

**POWER GRID COMPANY OF BANGLADESH LIMITED**  
**Construction of Notun Bidyut Power Plant-Char Fasson 230kV Transmission Line and Reconductoring**  
**of 230kV & 132kV Transmission Lines on Turnkey Basis (Package-7) (Contract No. PGCB/ADB/L3683-**  
**BAN/SWTGEP/230kV&132kV/TL)**  
**CLARIFICATION NO. 1**  
**Date-05.06.2022**

Pre-bid meeting was held on May 10, 2022 as per clause 7.4 of Instruction to Bidders of Volume 1 of 3 of the Bidding document. A list of the firms, who have purchased the bidding document, is also enclosed. Some queries were received from the prospective Bidders regarding the Bidding Documents prior the Pre-bid meeting as well as some of the bidders have submitted queries after pre-bid meeting. Clarifications on the above queries are given below, which will form part of the bidding documents.

| Sl. No. | Reference and Queries of Prospective Bidders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reply (PGCB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|         | <b>VOLUME -2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1       | <p><b>A. <u>Store Location:</u></b></p> <ul style="list-style-type: none"> <li>Please, refer the Sl. No.(d), Page 9, Annex 1-1, Sec-1, Vol-3, it is mentioned that the dismantled/removed material from the existing line including the measurement of conductor lengths, rewinding on drums/packing at site and safe transportation of dismantled conductors and fittings to PGCB's local grid maintenance division store.</li> </ul> <p>Kindly specify the location of the store. Whether PGCB will facilitate in the process of the transportation and loading/unloading of materials at site and store. Kindly confirm.</p> <p><b>B. <u>Connector Fittings:</u></b></p> <ul style="list-style-type: none"> <li>Please, refer the Sl. No. (f) &amp; (o), Page 9 &amp; 11, Annex 1-1, Sec-1, Vol-3, the scope of designing and supply of all types of connector fittings shall be in the scope of the contractor.</li> </ul> <p>Kindly confirm whether the existing connector fittings, removed during the process are to be returned to PGCB as scrap or additionally supplied in new condition.</p> <ul style="list-style-type: none"> <li>Also, the terminal Pad drawings of the existing LA, CVT and BPI at Line end shall be required to be furnished for the procurement of the matching hole dia. Of Terminal Connectors with the Terminal Pad of the equipment for all substations.</li> </ul> <p>Kindly furnish the same.</p> | <p>The dismantled/removed material from the existing line handed over to respective PGCB's local grid maintenance division store of each transmission line.</p> <p>After dismantling, the material shall be stored at site instead of GMD and be auctioned immediately.</p> <p>The existing connector fittings, removed during the process are to be returned to PGCB as scrap.</p> <p>It shall be deemed that the design/drawings/other engineering data/documents of the existing equipment /fittings are not available with the employer. All such matters as required for the termination shall have to be collected/prepared by the bidder/contractor themselves</p> |




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|  | <p>• We understand that for <b>all 230 kV / 132 kV substations</b> reconductoring up to Bus Level means: changing of Main Bus conductors, Jack Bus Conductors and dropper conductors from Main Bus/Jack Bus to Equipment i.e. changing of all the conductors inside the switchyard.</p> <p>Please clarify the same.</p> <p>If Point No. 3 exists then, Terminal Pad Drawings of all the Substation Equipment shall be required to be furnished for the procurement of the matching hole dia. of Terminal Connectors with the Terminal Pad of the equipment.</p> <p>Kindly furnish the same.</p> <p>If Point No. 3 does not exist, then Customer has to ensure that the existing Equipment Connectors are suitable for carrying the Current carrying capacity of the New Conductors.</p> <p>Please clarify and confirm</p> <p><b>C. <u>Tender Drawings:</u></b></p> <p>Kindly furnish Readable and Legible Plan, Section and SLD of all the scope substations to evaluate and estimate the substation quantities of the scope work.</p> <p><b>D. <u>Line Route Data &amp; Tower Drawings:</u></b></p> <p>i. Requesting you to kindly share the Line Route data &amp; Tower drawings for all the lines.</p> <p>ii. Please provide the Foundation Loads and Structural drawings of already design towers of 230 kV line.</p> <p>iii. As per Cl. No. 22.2, Section 22, Vol-2, Tower Drawings are included in the CD but we have not received any CD with Original Tender Documents. Kindly arrange to provide the same please.</p> <p>iv. Kindly arrange to provide the Foundation Loads and Structural</p> | <p>based on the existing equipment/system.</p> <p>Changing of Line bay conductor up to Bus including all loop, dropper etc.</p> <p>It shall be deemed that the design/drawings/other engineering data/documents of the existing equipment /fittings are not available with the employer. All such matters as required for the termination shall have to be collected/prepared by the bidder/contractor themselves based on the existing equipment/system.</p> <p>It shall be deemed that the design/drawings/other engineering data/documents of the existing equipment /fittings are not available with the employer. All such matters as required for the termination shall have to be collected/prepared by the bidder/contractor themselves based on the existing equipment/system.</p> <p>I. It shall be deemed that the Line Route data &amp; Tower drawings of the existing lines are not available with the employer. All such matters as required shall have to be collected/prepared by the bidder/contractor themselves based on the existing system. Line Route data &amp; Tower drawings for the new line is already Provided.</p> |
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|   | <p>drawings of already design Pole 2DT6P for 230kV Line.</p> <p>v. From Tender Documents we understand that Tower and Pole design are not in the scope of contractor. Kindly Confirm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>II. Already Provided.</p> <p>III. Already Provided.</p> <p>IV. Already Provided.</p> <p>V. Your understanding is correct. PGCB's existing designed towers/Pole shall be used.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2 | <p><b>E. Scope of Work and Price Schedule:</b></p> <p>Scope B1</p> <ul style="list-style-type: none"> <li>As per Item No. 2, Schedule No.1, we understand that we need to replace only hardware fittings-parts/accessories subjected to the system voltage (without Insulators) with phase conductor.</li> </ul> <p>Kindly Confirm please.</p><br><ul style="list-style-type: none"> <li>As per Item No. 3, Schedule No.1, we understand that we need to supply complete set for Tension fitting without Insulators.</li> </ul> <p>Kindly Confirm please.</p><br><ul style="list-style-type: none"> <li>Kindly refer Item No. 7, Schedule No.1, from item description we understand that we do not required to provide Anti-Theft Lock Nut.</li> </ul> <p>Kindly Confirm please.</p><br><ul style="list-style-type: none"> <li>As per Item No. S3.8, Schedule No.1, we need to supply spare quantity of fittings for termination of Transmission Line in lot.</li> </ul> | <p>Your understanding is correct. But, if some insulators found defective during the reconductoring works, then those shall be replaced by new insulators supplied within this contract as spares. Prior notification to/ approval of the Employer shall be a pre-requisite for such replacement/use of insulators.</p><br><p>Your understanding is correct. But, if some insulators found defective during the reconductoring works, then those shall be replaced by new insulators supplied within this contract as spares. Prior notification to/ approval of the Employer shall be a pre-requisite for such replacement/use of insulators.</p><br><p>Your understanding is not correct. Anti-Theft Lock Nut also need to be provide with Fabricated and galvanized tower steel (Mild steel &amp; High tensile) including nut-bolts, washers etc for strengthening/ repair of existing any tower(s), as/if required</p><br><p>Contractor need to supply spare quantity of fittings for</p> |

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|  | <p>From above we cannot able to consider how many spare quantity &amp; type of fittings is required, so kindly arrange to provide detail BOQ of fittings for spare quantity please.</p> <p><b>Scope B2</b></p> <ul style="list-style-type: none"> <li>As per Item No. B2, Schedule No.1, we understand that we need to replace only hardware fittings-parts/accessories subjected to the system voltage (without Insulators) with phase conductor.</li> </ul> <p>Kindly Confirm please.</p> <ul style="list-style-type: none"> <li>As per Item No. B3, Schedule No.1, we understand that we need to supply complete set for Tension fitting without Insulators.</li> </ul> <p>Kindly Confirm please.</p> <ul style="list-style-type: none"> <li>Kindly refer Item No. B7, Schedule No.1, from item description we understand that we do not required to provide Anti-Theft Lock Nut.</li> </ul> <p>Kindly Confirm please.</p> <ul style="list-style-type: none"> <li>As per Item No. S3.8, Schedule No.1, we need to supply spare quantity of fittings for termination of Transmission Line in lot.</li> </ul> <p>From above we cannot able to consider how many spare quantity &amp; type of fittings is required, so kindly arrange to provide detail BOQ of fittings for spare quantity please.</p> <p><b>Scope B3</b></p> <ul style="list-style-type: none"> <li>As per Item No. B2, Schedule No.1, we understand that we need to replace only hardware fittings-parts/accessories subjected to the system voltage (without Insulators) with phase conductor.</li> </ul> <p>Kindly Confirm please.</p> <ul style="list-style-type: none"> <li>As per Item No. B3, Schedule No.1, we understand that we need to supply complete set for Tension fitting without Insulators.</li> </ul> <p>Kindly Confirm please.</p> <ul style="list-style-type: none"> <li>Kindly refer Item No. B7, Schedule No.1, from item description we understand that we do not required to provide Anti-Theft Lock Nut.</li> </ul> <p>Kindly Confirm please.</p> <ul style="list-style-type: none"> <li>As per Item No. S3.8, Schedule No.1, we need to supply spare quantity of fittings for termination of Transmission Line in lot.</li> </ul> <p>From above we cannot able to consider how many spare quantity &amp; type</p> | <p>termination of Transmission Line in lot as similar lot (item) as described in item No. B 8.1 &amp; B 8.2.</p> <p><b>For the queries under Scope B2, please follow the replies of queries under Scope B1.</b></p> <p><b>For the queries under Scope B3, please follow the replies of queries under Scope B1.</b></p> |
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|  | <p>Kindly Confirm please.</p> <ul style="list-style-type: none"> <li>As per Item No. S3.9, Schedule No.1, we need to supply spare quantity of fittings for termination of Transmission Line in lot.</li> </ul> <p>From above we cannot able to consider how many spare quantity &amp; type of fittings is required, so kindly arrange to provide detail BOQ of fittings for spare quantity please.</p> <p>Kindly request you to amend item no. S.3.9 as S.3.8 and provide revised Price Schedule.</p> <p>Also in Item No. S3.8, Schedule No.1 &amp; 2, in item description reference is given for Item No. B6.1 &amp; B6.2, from this we understand it is typographic error and it should be only "B6.1".</p> <p>If our understanding is correct then kindly arrange to provide corrected copy of Price Schedule, please.</p> <ul style="list-style-type: none"> <li>Kindly amend item no. B8 &amp; B8.1 as B5 &amp; B5.1 respectively in Schedule No.4. Installation &amp; Other Services and provide revised Price Schedule with amendment.</li> </ul> <p><b>F. Scope B &amp; Price Schedule:</b></p> <ul style="list-style-type: none"> <li>Please, refer Scope B, Cl. 2 iii., Page 7, Volume 3 of bid documents, where it is given as<br/> "Reconductoring of the existing Ishurdi-Dhamrai-Ghorasal (1st East-West Interconnector) 230 kV Double Circuit transmission Line: 175 km including approx. 13.5 km river crossing (please refer to Annexure-A for detail information) and Reconductoring of LILLO at Dhamrai of Ishurdi-Ghorasal 230 kV line (1 km)" .</li> </ul> <p>"All existing hardware fittings-parts/accessories..... New OPGW conducting replacing existing GW including up gradation of terminal equipment connected to line if required.</p> <ol style="list-style-type: none"> <li>From the above, we understand that we need to replace existing GW (Earthwire) with new OPGW. But the Quantity and Type of OPGW not provided in the Price Schedule. Kindly furnish the same.</li> <li>As per above clause, we need to refer 'Annexure-A' for detail information, but 'Annexure-A', is not provided in tender documents. So, kindly arrange to provide the same.</li> </ol> <p><b>I. Type test of Insulator String</b></p> <p>As per Clause No. 9.6.2 (ii), Volume-2 of the bid documents, "If the type tests for insulator sets are not available as offered combination of insulator &amp; fitting manufacturer (except low duty sets) with proposed design, the tests shall be performed in laboratories mentioned in Clause</p> | <ol style="list-style-type: none"> <li>Please refer to <b>Addendum-1</b>.</li> <li>'Annexure-A', is already provided in Volume-2 of 3 of Bidding Document.</li> </ol> <p>Your understanding is correct.</p> |
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|                                                 | <p>9.6.2 (i) during execution stage in presence of Employer's Engineers. Cost of such test and witness shall deem to be included in the Contract Price".</p> <p>From the above clause we understand that, if the bidder fails to submit type tests of offered insulator string sets (except low duty sets), then the bidder needs to conduct fresh type tests on all the insulator string sets (except low duty sets) such as 'suspension sets, jumper suspension sets and tension string sets',.</p> <p>Kindly clarify &amp; confirm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
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| 3                                               | <p><b>J. Type test of Insulator Units:</b></p> <p>i. The type test requirement for Insulator Unit are given in the Table 9-1 and also in Clause No. 9.6.2 (i), Chapter 9, Volume-2.</p> <p>Please confirm whether type test reports shall include all items mentioned in Table 9-1 or only include lists in 9.6.2</p> <p>Table 9-1: Test Requirements</p> <table border="1"> <thead> <tr> <th>Test</th><th>Insulator Units<br/>Cap &amp; Pin (Type B)</th><th>Insulator Sets</th></tr> </thead> <tbody> <tr> <td>Type Tests:</td><td></td><td></td></tr> <tr> <td>Verification of dimensions</td><td>X</td><td>-</td></tr> <tr> <td>Dry lightning impulse withstand voltage</td><td>X</td><td>X</td></tr> <tr> <td>Wet power frequency withstand voltage</td><td>X</td><td>X</td></tr> <tr> <td>Thermal mechanical performance</td><td>X</td><td>-</td></tr> <tr> <td>Mechanical or EMF load</td><td>X</td><td>-</td></tr> <tr> <td>Radio Interference Voltage (RIV)</td><td>X</td><td>X</td></tr> <tr> <td>Pollution performance</td><td></td><td>X a)</td></tr> <tr> <td>Power arc</td><td>X</td><td>X</td></tr> </tbody> </table> <p>Construction of Notun Bidyut Power Plant-Char Fasson 230kV Transmission Line and Reconductoring of 230kV &amp; 132kV Transmission Lines on Turnkey Basis (Package-7)</p> <p>9-6</p> <table border="1"> <thead> <tr> <th>Test</th><th>Insulator Units<br/>Cap &amp; Pin (Type B)</th><th>Insulator Sets</th></tr> </thead> <tbody> <tr> <td>Impulse voltage puncture</td><td>X</td><td>-</td></tr> <tr> <td>Zinc sleeve</td><td>X</td><td>-</td></tr> <tr> <td>Residual strength</td><td>X</td><td>-</td></tr> <tr> <td>Sample Tests:</td><td></td><td></td></tr> <tr> <td>Verification of dimensions</td><td>X</td><td>-</td></tr> <tr> <td>Verification of locking system and displacement</td><td>X</td><td>-</td></tr> <tr> <td>Temperature cycle test</td><td>X</td><td>-</td></tr> <tr> <td>Mechanical or EMF load</td><td>X</td><td>-</td></tr> <tr> <td>Porosity</td><td>X</td><td>-</td></tr> <tr> <td>Galvanizing</td><td>X</td><td>-</td></tr> <tr> <td>RIV</td><td>X</td><td>-</td></tr> <tr> <td>Impulse Voltage puncture</td><td>X</td><td>-</td></tr> <tr> <td>Zinc sleeve test</td><td>X</td><td>-</td></tr> <tr> <td>Head design test</td><td>X</td><td>-</td></tr> <tr> <td>Routine Tests:</td><td></td><td></td></tr> <tr> <td>Visual inspection</td><td>X</td><td>-</td></tr> <tr> <td>Mechanical</td><td>X</td><td>-</td></tr> <tr> <td>Electrical</td><td>X</td><td>-</td></tr> </tbody> </table> <p>a) U=245kV.</p> | Test           | Insulator Units<br>Cap & Pin (Type B) | Insulator Sets | Type Tests: |  |  | Verification of dimensions | X | - | Dry lightning impulse withstand voltage | X | X | Wet power frequency withstand voltage | X | X | Thermal mechanical performance | X | - | Mechanical or EMF load | X | - | Radio Interference Voltage (RIV) | X | X | Pollution performance |  | X a) | Power arc | X | X | Test | Insulator Units<br>Cap & Pin (Type B) | Insulator Sets | Impulse voltage puncture | X | - | Zinc sleeve | X | - | Residual strength | X | - | Sample Tests: |  |  | Verification of dimensions | X | - | Verification of locking system and displacement | X | - | Temperature cycle test | X | - | Mechanical or EMF load | X | - | Porosity | X | - | Galvanizing | X | - | RIV | X | - | Impulse Voltage puncture | X | - | Zinc sleeve test | X | - | Head design test | X | - | Routine Tests: |  |  | Visual inspection | X | - | Mechanical | X | - | Electrical | X | - | <p>i. All tests requirement mentioned in Table 9-1 and in Clause No. 9.6.2 (i) are required to be performed as type test.</p> <p>ii. Bidder has to submit all required type test reports for offered type insulator units during the bidding stage.</p> |
| Test                                            | Insulator Units<br>Cap & Pin (Type B)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Insulator Sets |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Type Tests:                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Verification of dimensions                      | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Dry lightning impulse withstand voltage         | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | X              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Wet power frequency withstand voltage           | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | X              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Thermal mechanical performance                  | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Mechanical or EMF load                          | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Radio Interference Voltage (RIV)                | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | X              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Pollution performance                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | X a)           |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Power arc                                       | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | X              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Test                                            | Insulator Units<br>Cap & Pin (Type B)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Insulator Sets |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Impulse voltage puncture                        | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Zinc sleeve                                     | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Residual strength                               | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Sample Tests:                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Verification of dimensions                      | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Verification of locking system and displacement | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Temperature cycle test                          | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Mechanical or EMF load                          | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Porosity                                        | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Galvanizing                                     | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| RIV                                             | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Impulse Voltage puncture                        | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Zinc sleeve test                                | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Head design test                                | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Routine Tests:                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Visual inspection                               | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Mechanical                                      | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |
| Electrical                                      | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -              |                                       |                |             |  |  |                            |   |   |                                         |   |   |                                       |   |   |                                |   |   |                        |   |   |                                  |   |   |                       |  |      |           |   |   |      |                                       |                |                          |   |   |             |   |   |                   |   |   |               |  |  |                            |   |   |                                                 |   |   |                        |   |   |                        |   |   |          |   |   |             |   |   |     |   |   |                          |   |   |                  |   |   |                  |   |   |                |  |  |                   |   |   |            |   |   |            |   |   |                                                                                                                                                                                                                                                         |

|                                      | <p><b>9.6.2 Type Tests</b></p> <p>(i) Insulator Units</p> <p>Type test reports issued from independent reputed testing laboratory outside the Manufacturer's country for insulator units which shall include the following tests performed on all the offered types of insulators as per IEC except power arc test which shall conform to test procedures outlined in this Clause:</p> <ul style="list-style-type: none"><li>• Verification of dimensions</li><li>• Dry lightning impulse voltage withstand test;</li><li>• Wet power frequency voltage withstand test;</li><li>• Electro-mechanical failing load test;</li><li>• Thermal mechanical performance test;</li><li>• Radio Interference Voltage (RIV)</li><li>• Impulse voltage puncture test</li><li>• Power arc test</li><li>• Zinc Sleeve Test</li><li>• Residual Strength Test</li></ul> <p>The independent Testing Laboratories shall comply with the following requirements:</p> <ol style="list-style-type: none"><li>1. Valid ISO-IEC/17025 Certificate issued from Accreditation body.</li><li>2. Scope of accreditation for the laboratory shall include the required type tests.</li><li>3. The Accreditation body shall be one of the Signatories under ILAC, IFA or IEEEEC.</li><li>4. Provide laboratory address and location details.</li></ol> <p>ii. As per Clause No. 9.6.2, Chapter-9, Volume-2 of the bid documents, we understand that in case bidder fails to submit type test reports of the offered insulator unit alongwith the bid, then is it possible to perform type tests of insulator unit during execution stage like insulator sets?</p> <p>Please clarify &amp; confirm.</p> |                      |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
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| 4                                    | <p><b>Annex 7-A2(3): Foundation Overload Factor: 230kV Twin Mallard Double Circuit Towers (High Wind Zone)</b></p> <p>The following overload factor shall be used to increase the ultimate tower reactions on the foundations for the design of the foundations:</p> <table><tr><th>Applied Loading Case</th><th colspan="2">Overload Factor for Foundation for all Tower Type</th></tr><tr><td rowspan="2">All load case</td><td>2DL</td><td>2D1, 2D25, 2DT6, 2D9</td></tr><tr><td>1.23</td><td>1.35</td></tr></table> <p>Annexure 7-A2(3.1), Section - 7,</p> <p>In given scope of work, 230kV D/C TL is single conductor per phase, however foundation overload factor si given for 230kV Twin Mallard Double Ciscuit Towers. Please Confirm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Applied Loading Case | Overload Factor for Foundation for all Tower Type |                  | All load case     | 2DL              | 2D1, 2D25, 2DT6, 2D9 | 1.23               | 1.35 | Confirmed. |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Applied Loading Case                 | Overload Factor for Foundation for all Tower Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| All load case                        | 2DL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2D1, 2D25, 2DT6, 2D9 |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
|                                      | 1.23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.35                 |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
|                                      | <p><b>3. 230kV Line (Overland Portion)</b></p> <table><tr><th>Parameter</th><th>Suspension/Jumper Suspension</th><th>Heavy Suspension</th><th>Tension (Twin)</th><th>Upright Low Duty</th><th>Inverted Low Duty</th></tr><tr><td>Insulator Set Type</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Production category</td><td colspan="5">Medium II</td></tr><tr><td>Nominal creepage</td><td colspan="5">4000</td></tr><tr><td>Insulator type</td><td colspan="5">Cap &amp; pin type disc insulators</td></tr><tr><td>Insulator unit reference</td><td>U120B</td><td>U210B</td><td>U210B</td><td>U120B</td><td>U120B</td></tr><tr><td>Glaze colour</td><td>Grey</td><td>Brown</td><td>Brown</td><td>Grey</td><td>Grey</td></tr><tr><td>Unit puncture voltage</td><td>110</td><td>125</td><td>125</td><td>110</td><td>110</td></tr><tr><td>Number of insulator units per string</td><td>17</td><td>14</td><td>14</td><td>17</td><td>17</td></tr><tr><td>Dielectric material</td><td colspan="5">Porcelain</td></tr></table> <p>Annexure 9-2, Table 3, Section 9</p> <p>In Table 3 of Annexure 9-2, Tension fittings requirement is mentioned as Twin, however in BoQ, Single tension fittings are asked, please clarify whether Twin or single tension fittings are to be supplied.</p>                                                                                                                                                                                                                                                                                                                                                                    | Parameter            | Suspension/Jumper Suspension                      | Heavy Suspension | Tension (Twin)    | Upright Low Duty | Inverted Low Duty    | Insulator Set Type |      |            |  |  |  | Production category | Medium II |  |  |  |  | Nominal creepage | 4000 |  |  |  |  | Insulator type | Cap & pin type disc insulators |  |  |  |  | Insulator unit reference | U120B | U210B | U210B | U120B | U120B | Glaze colour | Grey | Brown | Brown | Grey | Grey | Unit puncture voltage | 110 | 125 | 125 | 110 | 110 | Number of insulator units per string | 17 | 14 | 14 | 17 | 17 | Dielectric material | Porcelain |  |  |  |  | In Table 3 of Annexure 9-2, Tension fittings requirement is mentioned as Single and single tension fittings need to be supplied. |
| Parameter                            | Suspension/Jumper Suspension                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Heavy Suspension     | Tension (Twin)                                    | Upright Low Duty | Inverted Low Duty |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Insulator Set Type                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Production category                  | Medium II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Nominal creepage                     | 4000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Insulator type                       | Cap & pin type disc insulators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Insulator unit reference             | U120B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | U210B                | U210B                                             | U120B            | U120B             |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Glaze colour                         | Grey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Brown                | Brown                                             | Grey             | Grey              |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Unit puncture voltage                | 110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 125                  | 125                                               | 110              | 110               |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Number of insulator units per string | 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 14                   | 14                                                | 17               | 17                |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |
| Dielectric material                  | Porcelain                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                                                   |                  |                   |                  |                      |                    |      |            |  |  |  |                     |           |  |  |  |  |                  |      |  |  |  |  |                |                                |  |  |  |  |                          |       |       |       |       |       |              |      |       |       |      |      |                       |     |     |     |     |     |                                      |    |    |    |    |    |                     |           |  |  |  |  |                                                                                                                                  |

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| 5 | <p><b>Annexure - 5.2: Access Road and Caluse 18.3 of Section 18</b></p> <p>Access roads/routes shall be identified by the Contractor themselves as and where necessary, and shall be constructed by them at their own expense and necessary compensations for damages thereof shall also be paid by the Contractor. The Employer's representative shall assist the Contractor in his negotiations with the landowners about such compensation etc.</p> <p>And</p> <p>Route clearance undertaken by the Contractor on the Employer's instruction shall be paid for at Schedule B unit prices and shall be measured to the nearest metre along the centre line of the route. The prices of route clearance shall include payment of compensation for crops, trees, houses, etc. and all kinds of damage compensation.</p> <p>As described in Price schedule A4, Item no. 7.11 i.e. "Payment for Compensation (For resettlement of affected people, dwelling/commercial structures, trees, crops etc. on the Right of Way) and Payment of compensation using private land to construct transmission line towers (based on area of tower footprint)"</p> <p>Fixed amount of BDT 42,956,000.00 is given, We have following understanding, please confirm.</p> <ol style="list-style-type: none"> <li>1. Payment for Compensation is not in scope of contractor.</li> <li>2. If Payment Compensation is in scope of contractor, then it will be paid at actuals from amount given against item no. 7.11 of schedule A4.</li> <li>3. If actual amount of compensation given against item no. 7.11 of schedule A4 exceeds, then it will be in scope of PGCB.</li> </ol> <p>Please confirm, if our understanding is correct.</p> |                                                                                                                                                     |
| 6 | <p><b>Price Schedule A1</b></p> <p>In Price Schedule, A1. Nutan Bidyut Power Plant-Char Fasson 230kV Double Circuit Line there is no river crossing and anchor tower to be supplied as per BoQ, And Annexure 7-A2 (4) "Foundation Overload Factor: 230kV Twin Mallard Double Circuit River Crossing Towers (High Wind Zone) - Not used"</p> <p>However as per price schedule A4, Item No. 2.7, Contractors need to quote for river crossing foundations. Please clarify.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>There is no river crossing tower in the line. However, River Crossing foundation has been included to make provision for future requirement.</p> |
| 7 | <p><b>2.7 River crossing foundation</b></p> <p>As per the clause three river crossing foundations need to be furnished for three towers, So kindly mention the river data such as ( H.F.L of the river, Maximum flow velocity of river, Maximum discharge, scour if applicable and any specific design considerations if any.) also soil data for the mentioned tower location.</p> <p>As per this clause one river crossing foundation is to be done for 2DT6P pole with raised chimney, Kindly mention the raised chimney height.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>Please follow the <b>Addendum-1</b>.</p>                                                                                                         |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                            |
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|    | For river crossing foundation liner is to be provided or not if yes kindly mention the thickness of liner.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                            |
| 8  | <p><b>Annexure- 3-5 Field Quality Plan for Transmission Line</b></p> <p>Under This Field Quality Plan (FQP) template at Item Number 4 "Tower Foundation" Item B Classification Point (C) Concrete Strength (Cube Comp Strength) it is written that per tower location One Sample of 4 Cubes to be taken for Concrete strength checking while in the Same FQP item No 5 Pile Foundation It is mentioned that for each pile One Set of Cubes (4 Nos) to be taken and tested for 7 &amp; 28 days strength.</p> <p>We have the following clarification in this regard</p> <p>a. Kindly clarify which specs is to be followed for cube testing i.e One set per tower or one set per pile?</p> <p>b. It is to submit that logistically it is practically challenging to handle 4 Cubes per pile and for 16-20 pile foundation about 64-80 cubes are to be taken and properly cured and tested. The subject requirement is practically hindering the whole project progress and takes huge amount of time &amp; financial resource to maintain the logistics associated with the cube testing. In view of the practical challenge and it is requested to kindly review the FQP and amend the cube sampling to one set per leg of pile foundation. Please clarify your position in this regard.</p> | Please follow the <b>Addendum-1.</b>                                                                                                                                                                                                                                                                                                                                       |
| 9  | <p><b>Foundation Appendix 7. A1</b></p> <p>Here it is mentioned that for any other type of proven pile foundation the proposal should be made at the bid stage itself. However, our submission is that the same must be allowed during project execution stage also. For your clarification please.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Please follow the <b>Addendum-1.</b>                                                                                                                                                                                                                                                                                                                                       |
| 10 | <p><b>Annexure- 23-1</b></p> <p>Here only the line coordinates of New Line has been provided while there is no line coordinates for the existing lines for which reconductoring work has to be performed. We request you to</p> <p>a. kindly furnish the same to enable the bidders for the site visits of Transmission Line routes of existing lines.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | It shall be deemed that the design/drawings/other engineering data/documents of the existing equipment /fittings are not available with the employer. All such matters as required for the termination shall have to be collected/prepared by the bidder/contractor themselves based on the existing equipment/system. However, the line length is mentioned in the scope. |
| 11 | <p><b>Section-3, Clause 2.5</b></p> <p>Along with the above, the bidder will submit document / certificate from offered ACCC Conductor manufacturer/ACCC technology owner confirming that the personnel which are expert &amp; certified by ACCC technology owner in installation/stringing supervision of ACCC Conductor must be deployed during entire duration of installation /stringing of the transmission line.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                            |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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|    | <p>We understand contractor need to deploy master installer for duration stringing activity. It is to submit that similar projects which are under execution in Bangladesh suffers from untimely shutdown &amp; master installer remains idle for significant time duration. Since Master installer being expensive manpower, we request PGCB to compensate for idle Master installer due to untimely shutdown.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 12 | <p><b>Overseas Training</b></p> <p>Please refer Clause No. 18.1.12.1, 'Overseas Training', Chapter-18, Page No. 18-3, Volume 2 of bid documents, where it is mentioned that 'Overseas Training – Not Applicable'.</p> <p>From the above, we understand that 'Overseas Training' is Not Applicable for this project &amp; bidder need not to consider 'Overseas Training' cost.</p> <p>Kindly confirm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Confirmed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 13 | <p><b>PLS CADD TOWER, POLE License Upgradation</b></p> <p>Please refer Clause No. 18.1.12.3, Volume 2 of bid documents regarding PLS-CADD, TOWER &amp; POLE License as given below:-</p> <p>18.1.12.3 PLS CADD, TOWER, POLE License</p> <p>PGCB's existing six Licenses of PLS CADD, PLS TOWER and PLS POLE shall be updated for one years under this contract. All available feature should be extended. The price of updating of PLS CADD, Tower and Pole License shall be deemed to be included in the Contract Price.</p> <p>From the above, we have following observations and clarifications:-</p> <p>(a) Kindly request you to please provide Serial No. of Keys / License, currently in use at PGCB for License Upgradation of PLS CADD, PLS TOWER and PLS POLE.</p> <p>(b) As per our understanding, bidder needs to arrange renewal /upgradation of existing 6 Nos. of Licenses i.e. for (PLS CADD - 2 License, PLS TOWER - 2 License &amp; PLS POLE -2 License) for one (1) year. Kindly confirm.</p> <p>(c) As mentioned in the above Clause, 'All available feature should be extended'. Kindly request you to please specify in detail all the available features that are extensively used by PGCB which needs to be extended for one (1) year.</p> | <p><b>a. License group: Power Grid Company of Bangladesh – HGPT Group 1</b></p> <p>1 Power Grid Company of Bangladesh-HGPT<br/>Md. Emdadul Hoque<br/>emdad.buet@gmail.com</p> <p>2 Power Grid Company of Bangladesh-HGPT<br/>Md. Shoeb Hasan<br/>sde1.tld@pgcb.gov.bd</p> <p>3 Power Grid Company of Bangladesh-HGPT<br/>Muhammad Mahmudul Islam<br/>sde2.tld@pgcb.gov.bd</p> <p><b>License group: Power Grid Company of Bangladesh – HGPT Group 2</b></p> <p>1 Power Grid Company of Bangladesh-HGPT<br/>S. M Rakibul Hasan</p> |




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|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>sde4.tld@pgcb.gov.bd</p> <p>2 Power Grid Company of Bangladesh-HGPT<br/>Md. Abdur Rahman<br/>sde5.tld@pgcb.gov.bd</p> <p>License group: Power Grid Company of Bangladesh – HGPT Group 3</p> <p>1 Power Grid Company of Bangladesh-HGPT<br/>Md. Mahfuzur Rahman<br/>sde7.tld@pgcb.gov.bd</p> <p>b. Your understanding is not correct. PGCB's existing six Licenses i.e. (PLS CADD - 6 Licenses, PLS TOWER - 6 Licenses &amp; PLS POLE -6 Licenses) shall be updated for one years under this contract.</p> <p>c. Please collect detail of all the available features by using the details given aforesaid at (a) from the power line system.</p> |
| 14 | <p><b>Pole Requirement</b></p> <p>Please refer item no. 1.6 (Pole type '2DT6P' – each 2) of Price Schedule No.1A &amp; 2A of Transmission Line 'A1. Nutan Bidyut Power Plant-Char Fasson 230kV Double Circuit Line'.</p> <p>(a) Kindly request you to provide Approved Manufacturers of Poles.</p> <p>(b) We understand that as the quantity given for Pole (2DT6P) is very less under this contract.<br/>So, we request you to kindly arrange to provide this item as 'OSM' (Owner Supplied Material) and remove this item from the Price Schedule.</p> | <p>a. Approved Drawing is already provided.</p> <p>b. Please follow the bid documents.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 15 | <p><b>Re-conductoring Work of 230 kV DC Ishwardi To Ghorasal Transmission Line</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

*(Handwritten signatures)*

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|                 | <p>During site survey of 'Reconductoring of 230 kV DC Ishwardi-Ghorasal Transmission Line', we have come across some major observations as listed below which needs to be clarified:-</p> <p>(i) 80 km of the afore-said transmission line is located in congested area. Semi Paka, Paka, Tin Shed building were constructed below the transmission line and in many cases sufficient clearance was not maintained.</p> <p>Therefore, during re-conductoring, whether we have to maintain the present available clearance or need to maintain clearance as per 'Sag Chart', because in maximum cases to maintain clearance as per 'SAG Chart' is not possible.</p> <p>Kindly confirm.</p> | <p>(i) Maintain the present available clearance.</p> |
| 16              | There are 3 locations used as per River Crossing Foundation, Please confirm whether we need to consider the Scour Depth or not? If we need to consider, please provide the Morphological Study Report to let bidder confirm the Scour Depth;                                                                                                                                                                                                                                                                                                                                                                                                                                              | Please follow <b>Addendum-1</b> .                    |
| 17              | Please clarify why there are 2poles 2DT6P used in this project. We're worry about missing the services if we do not know the reason carefully.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | One/two pole may require near the power plant area.  |
| 18              | Please provide the tower structural drawings, BOM, Tower Foundation Reaction for tower type 2DL, 2D1, 2D25, 2DT6, 2D9, pole type 2DT6P                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Already provided.                                    |
| 19              | <p>Item No. 2: Foundations for towers/Poles</p> <p>1. We request you to provide minimum pile diameter to be used in the Project.</p> <p>2. We request you to provide ratio Maximum permitted length of Pile w.r.to Pile diameter.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Please follow <b>Addendum-1</b> .                    |
| <b>VOLUME-3</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                      |
| 1               | <p><b>Price Schedules of 132kV Reconducting Transmission Lines</b></p> <p>Quantity of Hardware Fittings Item no. 2.1, 2.2, 2.3, 3.1, 3.3 &amp; 3.4 in all of the supply price schedules is given as "1". We understand there is issue in quantities and request you to please issue an amendment with right quantities.</p>                                                                                                                                                                                                                                                                                                                                                               | Please refer to <b>Addendum-1</b> .                  |
| 2               | <p><b>Appendix-7.A4</b></p> <p>As per appendix No. 7-A4, to calculate the skin friction for clay soil the attachment coefficient is to be considered from 0.3 to 0.7, whereas as per appendix 7.DI the code mention for pile design is BS8004 and as per the BS8004:2015, The alpha value depends on</p>                                                                                                                                                                                                                                                                                                                                                                                  | Please refer to <b>Addendum-1</b> .                  |

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|   | Cu and ranges between 0.4 to 1.0, So kindly clarify how to consider the alpha value for design calculations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                           |
| 3 | <b>Annexure 1-1 Scope of Works</b><br><br><b>River Crossing Portion</b><br>Here it is written that no Mid Span Joint shall be allowed from Anchor-to-Anchor Tower. However the River Crossing Section as defined in the bid is 13.5 Kms which is practically impossible to have conductor length without Mid Span joint. Kindly provide the Tower Schedule of River Crossing Section for having more clarity on conductor length and maximum drum length. Pls clarify your position in this regard.                                                                                                                                                                                                                                                                     | Please refer to Annexure-A of Volume-2 of bid document.<br>Mid Span Joint may be used for river crossing portion of Ishurdi-Dhamrai-Ghorasal (1st East-West Interconnector) 230 kV Double Circuit transmission Line but Mid span joint should be minimum. |
| 4 | <b>Price Schedule A4 item no 7.11</b><br><br>Here the description of the items is "Payment for Compensation (For resettlement of affected people, dwelling/commercial structures, trees, crops etc. on the Right of Way) and Payment of compensation using private land to construct transmission line towers (based on area of tower footprint)"<br><br>We have the following clarification in this regard<br>a. We understand that the land acquisition compensation shall be made "based on the tower footing area as mentioned above. Pls Confirm.<br>b. For Crop or any other temporary compensation, the practical use of land in line corridor shall be evaluated for right compensation to the affected people. Please confirm if the understanding is correct. | Your understanding is correct.                                                                                                                                                                                                                            |
| 5 | <b>Scope B, General</b><br>In Reconductoring Scope in "Schedule No. 4 " Items B3 " Dismantling and Storing" it is mentioned that Storing of Dismantled Material shall be done at Respective GMD Store as per the instruction of Engineer Incharge.<br><br>Since Distance of the GMD Store from the line site is critical in terms of assessing the total activity scope as well as cost, hence it is requested that the specific GMD Stores should be clearly defined at this stage itself for bidders to plan their delivery of Dismantled material effectively. For your clarification please.                                                                                                                                                                        | After dismantling, the material shall be stored at site instead of GMD and be auctioned immediately.                                                                                                                                                      |
| 6 | <b>Annexure 1-2 Terminal Points Scope B</b><br><br>Here 6 Nos. of Different Transmission Lines are mentioned for which reconductoring is to be performed by the contractor. Also,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Please follow the bid documents.                                                                                                                                                                                                                          |

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|    | <p>there is Scope A, where new Transmission Line is to be constructed by the contractor. Since both Scope A &amp; B are under the single contract but are two independent scopes, hence we have the following query for your kind consideration</p> <p>Whether Scope Wise completion and defect liability shall be acceptable or not as reconductoring works shall have huge dependence on shutdowns availability while new lines can be constructed independent of that. Pls clarify your position in this regard.</p> |                                                                                                                                                                                                                                                                                                    |
| 7  | <p><b>Price Schedule A3</b></p> <p>In Price Schedule A3, item no. 4.1, Cost and Expenses related to test witness (Provisional Sum)-(For both scope A &amp; B).</p> <p>We understand that, contractor need not to quote the cost and expenses related to test witness, as it is fixed to USD 140,000/-. Please Confirm.</p>                                                                                                                                                                                              | Your understanding is correct.                                                                                                                                                                                                                                                                     |
| 8  | <p><b>Section-1</b></p> <p>It is preferable that no mid span joint be used in the reconductoring and hence the length of conductor on the drums to be decided by referring to the tower schedule. Request you to please provide Tower Schedules and coordinates of all lines.</p>                                                                                                                                                                                                                                       | It shall be deemed that the design/drawings/other engineering data/documents of the existing equipment /fittings are not available with the employer. All such matters as required shall have to be collected/prepared by the bidder/contractor themselves based on the existing equipment/system. |
| 9  | The total tower numbers 121 in Schedule No.1 mismatched the total tower foundations numbers 122 in Schedule No.4, Please confirm which one is right?                                                                                                                                                                                                                                                                                                                                                                    | Please quote accordingly.                                                                                                                                                                                                                                                                          |
| 10 | There is no spare towers in item "Schedule No.1, 5 Mandatory Spare Parts and Tools", Please confirm whether we need to consider or not?                                                                                                                                                                                                                                                                                                                                                                                 | Please follow the bid document.                                                                                                                                                                                                                                                                    |
| 11 | Please verify that the quantity of Insulator strings in Schedule No.1 (Item 3.1, 3.2, 3.3 and 3.4, as well as Item 3.16 and 4.6), we doubt that the quantity of strings and the quantity of towers do not match.                                                                                                                                                                                                                                                                                                        | Please follow <b>Addendum-1</b> .                                                                                                                                                                                                                                                                  |
| 12 | Please verify that the quantity of Earthwire/OPGW Tension set in Schedule No.1 (Item 3.9and 3.11), we doubt that the quantity of Tension sets and the quantity of tension towers do not match.                                                                                                                                                                                                                                                                                                                          | Please follow the bid document.                                                                                                                                                                                                                                                                    |
| 13 | It's written that Single Conductor per phase on the line in Schedule No.1 Item 2.1, but we understand that it should be Twin ACSR Mallard Conductor from other description, Please clarify that.                                                                                                                                                                                                                                                                                                                        | It will be Single ACSR instead of Twin Mallard. Please follow <b>Addendum-1</b> .                                                                                                                                                                                                                  |

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| 14 | There is no spare Vibration damper for "ACSR Mallard" in item "Schedule No.1, 5 Mandatory Spare Parts and Tools", Please confirm whether we need to consider or not?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Please follow Addendum-1.                                                                                                                                                                                                                                                                                                                                                                                              |
| 15 | If Twin ACSR Mallard Conductor will be considered, we suggest that it should be 210kN twin tension string for item 3.3 in Price Schedule No. 1. Please clarify that.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | It will be Single ACSR instead of Twin Mallard. Please follow <b>Addendum-1</b> .                                                                                                                                                                                                                                                                                                                                      |
| 16 | It's written that 'The existing OPGW/earthwire of each of the transmission lines will remain unchanged except Ishurdi-Dhamrai-Ghorasal (1st East-West Interconnector) 230 kV Double Circuit transmission Line. New OPGW replacing existing GW for Ishurdi-Dhamrai-Ghorasal (1st East-West Interconnector) 230 kV Double Circuit transmission Line.' in Page 10 of Tender Documents Volume 3 of 3. But there is no OPGW in Sch.B1-1. Please clarify is there any OPGW needs to be replaced.                                                                                                                                                                                                                                                                                                                                                                                              | Please follow <b>Addendum-1</b> .                                                                                                                                                                                                                                                                                                                                                                                      |
| 17 | <p><b>5.6.1 Damage</b></p> <p>The Contractor shall pay compensation to the owners/tenants for damages of crops, trees and houses during the project implementation within the wayleaves (right-of-way) which are unavoidable for construction of the transmission line.</p> <p>In Price Schedule, Schedule 4, the Provisional Sum is provided for Payment for Compensation (For resettlement of affected people, dwelling/commercial structures, trees, crops etc. on the Right of Way) and Payment of compensation using private land to construct transmission line towers (based on area of tower footprint).</p> <p>In case of increase in the compensation to be disbursed to affected people from the provisional sum provided in the Price Schedule during the execution of work, we understand that PGCB will reimburse the same as per actuals. we request you to confirm.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 18 | <p><b>Scope B1 - "Reconductoring of Existing Ishurdi-Dhamrai-Ghorasal (1st East West Interconnector) 230 kV Double Circuit Line"</b></p> <p>(i) Please refer item no.2, of Scope B1, Price Schedule No.1 &amp; 2, where it is mentioned as "Suspension type..... (b) new phase conductor (High Capacity ACCC); for below type and kN rating :"</p> <p>From the above, we understand that Hardware fittings given under Item no. 2.1, 2.2, 2.3 &amp; 2.4 are for ACCC Conductor equivalent to ACSR Mallard Conductor. Please confirm.</p> <p>(ii) We understand that in Price Schedule No.1 &amp; 2, there is no requirement of Insulator String / Hardware Fittings and accessories for 'ACCC conductor equivalent to Smooth body ACSR special conductor (27.91mm)'.</p>                                                                                                                | <p>(i) Confirmed.</p> <p>(ii) Your understanding is incorrect. Insulator String / Hardware Fittings and accessories for 'ACCC conductor equivalent to Smooth body ACSR special conductor (27.91mm)' will definitely be required and it is included in the price schedule item "Supply of Hardware fittings". However, the contractor shall be required to supply compatible hardware fittings with 'ACCC conductor</p> |

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|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | equivalent to Smooth body ACSR special conductor (27.91mm)'.                                                                                      |
|          | <b>VOLUME-1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                   |
| <b>1</b> | <p><b>ITB &amp; BDS 18.6</b></p> <p>The prices quoted by the Bidder shall be Adjustable</p> <p>The formula for adjusting the prices and explanatory details are specified in the Special Conditions of Contract (SCC) clause 11.2 and Appendix 2 of Contract Agreement. Bidder shall fill out the Tables of Adjustment Data in section 4 (Bidding forms).</p> <p>Section 9, Appendix - 2 of Volume 1 of 3 : This <b>clause says, price variation is not applicable.</b></p> <p>Please confirm if Price Variation is Applicable for this tender.</p>                                                                                                                                                                                                                                                                                                                                                                   | Price variation is applicable in this project. The clause you quoted has not been mentioned anywhere in Section 9, Appendix - 2 of Volume 1 of 3. |
| <b>2</b> | <p><b>Clause 18.6 (b)</b></p> <p>In the case of Adjustable Price, prices quoted by the Bidder shall be subject to adjustment during performance of the contract to reflect changes in the cost elements such as labor, material, transport, and contractor's equipment in accordance with the procedures specified in the corresponding appendix to the Contract Agreement. A Bid submitted with a fixed price quotation will be treated as nonresponsive and be rejected. The Bidder shall furnish the indexes (e.g. for labor and materials), their weightings and source in the Tables of Adjustment Data included in Section 4 (Bidding Forms). The Employer may require the Bidder to justify its proposed indexes and weightings. Any bid that omits indexes and weightings shall be subject to clarification with the Bidder.</p> <p>We hereby request PGCB to allow bidder's to quote on Firm Basis Also.</p> | Please refer to addendum-1 and follow the bidding documents.                                                                                      |
| <b>3</b> | <p><b>Appendix - 3 of Section 9</b></p> <p>We undersand that, Its not mandatory to get Isurance from Sadharan Bima, Please Confirm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The Contractor shall follow the existing insurance act and related acts of the Government of Bangladesh.                                          |
| <b>4</b> | <p><b>ITB 18.6 (b)</b></p> <p>Here in this clause it is mentioned that "in case of Adjustable Price, prices quoted by the Bidder shall be subject to adjustment during performance of the contract to reflect changes in the cost elements such as labor, material, transport, and contractor's equipment in accordance with the procedures specified in the corresponding appendix to the Contract Agreement. A Bid submitted with a fixed price quotation will be treated as nonresponsive and be rejected.".</p> <p>We have the following clarification in this regards</p> <p>a. As per our understanding the above clause is applicable to all the items for which Price variation is made applicable in Appendix 2 "Price Adjustment" in Section 9 Contract forms. Pls</p>                                                                                                                                      | Your understanding is correct.                                                                                                                    |

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|   | Confirm if the understanding is correct.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                               |
| 5 | <p><b>SCC 9 Contractor's responsibility</b><br/>Here in the newly added clause 9.8 (C) it is written that</p> <p>The Contractor shall (a) establish an operational system for managing environmental impacts, (b) comply with the approved SSEMP and any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the project EMP through the SSEMP, (c) allocate the budget required to ensure that such measures, requirements and actions are carried out, (d) submit semi-annual reports on the compliance of such measures to the Employer</p> <p>For the above, we have the following clarification<br/>a. We understand that the payment for the above SSEMP Implementation and reporting shall be made through Item No. 7.9 "Environmental &amp; Social Services" in Price Schedule No. A4 of Nutan Bidyut Power Plant-Char Fasson 230kV Double Circuit Line. Pls clarify your position in this regard.</p>                             | <p>Your understanding is correct.</p> <p>The bidder shall quote price for the Environmental &amp; Social Services in the item no 7.9. The payment will be made at actual basis upon submission of the required documents.</p> |
| 6 | <p><b>SCC 9 Contractor's responsibility</b></p> <p>A new Clause 9.11 is added<br/>The Contractor shall obtain temporary rights-of-way for the mobilization of materials for the purpose of construction of transmission lines which are necessary for the Works in accordance with the Resettlement Plan (RP). The Employer shall monitor Contractor's activity, secure necessary budget, pay actual compensation cost and ensure timely disbursement of compensation and other entitlements to the Contractor in accordance with the RP and the Development Project Proposal (DPP) as updated from time to time. The Contractor shall obtain, at his risk and cost, any additional rights of way or facilities outside the Site which he may require for the purposes of the Works in accordance with the RP.</p> <p>For the above, we have the following clarification<br/>a. Kindly share the detailed resettlement plan &amp; Development project proposal for the bidders to understand their related Scope and Activities to be performed.</p> | <p>Resettlement Plan (RP) is available for this project in PGCB website.</p>                                                                                                                                                  |
| 7 | <p><b>SCC 47 Environmental Management Plan</b><br/>Here at the end of this clause it is written that<br/>Appendix to SCC (will be provided in PDF form) with the bidding document):</p> <ol style="list-style-type: none"> <li>1. Resettlement Plan (RP)</li> <li>2. Initial Environment Examination (IEE)</li> <li>3. Environment management Plan (EMP)</li> <li>4. Corrective Action Plan (CAP)</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Documents are available for this project in PGCB website.</p>                                                                                                                                                              |

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|    | It is requested to kindly provide the above referred document in PDF Form.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                          |
| 8  | <p><b>Bid Securing Declaration</b></p> <p>Please refer Section-4, Bidding Forms, P.No. 4-17, Volume 1 of the bid docs., where form for Bid Securing Declaration is given; whereas in BDS 21.2 it is mentioned that 'Bid securing Declaration' is not acceptable for this package.</p> <p>We understand that the bidder need not to submit 'Bid Securing Declaration' in the bid.</p> <p>Kindly confirm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Your understanding is correct.                                                                           |
| 9  | <p><b>Volume-1, Section-9, Contract Forms, Appendix 3 – Insurance Requirements</b></p> <p>We understand that it is not mandatory for the Bidder to procure insurance from 'Sadharan Bima Corporation' Bangladesh and Insurance from Indian company is acceptable.</p> <p>Please confirm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The Contractor shall follow the existing insurance act and related acts of the Government of Bangladesh. |
| 10 | <p><b>Taxes &amp; Duties</b></p> <p>As per Clause No. 14 of GCC (Section 7) &amp; SCC (Section 8) of Volume-1 of bidding document, we understand followings.</p> <p>i. Taxes on Plants &amp; Materials from Outside Bangladesh Schedule No.-1</p> <p>We understand that the Income Tax TDS will be paid by the employer directly to the respective authority from his own fund and it will not be deducted from contractor's invoice/payment.</p> <p>ii. Taxes on Design Services, Schedule 3, Installation &amp; Other Services, Schedule No.4 for Transaction between contractor and employer</p> <p>As per Clause No. 14.2.a, SCC, Section-8, Volume-1, we request you to confirm the following understandings:</p> <ul style="list-style-type: none"> <li>Contract Price for Installation &amp; Other Local Services shall be exclusive of applicable VAT.</li> </ul> <p>Kindly confirm.</p> <ul style="list-style-type: none"> <li>If any VAT is applicable, the employer shall bear and deposit the same to the govt. exchequer on behalf of contractor.</li> </ul> <p>Kindly confirm.</p> | Please follow the GCC and SCC Clause No. 14 for Taxes and Duties.                                        |

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|    | <ul style="list-style-type: none"> <li>• Advance Income Tax TDS will not be paid by employer directly from his own fund and it will be deducted from contractor's price. Kindly confirm.</li> </ul> <p>iii. Contractor are responsible for payment of AIT in Price Schedule No.2 and Employer will deduct AIT from each payment amount. However, if local company is supplying towers under International Tender and getting payment in USD, this is deemed to be an export. Therefore, the EPC contractor who supply Materials and Equipments from within the employer's country are also not liable to pay TDS. It means that AIT in the Price Schedule No. 2 will not be deducted by the employer in case of USD contract between contractor and local manufacturer.</p> <p>Is our understanding correct?</p> <p><b>H. Volume 1: Section 8 – SCC Clause 14.2(a)</b></p> <p>In this particular clause it is mentioned that "If any VAT is applicable for any or all of the items under this contract, the Employer shall bear and deposit the same to the govt. exchequer as per prevailing law of the Employer's Country". We have the following clarification in this regards:-</p> <p>i. As per our understanding, the bidders have to quote their prices of the whole contract exclusive of any VAT.</p> <p>Please, Clarify.</p> <p>ii. Kindly Confirm that PGCB shall reimburse all the VAT cost to the contractor as applicable which shall arise in connection with this contract execution.</p> |                                                                                                                                                                                                          |
| 11 | <p><b>Transaction for Goods &amp; Services Procured Locally</b></p> <p>For transaction between Bidder / main Contractor and its local Subcontractor/ Service Provider (for Goods and Services procured locally by Bidder for Price Schedule No.-2, 3, &amp; 4 of respective Lot), please clarify &amp; confirm followings:</p> <p>We understand that VAT for the transaction between main Contractor &amp; its Sub-contractor for back-to-back Subcontract work will also be exempt or reimbursed by PGCB. Please Confirm.</p> <p><b>Payment Terms</b></p> <p>As per Appendix -1, 10% of total CIP amount as an advance payment against receipt of invoice and irrevocable advance payment security.</p> <p>In this regard, your confirmation is required to have a time bound for release of advance payment from the submission of invoices.</p> <p>Since there is no site verification or JMC or cube results to be attached to the advance invoice and the mobilization is fully</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>Your understanding is not correct. Please follow the bidding documents.</p> <p>After getting the Advance Payment Security the advance payment will be released within the shortest possible time.</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                     |
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|  | <p>dependent on this advance payment, can this payment released within a very short duration?</p> <p>ii. Terms of Payment - Eighty Percent (80%)<br/>Supply of Material (Schedule No.1 and Schedule No.2) – PLI Report (Supporting documents for payment).</p> <p>Installation and Other Services (Schedule No.4) – Employer's Authorization (Supporting document for payment).</p> <p>In this regard, we would like to know the duration of issuance of certification by Employer.</p> <p>Please confirm.</p> <p><b>Contract Agreement</b></p> <p>Terms of Payment<br/>As per Clause No. 2.2, Terms of Payment, Section 9, Page 9-5, Volume 1 of 3 of the bid documents, the Employer shall instruct its bank to issue an irrevocable letter of credit made available to the Contractor.</p> <p>Kindly clarify / confirm the specific duration for opening of letter of credit from Contract Effectiveness.</p> <p>Please Confirm.</p> <p><b>ROW</b></p> <p>i. As per Clause 10.2 &amp; 10.3, Employer's responsibilities, GCC &amp; SCC, Volume 1 of 3. The Employer shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way, as specified in the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement. The Employer shall give full possession of and accord all rights of access for transmission line thereto on or before the date(s) specified in that Appendix.</p> <p>We understand that it is the Employer's responsibility for acquiring and providing legal and physical possession of the Site and access thereto.</p> <p>Please Confirm.</p> <p>Since the Employer shall give full possession of and accord all rights of access, Contractor shall not be responsible for any Right of Way for foundation nor for stringing corridor.</p> <p>Please Confirm.</p> <p>What is the current status of Right of Way?</p> <p>Kindly arrange to provide.</p> <p><b>Bid Security</b></p> | <p>Certification will be provided within the shortest possible time subject to getting all the compliant documents from the Contractor.</p> <p>Letter of Credit will be opened within the shortest possible time subject to getting all the compliant documents from the Contractor.</p> <p>Bidders are requested to visit the site to assess the Right of Way.</p> |
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|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
|    | <p>As per ITB &amp; BDS Clauses 21.1, Volume 1 of the bid documents, we understand that the bidder can submit the bid security issued from any financial institution or bank from India and it is not mandatory to issue bid security from Employer's country.</p> <p>Please clarify &amp; confirm.</p> <p><b>Affiliate Company Guarantee</b></p> <p>Please refer Section-4, Bidding Forms, Pg. No. 4-29, Volume 1 of the bid docs., where form for 'Affiliate Company Guarantee' is given; whereas in BDS 35.2 it is mentioned that 'qualifications of firms such as Bidder's subsidiaries, parent entities, affiliates, subcontractors shall not be permitted'.</p> <p>We understand that the bidder need not to submit 'Affiliate Company Guarantee' Form in the bid.</p> <p>Kindly confirm.</p> <p><b>Identification number of the OCB</b></p> <p>As per BDS Clause 1.1, Volume 1 of the bid documents, we understand that the OCB No. is "PGCB/ADB/L3683-BAN/SWTGEP/230kV&amp;132kV/TL", whereas in Price Schedule, Volume-3 in the header Contract No. mentioned as "PGCB/ADB/51137-BAN/SWTGEP/230kV&amp;132kV/TL".</p> <p>Kindly request you to please amend the Contract No. as "PGCB/ADB/L3683-BAN/SWTGEP/230kV&amp;132kV/TL" in Volume-3, Price Schedule and provide revised Price Schedule with amendment.</p> | <p>Your understanding is correct.</p> <p>Please follow <b>Addendum-1</b>.</p> |
| 12 | <p><b>Appendix 2- Price Adjustment, Page 9-13, g.</b></p> <p>Any payments resulting from price adjustments will be settled at the end of contract.</p> <p>Considering the market volatility, We request you to amend the above clause as "Any payments resulting from price adjustments will be settled at end of every quarter.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Please follow the bid document.</p>                                        |
| 13 | <p><b>Re-conductoring Work of 230 kV DC Ishwardi To Ghorasal Transmission Line</b></p> <p>During site survey of 'Reconductoring of 230 kV DC Ishwardi-Ghorasal Transmission Line', we have come across some major observations as listed below which needs to be clarified:-</p> <p>(i) For Paying the conductor, necessary corridor clearance is required and for that the bidder has the facility of Trimming &amp; Cutting, but corridor clearance in old transmission line is not practically feasible as the same involve huge compensation.</p> <p>Hence, please clarify about necessary 'Corridor Clearance'.</p> <p>(ii) ROW should be huge for this transmission line, therefore,</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>PGCB will provide necessary administrative support for ROW issues.</p>     |

|  |                                                                                                                                                                                   |  |
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|  | <p>we require necessary support from PGCB for providing administrative support.</p> <p>Kindly confirm that PGCB will provide necessary administrative support for ROW issues.</p> |  |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

The above mentioned clarification will form part of the Bidding Documents.

-End-

A. R.



# POWER GRID COMPANY OF BANGLADESH LIMITED (PGCB)

## Construction of Notun Bidyut Power Plant-Char Fasson 230kV Transmission Line and Reconductoring of 230kV & 132kV Transmission Lines on Turnkey Basis (Package-7) (Contract No. PGCB/ADB/L3683-BAN/SWTGEP/230kV&132kV/TL)

### ADDENDUM NO. 1

(Date: June 05, 2022)

Following revisions/changes are made in the Bidding Document which will form part of the Bidding Document:

#### Volume 1 of 3

#### 1. Section 9: Contract Forms, Page-9-12 & Page-9-13

- (i) The text "OPGW" shall be deleted from Page-9-12 & Page-9-13.
- (ii) Paragraph (f) shall be deleted from Page-9-13 and the text "g" shall be replaced by the text "f".

#### Volume 2 of 3

#### 1. Section 11. Conductors, Clause 11.7.6 Acceptance Tests, Page 11-13

"Clause 11.7.6-Acceptance Tests" is replaced with the following:

##### **11.7.6 Acceptance Tests**

| <b>a) ACCC Conductor</b> |                                                                                         |                     |
|--------------------------|-----------------------------------------------------------------------------------------|---------------------|
| i)                       | Visual and dimensional check on drum                                                    | : As per Annex 11.4 |
| ii)                      | Visual check for joints scratches etc. and length measurement of conductor by rewinding | : As per Annex 11.4 |
| iii)                     | Dimensional check on core/core strands and Aluminium or Aluminium Alloy strands         | : As per Annex 11.4 |
| iv)                      | Check for lay-ratios of various layers                                                  | : As per Annex 11.4 |
| v)                       | Breaking load test on core/core strands and aluminium/Aluminium alloy strands           | : As per Annex 11.4 |
| vi)                      | Minimum conductivity test on Aluminium/thermal resistant Aluminium Alloy strands        | : As per IEC 60889  |
| vii)                     | Procedure qualification test on welded joint of Aluminium/ Aluminium Alloy strands      | : As per Annex 11.4 |
| viii)                    | Heat resistant test on Aluminium Alloy strands                                          | : As per Annex 11.4 |
| ix)                      | Glass transition temperature test for composite core                                    | : As per Annex 11.4 |

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| x)                                                                                                                                                                                                                                                                                                                                                                                                   | Galvanic layer thickness test for composite core                                        | : As per Annex 11.4                                                                                                                                                                                                                                                                                         |
| xi)                                                                                                                                                                                                                                                                                                                                                                                                  | DC resistance test on aluminium/Aluminium alloy strands                                 | : As per Annex 11.4                                                                                                                                                                                                                                                                                         |
| xii)                                                                                                                                                                                                                                                                                                                                                                                                 | Bending test on composite core                                                          | : As per Annex 11.4                                                                                                                                                                                                                                                                                         |
| xiii)                                                                                                                                                                                                                                                                                                                                                                                                | Torsional Ductility Test                                                                | : As per Annex 11.4                                                                                                                                                                                                                                                                                         |
| xiv)                                                                                                                                                                                                                                                                                                                                                                                                 | Flexural Strength Test (for polymer composite core only)                                | : As per Annex 11.4                                                                                                                                                                                                                                                                                         |
| All the tests to be performed on composite core shall be carried out in as manufactured conditions before dispatch of composite core. Two engineers of PGCB will carry out the witnessing of these tests on 5% reels of each lot/shipment. Tenderers are requested to refer to clause 18.1.11.1 in this regard. All costs of such tests and witness shall deem to be included in the contract price. |                                                                                         |                                                                                                                                                                                                                                                                                                             |
| <b>(a) ACSR Conductor</b>                                                                                                                                                                                                                                                                                                                                                                            |                                                                                         |                                                                                                                                                                                                                                                                                                             |
| i)                                                                                                                                                                                                                                                                                                                                                                                                   | Visual and dimensional check on drum                                                    | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| ii)                                                                                                                                                                                                                                                                                                                                                                                                  | Visual check for joints scratches etc. and length measurement of conductor by rewinding | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| iii)                                                                                                                                                                                                                                                                                                                                                                                                 | Dimensional check on steel and aluminium/Aluminium alloy strands                        | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| iv)                                                                                                                                                                                                                                                                                                                                                                                                  | Check for lay-ratios of various layers                                                  | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| v)                                                                                                                                                                                                                                                                                                                                                                                                   | Galvanic layer thickness test for steel strands                                         | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| vi)                                                                                                                                                                                                                                                                                                                                                                                                  | Torsion and Elongation tests on steel strands                                           | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| vi)                                                                                                                                                                                                                                                                                                                                                                                                  | Breaking load test on steel and aluminium/Aluminium alloy strands                       | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| vi)                                                                                                                                                                                                                                                                                                                                                                                                  | Wrap test on steel and aluminium/Aluminium alloy strands                                | : IEC 60888 and IEC 60889                                                                                                                                                                                                                                                                                   |
| vii)                                                                                                                                                                                                                                                                                                                                                                                                 | DC resistance test on aluminium/Aluminium alloy strands                                 | : IEC 60889                                                                                                                                                                                                                                                                                                 |
| viii)                                                                                                                                                                                                                                                                                                                                                                                                | Procedure qualification test on welded joint of Aluminium/Aluminium Alloy strands       | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| ix)                                                                                                                                                                                                                                                                                                                                                                                                  | Barrel batten strength test                                                             | : As per Annex 11.4a                                                                                                                                                                                                                                                                                        |
| x)                                                                                                                                                                                                                                                                                                                                                                                                   | Drop point of grease                                                                    | ASTM D 566                                                                                                                                                                                                                                                                                                  |
| xi)                                                                                                                                                                                                                                                                                                                                                                                                  | Verification of conductor length                                                        | The Employer reserves the right to verify the length of conductor after unreeling at least Five percent (5%) to ten percent (10%) of the drums in a lot offered for inspection. The actual quantity will be discussed and mutually agreed to by the Supplier & Employer in the Quality Assurance Programme. |

**2. Section 11. Conductors, Annex 11-1(4):230kV (River crossing Portion), Page 11-18, 11-19**

“Annex 11-1(4):230kV (River crossing Portion)” is replaced with the following:

**Annex 11-1(4):230kV (River crossing Portion)**

| Conductor                                                    | Phase                       | Earthwires |                        |
|--------------------------------------------------------------|-----------------------------|------------|------------------------|
| Designation<br>(Code Name)                                   | ACCC ULS DRAKE or<br>equiv. | 19x3.67    | 19x3.67<br>equiv. OPGW |
| Type                                                         | ACCC                        | 20SA       | -                      |
| Reference standards                                          | ASTM/IEC/BSEN               | IEC 61232  | IEC, ITU, IEEE         |
| Aluminium/Aluminium alloy grade                              | 1350 O                      | -          | -                      |
| Steel grade                                                  | -                           | -          | -                      |
| Galvanising Thickness                                        | -                           | -          | -                      |
| Aluminium class (AS wire)                                    | -                           | -          | -                      |
| Aluminium type (AS wire)                                     | -                           | -          | -                      |
| Conductor max. continuous operating temperature (°C)         | 180                         | -          | 20SA                   |
| Minimum mass of grease (kg/km)                               | -                           | 12         | -                      |
| Creep period of conductor to be considered (years)           | -                           | -          | -                      |
| No. and diameter of aluminium wire (No./mm)                  | -                           | -          | -                      |
| No. and diameter of steel wire (No./mm)                      | -                           | -          | -                      |
| Overall diameter of conductor (mm)                           | Max. 28.14 mm.              | 18.35      | Not applicable         |
| Overall Cross sectional area of conductor (mm <sup>2</sup> ) | 591.0 (Nom)                 | -          | 158                    |
| Rated tensile strength of conductor (kN)                     | 212.2                       | -          | -                      |
| Weight (kg/km)                                               | 1560.9 (Nom)                | -          | -                      |
| Direction of external lay                                    | Right hand                  | Right hand | Right hand             |
| Cross Sectional Area of Al (mm <sup>2</sup> )                | 519.7 (Nom)                 | -          | -                      |
| Cross Sectional Area of Composite Core (mm <sup>2</sup> )    | 71.30 (Nom)                 | -          | -                      |
| No. of Composite Core (mm)                                   | 1                           | -          | -                      |
| Shape of wires                                               | All trapezoidal             | Round      | Round                  |
| Diameter of Composite Core (mm)                              | 9.53 (Nom)                  | -          | -                      |
| Rated tensile strength of core (kN)                          | 183.3                       | -          | -                      |
| Current carrying capacity at 180 Deg C                       | 1774 A                      | -          | -                      |
| Max. allowable emergency operating temp. (Deg C)             | 200                         | -          | -                      |
| Nominal DC Resistance at 20 Deg C (ohm/km)                   | 0.0536                      | -          | 0.323                  |

Note:

(i) Number and diameter of the aluminium strands will depend on the conductor manufacturer. The manufacturer must show the aluminum cross-section meets the nominal cross-sectional area shown.

(ii) 40degC ambient, 0.61m/sec wind, 1033 W/sq.m sun

(iii) Absorptivity 0.9 and Emissivity 0.7

**3. Section 6, Survey, Profile, Geotechnical Investigation**

(i) Article 6.4.2.5 will be replaced by the following:

After reaching the minimum depth, the test may be continued as per the contractor's design requirement by recording SPT at an interval of 1.5m. However, the test may be discontinued before reaching the minimum depth, if contractor's design requirement satisfies and 3 consecutive recorded SPT for normal locations and 5 consecutive recorded SPT for river crossing & special locations at 1.5m intervals is minimum 50. At the level where the test is discontinued, the number of blows and the corresponding penetration shall be reported. No extra payment shall be made for any of the cases.

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Sufficient quantity of disturbed soil samples shall be collected from the split spoon sampler for identification and laboratory testing. The sample shall be visually classified and recorded at the site as well as properly preserved without loss of moisture content and labelled.

(ii) Article 6.4.3.3 Undisturbed Samples will be replaced by the following:

In each borehole, undisturbed samples shall be collected at every change of strata and at depths as follows:

| Location                                      | Depths (m)                                                                                                                                                                               |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Normal Soils for open cast foundations        | 1.0, 4.0, 6.0, 8.0, 10.0 m                                                                                                                                                               |
| Pile foundation locations & special locations | 1.0, 2.5, 4.0, 5.5, 7.0, 8.5, 10.0 m<br>and thereafter at the rate of 3 m intervals up to 30 m for<br>normal soil conditions and up to 60 m at river crossings<br>and special locations. |

The spacing between the top levels of undisturbed sampling and standard penetration testing shall not be less than 1.0 m. Undisturbed samples shall be of 100mm diameter and 450mm in length. Samples shall be collected in a manner to preserve the structure and moisture content of the soil Accessories and sampling procedures shall conform to BS 5930.

(iii) Article 6.8 Morphological Study of Rivers will be replaced by the following:

Morphological study should be conducted for the rivers which are crossed by transmission line or the rivers that run parallel/close to transmission line. The study shall be carried out by a specialist firm/person appointed by the Contractor in consultation with the Employer's Engineer. Duely sealed and signed study report shall be submitted by the Contractor for Employer's review and approval.

The study report shall include the following:

- Geological information of the study area including geomorphology, geological structure, etc.
- Study area should cover at least 2(two) kilometers in upstream and 2 (two) kilometers in downstream stream from the proposed transmission line.
- Collection and processing of historical data & maps, satellite images, hydrological data (water level, discharge), including the Highest Flood Level (HFL) of the rivers (within the study area) for at least past 20 years.
- Prediction about possible future development/shifting of the rivers within the study area (forecast for at least 50 years).
- Assessment of erosion-accretion over time and sedimentation processes of the rivers.
- Analysis and Identification of riverbank erosion vulnerable areas.
- Bathymetric survey shall cover at least 0.5 kilometers in upstream and 0.5 kilometers in downstream stream from the proposed transmission line.
- Maximum design discharge, maximum water velocity, particle size of riverbed, silt factor, width of rivers at crossing locations, depth of river bed, Highest & lowest water level at tower/pole locations, Nature of river flow (perineal or non-perineal) and seasonal variations of the river (Discharge, Velocity, depth and width).
- Reduced Level (RL) of existing ground, highest water level and maximum scour depth for every finally proposed tower/pole location shall be mentioned with respect to Mean Sea Level (MSL).

- j. Maximum scour depth shall be calculated following IRC: 78-2014 or updated guideline at each finally proposed tower/pole location.
- k. Necessary input data required to calculate velocity attack and wave attack on the structures.
- l. Chemical analysis of water samples (Sulphate content, Calcium Content, Chloride content, Total Dissolved solids in water).
- m. Past observations and historical data, if available, for the area or for near other areas with soil profile, or with similar structures in the surrounding areas.

Based on the study and analysis, any required shifting of the proposed line or part thereof or any tower/pole location/locations shall be done by the contractor to find a best suitable route and tower location for the river crossing section of the transmission line. Any other data/force (not mentioned here) which are necessary for river crossing tower/pole foundation design of the transmission line, shall be collected by the contractor.

#### **4. Section 7, Foundation**

(i) Article 7.1.3 Foundation Types and Uses will be replaced by the following:

The foundation shall be of open cast type and / or piles type (e.g. bored piles, precast piles, helical piles etc). Plain Cement Concrete/Reinforced Cement Concrete footing shall be used for all type of normal towers/poles. All the four footings of the tower and their extensions shall be similar for a particular location, except where soil condition and or water table are different at different legs. The minimum depth of foundation, below ground level shall generally be 3.0 meters. For Hard Rock type and also where specific site conditions / properties demand foundation of different depths (lower or higher), the same shall be adopted. Further, for multi circuit tower foundations, foundation depth shall be 3.5 meters and for river crossing open cast foundations, the foundation depth shall be more than 3.5 meters.

Foundations for towers/poles for different categories of soil conditions shall be selected from the approved types detailed in Appendix 7.A1.

Reinforced concrete pile caps shall be used for all types of piles.

Unless specified to the contrary, foundations for angle/terminal towers/poles shall not have different designs for compression and tension footings, but shall be satisfactory for the most adverse condition of maximum and minimum angles of deviation/entry and with the wind blowing from the most onerous direction.

(ii) Article 7.1.4.4 Raised Chimney will be replaced by the following:

Chimney of foundation may be raised at high water level area to keep the steel part of the tower/pole away from water.

The contractor shall confirm the water level and adjust the foundation setting level to meet the requirement. Such foundation site shall be dewatered by pumping or other approved means during excavation, all other necessary arrangements to perform the foundation work in water-logged condition, concrete works and backfilling works. Those costs shall be deemed to be considered in the Contractor's expense.

A K

If raised chimney is required at any location, stubs required for that raised chimney will have to be designed by the contractor subject to approval by the Employer. Such costs shall be deemed to be included in the contract price.

Depending on the highest flood level (HFL), raised chimney may vary from 1m to 6m in one meter increment but maximum height of raised chimney shall be restricted to 6m irrespective of HFL. The Contractor shall submit his proposed method of installation and Q.C. procedures to the Engineer prior to commencing his design. This is a **Hold Point**.

(iii) Article 7.1.4.6 River Crossing Foundations will be replaced by the following:

The location of both river crossing tower/pole, anchor tower/pole and any other tower/pole near the river, should be finalized based on hydro and geo-morphological study of the selected rivers (See APPENDIX A7.9). If river crossing tower/pole, anchor tower/pole and any other towers/poles go into the river due to shifting of river in future, then foundation of those towers/poles shall be treated as foundations on midstream of river and foundation of those towers/poles shall be river crossing foundation. If any other type of tower/towers and pole/poles is/are required to be spotted near/parallel to any river, then based on morphological study foundation of those tower/towers and pole/poles shall be treated same as described above. Foundation of these types of tower/pole shall be pile supported. The pile shall be designed considering an unsupported height equal to depth of river bed from (HFL) plus allowance for scour depth. Skin friction for unsupported height shall be considered zero in calculating the pile capacity in this regard. All required data to calculate the scour depth shall be collected and managed by bidder themselves. Scour depth shall be calculated as per IRC 78 (2014 or latest version) guidelines (APPENDIX A7.10). During design of such foundations, ship impact should be considered (APPENDIX 7.A11). Bangladesh/International codes in this regard should be followed. If permanent casing is required for pile casting upto any depth, the contractor shall consider its cost within the quoted price. For any reason, no extra payment shall be made beyond the quoted price of river crossing tower/pole foundation.

Top of chimney of this type of tower/pole shall be at least 450mm above highest flood level. The Contractor has to assess the river erosion and has to perform the foundation works within the quoted price even if the tower/pole location found under water during execution stage.

(iv) Article 7.2.6.3 will be replaced by the following:

The top of chimney of tower/pole foundation shall be as per **Appendix 7.A8** to this Section.

(v) In APPENDIX 7.A8 item no. (iii) will be added as follows:

(iii) The top of chimney of pole foundation shall be at least 450 mm above nominal ground level. In case of pile foundation pile cap shall be at least 450 mm below nominal ground level for standard chimney.

For pre-designed towers/poles foundation, existing drawings may require to be modified in this regard.

(vi) Article 7.3.3 will be added after article 7.3.2 Construction of Bored Cast In-Situ Pile foundation as follows:

*A* *K*

### 7.3.3 Construction of Other Pile foundation

7.3.3.1 The Contractor shall submit the construction methodology, installation procedure with drawings, Quality Control procedure, Standards and Codes of Practices to be followed, advantages of selecting such type of piles, etc. Reinforced concrete pile caps shall be used for all types of piles. Payments of all types of foundations shall be as per prices quoted in the Price Schedule.

(vii) Article 7.4.9 will be replaced by the following:

#### 7.4.9 Holding Down Bolts

Foundation shall be design for holding down bolt considering steel failure, pullout, concrete breakout, concrete splitting, side face blowout, bond failure etc. as per ACI 318 (Latest version).

(viii) Article 7.4.1.1 will be replaced by the following:

#### 7.4.1.1 Works Cubes

Compliance with the specified characteristic strength shall be based on tests made on cubes at twenty eight days. Cubes shall be made, cured and tested in accordance with BS EN 12350-1. Samples of Concrete shall be taken at the point of discharge from the delivery vehicle.

Unless otherwise directed by the Engineer for sampling of working cubes Annexure 3-6(5) shall be followed.

In preparation of test cubes/specimens vibrators shall not be used.

Concrete shall be tested for slump at every 1 hour interval.

Each set of cubes shall be accompanied by a certificate noting the details required by BS EN 12350-1.

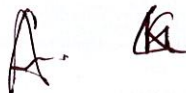
Cubes shall be tested in accordance with BS EN 12350-1 to determine the density and characteristic strength as follows:

- (a) One cube shall be tested at seven days to provide an early indication as to whether the twenty eight day strength is likely to be achieved;
- (b) Two cubes shall be tested at twenty eight days, the average strength shall be deemed the test results;

The test report shall provide information in accordance with BS EN 12350-1.

Concrete shall be assumed to have achieved its characteristic strength when, at twenty eight days, the conditions specified in BS 8500 and BS EN 206 are met.

Copies of the test reports shall be made available to the Engineer on a regular basis. This is a **Notification Point**.

Two handwritten signatures in dark ink, one appearing to be 'A' and the other 'K'.

The Employer will consider whether the concrete in the Works represented by cubes falling below the limits laid down can be accepted, and he may order that any or all of the following, actions shall be taken:

- i) Penetration resistance or surface hardness tests;
- i) The drilling of test cylinders in the concrete and testing the samples to destruction by compression;
- ii) The cutting out and replacement of such volumes at their discretion which they consider to be defective;

(ix) APPENDIX 7.A1 will be replaced by the following:

#### APPENDIX 7.A1

#### FOUNDATION TYPES & USES

| Soil Category | Allowable Foundation Type                     |
|---------------|-----------------------------------------------|
| 1             | Concrete Pad & Chimney/<br>Cast in situ Pile* |
| 2             | Concrete Pad & Chimney/<br>Cast in situ Pile* |
| 3             | Concrete Pad & Chimney/<br>Cast in situ Pile* |
| 4             | Concrete Pad & Chimney/<br>Cast in situ Pile* |

- \* The bidder may propose any other proven type of piled foundation instead of Cast in Situ Piled foundation except wooden pile. The bidder shall submit the design of the proposed type of piled foundation along with detailed design calculation, installation procedure with drawings, Quality Control procedure, Standards and Codes of Practices to be followed, advantages of selecting such type of piles, etc. in execution stage. Reinforced concrete pile caps shall be used for all types of piles. The Contractor has to submit relevant documents/drawings for approval of the Employer. **This is a Hold Point.**  
Payments of all types of foundations shall be as per prices quoted in the Price Schedule.

(x) APPENDIX 7.A4 will be replaced by the followings:

#### GEOTECHNICAL PARAMETERS

| Parameter | Soil Category |
|-----------|---------------|
|-----------|---------------|

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|                                                           |                                                                                             | 1                                                       | 2                         | 3                                 | 4                                         |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------|-----------------------------------|-------------------------------------------|
| Soil classification                                       |                                                                                             | Dense sand or very stiff hard clay                      | Medium sand or stiff clay | Loose sand or soft to medium clay | Very loose sand or very soft to soft clay |
| SPT "N" blows                                             |                                                                                             |                                                         |                           |                                   |                                           |
| 1.                                                        | Average SPT from existing ground level to 75% of length of pile in case of pile foundation  | >20                                                     | 10-20                     | 5- <10                            | <5                                        |
| 2.                                                        | Average SPT of top 5 meter soil from existing ground level case of pad & chimney foundation |                                                         |                           |                                   |                                           |
| Water level (for design purpose)                          |                                                                                             | At (depth of foundation + width of foundation) from EGL | At ground level           |                                   |                                           |
| Soil density                                              | kN/m <sup>3</sup>                                                                           | 16                                                      | 8                         | 7.5                               | 7                                         |
| Backfill density                                          | kN/m <sup>3</sup>                                                                           | 16                                                      | 8                         | 7.5                               | 7                                         |
| Concrete Density                                          | kN/m <sup>3</sup>                                                                           | 24                                                      | 14                        | 14                                | 14                                        |
| Allowable bearing pressure under ultimate applied loading | kN/m <sup>3</sup>                                                                           | CLAY                                                    | 250                       | 150                               | 75                                        |
|                                                           |                                                                                             | SAND                                                    | 350                       | 250                               | 120                                       |
| Lateral earth pressure (for shallow foundation)           | kN/m <sup>3</sup>                                                                           | Rankine's theory of earth pressure is applicable        |                           |                                   |                                           |
| Frustum angle (degrees to vertical)                       |                                                                                             | 15                                                      | 15                        | 10                                | 0                                         |

| Parameter                                                      | Any Soil Category                                                                                            |  |                                                                                                                             |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------|
| <u>For sandy soil</u>                                          |                                                                                                              |  |                                                                                                                             |
| Ultimate skin friction = $\frac{1}{2} K_s p_d \tan \delta A_s$ |                                                                                                              |  | where                                                                                                                       |
|                                                                |                                                                                                              |  | $p_d$ = effective overburden pressure;                                                                                      |
| Bored piles $K_s$                                              | 0.7                                                                                                          |  | $\phi$ = angle of shearing resistance                                                                                       |
| $\delta$                                                       | $\Phi$                                                                                                       |  | $A_s$ = surface area of pile shaft (m <sup>2</sup> )                                                                        |
| Driven piles: Steel $K_s$                                      | 0.5                                                                                                          |  |                                                                                                                             |
| $\delta$                                                       | 20°                                                                                                          |  |                                                                                                                             |
| Concrete $K_s$                                                 | 1.0                                                                                                          |  |                                                                                                                             |
| $\delta$                                                       | $\frac{3}{4} \Phi$                                                                                           |  |                                                                                                                             |
| <u>For clay soil</u>                                           |                                                                                                              |  |                                                                                                                             |
| Ultimate skin friction = $\alpha C_U A_s$                      | $\alpha$ = 1.0 for $N < 4$<br>= 0.8 for $4 \leq N < 8$<br>= 0.6 for $8 \leq N < 15$<br>= 0.4 for $N \geq 15$ |  | where<br>$\alpha$ = attachment coefficient<br>$C_U$ = Undrained shear strength<br>$N$ = Average SPT for a particular layer. |

**APPENDIX 7.A4 (Continued)****Minimum Factor of safety for Foundations:**

| Parameter                                                                                                                                                                                             | Requirement |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Minimum factor of safety for pad & chimney and piles or drilled shafts i.e. Ultimate resistance to allowable load<br>(For all types of soil categories)                                               | 1.5         |
| Minimum percentage of ultimate uplift load ( <b>without foundation strength factor</b> ) to be resisted by submerged dead weight of piles & pile cap<br>(For soil category 4 of pile foundation only) | 28%         |

(xi) APPENDIX 7.A9 will be replaced by the following:

**APPENDIX 7.A9****FOR THE FOLLOWING RIVERS MORPHOLOGICAL STUDY HAVE TO BE CONDUCTED:**

| Name of transmission line                                                    | Name of river                      | Approximate width of river (m) |
|------------------------------------------------------------------------------|------------------------------------|--------------------------------|
| Nutan Bidyut Power Plant–Char Fasson 230 kV double circuit transmission line | Borhan Uddin (Near Polwer Station) | 90                             |

(xii) Annex 3-6(5) will be replaced by the following

**Annex 3-6(5): Acceptance Criteria and Permissible Limits for Concrete Work**

|    |          |                         |                                                                                                                                                                                       |
|----|----------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) | Concrete | a) Workability          | Slump shall be recorded by slump cone method and it shall be between 50-100 mm for pile cap and chimney, 150mm to 200mm for concrete pile.                                            |
|    |          | b) Compressive strength | One set for each leg of tower. Two set for Pile caps & Chimney at each location. Each set consists of three cubes, one for 7 days testing and two for 28 days testing shall be taken. |

(xiii) In "Annex 3-5: Field Quality Plan for Transmission Lines" table, No. 5 Pile foundations will be replaced by the following:

|    |                  |                                                                     |                                                                          |                                     |                                                                                                                              |                                                                                  |                                                                                                                                        |                    |
|----|------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 5. | Pile foundations | 1. All materials like cement, steel, coarse / fine aggregate, water | To be tested as per procedure enumerated in the respective columns above |                                     |                                                                                                                              |                                                                                  |                                                                                                                                        |                    |
|    |                  | 2. Before concreting                                                | 1. Check for centre line of each pile                                    | Approved Drawings                   | Contractor                                                                                                                   | 100%                                                                             | 100%                                                                                                                                   | Site Engr.         |
|    |                  |                                                                     | 2. Check for diameter /verticality of each pile                          | -do-                                | -do-                                                                                                                         | -do-                                                                             | -do-                                                                                                                                   | -do-               |
|    |                  |                                                                     | 3. Check for depth of each pile                                          | -do-                                | -do-                                                                                                                         | -do-                                                                             | -do-                                                                                                                                   | -do-               |
|    |                  | 3. During concreting                                                |                                                                          |                                     |                                                                                                                              |                                                                                  |                                                                                                                                        |                    |
|    |                  | a. Workability                                                      | 1. Slump test                                                            | 150-200mm as per Employer's Specif. | Contractor                                                                                                                   | For each pile                                                                    | 100% at field                                                                                                                          | Site ENGINEER      |
|    |                  | b. Concrete strength                                                | 2. Cubes compressive strength                                            | As per Employer's specifications    | Contractor. One set of cubes (min. 3 pieces) to be taken and tested for 7 & 28 days strength at Employer-approved laboratory | One set for each leg of tower. Two set for Pile caps & Chimney at each location. | 100% cubes for piles, 20% pile caps, beams, chimney etc. to be taken in presence of Employer's officials. 100% review of test results. | Section in charge. |

(xiv) Following drawing list will be added below article 22. Bid Drawings:

|       |                                                  |                                                                                             |
|-------|--------------------------------------------------|---------------------------------------------------------------------------------------------|
| (2)   | Towers/Pole Foundation Drawing                   |                                                                                             |
| 2.1   | 230kV Double Circuit Towers (High Wind Zone)     |                                                                                             |
| (i)   | PGCB/G-G/B(N)-P/2DL/FDN/Cat-2, Rev:0, Sheet: 1/1 | Tower Type-2DL+12M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -02 |
| (ii)  | PGCB/G-G/B(N)-P/2DL/FDN/Cat-3, Rev:0, Sheet: 1/1 | Tower Type-2DL+12M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -03 |
| (iii) | PGCB/G-G/B(N)-P/2DL/FDN/Cat-4, Rev:0, Sheet: 1/1 | Tower Type-2DL+12M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -04 |
| (iv)  | PGCB/G-G/B(N)-P/2D1/FDN/Cat-2, Rev:0, Sheet: 1/1 | Tower Type-2D1+25M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -02 |
| (v)   | PGCB/G-G/B(N)-P/2D1/FDN/Cat-3, Rev:0, Sheet: 1/1 | Tower Type-2D1+25M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -03 |
| (vi)  | PGCB/G-G/B(N)-P/2D1/FDN/Cat-4, Rev:0,            | Tower Type-2D1+25M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -04 |

|            |                                                             |                                                                                                      |
|------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|            | Sheet: 1/1                                                  |                                                                                                      |
| (vii)      | PGCB/G-G/B(N)-<br>P/2D25/FDN/Cat-2, Rev:0,<br>Sheet: 1/1    | Tower Type-2D25+15M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -02         |
| (viii)     | PGCB/G-G/B(N)-<br>P/2D25/FDN/Cat-3, Rev:0,<br>Sheet: 1/1    | Tower Type-2D25+15M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -03         |
| (ix)       | PGCB/G-G/B(N)-<br>P/2D25/FDN/Cat-4, Rev:0,<br>Sheet: 1/1    | Tower Type-2D25+15M<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -04         |
| (x)        | PGCB/G-G/B(N)-<br>P/2DT6(A)/FDN/Cat-2, Rev:0,<br>Sheet: 1/1 | Tower Type-2DT6+15M (Angle)<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -02 |
| (xi)       | PGCB/G-G/B(N)-<br>P/2DT6(A)/FDN/Cat-3, Rev:0,<br>Sheet: 1/1 | Tower Type-2DT6+15M (Angle)<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -03 |
| (xii)      | PGCB/G-G/B(N)-<br>P/2DT6(A)/FDN/Cat-4, Rev:0,<br>Sheet: 1/1 | Tower Type-2DT6+15M (Angle)<br>Detail Drawing of Piling and Pilecap Foundation For Soil Category -04 |
| <b>2.2</b> | <b>230kV Pole Foundation</b>                                |                                                                                                      |
| (i)        | PGCB/JICA-6/2DLP/02,<br>Rev:00, Sheet 1 of 1                | Detailing drawing of pile and pilecap foundation or pole type 2DLP : Soul<br>Category 2              |
| (ii)       | PGCB/JICA-6/2DLP/03,<br>Rev:00, Sheet 1 of 1                | Detailing drawing of pile and pilecap foundation or pole type 2DLP : Soul<br>Category 3              |
| (iii)      | PGCB/JICA-6/2D1P/02,<br>Rev:00, Sheet 1 of 1                | Detailing drawing of pile and pilecap foundation or pole type 2D1P : Soul<br>Category 2              |
| (iv)       | PGCB/JICA-6/2D1P/03,<br>Rev:00, Sheet 1 of 1                | Detailing drawing of pile and pilecap foundation or pole type 2D1P : Soul<br>Category 3              |
| (v)        | PGCB/JICA-6/2D25P/02,<br>Rev:00, Sheet 1 of 1               | Detailing drawing of pile and pilecap foundation or pole type 2D25P : Soul<br>Category 2             |
| (vi)       | PGCB/JICA-6/2D25P/03,<br>Rev:00, Sheet 1 of 1               | Detailing drawing of pile and pilecap foundation or pole type 2D25P : Soul<br>Category 3             |
| (vii)      | PGCB/JICA-6/2DT6P/02,<br>Rev:00, Sheet 1 of 1               | Detailing drawing of pile and pilecap foundation or pole type 2DT6P : Soul<br>Category 2             |
| (viii)     | PGCB/JICA-6/2DT6P/03,<br>Rev:00, Sheet 1 of 1               | Detailing drawing of pile and pilecap foundation or pole type 2DT6P : Soul<br>Category 3             |
| (ix)       | PGCB/JICA-6/2D9P/02,<br>Rev:00, Sheet 1 of 1                | Detailing drawing of pile and pilecap foundation or pole type 2D9P : Soul<br>Category 2              |
| (x)        | PGCB/JICA-6/2D9P/03,<br>Rev:00, Sheet 1 of 1                | Detailing drawing of pile and pilecap foundation or pole type 2D9P : Soul<br>Category 3              |

### Volume 3 of 3

#### **(1) Schedule-A, Section 1, Annex 1-1: Scope and Extent of Definite Works**

Clause 2(f) will be replaced by the following:

- f. The generic foundation drawings are provided in the bid documents (Volume 2, chapter 22). Bidder has to review the provided design and take complete responsibility for the tower foundation. All the dimensions of tower foundation in provided drawings shall be treated as minimum. In case any modification needed for the tower foundation, the bidder has to assess the same based on technical

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specification. In such case, the Bidder has to submit relevant documents/drawings for approval of the Employer. Otherwise Bidder has to submit provided drawing for release from the Employer.

Pile reactions are provided in corresponding drawings. Bidder has to design actual length of piles for each tower location based on soil investigation report.

Any foundation not available in the provided drawings by Employer has to be designed by Bidder. Hence, Bidder has to submit designed documents/drawings for approval of the Employer.

The generic foundation drawings are provided for the cast in situ type pile foundation. For any other proven type of piled foundation instead of Cast in Situ Piled Foundation the bidder shall have to submit the design of the proposed type of piled foundation along with detailed design calculation, installation procedure with drawings, Quality Control procedure, Standards and Codes of Practices to be followed, advantages of selecting such type of piles, etc.

## **2. Price Schedule No.1 and Price Schedule No.2**

### **(i) Scope B2 and Scope B5-Item No.2.1, 2.2 & 2.3 and Item No.3.1, 3.2 & 3.3**

The quantity in the item no. 2.1, 2.2, 2.3, 3.1, 3.2 & 3.3 shall be 600, 30, 30, 216, 12 & 12 respectively instead of 1 (one) mentioned against each item for both Price Schedule No.1 and Price Schedule No.2.

### **(ii) Scope B4-Item No.2.1, 2.2 & 2.3 and Item No.3.1, 3.2 & 3.3**

The quantity in the item no. 2.1, 2.2, 2.3, 3.1, 3.2 & 3.3 shall be 510, 30, 15, 132, 12 & 12 respectively instead of 1 (one) mentioned against each item for both Price Schedule No.1 and Price Schedule No.2.

### **(iii) Scope B3-Item No.2.1, 2.2 & 2.3 and Item No.3.1, 3.2 & 3.3**

The quantity in the item no. 2.1, 2.2, 2.3, 3.1, 3.2 & 3.3 shall be 108, 12, 15, 288, 12 & 12 respectively instead of 1 (one) mentioned against each item for both Price Schedule No.1 and Price Schedule No.2.

### **(iv) Scope B6-Item No.2.1, 2.2 & 2.3 and Item No.3.1, 3.2 & 3.3**

The quantity in the item no. 2.1, 2.2, 2.3, 3.1, 3.2 & 3.3 shall be 150, 12, 6, 96, 12 & 12 respectively instead of 1 (one) mentioned against each item for both Price Schedule No.1 and Price Schedule No.2.

### **(v) Scope B7-1-Item No.2.1, 2.2 & 2.3 and Item No.3.1, 3.2 & 3.3**

The quantity in the item no. 2.1, 2.2, 2.3, 3.1, 3.2 & 3.3 shall be 6, 6, 3, 12, 6 & 6 respectively instead of zero (Blank) mentioned against each item for both Price Schedule No.1 and Price Schedule No.2.

### **(vi) Scope B1-Item No.2.1, 2.2, 2.3 & 2.4 and Item No.3.1, 3.2, 3.3 & 3.4**

The quantity in the item no. 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3 & 3.4 shall be 2280, 120, 120, 24, 336, 120, 12 & 12 respectively instead of 60, 10, 10, 6, 10, 6, 3 & 3 respectively mentioned against each item for both Price Schedule No.1 and Price Schedule No.2.

**(vii) Scope B1-Item No.1.4-Supply of OPGW & Fittings**

The following items shall be added after the item no.1.3 for both Price Schedule No.1 and Price Schedule No.2 in Scope B1.

| <b>1.4</b> | <b>Supply of OPGW and Fittings</b>                                                                                                                                |          |     |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----|
| 1.4.1      | 7 x 4.0 GS earthwire equivalent OPGW (48 fibres) inclusive of joint boxes, fixing clamps, fusion splices and connections to the joint boxes. One OPGW on the line | route-km | 175 |
| 1.4.2      | OPGW sets, complete with all accessories, incl. armour rods and earth bounds                                                                                      |          |     |
| 1.4.2.1    | OPGW (7 x 4.0 GS earthwire equivalent) Suspension Set, complete assembly                                                                                          | set      | 422 |
| 1.4.2.2    | OPGW (7 x 4.0 GS earthwire equivalent) Tension Set, complete assembly                                                                                             | set      | 76  |
| 1.4.2.3    | Vibration damper for OPGW                                                                                                                                         | Per span | 459 |

**(viii) Scope B2-Item No. B5 & B6**

The quantity of Item No. **B5 & B6** shall be 5 instead of 1 in Schedule-1

**(ix) Scope B3, B4, B5 & B8-2 -Item No. 4**

The unit of Item No. **4** shall be "per span" instead of "each" in Schedule-2.

**(x) Scope B8-2**

The quantity of Item No. **S1.1, S2.1 & S2.2** shall be 1, 100 & 150 respectively instead of 4, 240 & 280 respectively in Schedule-2.

**(xi) Scope A-Item No.3.13 & 5.2.4-Spacer Damper**

Item No. 3.13 & 5.2.4 shall be deleted from Schedule-1 and Schedule-2.

**(xii) Scope A-Item No.3.12, 3.14, 3.15, Schedule-2**

The quantity of Item No. 3.12, 3.14 and 3.15 shall be 120 instead of 116.

**(xiii) Scope A-Item No.1.1.8, Schedule-1 & Schedule-2**

Item No. 1.1.8 shall be deleted. Quantity of Item No. 1.1.5 and Item No. 1.1.6 shall be 18 & 20 respectively instead of 13 & 15.

### 3. Price Schedule No.4 Installation and other services

#### (i) Scope B1- Item B2-Stringing

Following item is added after item B2.1 and the text "/OPGW" shall be deleted from item B2.1.

|      |                                                         |          |     |
|------|---------------------------------------------------------|----------|-----|
| B2.2 | Installation of OPGW including fittings and accessories | route-km | 175 |
|------|---------------------------------------------------------|----------|-----|

#### (ii) Scope B1- Item B6-Dismantling and Storing

Item 6.1 is revised as below-

|      |                                                                                                                                                                                                         |          |     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----|
| B6.1 | Dismantling of existing phase conductor ACSR [six (6) nos. single conductors on the line], OPGW and all fittings etc, drumming/packing of dismantled materials as per instruction of engineer in-charge | route-km | 175 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----|

#### (iii) Scope A-Item No.2.1.5, Schedule-4

The quantity of Item No. 2.1.5 shall be 14 instead of 12.

#### (iii) Scope A-Item No.3.1.5, Schedule-4

Item No. 3.1.8 shall be deleted. Quantity of Item No. 3.1.5 and Item No. 3.1.6 shall be 18 & 20 respectively instead of 13 & 15.

### 4. Price Schedule Heading

The OCB No. mentioned in the header of each price schedule shall be "PGCB/ADB/L3683-BAN/SWTGEP/230kV&132kV/TL", instead of "PGCB/ADB/51137-BAN/SWTGEP/230kV&132kV/TL".

### 5. Scope B1-Item No.1.2, Schedule-1 & Schedule-2

The text "ACCC conductor equivalent to Smooth body ACSR special conductor (27.91mm)" shall be replaced by the text "ACCC ULS DRAKE or equiv. Conductor"

### 6. Scope B1-Item No.6, Schedule-1 & Schedule-2

The unit of Item No.6 shall be "per tower" instead of "each".

All other terms and conditions of the bidding document shall remain unaltered.

Enclosure: As stated

