Specifications16.4.43.2	The contractor shall supply the entire material for grounding bus of GIS viz conductor, clamps, joints, operating and safety platforms etc. The contractor is also required to supply all the earthing conductors and associated hardware material for connecting all GIS equipment, bus ducts, enclosures, control cabinets, supporting structure, GIS surge arrestor etc. to the ground bus of GIS.		**As per Bid**
122	GIS Specifications16.4.43.3	The enclosure of the GIS may be grounded at several points so that there shall be grounded cage around all the live parts. A minimum of two nos. of grounding connections should be provided for each of circuit breaker, current transformers, voltage transformers, cable terminals, surge arrestors, earth switches and at each end of the bus bars.	GIS shall meet earthing requirements as per relevant IEEE publication.	**During detail engineering**
123	GIS Specifications16.4.43.6	Equipotential Earthmat		**EPC/OEM scope**
124	GIS Specifications16.4.49	Maximum weight of gas in a gas tight section of GIB shall not exceed 400 Kg (for 400 kV)/ 250 Kg (for 220 kV & 132 kV).	The Gas quantities shall be in line with manufacturer standard type tested design suitable form GIS operation at site	**As per Bid**
125	GIS Specifications16.4.50	The arrangement of gas sections or compartments shall be such as to facilitate future extension of any make without any drilling, cutting or welding on the existing equipment. To add equipment, it shall not be necessary to move or dislocate the existing switchgearbays.	We confirm the provision for future extension is available in the offered 400kV/220kV GIS meeting functional requirement of service continuity.We understand that any requirement of design and supply of interface module along with the associated hardware etc. as per tender shall be part of OEM performing future extension. Thus, any interface module supply is excluded from GIS OEM scope.	**End Piece (Interface) module with the test link for Future extension shall be in scope of present GIS OEM**
126	GIS Specifications16.4.52	DOCUMENTATION : vi. GIS Component Drawings	Being intellectual property, manufacturing drawings can not be shared.	**During detail engineering**
127	GIS Specifications16.4.52	Capacity calculation of EOT crane for GIS hall considering a factor of safety of 5		**As per Bid**
128	GIS Specifications16.5.1.2	Pre insertion resister: 400 kV circuit breakers for line bay (as per the provisions of bid proposal sheet) shall be provided with single step pre insertion closing resistors (wherever the requirement of PIR is explicitly specified so) to limit the switching surges to a value of less than 2.3 p.u for 400kV. PIR contacts should open immediately after closing of main contacts or At least 5 ms prior to opening of main contacts at rated air/gas pressure where the PIR contacts remain closed.	As per BOQ,we understand there is no requirement of PIR for Line Bays.Kindly confirm our understanding.	**Confirmed**
129	GIS Specifications16.5.1.7.4	The breaker should be able to withstand all dielectric stresses imposed on it in open condition at lockout pressure continuously (i.e. 2 p.u. power frequency voltage across the breaker continuously)	The breaker should be able to withstand all dielectric stresses imposed on it in open condition at lockout pressure continuously (i.e. 2 p.u. power frequency voltage across the breaker for a specified period of time)	**As per Bid**
130	GIS Specifications16.5.1.14.2.19	DISCONNECTORS (ISOLATORS) The mechanical endurance class shall be M2 as per IEC for 400kV, 220 kV and 132kV disconnectors. Electrical endurance class shall be E2.	Mechanical endurance class shall be M2. however, electrical endurance class E2 is not applicable for disconnector switch.	**As per type tested design**
131	GIS Specifications16.5.1.14.2.22	The degree of protection for the Drive Mechanism box of disconnector shall be IP55.	Considering Indoor requirement, IP4X class shall be sufficient. Please accept the same.	**As per Bid**
132	GIS Specifications16.5.1.15.10	The safety grounding switches shall conform to the requirements of IEC- 62271- 102 and shall have electrical endurance class: E2 & shall have mechanical endurance class M2 for 400 kV/220/132 kV voltage level..	Mechanical endurance class shall be M2. however, electrical endurance class shall be E0 for maintenance earth switch in line with IEC and type test report.	**As per type tested design**
133	GIS Specifications16.5.1.15.15	The degree of protection of the Drive Mechanism box of maintenance earth switch shall be IP55.	Considering Indoor requirement, IP4X class shall be sufficient. Please accept the same.	**As per Bid**
134	GIS Specifications16.5.1.3	HIGH SPEED MAKE PROOF GROUNDING SWITCHES These shall confirm to class F and electrical endurance class E2 and mechanical endurance class M2.	Electrical endurance class shall be E1 and mechanical endurance class M1 for high speed earth switch in line with IEC and type test report which is in line with tender GTP.	**As per type tested design**
135	GIS Specifications16.5.1.18.2	Insulation co-ordination and selection of surge arrestor		**EPC/OEM scope**
136	GIS Specifications16.5.1.22.2.1	Minimum degree of protection of enclosure of LCC shall be IP55	Considering Indoor requirement, IP4X class shall be sufficient. Please accept the same.	**As per Bid**
137	GIS Specifications16.5.1.23.1	The core insulation and outer sheath of cable shall be of halogen-free special polymer.	Request to accept FRLS cables for cabling of LCC panel and GIS equipments.	**As per Bid**

138	GIS Specifications16.5.1.25.12.15	Crane Power Supply		**Shall be from Main ACDB**
139	GIS Specifications16.10	All transport packages containing critical units viz Circuit breakers and Voltage transformers shall be provided with sufficient number of impact recorders (on returnable basis) during transportation to measure the magnitude and duration of the impact in all three directions. In case of electronic impact recorder, the recording shall commence in the factory and must continue till the units reach site. The data of electronic impact recorders shall be downloaded at site and a soft copy of it shall be handed over to Engineer	GIS modules are rigidly build and does not gets affected by transportation vibrations. Large modules are shipped by splitting into small parts to reduce mechanical stress during transport. However, mechanical type shock indicators shall be provided for critical items like CB, CT, VT. Request your acceptance on the same.	**As per Bid**
140	GIS Specifications16.14	TESTING & MAINTENACE EQUIPMENT		**As per BoQ**
141	GIS Specifications 16.16.11	Special Tools		**As per BoQ**
142	General	CT VT Parameters	Kindly share the complete CT VT paramaters.	**Refer Chapter-2 of Volume-II "Information to Bidders"**
143	General	Gas SLD and Plan Layout	Kindly share the complete SLD and Layout.	**Refer SLD and Layout**
144	Bid Data Sheet	Joint Venture Provision is presently indicated as “Not Applicable.”	permit participation of Joint Venture”.	**Refer to Addendum-I, Sl. No.: 01**
145	Section IV – Evaluation and Qualification Criteria, Clause 4.2.1(a) – Contracts of Similar Size and Nature & 4.2.1(b) - Experience in Key Activities and Clause 4.2.2 (a) - Historical Financial Performance, Clause 4.2.2 (b) - Average Annual Turnover & Clause 4.2.2 (c) Financial Resources.	Clause 4.2.1(a) and 4.2.1(b) requiring the complete Technical Qualification to be met by a single entity	permit collective/cumulative fulfillment of the Technical & Financial Qualification by the JV Partners, wherein the required qualification may be met by the Lead Partner and/or the other JV Partner(s), as applicable.	**As per Bid**
146	Bid Security, Performance Security, Advance Payment Security, GIS Support Guarantee Clauses	Bank Guarantee stipulated	Kindly permit submission of Insurance Surety Bond issued by IRDAI-approved insurers in lieu of Bank Guarantee for EMD, Performance Security, Advance Payment Security and GIS Support Guarantee. In line with Government of India initiatives and banking limits of financial institutions promoting Surety Bonds as an alternative financial security instrument, thereby reducing pressure on banking limits and enhancing project execution capability.	**Refer to Sl. No.: 150**
147	ITB Clause 2.14.3 and SCC Contract Price Provisions	Contract price to remain Firm	Kindly allow Price Variation / Price Adjustment mechanism for major equipment, materials and works instead of firm price basis. Considering the long execution period and volatility in prices of transformers, GIS equipment, EHV Cables, steel, aluminium, copper and other commodities, price adjustment is necessary for realistic and competitive participation.	**As per Bid**
148	Completion Schedule	Completion Period: 24 Months	Kindly revise the contract completion period from 24 Months to 30 Months. Manufacturing, testing and delivery/lead times of EHV transformers and associated materials presently exceed normal schedules and completion within 24 months may not be practical.	**Completion Period: 24 Months**
149	Civil & Geotechnical Data	Soil data not available in tender documents	Kindly provide Soil Investigation Report, Geotechnical Investigation Report and SBC (Safe Bearing Capacity) Report for the project site.	**The soil investigation is currently under progress. The Soil Investigation Report, shall be provided by AEGCL as early as possible, allowing the Bidders sufficient time to prepare and submit their bids.**
150	Section III-BDS_Cl.No. 2.20.1	Bidder shall furnish a Bid security in the amount of 11.2 Crores (Rupees Eleven Crore Twenty Lakh only.) in the in the form of Bank Guarantee/DD/FIXED DEPOSIT from Nationalised Bank (India)in favour of ASSAM ELECTRICITY GRID CORPORATION LIMITED, AEGCL payable at Guwahati, Assam.	As per Amendment to the General Financial Rule (GFR), 2017 issued by Ministry of finance, EMD/Bid Security can be submitted in the form of Insurance Surety Bonds and the same is accepted by most of the Public sector Organizations like NHAI, NHIDCL, BRO, MORTH, NHPC, NPCIL etc. Hence, we request to kindly accept to submit the EMD/Bid Security in form of Insurance Surety Bond also. Further, we request to provide the format for the same.	**The Bid Security shall be furnished strictly in accordance with the provisions of the Bid Document. Only Bank Guarantee (BG) and online payment are acceptable modes of submission of Bid Security. Submission of Bid Security in the form of an Insurance Surety Bond shall not be permitted. Accordingly, no separate format for an Insurance Surety Bond shall be provided.**

151	Section VI-Bidding forms_Format-B3_Bank Guarantee (Bid Security)	EMD Bank Guarantee -Stamp duty	We request to kindly confirm the stamp paper value for execution of Bid Security Bank Guarantee. We request to kindly Provide the AEGCL Bank account details for the confirmation of EMD BG to the client through SFMS (Structured Finance Messaging System)	**The Bid Security Bank Guarantee shall be executed on stamp paper of ₹100/- or as per the applicable bank guidelines, whichever is applicable. Bank details is Provided below with this document**
152	General	Assam Electricity Grid Corporation Limited (AEGCL) - Bank Account Details	Kindly provide the the follwing details of 1.Name of the Bank, 2. Bank Account Number 3. IFSC Code	**Provided below with this document**
153	Section III-BDS_Cl.No. 2.13.2 & 2.13.3	Section III - BDS_Cl.no. 2.13.2 & 2.13.3: The Tenderer (for single as well as Joint venture entity) shall submit with its tender the following additional documents: i. Valid Electrical license issued by the Authority anywhere in India. ii. Manufacturer's Authorization iii. Technical Compliance. iv. Undertaking between the GIS Manufacturer and authorised agents in India to provide service facility as per clause V of 4.2.1(c)(Subcontractor GIS) of section IV (Evaluation and Qualification requirement) vii. Undertaking by the contractor to supply spare parts for a period of 10 years. viii. Self-Undertaking for Payment of all Statutory Taxes and up to date Return Acknowledgement Receipt (online copy) issued by GSTIN Authority.	As per the said clause, the Technical Compliance need to be submitted as an additional Documents. In this regard, we request to kindly confirm which are all the documents need to be submitted against Technical Compliance or only GTP's of major equipments are required to be submitted. Please confirm.	**The requirement for submission of "Technical Compliance" as mentioned in the said clause is not applicable to the bidder. However, the bidder shall submit the other documents specified in the Bid Document, including GTPs of major equipment, Manufacturer's Authorization (MA), and the required undertakings, as applicable.**
154	Bid Volume-II, Transformer Specification As per Annexure - A.1.1.0 (S1.no.1.10) Technical Particulars / Parameters of Transformer.	Tap Changes (OLTC): +10% to -10% in steps of 1.25% of IV voltage variation using variable fulx variation concept.	Our Manufacturer would like to provide HV Voltage variation instead of IV Voltage variation to enable to submit Short Circuit comparision. Please Confirm.	**As per CEA's "Standard Specifications and Technical Parameters for Transformers and Reactors (66kV and Above Voltage Class)**
155	Bid Volume-II, Transformer Specification As per Annexure - A.1.1.0 (Sl.no.1.25) Technical Paxticulaxs / Patametets of Transfoxmex.	Losses : No—Load Loss — 75 CW Load Loss — 440 IAW Auxiliary Loss — 10 IAW	Our Manufacturer would like to provide transformer losses as below. Which are as per CEA Guidelines. Losses : No—Load Loss — 100 IAW Load Loss — 470 IAW Auxiliary Loss — 11 KW Please Confirm.	**As per CEA's "Standard Specifications and Technical Parameters for Transformers and Reactors (66kV and Above Voltage Class)**
156	Price Schedule	LT control cable and LT power cable	We observe that the supply of LT Power and Control Cables is provided under the Supply BOQ. Further, cable laying and termination are mentioned within certain ETC items of BOQ for specific equipment only. Kindly clarify whether laying, dressing, glanding and termination of all LT Power and Control Cables supplied under the Supply BOQ are deemed included in the respective ETC items of BOQ, and that no separate payment shall be made for these activities. Alternatively, please specify the applicable BOQ item under which these works are to be quoted.	**ETC of LT Power, control cables and accessories to be included with respective euipments**
157	CHAPTER 9: TECHNICAL SPECIFICATIONS OF CONTROL AND POWER CABLE	POWER & CONTROL CABLES	We observe that separate technical requirements for power and control cables have been provided under Chapter 9 and Annexure-M, and certain requirements pertaining to cable construction and materials appear to differ between the two specifications. Kindly clarify which specification shall govern the design, manufacture, testing, and supply of power and control cables in case of any conflict between Chapter 9 and Annexure-M.	**During detail engineering**
158	CHAPTER 9: TECHNICAL SPECIFICATIONS OF CONTROL AND POWER CABLE	POWER & CONTROL CABLES	Clause 9.3.2 of Chapter 9 stipulates supply on steel cable drums. Kindly confirm whether cables are required to be supplied exclusively on non-returnable steel drums or whether wooden drums shall also be acceptable.	**As per Bid**

159	CHAPTER 9: TECHNICAL SPECIFICATIONS OF CONTROL AND POWER CABLE	POWER & CONTROL CABLES	Clause 9.15 of Chapter 9 specifies preferred make of XLPE compound as Dow/Borealis. Kindly confirm whether this requirement is applicable only for HT/EHV XLPE cables or whether the same shall also be applicable for LT power and control cables.	**As per Bid**
160	CHAPTER 9: TECHNICAL SPECIFICATIONS OF CONTROL AND POWER CABLE	POWER & CONTROL CABLES	We understand that the specification requires type testing on four randomly selected cable drums irrespective of the availability of valid type test certificates. Kindly confirm whether the mandatory type testing on four cable drums shall be carried out at the Contractor's cost. Further, please clarify whether any separate payment/reimbursement shall be made for testing, witnessing, and associated expenses.	**As per BoQ**
161	CHAPTER 9: TECHNICAL SPECIFICATIONS OF CONTROL AND POWER CABLE	POWER & CONTROL CABLES	The specification requires type testing on four randomly selected cable drums. Kindly confirm whether this requirement is applicable to all cable types and sizes covered under the contract or only to selected cable categories/sizes to be identified during detailed engineering.	**During detail engineering**

ভারতীয় স্টেট বেংক
নিউ গুৱাহাটী
জিলা - কামৰূপ
গুৱাহাটী - ৭৮১০২১
অসম ৰাজ্য

भारतीय स्टेट बैंक
न्यू गुवाहाटी
जिला - कामरूप
गुवाहाटी - 781021
असम

State Bank of India
New Guwahati (0221)
Dist : Kamrup
Guwahati-781021
Assam

नं. / क्रमांक /No

तारिख / दिनांक/ Date :

Date. 10/05/2018

TO WHOM IT MAY CONCERN

This is to certify that Managing Director, ASSAM ELETRICITY GRID CORPORATION LIMITED (AEGCL) is operating its Principal Account with us in the name of "ASSAM ELETRICITY GRID PRIN AC"

The detail of Bank Account is as follows:

Name Of Bank	:	STATE BANK OF INDIA
Branch Name	:	NEW GUWAHATI BRANCH (BAMUNIMAIDAM)
Branch Code	:	00221
Account No	:	10566984188
Account Type	:	Current Account
IFSC Code	:	SBIN0000221
Name Of Account	:	ASSAM ELETRICITY GRID PRIN AC

STATE BANK OF INDIA NEW GUWAHATI

Assistant General Manager.
State Bank of India
New Guwahati Branch
Bamunimaidan,
Guwahati 781021

1. Technical Specifications of Phasor Measurement Unit (PMU)

1.1 Phasor Measurement Unit

Substations and generating stations are generally equipped with Current Transformers (CTs) for each bay in the switchyard, along with Capacitive Voltage Transformers/Potential Transformers (CVTs/PTs) provided in each transmission line bay and on each bus. Typically, CTs are designed with one metering core and four protection cores, while CVTS are provided with three cores for metering and protection purposes.

The Phasor Measurement Units (PMUs) offered shall be connected to the available CT and CVT cores, and they shall be suitable for measurement from both metering and protection cores. The specific cores to be utilized for PMU connections shall be finalized during the detailed engineering stage.

The Phasor Measurement Units (PMUs) to be supplied under this specification shall be installed at designated Substations and Power Stations. Each PMU shall communicate with the Phasor Data Concentrator (PDC), which is to be supplied by the bidder and installed at the SLDC/NERLDC, in compliance with the IEEE C37.118.1-2011, IEEE C37.118.2-2011, IEEE C37.118.1a-2014, or IEC/IEEE 60255-118-1:2018 standards (including all subsequent amendments). Preference shall be given to PMUs conforming to IEC/IEEE 60255-118-1:2018.
The supplied PMUs shall be mounted within the panels provided by the bidder. All associated hardware, including panels, accessories, and cabling required for proper installation and operation, shall also be provided by the bidder.

The PMUs shall be compatible with secure IEC 60870-5-104 and IEC 61850 communication protocols. The CCU/PDC shall be capable of issuing islanding commands to the PMUs using IEC 61850 R-GOOSE or secure IEC 60870-5-104, and shall also report the required data points to the SLDC/NERLDC SCADA over secure IEC 60870-5-104. The successful demonstration of this functionality shall be carried out by the bidder during Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT).

The PMUs shall be designed for continuous operation in utility-grade environments and shall comply with the standards, protocols, and performance criteria specified herein.

1.1.1 General Requirements

The offered PMUs shall be supplied as complete systems suitable for installation at substations or power plants. They shall be capable of seamless communication with the CCU/PDC located at the SLDC/NERLDC. All required cables, connectors, and installation hardware shall be provided by the bidder. As a general practice, the PMUs shall be installed near the control and relay panels, with CT/PT and CVT connections extended from these panels.

1.1.2 Communication Interfaces

For integration with the PDC/CCU, each PMU shall be equipped with at least two (02) Ethernet port of 10/100 Base-Tx and two (02) optical fibre port of 100 Mbps. The optical ports should support both single mode and multiple modes. These ports shall support streaming of data in

UDP/IP multicast or unicast and TCP/IP modes in compliance with IEEE C37.118. The Ethernet port shall allow direct connection to the substation communication equipment, and the PMU shall also be capable of reporting data over TCP/IP also.

1.1.3 Data Reporting Capability

The PMU shall be capable of synchro-phasor reporting to a minimum of four (04) clients over TCP and at least four (04) clients over UDP in multicast or unicast mode. The device shall be capable of transmitting data both in multicast and unicast configurations as required by the system operator. The PMU must primarily report data via its proprietary protocol along with the other protocols mentioned in the document.

1.1.4 Power Supply

The PMUs shall be suitable for operation on unearthed DC supplies of 220 V, 110 V, or 48 V with an operating tolerance of +10% and -15%. In addition, the PMUs shall also be capable of operating on an AC auxiliary supply of 230 V, 50 Hz (±10%). The bidder shall ensure that the supplied units can operate reliably with any of the available supply voltages at the substation.

1.1.5 Reporting Rate

The PMUs shall support user-selectable synchro-phasor reporting rates of 50 frames per second, or higher, for a 50 Hz system. PMUs with higher reporting rates shall be given preference. All hardware and software supplied shall be adequately sized to support the maximum reporting rate offered by the device.

1.1.6 Protocol Support

The PMUs shall support multiple protocols to ensure interoperability with CCU and SCADA systems. These shall include:

- Routable GOOSE (R-GOOSE) and IEC 61850-90-5,
- IEEE C37.118.2-2011 (Communication), IEEE C37.118.1-2011 with Amendment IEEE C37.118.1a-2014 (Measurement), or IEC/IEEE 60255-118-1:2018 (preferred),
- IEC 61850 Editions 1 and 2,
- IEC 60870-5-104 Client and Server protocols with secure implementation in compliance with IEC 62351-5 and IEC 62351-3 to ensure authentication, encryption, and integrity of communications.
- IEEE 1588 PTP or SNTP/NTP or IRIG-B for precise time synchronization.

1.1.7 Measurement Capabilities

Each PMU shall be capable of measuring and reporting three (03)-phase voltage phasors (magnitude and angle), three (03)-phase current phasors (magnitude and angle), positive sequence voltage and current (magnitude and angle), breaker status, main protection status, frequency, rate of change of frequency (ROCOF), and analog quantities such as MW and MVAr. Measurement coverage shall be provided for a minimum of three (03) bays per PMU as specified in the Bill of Quantities.

1.1.8 Time Synchronization

The PMU shall be supplied with a GNSS & NaVIC receiver for accurate time synchronization. The internal PMU clock shall be synchronized with the GNSS & NaVIC clock and revert to an internal oscillator with stability of at least 1 ppm upon loss of GNSS & NaVIC signal. The PMU shall generate an alarm in the event of GNSS signal loss, and the alarm shall be transmitted to the PDC. The PMU shall maintain TVE, frequency error, and ROCOF within the limits specified in IEEE C37.118 and its amendments. The PMU shall also time synchronise with control centre's clock over NTP for time synchronization, in case of failure of GNSS & NaVIC.

1.1.9 Protection and Monitoring Functions

The PMU shall include continuous self-monitoring and diagnostic features capable of detecting and reporting internal faults or abnormal conditions. All alarms shall be displayed locally and reported to the PDC, with status indications provided on the PMU front panel.

1.1.10 Configuration and display

The PMU shall support Configuration Frames 2 and 3. A local display, embedded in PMU, shall be provided to display measured voltages, currents, frequency, active, reactive, and apparent power, power factor, primary and secondary phasors, positive, negative, and zero-sequence values, and breaker and protection status. Remote configuration via PDC/CCU over the same communication channel used for reporting shall be supported.

Alternatively portable configuration device for configuring the PMUs can be provided. Testing & configuration accessories such as test switches, connectors, hardware and software shall be also supplied.

1.1.11 Cybersecurity and NMS compatibility

The PMU shall incorporate robust cybersecurity features. Access shall be role-based and password-protected, with logs maintained for all access attempts. Configuration changes shall require authorized access, and all such changes shall be logged and reported to the PDC/CCU. The PMU shall be protected from external threats including malware and spam. Compliance with IEC 62351 or equivalent cybersecurity standards shall be ensured, and secure firmware upgrades shall be supported.

The PMUs shall support network monitoring by the NMS for device availability and health supervision. The PMU shall expose parameters such as device status, communication port status, CPU and memory utilization, and internal alarms via standard protocols including ICMP, SNMP, and Syslog. This information shall be used exclusively for device monitoring in the NMS.

1.1.12 Data Streaming

The PMU shall support multiple independent data streams. Each stream shall be individually configurable with respect to contents, reporting rate, class of service (P or M), communication mode (TCP/UDP), and destination IDCODE.

1.1.13 Performance Classes

The PMUs shall meet the requirements of both P-Class and M-Class performance as specified in IEEE C37.118.1-2011, IEEE C37.118.1a-2014, or IEC/IEEE 60255-118-1:2018. The reporting class shall be user-selectable. Certified test reports demonstrating compliance with both classes shall be submitted by the bidder.

1.1.14 Accuracy and Frequency Range

The PMUs shall measure electrical parameters with specified accuracy in the frequency range of 48 Hz to 52 Hz, in accordance with IEEE C37.118.1 standards. Data shall remain available outside this band, and the PMU shall ensure that the effect of frequency deviations on measurement accuracy remains within the permissible limits of the applicable standards.

1.1.15 Environmental and Reliability Requirements

The PMU shall be suitable for continuous operation in utility environments with an ambient temperature range of -10 °C to +60 °C and relative humidity up to 95% non-condensing. The design shall comply with IEC 60068 standards for temperature, humidity, and vibration testing, as well as IEC 61000 for EMC/EMI compliance. The PMU shall withstand seismic conditions in line with IEEE 693 or equivalent. The design shall target a minimum MTBF of 100,000 hours, and hot-swappable modules or redundant designs shall be preferred.

1.1.16 Redundancy and Latency

The PMU shall support redundant communication paths over Ethernet and fiber. Dual redundant AC/DC power supply inputs shall be provided. End-to-end latency shall not exceed 20 ms for P-Class operation at 50 fps, in compliance with IEEE C37.118.

1.1.17 Interoperability and Testing

The PMUs shall be interoperable with PDCs and SCADA systems of multiple vendors. The bidder shall demonstrate interoperability and compliance with all functional requirements during Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT). All features specified in this document shall be successfully validated during FAT and SAT.

1.1.18 Documentation

The bidder shall provide comprehensive documentation to establish compliance with IEEE and IEC standards. This shall include details of supported performance classes, measurement functions, certified test results, equipment settings used in testing, and environmental conditions during testing.