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- (i) galvanized steel earthwire equivalent OPGW. Dismantling and by-pass of existing Bogura(S)-Naogaon 132kV double circuit transmission line near LILO location.
 - (ii) LILO of Bheramara – Rajbari 132kV transmission line at Kumarkhali Substation (Approx. 0.6km) using Single ACCC Grosbeak Conductor per phase, two 7x3.25 galvanized steel earthwire equivalent OPGW. Dismantling and by-pass of existing Bheramara – Rajbari 132kV double circuit transmission line near LILO location.
 - (iii) Reconductoring of Shahjibazar-Brahmanbaria-Ashuganj 132kV transmission line (Approx. 52.4km double circuit and 10.9km four circuit) using Single ACCC Grosbeak Conductor per phase, one 7x3.25 galvanized steel earthwire equivalent OPGW at double circuit portion of the line and two 7x3.25 galvanized steel earthwire equivalent OPGW at four circuit portion of the transmission line.
2. For reconductoring of the existing transmission lines, bidders shall consider the following:
- a. Classification of towers to be assessed by Contractor from the existing towers / available data.
 - b. For each existing transmission line, the existing insulators shall be replaced by new insulators supplied within this contract.
 - c. The bidder (Contractor) shall have to design, manufacture, supply and install all types of hardware fittings required for completing the works.
 - d. After dismantling, dismantled Conductor, Hardware Fittings, OPGW and OPGW Fittings shall be Auctioned at site after dismantle.
 - e. The contractor shall inspect the entire stretch of each of the transmission lines listed above and shall accordingly devise appropriate methodology/procedure of carrying out the reconductoring works.

The contractor shall deploy appropriate tools/equipment/machinery to ensure that the stringing operation is carried out without causing any damage to conductor and existing tower/structure and to ensure that the conductor is installed at the prescribed sag-tension as per the approved stringing charts.

After award of the contract, the contractor shall carry out the detailed survey in accordance with Section-6 of Technical Specification (Volume 2 of 3 of Bidding Document) and submit to the employer Sag-Tension calculations corresponding to specified/prevaling conditions and the ruling span and all the spans as per detailed survey.



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- f. Survey & profiling of existing line routes using Total stations; verification of availability of statutory electrical clearances using PLS-CADD software; de-stringing of existing conductors including dismantling of associated fittings/ insulators (as required) on the above lines and re-stringing (as well as new stringing as/if needed) each circuit with the conductor mentioned in the Scope of Works including associated new hardware fittings and insulators (as required) with the other circuit under live condition.
- g. Design and manufacture of the hardware fittings, fittings-parts/components, and accessories shall be such that they shall be completely compatible with the ACCC conductor of the line conductor.
- h. It is the contractor's responsibility to check each 132kV transmission line/substation to assess by themselves the existing facilities viz various types of towers/other structures, various types of insulator sets/hardware fittings /accessories, various types of substation equipment etc. ; and all the required plant and equipment i.e. conductor, line hardware fittings/accessories, connecting fittings/accessories for substation, insulators (as/if required) etc. shall be designed, manufactured and installed in the system by the contractor for completion of whole of the Facilities. The conductors, hardware fittings/accessories, insulators and all other plant/equipment shall be designed and manufactured following the specifications stipulated in individual sections and schedules throughout the bidding documents and in accordance with the relevant IEC/BS EN/ASTM/ISO/DIN standards mentioned therein. The contractor shall have to fulfill all the requirements specified throughout the bidding documents.
- i. The material covered in this bid shall be supplied complete in all respects, including all components, fittings and accessories which are necessary or are usual for their efficient performance and satisfactory maintenance under the various operating and atmospheric conditions. The Contractor shall be responsible for ensuring compatibility between/among the equipment and associated fittings/ accessories, and satisfactory performance of complete conductor system for continuous operation at the designated continuous operating temperature of the offered ACCC conductor. Such parts shall be deemed to be within the scope of the Contract whether specially included or not in the Specification or in the Contract Schedules.
- j. Power Grid Bangladesh PLC will arrange shut down of one circuit at a time and the other circuit shall be kept under charged condition. The contractor shall de-string/dismantle the existing conductor and associated hardware fittings/insulators as required, and re-string the circuit with the ACCC conductor and associated new hardware fittings-parts and insulators, section by section, and restore the line in original conditions as per program finalized in coordination with site. Appropriate safety measures along with necessary safety tools and equipment to carry out de-stringing/dismantling and stringing operations under the above conditions including mechanical/ structural safety of the towers shall be the responsibility of the contractor.

Necessary calculations shall be carried out by the contractor to ensure that the loadings on the towers due to conductor tensions as well as loads on account of the reconductoring activities shall be within specified limits. These calculations shall be submitted by the contractor during detailed engineering.



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- k. The entire stringing work of conductor shall be carried out by tension stringing technique except where geographical/ topographical or other site constraints do not permit use of tension stringing equipment. In such cases manual stringing along with other appropriate tools and equipment may be employed with the approval of the Project Manager.

The bidder shall indicate in their proposal the special equipment for reconductoring works, if any, and indicate no. of that equipment which the bidder plans to deploy during erection/stringing works.

The stringing work of conductor on the existing towers in each transmission line under the Contract will be carried out from angle tower to nearest angle tower.

- l. The bidder/ contractor will inspect all the towers existing on each transmission line and check whether any tower(s) require strengthening/ repair due to tower member missing, corrosion of members or any other type damage/deformation of members resulting to insufficient structural strength of the tower(s). Identification of such towers and strengthening/repair of them including supplies of the required tower materials is included in the contractor's scope. Those tower materials are referred to as 'Fabricated and galvanized tower steel (Mild steel & High tensile) including nut-bolts, washers etc.' in the price schedules. The quantity of 'Galvanized Tower Steel' which may require strengthening /repair as mentioned in the price schedules of the bidding document is indicative only. Actual quantity will be finalized during execution of the Works. The design/drawings of the towers are not available with the Employer. Required size of members, nuts-bolts, accessories will be decided by the Contractor subject to approval of the Employer. The tower materials will be manufactured by contractor's proposed manufacturer following the standards/ provisions mentioned in Section 8 (Towers), volume 2 of the bidding document.
- m. The existing OPGW/earthwire of the transmission lines for Reconductoring shall be replaced by new OPGW/earthwire supplied within this contract.
- n. 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.
- o. The Contractor must deploy the personnel which are expert & certified by ACCC technology owner in installation/stringing supervision of ACCC conductor for entire duration of installation/stringing of each transmission line. Cost of arranging and using of such expatriate as required to complete the Contract in time shall be deemed to be included in the Contract price.
- p. The termination of each transmission line to each relevant substation equipment up to each 132kV bus in the 132kV substation at both ends of the transmission line is included in the contractor's scope. The details regarding the termination in each 132kV substation related to the above transmission lines are as below:
In each 132kV substation, the line phase conductors (ACCC) coming from the terminal tower will be terminated by the Contractor to the gantry of the 132kV substation; and from the gantry up to each 132kV bus, through each existing substation equipment viz LA, PT/VT, ES, DS, CT, CB etc., in each relevant bay/circuit of the substation, the existing phase conductors for jumper/loop/drop-in/down-drop etc. will be replaced by the Contractor with new twin ACSR-



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Grosbeak conductor per phase along with new connecting fittings/accessories suitable for the twin ACSR- Grosbeak per phase. Such termination/replacement up to each 132kV bus at relevant substation is required for each 132kV transmission line under reconductoring in this package/contract. All the connecting fittings/accessories (i.e. the fittings/accessories which connect/fix the phase conductor to the bay equipment viz LA, CT/PT, ES, DS, CB, busbar conductors etc, including the spacer for twin ACSR-Grosbeak conductor) required in each relevant 132kV substation shall be designed, manufactured, supplied and installed by the Contractor. Those fittings/accessories shall be of such design & materials that those can smoothly connect/fix the phase conductor to the existing substation equipment and can continuously conduct the rated current of twin ACSR- Grosbeak i.e. two times the rated current of ACSR-Grosbeak without raising the temperature of the fittings and the contact points of fittings/phase conductor (ACSR- Grosbeak)/substation equipment, above rated operating temperature of ACSR- Grosbeak (80 degree C). Since the phase conductors inside the 132kV substation – from gantry up to 132kV bus through all existing bay-equipment – shall be twin ACSR- Grosbeak per phase, all engineering and design related to the sub-conductor configuration and all other aspects in this regard shall have to be done/provided by the Contractor subject to approval of the Employer.

Further, since the transmission lines are to be reconducted with ACCC while the relevant bay phase conductors are with ACSR, hence near the gantry of the substation, two different types of conductors – single ACCC and twin ACSR, will have to be joined together through a connector called T-connector /T-pad or any other kind of fittings as appropriate. This connector shall be of such design & materials (bi-metal or any other type as appropriate) that the temperature of the ACSR conductor and the connector will not rise above the rated operating temperature of ACSR-Grosbeak (80 degree C) while maximum continuous operating current which is two times the maximum continuous operating current of ACSR-Grosbeak will be flowing through the circuit at prevailing conditions. Similar consideration shall have to be taken into account by the bidder/contractor for making the connection/joint between the busbar conductor and bay phase conductor.

The Contractor shall be responsible for assessment and determination of each and every type of fittings/accessories required in the termination in each relevant 132kV substation. Design, manufacture, supply and installation of all those fittings/ accessories is included in the Contractor's scope.

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. The bidder/contractor shall complete their all checking/survey/studies required in this regard in appropriate time such that the design and quantity of all the substation fittings can be finalized (subject to approval of the employer) immediately after signing the contract so that the contractor can timely place manufacturing order to the manufacturer (approved by the employer) in order to complete the works under the contract in time.

Replacement of busbar conductor and bay equipment viz LA, PT/VT, ES, DS, CT, CB etc. is not included in this contract.



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- q. Appropriate safety measures along with necessary safety tools and equipment to carry out dismantling and installation operations under the prevailing conditions including mechanical/ structural safety of each existing structure/equipment shall be the responsibility of the contractor.
 - r. Any additional arrangement/work/supplies required to complete the above reconductoring works, which is not expressly mentioned in the specification, will be done/provided by the contractor without any additional cost.
3. The specification covers **following scope of works**:
- a. Detailed survey including route alignment, profiling, tower spotting, optimization of tower locations, soil resistivity measurement & geotechnical investigation (including special foundation locations, viz. pile/well foundation locations, if any).
 - b. Check survey shall be conducted to locate tower locations on ground conforming to the approved profile and tower schedule.
 - c. The IEE (specifically the Environmental Management Plan) shall be followed by the contractor during the contract period to comply with environmental safeguards including social issues, Health & Safety. The contractor shall prepare & submit reports (e.g. Construction Environmental and Social Management Plan, Baseline Environmental Monitoring Report, Quarterly Environmental Monitoring Reports) according to the IEE (Environmental Management Plan) in due time after awarding the contract. The baseline environmental monitoring report and quarterly monitoring reports shall include laboratory (Govt. accredited/internationally recognized) based environmental parameters test reports by following Environmental Conservation Rules 2023 and IEE. A tree plantation plan shall be prepared by the contractor for undertaking 1:3 compensatory plantation with the timeline for completion prior to commissioning of substations and transmission lines. For tree plantation and Ecological Study, Quarterly Monitoring Report must be submitted up to the defect liability period. Monitoring and Reporting must be done for 2 years for tree plantation management status and viability assessment by the Contractor after the completion of the work.
 - d. Design, fabrication, testing and supply of all types of transmission line towers including stubs, fasteners, anti-theft fasteners, step bolts, hangers, D-shackles, number plate, danger plate, tower earthing etc.

Power Grid Bangladesh's existing design shall be used for all other towers to be used in the lines. The Employer shall provide structural/erection drawings, available shop drawings and available bill of materials of all types of transmission line towers and their extensions as required to the Contractor after placement of award, in sequence, suiting the project requirement upon written request of the Contractor. However, if the Contractor needs to prepare any additional structural and shop drawings or make any correction of existing drawings, these have to be prepared by



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