

Section 6. Employer's Requirements

Table of Contents

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|---|--|
| 6.1 Scope of Supply of Plant and Installation Services by the Contractor | |
| 6.2 Specification (Specification & GTP Section 7 & 8) | |
| 6.3 Form of Completion Certificate | |
| 6.4 Form of Operational Acceptance Certificate | |
| 6.5 Change Order Procedure and Forms | |
| Annex 1. Request for Change Proposal | |
| Annex 2. Estimate or Change Proposal | |
| Annex 3. Acceptance of Estimate | |
| Annex 4. Change Proposal | |
| Annex 5. Change Order | |
| Annex 6. Pending Agreement Change Order | |
| Annex 7. Application for Change Proposal | |
| Annex 9. SLD , Layout , Conceptual drawing | |
| 6.6 Supplementary Information | |

6.1 Scope of Supply of Plant and Installation Services by the Contractor

General:

This section of the document describes basic equipment, sub-assembly, configuration and schedule of Goods and Services which is mandatory requirement to cover and shall be supplied and performed but not limited to implement the complete facility on turnkey basis. The works covered by the Tender/Bid is “Design, Supply, Construction, Erection, Installation, Testing and Commissioning of 07 Nos. New 33/11kV GIS Substation, 04 Nos. 33/11kV GIS Substation (Up-gradation), 05 Nos 33 kV Bay Extension with Civil works, and other related works; including automation of the sub-station (SAS) interfacing with the existing SCADA System of Chattogram, on Turnkey Basis under Power Distribution System Development, Chattogram Zone (2nd Phase)”. The scope of the plant and services also includes/covers quality assurance, packing for export, insurance & shipment to site, complete construction & installation, jointing, terminating, bonding, earthing, painting, transportation, setting to work, site testing & commissioning of all the equipment necessary for safe operation of the sub-stations along with having the full responsibility for civil works including design and construction of transformer foundations and control building, etc. Moreover, the existing equipment dismantled from the existing substation shall be handed over and deposited to Project Store, Chattogram without any damage as per direction of Project Director or Engineer of this project. Shifting/ Modification of any existing scheme of equipment to new equipment in up gradation work scope shall be deemed included in the scope.

The scope includes the design, manufacture, supply, installation and commissioning of Substation Automation System (SAS) for both 33KV GIS system with provision for interfacing with SCADA System for 07 Nos. New 33/11kV GIS Substation, 04 Nos. 33/11kV GIS Substation (Up-gradation) and 0 no 33 kV Bay extension.

The detail requirement is listed in the technical specification and Guaranteed Technical particulars (GTP) in the tender document. The contractor shall remedy all defects during the defect liability period of the Plant & Equipment as per contract.

The contractor is responsible for ensuring that all and any items of work required for the safe efficient and satisfactory completion and functioning of the Plant & Equipment and services. After completing all works of substation if any amount of any item remain excess (as per BOQ & price schedule) handed over to Project Store, Chattogram .

The conceptual layout, general arrangement and single line diagram for the proposed 07 Nos. New 33/11kV GIS Substation, 04 Nos. 33/11kV GIS Substation (Up-gradation), 05 Nos 33 kV Bay Extension are attached in Annex-9. The GIS/AIS equipment building and control room and probable approach and internal roads have been shown. The arrangement is indicative and the detailed

layout design will be prepared and submitted by the EPC Contractor for BPDB's approval. The station layout and equipment rating shall be based on the single line diagram. The Contractor shall work out an optimum layout based on the requirement and specific features of the manufacturer's product within the constraints of overall dimensions of the plot. The layout and equipment setup shall be optimized in such way as to keep free space, if any, for other purpose and future expansion.

The detailed design arrangement of the equipment shall be the responsibility of the Contractor subject to the approval of the Engineer. The Contractor shall submit all drawings, manuals, designs and calculations for review prior to commencing manufacturing and /or installation works.

Moreover, the contractor shall responsible for Transportation of machinery/equipment to the Project Site including moving the equipment and materials from the designated store as per site requirement and Consignee's advice. All the consumables goods or any equipment/machinery/ materials are required to complete the Plant & Equipment and services shall be the responsibilities of the contractor and all the necessary arrangement for Power, Water, accommodations or any such facilities and tools-tackles, necessary instruments required for erection, installation, testing and commissioning will be supplied/arranged by the contractor within the quoted price. The contractor shall handover all the removable materials/goods at the place within layout plan as instructed by the consignee.

Training at Site:

The Contractor shall provide training on site to the BPDB personnel. The training shall comprise a balanced combination of classroom training and hands on experience, and shall cover all aspects of equipment installation, operation and maintenance. The BPDB personnel will be deputed full time to the Contractor for both class room and on-the-job training.

The Contractor shall provide a program for site training and course synopsis during commissioning period of each substation at site before handover to BPDB. The Contractor shall submit to the Purchaser a copy of all classroom material handed out to the trainees.

Three (03) days local training conducted by the expert in providing related training for 8 nos. of purchaser employees (Engineer/ Supervisor/ Technician) in each substation regarding all aspects of Fundamentals/ Basics conception of Descriptions & Functions of Plant /Equipment, Configuration, setting, testing & safe operation of substation for all operation, maintenance and troubleshooting of Substation.

Note: Tenderers shall quote a Firm Turnkey Contract Price for the Plant & Equipment and services as described in Price Schedule and in Section 6, 7, 8 & 9 of this Tender document. If the Tenderer deemed necessary any additional Plant & Equipment and services out of the list of tender schedules for completion of the said Turnkey works and site requirement, contractor shall have to do the additional works. The costs of these additional works are deemed to be included within the quoted price. Tenderer are requested to visit the site to consider all before the submission of the Tender

6.1.1 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x16/20MVA Regular Type GIS (Himchori New) at S&D-Coxsbazar, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

A. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.

- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of

Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almira for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher

with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 16/20 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room

internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- a) Incoming Feeders (1250A): 02Nos with PT
- b) Outgoing Feeders (1250 A): 02 Nos with PT
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- d) Power Transformer Feeders (1250A): 02Nos with PT
- e) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 8 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,16/20MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be

identical and from the same manufacturer. Provision for running the transformers in parallel is to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 16/20MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station

Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.2 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x20/26 MVA Regular Type GIS (Coxsbazar New) at S&D-Coxsbazar, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

B. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra-long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.

- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of

Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almira for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher

with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

24) Dismantling, Demolishing, Relocate of existing tin shade mosque and construction of One Storied Mosque (200sq.m) with two storied foundation.

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS -02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 20/26 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room

internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- f) Incoming Feeders (1250A): 02Nos with PT
- g) Outgoing Feeders (1250 A): 02 Nos with PT
- h) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- i) Power Transformer Feeders (1250A): 02Nos with PT
- j) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 12 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,20/26MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be

identical and from the same manufacturer. Provision for running the transformers in parallel is to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 20/26MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station

Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.3 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x16/20MVA Regular Type GIS (Ramu cantonement New) at S&D- Cox'sbazar, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

C. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra-long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.

- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of

Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almira for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher

with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 16/20 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room

internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- a) Incoming Feeders (1250A): 02Nos with PT
- b) Outgoing Feeders (1250 A): 02 Nos with PT
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- d) Power Transformer Feeders (1250A): 02Nos with PT
- e) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 8 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,16/20MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be

identical and from the same manufacturer. Provision for running the transformers in parallel is to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 16/20MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station

Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.4 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x16/20MVA Regular Type GIS (Keranihat New) at S&D-Patiya, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

D. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.

- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of

Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almira for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher

with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 16/20 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room

internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- f) Incoming Feeders (1250A): 02Nos with PT
- g) Outgoing Feeders (1250 A): 02 Nos with PT
- h) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- i) Power Transformer Feeders (1250A): 02Nos with PT
- j) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 12 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,16/20MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be

identical and from the same manufacturer. Provision for running the transformers in parallel is to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 16/20MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station

Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.5 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x20/26MVA Regular Type GIS (Patiya Bypass) at S&D-patiya, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

E. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
 - 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
 - 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
 - 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
 - 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
 - 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.
- Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.
- Overhead water tank 2X500 liter on the top of the control room building underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.
- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almirah for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with

CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 20/26 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room internal & external illumination switching, extra power supply arrangement for testing

purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- a) Incoming Feeders (1250A): 02Nos with PT
- b) Outgoing Feeders (1250 A): 02 Nos with PT
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- d) Power Transformer Feeders (1250A): 02Nos with PT
- e) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 12 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,20/26MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be identical and from the same manufacturer. Provision for running the transformers in parallel is

to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 20/26MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.6 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x20/26MVA Regular Type GIS (Shikalbaha New) at S&D-patiya, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

F. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building, underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.

- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almirah for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with

CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 05 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 20/26 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room internal & external illumination switching, extra power supply arrangement for testing

purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- f) Incoming Feeders (1250A): 02Nos with PT
- g) Outgoing Feeders (1250 A): 05 Nos with PT
- h) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- i) Power Transformer Feeders (1250A): 02Nos with PT
- j) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 8 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,20/26MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be identical and from the same manufacturer. Provision for running the transformers in parallel is

to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 03 (Three) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 20/26MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station

Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.7 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x20/26MVA Regular Type GIS (Dimond Cement Area New) at S &D-patiya, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

G. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building, underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.

- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almirah for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with

CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 20/26 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room internal & external illumination switching, extra power supply arrangement for testing

purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- k) Incoming Feeders (1250A): 02Nos with PT
- l) Outgoing Feeders (1250 A): 02 Nos with PT
- m) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- n) Power Transformer Feeders (1250A): 02Nos with PT
- o) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 12 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,20/26MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be identical and from the same manufacturer. Provision for running the transformers in parallel is

to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 20/26MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.8 Upgradation work including Design, Supply, Dismantling, Installation, Testing, Commissioning and Civil work of 33/11KV, 2x5/6.67 MVA to 2x16/20 MVA GIS Upgradation at Satkania at S&D-Potiya, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

H. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
 - 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
 - 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
 - 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
 - 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
 - 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.
- Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.
- Overhead water tank 2X500 liter on the top of the control room building, underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.
- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almirah for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with

CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 16/20 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room

internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- p) Incoming Feeders (1250A): 02Nos with PT
- q) Outgoing Feeders (1250 A): 02 Nos with PT
- r) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- s) Power Transformer Feeders (1250A): 02Nos with PT
- t) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 8 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,16/20MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be

identical and from the same manufacturer. Provision for running the transformers in parallel is to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 16/20MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station

Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex 9.

6.1.9 Upgradation work including Design, Supply, Dismantling, Installation, Testing, Commissioning and Civil work of 33/11KV, 1x16/20 MVA to 2x16/20 MVA GIS Up-gradation at (Dohazari ESU) at S&D-Potiya, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

I. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers in substation building ground floor and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
750 square meter (250 Sq. m each floor) three storied Building with four storied foundation (Ground Floor- Height 24'6" for power transformer, 1st Floor- Height-10'6" for Cable room, 2nd Floor- Height-14'6" for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building, underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.

- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.
- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almira for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire

extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 07 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 16/20 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.

- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.
- 14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.
- 15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having Single bus 3150A:

- a) Incoming Feeders (2500A): 02Nos with PT
- b) Outgoing Feeders (1250 A): 07 Nos with PT
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (3150 A): 01 Nos.
- d) Power Transformer Feeders (1250A): 02Nos with PT
- e) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 8 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

- 16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.
- 17) Supply and installation/ connection of Control Cables
- 18) Supply and installation of Battery, Ni-Cd as per BOQ.
- 19) Supply and installation of Battery Charger as per BOQ.
- 20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.
- 21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .
- 22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,16/20MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in

the space available by keeping safe electrical clearance. Both the new Transformers are to be identical and from the same manufacturer. Provision for running the transformers in parallel is to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be $<0.50\text{ohm}$) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 2X1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 16/20MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33

kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.10 Upgradation work including Design, Supply, Dismantling, Installation, Testing, Commissioning and Civil work of 33/11KV, 1x5/6.67 MVA to 2x16/20 MVA GIS Upgradation at Aziznagar at S&D-Cox,sbazar , BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

J. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building, underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.
- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of

Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almira for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher

with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 16/20 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room

internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- a) Incoming Feeders (1250A): 02Nos with PT
- b) Outgoing Feeders (1250 A): 02 Nos with PT
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- d) Power Transformer Feeders (1250A): 02Nos with PT
- e) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 8 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,16/20MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in

the space available by keeping safe electrical clearance. Both the new Transformers are to be identical and from the same manufacturer. Provision for running the transformers in parallel is to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 16/20MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33

kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.11 Upgradation work including Design, Supply, Dismantling, Installation, Testing, Commissioning and Civil work of 33/11KV, 1x5/6.67 MVA to 2x16/20 MVA GIS Upgradation at Lama at DD-Cox,sbazar , BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

K. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, (dismantling if necessary) and so on of the following works are the scope of works:

- 1) Land development work with height of 1(One) Meter above the highest flood level or 1 (One) Meter above the nearest high way/road level which is higher. Employer will provide all lands only and contractor will fill it by sand (if necessary) up to ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of entire switchyard area with crushed rock (where required) to cater for the ultimate development of the substation. Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 3) Construction of main entrance gate and side gate with aesthetic view. Construction/ installation of Substation NAME PLATE/ SIGN BOARD. A digital sign board (electronic sign board) to be fixed on the top of the main entrance gate.
- 4) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 5) Construction of Guard post 10 square meter adjacent to the main gate of the substation.
- 6) Design & Construction of new GIS Substation Building:
500 square meter (250 Sq. m each floor) two storied Building with four storied foundation (Ground Floor- Height 10'6", 1st Floor- Height-14'6"for Control Room) as per price schedule for the substation control room, store, cable room, etc. including roof lime terracing, door, window, toilet etc.

Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect.

Overhead water tank 2X500 liter on the top of the control room building, underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located.

- 7) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.

- 8) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach RCC road shall be min 6 meters wide. Road in front of transformer shall be min 6.0 meters wide RCC road.
- 9) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 10) Construction of drainage, sanitary system for whole sub-station area.
- 11) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 12) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 13) Supply of two operator working table, Steel made with extra glass on the top, and two nos. of wheel based revolving chair & ten nos. visitor chair, curtain (venetian blind) of window in the control room.
- 14) Supply of Steel File Cabinet (four drawers), Steel Almira for record keeping in the control room.
- 15) Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner and complete furniture for the substation control room & office building.
- 16) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 17) Dismantling work (If necessary) as per Price Schedule, BOQ & field requirement.
- 18) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 19) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 20) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 21) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher

with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.

22) The transformer foundation should be 20/26MVA for future provision.

23) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Incoming Feeder, 02 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 01 nos. Incoming feeder for Station Auxiliary X- former and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 2) Supply and installation of 01 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 02 nos. of Power Transformer 33/11 kV, 16/20 MVA, Dyn11 with all related accessories.
- 4) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 5) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 6) Supply and installation of Control room indoor illumination.
- 7) Supply and installation of Emergency lighting
- 8) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 9) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 10) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 11) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 12) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 13) Supply and installation of Separate AC distribution Box, wall mounting for control room

internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.

14) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.

15) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Panels having single bus 2000A:

- f) Incoming Feeders (1250A): 02Nos with PT
- g) Outgoing Feeders (1250 A): 02 Nos with PT
- h) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A): 01 Nos.
- i) Power Transformer Feeders (1250A): 02Nos with PT
- j) Station Auxiliary Transformer Feeders (1250A) : 01 Nos .

Indoor 11 KV GIS Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A) with PT: 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 8 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.

16) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE for all 33kV or 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.

17) Supply and installation/ connection of Control Cables

18) Supply and installation of Battery, Ni-Cd as per BOQ.

19) Supply and installation of Battery Charger as per BOQ.

20) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

21) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted to the Directorate of Design & Inspection -2, BPDB, Dhaka for reviewing within 15 days of commissioning of substation .

22) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

23) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.

24) 02 (Two) Nos. new 33/11KV,16/20MVA, ONAN/ONAF Power Transformers shall be installed in the Substation control room building and shall be connected to the 33 kV switchgear and 11 kV switchgear panels (described above) and by single core XLPE cable of required voltage and size. The volume of the transformers shall be such that these are accommodated in the space available by keeping safe electrical clearance. Both the new Transformers are to be

identical and from the same manufacturer. Provision for running the transformers in parallel is to be provided. Tap Changer Control panel with AVR relay, Auto/Manual and Master/ Follower control switch. (02 panel for power transformers).

25) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.

26) 01 (one) No. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.

27) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

28) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

29) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

30) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

31) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

32) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

33) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

34) The 33 KV incoming feeders (from source substation/grid) shall be connected to the 33 KV incoming GIS panel. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming GIS Panel.

- 33KV 1Cx800mm² cable per phase connected to 02 (Two) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV 1Cx500mm² cable connected to 02 (Two) nos. 33 kV GIS Outgoing feeder (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 16/20MVA, ONAN/ONAF Power Transformers.
- 0.415 kV, 4CX120 mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 33 kV, 3CX95mm² XLPE Copper Cable with Indoor and outdoor termination kits for Station

Auxiliary Transformer Incoming.

- Transformer Neutral will also be connected to ground by copper cable of 2X1CX185 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

35) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

36) Outdoor lightning protection system for the substation shall be installed.

37) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

38) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

39) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.12 Design, Supply, Erection, Installation, Testing and Commissioning of 4D (7mx6m each) Bay Extension of 33kV Switchyard at Shikalbaha Grid Substation under S&D, Patiya, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

A. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and commissioning and so on of the following works are the scope of works:

- 1) Earth filling, Land escaping, Leveling, Dressing of the proposed switchyard area. Employer will provide all lands only and contractor will fill it by sand (if necessary) upto ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of related switchyard area with crushed rock (where required) to cater for the ultimate development of the substation.
- 2) Construction of cable trenches for control cable:

- (a) Within the switch yard area
 - (b) Switch yard area to control room building
- 3) Construction of R.C.C foundations for, switch yard tower and all others equipment & Structure as required.
 - 4) Supply of gravel and finishing the Switchyard surface by the gravel to the switchyard.
 - 5) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.
 - 6) Construction of drainage, sanitary system for Bay Extension area.
 - 7) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
 - 8) Dismantling work as per Price Schedule, BOQ & field requirement.
 - 9) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
 - 10) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.

B. SUB-STATION / ELECTRICAL WORKS:

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of the following works are the scope of works:

- 1) Supply and installation of **four nos. 33kV Line Feeders** comprising: 33kV VCB, CT, Isolator, LA, Control cable, Cable termination kit, PCM Panel, Supporting structures etc.
- 3) Supply and installation of Switch yard shielding materials.
- 4) Supply and installation of Switch yard grounding materials for extended sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm.
- 5) Supply and installation of Switchyard outdoor illumination system for the extended area.
- 6) Supply and installation of 33KV Bus bar conductor (ACSR Martin)
- 7) Supply and installation of 33kV switchyard gantry structure Four diameters (7M×6M each) with bus bar, bus support insulator & hardware, jumper, shielding materials and grounding materials etc. as required complete in all respect.

- 8) Supply and installation/ connection of Control Cables.
- 9) 3 (Three) sets of As-built drawings together with operation and maintenance manual, **relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.** One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, **relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB.**
- 10) The Bidder must visit the site and assess the works before tender submission.
- 11) Supply and installation of switching boards to be installed at switchyard for functioning of lights etc.
- 12) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid

Indicative Layout & Single line diagram in Annex-9.

**6.1.13 Design, Supply, Erection, Installation, Testing and Commissioning of 2D
(6.2mx6.2m each) Bay Extension of 33kV Switchyard at Dohazari Grid Substation
under S&D, Patiya, BPDB, Chattogram.**

(Not limited but at least the following works to be done by the turnkey contractor)

A. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and commissioning and so on of the following works are the scope of works:

- 1) Earth filling, Land escaping, Leveling, Dressing of the proposed switchyard area. Employer will provide all lands only and contractor will fill it by sand (if necessary) upto ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of related switchyard area with crushed rock (where required) to cater for the ultimate development of the substation.
- 2) Construction of cable trenches for control cable:
 - (a) Within the switch yard area
 - (b) Switch yard area to control room building
- 3) Construction of R.C.C foundations for, switch yard tower and all others equipment & Structure as required.
- 4) Supply of gravel and finishing the Switchyard surface by the gravel to the switchyard.
- 5) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.
- 6) Construction of drainage, sanitary system for Bay Extension area.
- 7) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 8) Dismantling work as per Price Schedule, BOQ & field requirement.
- 9) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 10) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS:

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of the following works are the scope of works:

- 1) Supply and installation of **two nos. 33kV Line Feeders** comprising: 33kV VCB, CT, Isolator, LA, Control cable, Cable termination kit, PCM Panel, Supporting structures etc.
- 2) Supply and installation of Switch yard shielding materials.
- 3) Supply and installation of Switch yard grounding materials for extended sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm.
- 4) Supply and installation of Switchyard outdoor illumination system for the extended area.
- 5) Supply and installation of 33KV Bus bar conductor (ACSR Martin)
- 6) Supply and installation of 33kV switchyard gantry structure Two diameters (6.20M×6.20M) with bus bar, bus support insulator & hardware, jumper, shielding materials and grounding materials etc. as required complete in all respect.
- 7) Supply and installation/ connection of Control Cables.
- 8) 3 (Three) sets of As-built drawings together with operation and maintenance manual, **relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.** One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, **relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB**
- 9) The Bidder must visit the site and assess the works before tender submission.
- 10) Supply and installation of switching boards to be installed at switchyard for functioning of lights etc.
- 11) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid

Indicative Layout & Single line diagram in Annex-9.

6.1.14 Design, Supply, Erection, Installation, Testing and Commissioning of 2D (10mx5m each) Bay Extension of 33kV Switchyard at Julda Grid Substation under S&D, Patiya, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

A. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and commissioning and so on of the following works are the scope of works:

- 1) Renovation work of existing control room for installation of 33 kV GIS Panel .
- 2) Construction of cable trenches for control cable:
 - (a) Within the switch yard area
 - (b) Switch yard area to control room building
- 3) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 4) Dismantling work as per Price Schedule, BOQ & field requirement.
- 5) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 6) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS - 02 nos. for Outgoing Feeder and all others accessories complete in all respect.
- 2) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm

during dry season.

3) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.

4) Supply & installation of GIS Panel for Line feeders of the proposed 33kV (GIS) Circuits to be installed in the control room building.

5) Supply and installation of 33kV indoor Type GIS as describe below:

Indoor 33 KV GIS Switchgear Panel having Double bus 1250 A:

a) 33 kV GIS Panel for Outgoing Feeders (1250 A) with PT : 02 Nos

This Two 33 kV Indoor type GIS Breaker have to be connected/coupled with existing 33 kV Indoor type GIS Breaker of control room.

6) Supply and installation/ connection of 33kV cable termination (Outdoor & Indoor) as required.

7) Supply and installation/ connection of Control Cables

8) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.

9) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

10) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

11) All the 33 KV Switchgears will be of Gas Insulated type with circuit breakers. They will be installed on the existing Control room / substation building.

12) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable termination kit.

13) All the 33kV cables shall be armored and cu-wire screened.

14) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure.

15) Grounding mesh of copper conductor of requisite earth resistance (shall be <0.50ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrester sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

- 33KV, 1Cx500mm² cable per phase connected to 02 (Two) nos. 33 kV GIS outgoing Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).

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16) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

17) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

18) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.15 Design, Supply, Erection, Installation, Testing and Commissioning of 33 kV Bay Extension at Jhlongiha Grid Substation under S&D, Cox's bazar, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

L. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/Erection, Construction, Testing and Commissioning, dismantling and so on of the following works are the scope of works:

- 1) Landscaping work and gardening of the whole sub-station area. Bidder shall submit the layout of the whole substation area of landscaping work for approval.
- 2) Construction of cable trenches including cable rack for power cable and control cable (where required);
 - (a) Within the switch yard area,
 - (b) Switch yard area to control room building,
 - (c) For 33KV & 11kV Cable lying inside Substation Compound.
- 5) Construction of main entrance gate and side gate.
- 6) Construction of R.C.C base foundations for power transformers and all others equipment & Structure as required.
- 8) Design & Construction of 700 square meter two storied with four storied foundation (GF-Height 10'6", 1st Floor- Height-14'6" for Control Room) new Substation Building (350 Sq. m each floor) as per price schedule for the substation control room, cable room, etc. including roof lime terracing, door, window, toilet etc. Electrification of the whole substation area is within the scope. In control room high quality tiles shall be installed in floor. For this new Sub-station, in the control room building having facilities of wash basin, bath shower towel rod, soap case, auzo wash, glass rack, looking mirror, pan fitting with low-down, swan neck pillar cock, extra long bib cock, interior walls and floor finished by tiles, underground water reservoir tank and all allied civil works deemed necessary are included in the Bid complete in all respect. Overhead water tank on the top of the control room building, underground water reservoir (tank), water lifting pump, suction pump and portable water supply system complete in all respect [Design shall be based on use of 20 persons per day for overhead water tank] Construction of septic tank, soak well, inspections pits, sewerage piping by PVC 6 inches dia. Pipe, toilet/ bathroom/lavatory located. A separate Guard Room of 10 square meter to be constructed at the site.
- 9) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.
- 10) Construction of approach road from the main gate to the Substation building entrance and internal road for whole sub-station campus area and parking area (shall be carpeting/RCC flooring) as required. All roads shall be of concrete road as per technical specification. The other roads main and approach road shall be 6 meters wide. Road in front of transformer shall be 6.0 meters wide concrete road.
- 11) Properly insulated False Ceiling of Control room, office, suitable for Air conditioning system.
- 12) Construction of drainage, sanitary system for whole sub-station area.
- 13) Supply and installation of Operation Key Board, Al/ Steel frame front cover glass with locking device, dust proof.
- 14) Supply and installation of Chain link fencing with gate for Power Transformer & Station transformer if required. Earthing for fencing required.
- 15) Supply of Operator working table, Steel made with extra glass on the top, and six nos. of wheel based revolving chair & 10 (ten) nos. visitor chair, curtain (venetian blind) of window in the control room.
- 16) Supply of Steel File Cabinet (four drawers), Steel Almirah for record keeping in the control room.

- 17) Construction/ installation of Substation NAME PLATE/ SIGN BOARD - one no., Contractor shall supply and install 32 inch LED Television, 01 set of Desktop Computer with Printer, Scanner, digital sign board (electronic sign board) and complete furniture for the substation control room & office building.
- 19) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 20) Dismantling work as per Price Schedule, BOQ & field requirement.
- 21) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
- 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 22) Supply and installation of decorative LED street lights after every 15 meter interval (if required). LED Street lighting has the feature of Multiple Mounting Options Available, Rugged Precision Cast Aluminum Housing, Perforated Air Flow Venting, High Surface Area Extruded Aluminum Heat Sinks, High Output White LED Diode, Decorative Lens Cover Seals the 22) Electrical/Optical Chamber to IP66, Electronic Driver. The pole shall be stylish, non-corrosive, easy to install and have longer service life.
- 23) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.
- 24) The scope shall include fire extinguishing equipment such as Trolley mounted fire extinguisher with foam type chemical for B type Fire (15kg), Wall mounted fire extinguisher with dry type chemical for A, B and C type Fire (5kg) and Wall mounted fire extinguisher with CO2 type chemical for A, B and C type Fire (2kg), Fire detection unit & Alarm system. The scope shall also include Air conditioning Equipment for substation.
- 25) Wall mounted Steel Stair for Emergency exit to be installed at outer side wall of control room building.
- 26) Service pile load test to be done for the construction of substation control building (where as required as per soil condition).

NOTE: All doors & windows work to be finished by aluminum frame and high quality transparent 6 mm thick glasses. Both indoor & outdoor surface finishing works of walls, roof etc, to be synthetic high quality plastic paint and moisture proof snowcem respectively and treatment to be made by lime terracing for rain water leakage proof of the roof.

B. SUB-STATION / ELECTRICAL WORKS :

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of at least but not limited to the following works are the scope of works:

- 1) Supply and installation of 33kV Indoor GIS -03 nos. for Incoming Feeder, 12 nos. for Outgoing Feeder, 02 nos. for Power Transformer Incoming Feeder, 02 nos. Incoming feeder for Station Auxiliary X- former and 02 nos. for Sectionalizer (Bus Coupler with riser), 02 Nos Capacitor bank feeders (1250A) and all others accessories complete in all respect.
- 2) Supply and installation of 02 nos. Station use 33/0.415 KV, 250 KVA Auxiliary transformer, ONAN, Dyn-11 to be connected with 33kV GIS panel including 0.415 kV MCCB, Power cable, cable terminating kits with structures, etc complete in all respect.
- 3) Supply and installation of 11 kV Indoor GIS -02 nos. for Incoming Feeder, 08 nos. for Outgoing Feeder, and 01 nos. for Sectionalizer (Bus Coupler with riser) and all others accessories complete in all respect.
- 3) Supply and installation of Switch yard grounding materials for required sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm during dry season.
- 4) Supporting steel/RCC structure for connecting the XLPE Power Cable (HV/LV) with accessories as required.
- 5) Supply and installation of Control room indoor illumination.
- 6) Supply and installation of Emergency lighting
- 7) Supply and installation of Fire Fighting equipment and Fire Detection system.
- 08) Supply and installation of Exhaust Fan (Two nos. in battery room).
- 09) Supply and installation of Split type Air conditioner (At least forty eight thousand BTU per hr. capacity including MCB, switch, male female plug socket complete) - 04 nos. in the GIS substation building.
- 10) Supply & installation of GIS Panel for 33kV power transformer, Line feeders of the proposed 33kV & 11KV (GIS) Circuits to be installed in the control room building.
- 11) Supply and installation of AC Distribution Panel, DC Distribution Panel.
- 12) Supply and installation of Separate AC distribution Box, wall mounting for control room internal & external illumination switching, extra power supply arrangement for testing purpose, different operation and maintenance use.
- 13) Supply and installation of switching boards to be installed in each room for functioning of fans, lights, Air conditioner etc.
- 14) Supply and installation of 33kV indoor Type GIS & 11kV indoor Type GIS as describe below:

Indoor 33 KV GIS Switchgear Panel having Double bus 3150A:

- b) Incoming Feeders (2500A): 03Nos with PT
- c) Outgoing Feeders (1250 A): 12 Nos with PT
- d) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (3150 A): 02 Nos.
- e) Power Transformer Feeders (1250A): 02Nos with PT
- f) Station Auxiliary Transformer Feeders (1250A) : 02 Nos .
- g) Capacitor bank feeders (1250A): 02 Nos

Indoor 11 KV GIS Switchgear Panels having single bus 2500A:

- a) Incoming Feeders with PCM (2500 A): 02 Nos.
- b) Outgoing Feeders with PCM (630A) with PCM: 08 Nos.
- c) Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A): 01Nos.
- d) 11 KV Bus Potential Transformers: 02 Sets (To be mounted on Transformer's feeder panel).

- 15) Supply and installation/ connection of 33kV, 11kV Power Cable, XLPE, but not PVC/ PILC for all 11kV line feeders and transformers feeder including cable termination (Outdoor & Indoor) as required.
- 16) Supply and installation/ connection of Control Cables
- 17) Supply and installation of Battery, Ni-Cd as per BOQ.
- 18) Supply and installation of Battery Charger as per BOQ.
- 19) Supply and lying of Rubber pad to be laid in front of the SWITCHGEAR Panels.
- 20) 05(Five) Sets of As-built drawings together with operation and maintenance Manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.
- 21) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid.

Besides the above others are as follow:

- 22) All the 33 KV & 11kV Switchgears will be of Gas Insulated type with circuit breakers.They will be installed on the 1st floor of the proposed Control room / substation building. All 33KV and 11KV cable shall be accommodated in the Ground floor of the proposed Control room / substation building with steel structure cable trenches. Portion of Ground floor may be used as office room of the sub-station building. All the Common Service Facility areas- Reception, Waiting/ Common Space, Rest/Wash rooms, etc shall be installed in floor. Every floor shall be designed with Natural Ventilation system. There shall be adequate space to both end of 33kV GIS panel & 11 kV GIS panel for future extension.
- 23) RCC Fire wall shall be constructed between one and the next power. Adequate free air passage space shall be maintained.
- 24) 02 (two) Nos. 33/0.415KV, 250KVA Station Transformers (Oil type) will be installed separately beside Power Transformer by 33 KV cable terminations. The LV sides of the station transformer will be connected to the LV A/C distribution Panel by LV cables of appropriate size. Single sources of D/C supply with 01 set of 110 V battery (Ni-Cd) and battery charger shall be installed and connected to the D/C distribution panel by LV cables of appropriate size.
- 28) The indoor 33KV XLPE copper cables will be connected to 33KV GIS panel by requisite cable

termination kit.

25) The indoor 11KV XLPE copper cables will be connected to 11KV GIS panel by requisite cable termination kit. The indoor terminations of the 11KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

26) The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure. In the same way the 11KV cables outdoor type terminations will be heat shrink type being supported by steel structure.

27) The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority. Meters for monitoring three phase Current and voltage are to be installed in each panel.

28) All 33KV & 11KV panels (except the bus couplers) are to be provided with separate high class Digital energy meter of 0.2 class having provision of remote communication facilities. Both mechanical and electrical inter locks are to be provided along with the breakers, isolators and earth switches of various feeders as per normal convention.

29) Grounding mesh of copper conductor of requisite earth resistance (shall be $<0.50\text{ohm}$) will be installed for grounding the neutrals of the power transformers, station transformers, their bodies, the lightning arrester sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

30) AC and DC distribution Panels, Battery Sets with battery chargers shall be accommodated on the same floor of 33 kV and 11 kV switchgear panels.

31) The 33 KV incoming feeders (to come from other substation/grid) shall be connected to the incoming of the 33 KV switchgear panel and the 33 KV Switchgear panel will be commissioned. Simultaneously the 33/11 KV power transformers and the 33/0.415 KV station transformer will also be energized. The 11 KV sides of 33/11KV power transformers will then be connected (by 11KV XLPE cables) to the 11 KV incoming cubicles.

- 33KV, 3X1Cx800mm² cable per phase connected to 03 (Three) nos. 33 kV GIS Incoming Breaker (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- 33KV, 1Cx500mm² cable connected to 12 (Twelve) nos. 33 kV GIS Outgoing feeder, 02 (two) capacitor Bank (Supply of Cable, Indoor and outdoor termination kits and connection work is under this scope).
- Connection from 33kV GIS (Transformer feeder) to power transformer will be made by 1Cx 500 mm² XLPE Cu cable for 02 (two) nos. 33 kV GIS x-former feeder .
- 11KV incoming connection from the transformer to the breaker will be made by 2x1Cx630 mm² XLPE Copper Cable for 33/11KV, 16/20MVA, ONAN/ONAF Power Transformers.
- 11kV, 3CX185 mm² for (630A) 08. Nos Outgoing feeder & 4CX120mm² XLPE PVC (Cu) Cable for Station Auxiliary Transformer and 3CX95mm² XLPE Copper Cable for Station Auxiliary Transformer Incoming.
- Transformer Neutral will also be connected to ground by copper cable of 2X1CX150 mm² with 03 (Three) Nos. of Electrode (Round Bar) of 16 mm Dia with 04 (Four) Meter Length Each and Length of the electrode will be decided as per Design calculation. The requisite termination kits are to be supplied and installed.
- The 11KV outgoing feeder of the substation from the 11KV outgoing breaker shall be connected by 3CX185 mm² XLPE Cable and connect through underground up to the outgoing SPC Feeder pole line (adjacent to proposed boundary wall).

Indoor and Outdoor all 33kV & 11 kV Termination is in the contractor's Scope.

36) The Scope also includes the design, manufacture, supply, Installation and commissioning of Substation Automation System (SAS) for both 33KV GIS & 11KV GIS system with provision for interfacing with SCADA System.

37) Outdoor lightning protection system for the substation shall be installed.

38) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid. One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.

39) The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have make all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

40) Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

Indicative Layout & Single line diagram in Annex-9.

6.1.16 Design, Supply, Erection, Installation, Testing and Commissioning of 4D (10mx5m each) Bay Extension of 33kV Switchyard at Chokoria Grid Substation under S&D, Cox's bazar, BPDB, Chattogram.

(Not limited but at least the following works to be done by the turnkey contractor)

A. CIVIL & BUILDING WORKS:

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and commissioning and so on of the following works are the scope of works:

- 1) Earth filling, Land escaping, Leveling, Dressing of the proposed switchyard area. Employer will provide all lands only and contractor will fill it by sand (if necessary) upto ground level. Soil testing for soil resistivity and soil bearing capacity before designing, final leveling, consolidation, surfacing and compaction of related switchyard area with crushed rock (where required) to cater for the ultimate development of the substation.
- 2) Construction of cable trenches for control cable:
 - (a) Within the switch yard area
 - (b) Switch yard area to control room building
- 3) Construction of R.C.C foundations for, switch yard tower and all others equipment & Structure as required.
- 4) Supply of gravel and finishing the Switchyard surface by the gravel to the switchyard.
- 5) Soil testing for soil resistivity and soil bearing capacity before designing final leveling of Control room area.
- 5) Construction of drainage, sanitary system for Bay Extension area.
- 6) Design & Construction of new Substation Building:
38.5 square meter (38.5 Sq. m floor) one storied Building horizontal extension with existing control room as per price schedule including roof lime terracing, door, window, toilet etc.
- 7) Supply and construction of Power cable trench and control cable rack inside the Ground floor of the substation building. Proper fire and water proof sealing of the cable entry (control & Power) at Control Room building, to prevent water entering from switch yard/outside to CR Building, preventing entry of rats and reptiles, fire proof etc.
- 8) Dismantling work as per Price Schedule, BOQ & field requirement.
- 9) Supply and installation of office room, Control room indoor illumination. Lighting levels within the building must be generally designed to meet the requirements of IEC Standards, and in particular, meet the following specific lighting levels:
 - 400 lux between rows at switchgear front panels within the Control Building;
 - 400 lux at the front of control panel within the Control Building;
 - 160 lux to the rear of switchgear in the Control building
 - 160 lux adjacent to the Battery Storage, Load Management Equipment, AC and DC panels
- 10) All civil works and necessary indoor & outdoor lighting [Energy efficient (LED) and automated] are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.

B. SUB-STATION / ELECTRICAL WORKS:

Design, Manufacture, Supply, Installation/ Erection, Construction, Testing and Commissioning etc. of the following works are the scope of works:

- 1) Supply and installation of **four nos. 33kV Line Feeders** comprising: 33kV VCB, CT, DS, LA, Control cable, Cable termination kit, PCM Panel, Supporting structures etc.
- 3) Supply and installation of Switch yard shielding materials.
- 4) Supply and installation of Switch yard grounding materials for extended sub-station area and equipment to be installed. Earth resistance of the substation shall be less than 0.5ohm.
- 5) Supply and installation of Switchyard outdoor illumination system for the extended area.
- 6) Supply and installation of 33KV Bus bar conductor (ACSR Martin)
- 7) Supply and installation of 33kV switchyard gantry structure Four diameters (7M×6M each) with bus bar, bus support insulator & hardware, jumper, shielding materials and grounding materials etc. as required complete in all respect.
- 8) Supply and installation/ connection of Control Cables.
- 9) 3 (Three) sets of As-built drawings together with operation and maintenance manual, **relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB, Dhaka.** One electronic copy (soft copy in a CD) of all relevant As-built drawings together with operation and maintenance manual, **relevant IEC standards of the installed equipment shall be submitted for the Directorate of Design & Inspection -2, BPDB.**
- 10) The Bidder must visit the site and assess the works before tender submission.
- 11) Supply and installation of switching boards to be installed at switchyard for functioning of lights etc.
- 12) Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection are within the scope of the Bid

Indicative Layout & Single line diagram in Annex-9.

Besides the above others are as follow:

The outdoor cable terminations of the 33 KV cables (where required) will be heat shrink type and supported by steel structure.

In the same way the 11 KV cables outdoor type terminations will be heat shrink type being supported by steel structure. The indoor terminations of the 11 KV cables with the 11 KV switchgear panel will be as per arrangement provided there. All the 33kV and 11kV cables shall be armored and cu-wire screened.

The conventional protections to transformer feeders, line feeders and bus coupler are to be provided. However, total protection scheme is to be implemented on approval from BPDB Authority.

Grounding mesh of copper conductor of requisite earth resistance (shall be <0.5ohm) will be installed for grounding the neutrals of the power transformers, station transformers, their

bodies, the lightning arrestor sets, the steel supporting structure, all indoor & outdoor panels etc. The grounding system is to be implemented on approval of the design from BPDB Authority.

All civil works and necessary indoor & outdoor lighting (Energy efficient (LED) and automated) are required within the scope of the Tender. The substation control room building shall have the emergency automated dc lighting system in case of power failure.

Contractor shall supply and install 32-inch LED Television, 01 set of Desktop Computer with Printer, Scanner, digital sign board (electronic sign board) and complete furniture for the substation control room & office building.

Transportation of all equipment and materials, all installations, connections and testing, commissioning, inspection is within the scope of the Bid.

The Bidder must visit the site and assess the works before submitting his Tender and will carefully examine the tender requirements and to determine the existing conditions, facilities and limitations. Tenderer shall have made all necessary arrangement to carry out the Contract if awarded. Any neglect to delay or failure on the part of the tenderer to obtain reliable information upon the foregoing or any matter effecting the work and completion period shall not relieve the successful tenderer of his responsibilities, risks or liabilities until final acceptance of the Supply of Goods and Related Services in case of award of the contract.

Any additional works not covered above but necessary for the functioning of the system & required as per specification to be incorporated by the Tenderer. The items of minor nature, which is not mentioned, shall be incorporated by the bidder.

6.2 Bill of Quantities (BOQ)

1. All the items mentioned in the BOQ (as follows) shall be quoted in the respective format of the price schedule, otherwise bid will be rejected.
2. Schedule No: 3 & 5 is applicable for total price of all Substations (Not for individual substation).
3. Tenderer shall quote a Firm Turnkey Contract Price for the Supply and Related Services as described in Price Schedule according to Section 6, Section 7 & Section 8 of this Tender document. If the Tenderer deemed necessary any additional machineries/equipment/ materials / Supply and Related Services out of the list of tender Price Schedule for completion of the said Turnkey basis works (Supply and Related Services), contractor shall have to do the additional works (Supply and Related Services) without any additional cost. The costs of these additional works (Supply and Related Services) are deemed to be included within the quoted price.
4. Individual sub-station Bill of Quantity (BoQ) as follows:

6.2.1 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x16/20 MVA Regular Type GIS (Himchori New) at S&D-Coxsbazar, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|---------------------|---|-----------------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -8Nos. | | |
| 4 | Supply of 33/11 kV, 16/20MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | | |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2 \times 1C \times 630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4C \times 120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 640 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4 \times 4mm ² , 4 \times 6mm ² , 4 \times 2.5mm ² , 8 \times 2.5mm ² , 16 \times 2.5mm ² , 24 \times 2.5 mm ² , 2\times1C\times150 mm² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-10 Set (1 set =03 Nos). | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|---------------------|---|-----------------|-----|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.2 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x20/26 MVA Regular Type GIS (Coxsazar New) at S&D-Coxsazar, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -12Nos. | | |
| 4 | Supply of 33/11 kV, 20/26MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| | (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | | |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 150 meter per phase. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2 \times 1C \times 630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4C \times 120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 960 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4 \times 4mm ² , 4 \times 6mm ² , 4 \times 2.5mm ² , 8 \times 2.5mm ² , 16 \times 2.5mm ² , 24 \times 2.5 mm ² , 2\times1C\times150 mm² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-14 Set (1 set =03 Nos). | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|---|
| 1 | 2 | 3 | |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building (500 Sq.m.), Dismantling, Demolishing, Relocate of existing tin shade mosque and re-construction (200 Sq.m) as per scope of work, Evacuation, Store, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc | Lot | 1 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.3 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x16/20 MVA Regular Type GIS (Ramu Cantonment New) at S&D-Coxsbazar, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced withthe existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -8Nos. | | |
| 4 | Supply of 33/11 kV, 16/20MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|---|
| 1 | 2 | 3 | |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | Set | 1 |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2 \times 1C \times 630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4C \times 120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 640 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4 \times 4mm ² , 4 \times 6mm ² , 4 \times 2.5mm ² , 8 \times 2.5mm ² , 16 \times 2.5mm ² , 24 \times 2.5 mm ² , 2\times1C\times150 mm ² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and | | |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| 1 | 2 | 3 | |
| | technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-10 Set (1 set =03 Nos). | Lot | 1 |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc. | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.4 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x16/20 MVA Regular Type GIS (Keranihat New) at S&D-Patiya, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -12Nos. | | |
| 4 | Supply of 33/11 kV, 16/20MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | | |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2x1Cx630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4CX120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 960 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4x4mm ² , 4x6mm ² , 4x2.5mm ² , 8x2.5mm ² , 16x 2.5mm ² , 24x2.5 mm ² , 2x1Cx150 mm² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-14 Set (1 set =03 Nos). | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc. | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.5 Bill of Quantities for : Design, Supply, Installation, Testing & Commissioning of a new 33/11kV, 2X20/26MVA, regular type GIS Substation at (Patiya Bypass) under S&D Patiya , BPDB, Chottogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -12Nos. | | |
| 4 | Supply of 33/11 kV, 20/26MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | Set | 1 |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2x1Cx630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4CX120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 960 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4x4mm ² , 4x6mm ² , 4x2.5mm ² , 8x2.5mm ² , 16x 2.5mm ² , 24x2.5 mm ² , 2x1Cx150 mm ² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| 1 | 2 | 3 | |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-14 Set (1 set =03 Nos). | Lot | 1 |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc. | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.6 Bill of Quantities for : Design, Supply, Installation, Testing & Commissioning of a new 33/11kV, 2X20/26MVA, regular type GIS Substation at (Shikalbaha new) Under S&D Patiya , BPDB, Chattogram

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-5 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories- 10 Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -8Nos. | | |
| 4 | Supply of 33/11 kV, 20/26MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | Set | 1 |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 100 meter per phase. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 720 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2x1Cx630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4CX120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 640 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4x4mm ² , 4x6mm ² , 4x2.5mm ² , 8x2.5mm ² , 16x 2.5mm ² , 24x2.5 mm ² , 2x1Cx150 mm ² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| 1 | 2 | 3 | |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-10 Set (1 set =03 Nos). | Lot | 1 |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc. | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.7 Bill of Quantities for Design, Supply, Installation, Testing & Commissioning of a new 33/11kV, 2X20/26MVA, regular type GIS Substation at (Diamond Cement new) Under S&D Patiya , BPDB, Chottogram

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -12Nos. | | |
| 4 | Supply of 33/11 kV, 20/26MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| 1 | 2 | 3 | |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | Set | 1 |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2 \times 1C \times 630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4CX120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 960 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4x4mm ² , 4x6mm ² , 4x2.5mm ² , 8x2.5mm ² , 16x 2.5mm ² , 24x2.5 mm ² , 2x1C\times150 mm ² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| 1 | 2 | 3 | |
| | a) Supply of grounding copper conductor (As per scope of works and technical Specification). b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-14 Set (1 set =03 Nos). | Lot | 1 |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc. | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.8 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 2x5/6.67 MVA to 2x16/20 MVA GIS Up-gradation at Satkania at S&D-Potiya, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -8Nos. | | |
| 4 | Supply of 33/11 kV, 16/20MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type (adjustable) with current limiting for boost and float charge, | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | input- 415 volts, output DC 110 - 150 volts including all accessories. | | |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C×500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C×800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| | Supply of 1C×500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2x1Cx630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C×95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4CX120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C×185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 640 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4x4mm ² , 4x6mm ² , 4x2.5mm ² , 8x2.5mm ² , 16x 2.5mm ² , 24x2.5 mm ² , 2x1Cx150 mm ² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-10 Set (1 set =03 Nos). | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|-----|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.9 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 1x16/20 MVA to 2x16/20 MVA GIS Up-gradation (Dohazari ESU) at S&D-Potiya, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 3150 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-7 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (3150 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-10 Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -8Nos. | | |
| 4 | Supply of 33/11 kV, 16/20MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | | |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 2X1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 750 meter per phase. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 1680 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2x1C \times 630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4CX120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 640 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4x4mm ² , 4x6mm ² , 4x2.5mm ² , 8x2.5mm ² , 16x 2.5mm ² , 24x2.5 mm ² , 2x1C\times150 mm ² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories- 10 Set (1 set =03 Nos). | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Three Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc. | Sqm | 750 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.10 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 1x5/6.67 MVA to 2x16/20 MVA GIS Up-gradation (Aziznogor) at S&D-Coxsbazar, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) -1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels.All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -8Nos. | | |
| 4 | Supply of 33/11 kV, 16/20MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | | |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2x1Cx630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4CX120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 640 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4x4mm ² , 4x6mm ² , 4x2.5mm ² , 8x2.5mm ² , 16x 2.5mm ² , 24x2.5 mm ² , 2x1Cx150 mm ² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-10 Set (1 set =03 Nos). | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc. | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.11 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33/11KV, 1x5/6.67 MVA to 2x16/20 MVA GIS Up-gradation at Lama at DD-Coxsazar, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear (GIS) unit comprising 2000 Ampere Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (1250A) with PT- 2 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2000 A) -1 No. | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2 Nos. | | |
| | GIS cubicles Station Auxiliary Transformer Feeders (1250A) - 1No. | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-7Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels. All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-2 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 No. | | |
| | GIS cubicles Outgoing Feeders (630 A) -8Nos. | | |
| 4 | Supply of 33/11 kV, 16/20MVA ONAN/ONAF Power Transformer with cable end termination facilities, On Load Tap Changer, all internal protection elements in built including Remote Tap changer Control Panel with complete accessories. | Set | 2 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 1 |
| 6 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 7 | Supply of Battery Charger, constant voltage type | Set | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | | |
| 8 | a) Supply of Battery, 110volt DC nominal, ≥ 160 Ah minimum with mounting rack including accessories | Set | 1 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 1 |
| 9 | Supply of 33kV 1C \times 500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 1C \times 800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| | Supply of 1C \times 500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 480 meter. | | |
| 10 | Supply of 11kV Single core XLPE copper cable for Transformer 2x1Cx630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 11 | Supply of 33kV 3C \times 95 sq.mm XLPE (Cu) Cable and 0.415 kV, 4CX120 sq.mm PVC (Cu) Cable for Station Transformer as required. | Lot | 1 |
| 12 | Supply of 11 kV 3C \times 185 sq. mm XLPE (Cu) Cable per Outgoing feeder from 11 kV GIS as required. As per field requirement but not less than 640 meter. | Lot | 1 |
| 13 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 14 | Supply of All Control cables of different sizes and all LV PVC copper cable of different sizes as necessary and MCCB, connectors to connect different panels/auxiliary transformer etc. 4x4mm ² , 4x6mm ² , 4x2.5mm ² , 8x2.5mm ² , 16x 2.5mm ² , 24x2.5 mm ² , 2x1Cx150 mm ² PVC (Cu) Cable for power transformer neutral etc including all accessories. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 16 | Supply of Station type 11 kV Surge Arrester including all accessories-10 Set (1 set =03 Nos). | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 17 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 18 | Supply of split type Air conditioner 48,000 BTU/hour capacity (4 Nos). | Lot | 1 |
| 19 | Supply of Outdoor and Indoor Lighting System. | Lot | 1 |
| 20 | Supply of All Steel Supporting Structures (including EM Tower, LA Structure, surge monitor/counter, Supporting Steel Structure and other accessories etc.) of Equipment as applicable. | Lot | 1 |
| 21 | Supply of Fire Detection (Smoke Detection & alarm System) & Fire Fighting Equipment a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 22 | Civil Works. | Lot | 1 |
| (a) | Earth filling, Land escaping, Leveling, Dressing / Preparation of Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Dismantling, Demolishing, Store, Evacuation, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling, CCTV system with night vision camera and other related items etc. | Sqm | 500 |
| (c) | Foundation of Transformer, Equipment, Power & Control Cable Trench, Cable Tray/Rack & others. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc). | Lot | 1 |
| (e) | Boundary Wall (with retaining where necessary) and Drainage System including gate etc. (As per site requirement) 10sq.m Guard Post. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| (g) | Computer, laser printer, Operation Key Board, Table, chair, Steel Almirah, File Cabinet, Exhaust fans, Ceiling Fans etc. | Lot | 1 |
| 23 | Installation, Testing, Commissioning of all Equipment. | Lot | 1 |
| 24 | Design, Drawing, Training and Inspection of the substation. | Lot | 1 |

6.2.12 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33 KV Bay Extension at Shikalbaha 132/33 KV Grid Substation Under S&D-Patiya, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV Vacuum Circuit Breaker, 1600 A, 31.5 kA for 3 sec. outdoor type along with supporting structure and accessories. | Set | 4 |
| 2 | Supply of Galvanized steel structure materials for 2 span gantry extension each 7m×6 m along with suitable beam for supporting 33 kV bus, bus-section isolator, PTs, Station Transformer and all other accessories as required. | Lot | 1 |
| 3 | Supply of 33 kV Isolator 1600 A, 31.5 kA for 3 sec. without earthing blade gang operated vertical mounted vertical break with galvanized steel support structure and necessary connectors and accessories. (1 set= 03 Nos) | Set | 4 |
| 4 | Supply of 33 kV Line Isolator 1600A, 31.5 kA for 3 sec. with earthing blade gang operated vertical mounted vertical break with galvanized steel support structure and necessary connectors and accessories. (1 set= 03 Nos) | Set | 4 |
| 5 | Supply of 33 kV 3 × single phase Current Transformer (3 nos. per circuit) ratio 600-1200/5/5A class 5P20 for protection and 0.2 for measuring along with supporting steel structure and suitable bi-metallic connectors and accessories as per field requirement. | Set | 4 |
| 6 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories- 4Set (1 Set= 3Nos). | Lot | 1 |
| 7 | Supply of Suitable busbar Droppers, Conductors, Connectors, outdoor marshal kiosk, hardware clamps, nuts and bolts, etc. as required for connecting the individual items of equipment of 33 kV switchyard & complete bay extension. | Lot | 1 |
| 8 | Supply of PG Clamps. | Lot | 1 |
| 9 | Supply of 33 kV Disc Insulator set with necessary suitable front and back connecting clamps. | Lot | 1 |
| 10 | Supply of 33 kV Bus Bar Conductor (ACSR Martin). | Lot | 1 |
| 11 | Supply of 33 kV Control, Metering and Protection panel for 33 kV line feeder with 3 O/C, 1 E/F (IDMT and Ins). 3 Directional O/C + 1 Directional E/F relays including audio visual annunciator. | Set | 4 |
| 12 | Supply of Shield wire extension, overall diameter 9.252 mm standard steel with terminal tension clamp and fitting, Tension Clamp, Support Clamp set for fixing the shield wire with the gantry steel structure. | Lot | 1 |
| 13 | Supply of Control Cables including CT and PT cables and LV Power Cables with all accessories between Control Room panels and 33 kV switchyard equipment. | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 14 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | Lot | 1 |
| 15 | Civil Works: | | |
| (a) | Earth filling and compaction as needed, Gravel Pit, Laying of Gravel etc. | | |
| (b) | Related civil works for installation of 04 nos 33 kV (AIS) PCM Panel in the existing Control room | Lot | 1 |
| (c) | Substation switchyard extension, gantry as per scope of works. | | |
| (d) | Foundation of Equipment, Power & Control Cable Trench etc. | | |
| 16 | Installation of complete Bay with existing system including Inspection, design, drawing, as-built drawing, erection, testing & commissioning. | Lot | 1 |

6.2.13 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33 KV Bay Extension at Dohazari 132/33 KV Grid Substation under S&D-Patiya, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV Vacuum Circuit Breaker, 2500 A, 31.5 kA for 3 sec. outdoor type along with all supporting structure and all accessories. | Set | 2 |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with all supporting structure and all accessories. 2 Set (1 set =03 Nos) | Lot | 1 |
| 3 | Supply of Galvanized steel structure materials for 1 (one) span gantry extension each 6.2m×6.2m along with suitable beam for supporting 33 kV bus, bus-section isolator, potential transformer, station transformer and all other accessories as required. | Lot | 1 |
| 4 | Supply of 33 kV Isolator 2500A, 31.5 kA for 3 sec. without earthing blade gang operated vertical mounted vertical break with galvanized steel support structure and necessary connectors and all accessories. 2 Set (1 set =03 Nos) | Lot | 1 |
| 5 | Supply of 33 kV line isolator 2500A, 31.5 kA for 3 sec. with earthing blade gang operated vertical mounted vertical break with galvanized steel support structure and necessary connectors and all accessories. 2 Set (1 set =03 Nos) | Lot | 1 |
| 6 | Supply of 33 kV 3× single phase current transformer (3 nos. per circuit) ratio 1200-2400/5/5A class 5P20 for protection and 0.2 for measuring along with supporting steel structure and suitable bi-metallic connectors and all accessories as per field requirement. 2 Set (1 set =03 Nos) | Lot | 1 |
| 7 | Supply of Suitable busbar Droppers, Conductors, Connectors, outdoor marshal kiosk, hardware clamps, nuts and bolts, etc. as required for connecting the individual items of equipment of 33 kV switchyard & complete bay extension. | Lot | 1 |
| 8 | Supply of PG Clamps including all other Clamps as Required | Lot | 1 |
| 9 | Supply of 33 kV Disc Insulator set with necessary suitable front and back connecting clamps. | Lot | 1 |
| 10 | Supply of 33 kV Bus Bar Conductor (ACSR Martin). | Lot | 1 |
| 11 | Supply of 33 kV control, metering and protection panel for 33 kV line feeder with 3 O/C, 1 E/F (IDMT and Ins). 3 Directional O/C + 1 Directional E/F relays including audio visual annunciator and all accessories 02 Sets | Lot | 1 |
| 12 | Supply of Shield wire extension, overall diameter 9.252 mm standard steel with terminal tension clamp and fitting, Tension Clamp, Support Clamp set for fixing the shield wire with the gantry steel structure and all accessories. | Lot | 1 |
| 13 | Supply of All Control Cables including CT and PT cables and LV Power Cables with all accessories between Control Room panels and 33 kV switchyard equipment. | Lot | 1 |
| 14 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 15 | Civil Works: | | |
| (a) | Earth filling and compaction as needed, Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (b) | Substation switchyard extension, gantry as needed etc. | | |
| (c) | Foundation of Equipment, Power & Control Cable Trench etc. | | |
| 16 | Installation of complete Bay with existing system including Inspection, design, drawing, as-built drawing, erection, testing & commissioning. | Lot | 1 |

6.2.14 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33 KV Bay Extension at Julda 132/33 KV Grid Substation Under S&D-Patiya, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV indoor Gas Insulated Switchgear unit comprising 1250 Ampere Bus including surge arresters and other related accessories. This 33kV GIS Must be Compatible with existing GIS system. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. Each Circuit Breaker must equipped with CTs, PTs, Current, Voltage, MW, MVAR, PF, MWh, MVARh meters (Energy meter) and 2 O/C, 1 E/F (IDMT and Ins), Directional 2 O/C and 1 E/F relays all to be connected and integrated with existing 33 kV indoor GIS unit. | Set | 1 |
| | GIS cubicles Outgoing Feeders (1250A) with PT-2 Nos | | |
| 2 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories-2 Set (1 set =03 Nos). | Lot | 1 |
| 3 | Supply of 33 kV 1×500 sq. mm XLPE (Cu) Cable for 2 (two) outgoing feeders as per requirement but not less than 480 meter . | Lot | 1 |
| 4 | Supply of All Cable termination kits (33 kV) for 500 sq.mm XLPE (Cu) both sides along with all accessories and cable support structure. | Lot | 1 |
| 5 | Supply of Control Cables including CT and PT cables and LV Power Cables with all accessories between Control Room panels and 33 kV switchyard equipment. | Lot | 1 |
| 6 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of Grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 7 | Civil Works. | | |
| | Related civil works for installation of 02 nos 33 kV GIS Panel in the existing Control room | Lot | 1 |
| 8 | Installation of complete Bay with existing system including Inspection, design, drawing, as-built drawing, erection, testing & commissioning. | Lot | 1 |

6.2.15 Bill of Quantities for Design, Supply, Erection, Installation, Testing and Commissioning of 33 KV Bay Extension at Jhilonjha, Coxsbazar 132/33 KV Grid Substation under S&D-Coxsbazar, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33kV indoor Gas Insulated Switchgear (GIS) unit comprising 3150 Ampere Double Bus including surge arresters and other related accessories. All 33 kV Control, Protection and Metering System shall be housed in the same 33 kV GIS panels. All the Circuit Breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and provision for interfacing with the existing/future BPDB's SCADA system in Chattogram Zone . | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT-3 Nos. | | |
| | GIS cubicles Outgoing Feeders (1250 A) with PT-12 Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (3150 A)-2 Nos. | | |
| | Bus sectionalizer for double bus bar system 3150A- 01 set with 4 set Bus PT (1 set= 3nos.) | | |
| | GIS cubicles Power Transformer Feeders (1250A) with PT-2Nos. | | |
| | GIS cubicles Auxiliary Transformer Feeders (1250A)-2Nos. | | |
| | Capacitor bank feeder (1250A)-2Nos. | | |
| 2 | Supply of 11 kV indoor Gas Insulated Switchgear (GIS) cubicles comprising 2500A Bus including surge arresters other related accessories. All 11 kV Control, Protection and Metering System shall be housed in the same 11 kV GIS panels. All circuit breaker's control with Local/ Remote switch and metering data shall be brought under Substation Automation System (SAS) and is to be interfaced with the existing/future BPDB's SCADA system in Chattogram Zone. | Set | 1 |
| | GIS cubicles Incoming Feeders (2500A) with PT- 2Nos. | | |
| | GIS cubicles Bus Coupler Breaker with Riser (Bus Coupler with Riser) (2500 A)-1 Nos. | | |
| | GIS cubicles Outgoing Feeders (630 A)-8 Nos. | | |
| 3 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with supporting structure and required accessories -18 set (1 set= 3Nos) | Lot | 1 |
| 4 | Supply of Station type 11 kV Surge Arrester including all accessories- 10 set (1 set= 3Nos) | Lot | 1 |
| 5 | Supply of Station Transformer 33/0.4 KV, 250 kVA including all accessories. | Set | 2 |
| 6 | Supply of 33kV 1C×500 sq.mm XLPE (Cu) Cable as required for Transformer Feeder. As per field requirement but not less than 210 meter. | Lot | 1 |
| | Supply of 3X1C×800sq. mm XLPE (Cu) Cable for 33kV incoming feeder as per requirement. As per field requirement but not less than 80 meter per phase. | | |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | Supply of 1C×500sq. mm XLPE (Cu) Cable for 33kV Outgoing feeder as per requirement. As per field requirement but not less than 3360 meter. | | |
| 7 | Supply of 11kV Single core XLPE copper cable for Transformer 2x1Cx630 Sq. mm per phase. As per field requirement but not less than 420 meter. | Lot | 1 |
| 8 | Supply of 11 kV 3Cx 185 sq. mm XLPE (Cu) cable per Feeder for Outgoing feeder. As per field requirement but not less than 640 meter. | Lot | 1 |
| 9 | Supply of 33 kV 3C×95 sq. mm XLPE (Cu) Cable and 0.415 kV, 4Cx 120 sq.mm PVC (Cu) Cable for Station Transformer as required | Lot | 1 |
| 10 | Supply of 0.415 kV, 2x150 Sq-m PVC Cu Cable. | Lot | 1 |
| 11 | Supply of All Control Cables including CT and PT cables and LV Power Cables with all accessories between Control Room panels and 33 kV Switchyard equipment. | Lot | 1 |
| 12 | Supply of all Cable termination kits in line with BOQ (For all 33 kV, 11 kV and 0.415 kV cable, cable tray along with all requirement (both for indoor and outdoor) including all accessories. | Lot | 1 |
| 13 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of grounding copper conductor (As per scope of works and technical Specification). b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 14 | Supply of Substation Automation System (SAS) with Server, Monitor, UPS with 30 Minute battery back-up and Printer etc. | Lot | 1 |
| 15 | Supply of split type Air conditioner, 48,000 BTU/hour capacity but not limited to. | Lot | 1 |
| 16 | Outdoor and indoor Lighting System with energy saving lamps. | Lot | 1 |
| 17 | Supply of Fire Detection & Fire Fighting Equipment with Smoke Detection & alarm System a) CO2-2Sets, b) Foam Type -2 Sets & c) Dry Chemical Type-2 Sets. | Lot | 1 |
| 18 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 2 |
| 19 | Supply of Battery Charger, constant voltage type (adjustable) with current limiting for boost and float charge, input- 415 volts, output DC 110 - 150 volts including all accessories. | Set | 2 |
| 20 | a) Supply of Battery, 110volt DC nominal, ≥160 Ah minimum with mounting rack including accessories | Set | 2 |
| | b) Supply of DC Distribution Panel including all accessories. | Set | 2 |
| 21 | Civil Works: | | |
| (a) | Earth filling and compaction as needed, Gravel Pit, Laying of | | |

| Line Item No | Description of Item | Quantity | |
|--------------|--|----------|-----|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| | Gravel etc. | | |
| (b) | Construction of Two Storied GIS Sub-Station Building Including Control Room, Office Room, Store, O/H Tank, Water Supply with new Deep Tube well, Sanitary system, Internal Electrification, Emergency Lighting, False Ceiling etc. | Sqm | 700 |
| (c) | Foundation of Equipment, Power & Control Cable Trench etc. | Lot | 1 |
| (d) | Road (approach including internal road & walkway etc) with 10sq.m Guard Post. | Lot | 1 |
| (e) | Drainage System extension etc. | Lot | 1 |
| (f) | Tree plantation, gardening and beautification etc. | Lot | 1 |
| 22 | Installation of complete Bay with existing system including Inspection, design, drawing, as-built drawing, erection, testing & commissioning. | Lot | 1 |

6.2.16 Bill of Quantities for for Design, Supply, Erection, Installation, Testing and Commissioning of 33 KV Bay Extension (Chokoria) from 33/11 KV Substation Under S&D-Coxs' Bazar, BPDB, Chattogram.

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of 33 kV Vacuum Circuit Breaker, 1600 A, 31.5 kA for 3 sec. outdoor type along with all supporting structure and all accessories. | Set | 4 |
| 2 | Supply of Galvanized steel structure materials for 2 span gantry extension each 7m×6m along with suitable beam for supporting 33 kV bus, bus-section isolator, potential transformer, station transformer and all other accessories as required. | Lot | 1 |
| 3 | Supply of 33 kV Isolator 1600A, 31.5 kA for 3 sec. without earthing blade gang operated vertical mounted vertical break with galvanized steel support structure and necessary connectors and all accessories. 1 set=3 Nos | Set | 4 |
| 4 | Supply of 33 kV line isolator 1600A, 31.5 kA for 3 sec. with earthing blade gang operated vertical mounted vertical break with galvanized steel support structure and necessary connectors and all accessories. 1 set=3 Nos | Set | 4 |
| 5 | Supply of 33 kV 3 × single phase current transformer (3 nos. per circuit) ratio 600-1200/5/5A class 5P20 for protection and 0.2 for measuring along with supporting steel structure and suitable bi-metallic connectors and accessories as per field requirement. | Set | 4 |
| 6 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) along with all supporting structure and all required accessories. 4 Sets (1Set=3Nos). | Lot | 1 |
| 7 | Supply of Suitable busbar Droppers, Conductors, Connectors, outdoor marshal kiosk, hardware clamps, nuts and bolts, etc. as required for connecting the individual items of equipment of 33 kV switchyard & complete bay extension. | Lot | 1 |

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------|---|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 8 | Supply of PG Clamps including all other Clamps as Required | Lot | 1 |
| 9 | Supply of 33 kV Disc Insulator set with necessary suitable front and back connecting clamps. | Lot | 1 |
| 10 | Supply of 33 kV Bus Bar Conductor (ACSR Martin). | Lot | 1 |
| 11 | Supply of 33 kV control, metering and protection panel for 33 kV line feeder with 3 O/C, 1 E/F (IDMT and Ins). 3 Directional O/C + 1 Directional E/F relays including audio visual annunciator. 4 Sets | Set | 4 |
| 12 | Supply of LV AC Distribution Panel 3 phase, 415 volts with interlocking provision including Kwh meter (accuracy class 1.0) and all accessories for station transformer. | Set | 1 |
| 13 | Supply of Shield wire extension, overall diameter 9.252 mm standard steel with terminal tension clamp and fitting, Tension Clamp, Support Clamp set for fixing the shield wire with the gantry steel structure. | Lot | 1 |
| 14 | Supply of Control Cables including CT and PT cables and LV Power Cables with all accessories between Control Room panels and 33 kV Switchyard equipment. | Lot | 1 |
| 15 | Supply of all material for Grounding System, Earthing mesh with earthing electrode. | Lot | 1 |
| | a) Supply of grounding copper conductor (As per scope of works and technical Specification). (b) Supply of Grounding copper rod (Earthing electrode) dia 16 mm each 4 Meter length to achieve Earth Resistance as per standard/ requirement. | | |
| 17 | Civil Works: | | |
| (a) | Design & Construction of Substation Building: 38.5 square meter (38.5 Sq. m floor) one storied Building horizontal extension with existing control room as per price schedule including roof lime terracing, door, window, toilet etc. | Lot | 1 |
| (b) | Earth filling and compaction as needed, Gravel Pit, Laying of Gravel etc. | Lot | 1 |
| (c) | Related civil works for installation of 04 nos 33 kV (AIS) PCM Panel in the existing Control room | | |
| (d) | Substation switchyard extension, gantry as needed etc. | | |
| (e) | Foundation of Equipment, Power & Control Cable Trench etc. | | |
| 19 | Installation of complete Bay with existing system including Inspection, design, drawing, as-built drawing, erection, testing & commissioning. | Lot | 1 |

6.2.17 Mandatory Spare parts

| Line Item No | Description of Item | Quantity | |
|--------------|---|----------------------|----|
| <u>1</u> | <u>2</u> | <u>3</u> | |
| 1 | Supply of Bushing of each type (HT & LT) with conductor and terminal for new 33/11 kV, 16/20 MVA Power Transformer | Set | 6 |
| 2 | Supply of Bushing of each type (HT & LT) with conductor and terminal for new 33/11 kV, 20/26 MVA Power Transformer | Set | 6 |
| 3 | Supply of closing and Tripping Coil for 33kV GIS Switchgear and Control Equipment | Set (1 set =2 nos.) | 20 |
| 4 | Supply of closing and Tripping Coil for 12kV AIS Switchgear | Set (1 set =2 nos.) | 20 |
| 5 | Supply of Motor Control Unit (MCU) for 33kV GIS Switchgear and Control Equipment | Nos | 9 |
| 6 | Supply of Universal Motor for Spring Charge for 33kV GIS Switchgear | Nos | 9 |
| 7 | Supply of Universal Motor for Spring Charge for 12kV AIS Switchgear | Nos | 9 |
| 8 | a)Manometer (Pressure Indicator) for 33kV GIS Switchgear | Nos | 15 |
| | b)Tap Disk Indicator for 33kV GIS Switchgear | Nos. | 9 |
| | c)Indicating Lamp for 33kV GIS Switchgear | Nos. | 36 |
| | d)SF6 Gas (50 kg Bottle) for 33kV GIS Switchgear | Nos. | 3 |
| | e)Tools Kit for 33kV GIS Switchgear | Set | 9 |
| 9 | Supply of 33 kV, Single phase Lightning Arrester (ZnO-type) | Sets (3 nos.= 1 set) | 21 |
| 10 | Supply of 11 kV, Single phase Lightning Arrester (ZnO-type) | Sets (3 nos.= 1 set) | 21 |
| 11 | Supply of 33 kV Single Phase Current Transformer ratio 300-600/5-5-5A class 5P20 for protection and 0.2 for measuring | Sets (3 nos.= 1 set) | 6 |
| 12 | Supply of 33 kV Single Phase Current Transformer ratio 400-800/5-5A class 5P20 for protection and 0.2 for measuring | Sets (3 nos.= 1 set) | 9 |
| 13 | Supply of 33kV, Single Phase Potential Transformer ratio 33/√3/0.11/√3/0.11/√3 kV Class 0.2 measuring & 3P for protection signaling instrument etc. | Sets (3 nos.= 1 set) | 12 |
| 14 | Supply of Differential Relay, 3 O/C + 1 E/F + 3 Directional O/C + 1 Directional E/F for 33 kV Control Metering and Relay Panel as per technical specification. | Set | 6 |
| 15 | Supply of 3 Over Current + 2 Earth fault (1 E/F + 1 Separate Standby Earth Fault) + Directional O/C & E/F relay for 11 kV Control Metering and Relay Panel as per technical specification. | Set | 6 |
| 16 | Supply of Trip relay, Trip Circuit Supervision Relay for PCM panel as per technical specification. | Sets | 6 |
| 17 | a)33kV Cable termination plug and socket with all accessories required for cable terminating with 1X1CX800mm2 (6 sets) &1X1CX500mm2 (15 sets) XLPE cable to be connected with GIS panel. 1 set= 3 nos | Lot | 1 |
| | b)11kV Cable termination plug and socket with all accessories required for cable terminating with 1X1CX630mm2 (6 sets) XLPE cable to be connected with GIS panel. 1 set= 3 nos | Lot | 1 |

6.2 Specification

The Plant & Equipment shall comply with following Technical Specifications:

| Item No | Name of Item or Related Service | Technical Specification and Standards |
|----------|---------------------------------|--|
| 1 | 2 | 3 |
| | <i>Plant & Equipment</i> | Bidder shall comply the Technical Specifications as per Section 7 & Guaranteed Technical Particular (GTP) as per Section-8 , otherwise bid will be rejected. |
| | <i>Inspection and Tests</i> | <i>As per Section 7 and Section 8</i> |

6.3 Form of Completion Certificate

Contract No:
To:

Date:

[Name of Contractor]

Pursuant to GCC Clause 39 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated *[insert date]*, for the supply and installation of plant and Services for *[name of contract]*, we hereby notify you that the following part(s) of the Facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Employer hereby takes over the said part(s) of the Facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below.

1. Description of the Facilities or part thereof: _____
2. Date of Completion: _____

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to complete the execution of the Facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

for and on behalf of the Employer

[*Signature*]

[*Title of the Project Manager*]

6.4 Form of Operational Acceptance Certificate

Contract No:

Date:

To:

[Name of Contractor]

Pursuant to GCC Clause 40.3 (Operational Acceptance) of the General Conditions of the Contract entered into between yourselves and the Employer dated *[insert date]*, for the supply and installation of plant and Services for *[name of contract]*, we hereby notify you that the Functional Guarantees of the following part(s) of the Facilities were satisfactorily attained on the date specified below.

1. Description of the Facilities or part thereof: _____
2. Date of Operational Acceptance: _____

This letter does not relieve you of your obligation to complete the execution of the Facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

for and on behalf of the Employer

[*Signature*]

[*Title of the Project Manager*]

6.5 Form of Change Order Procedure and Forms

Contract No:

Date:

To:

[Name of Contractor]

CONTENTS

1. General
2. Change Order Log
3. References for Changes

ANNEXES

- Annex 1 Request for Change Proposal
- Annex 2 Estimate for Change Proposal
- Annex 3 Acceptance of Estimate
- Annex 4 Change Proposal
- Annex 5 Change Order
- Annex 6 Pending Agreement Change Order
- Annex 7 Application for Change Proposal
- Annex 9 Indicative Layout & Single line diagram

Change Order Procedure

1. General

This section provides samples of procedures and forms for implementing changes in the Facilities during the performance of the Contract in accordance with GCC Clause 64 (Change in the Facilities) of the General Conditions.

2. Change Order Log

The Contractor shall keep an up-to-date Change Order Log to show the current status of Requests for Change and Changes authorized or pending, as Annex 8. Entries of the Changes in the Change Order Log shall be made to ensure that the log is up-to-date. The Contractor shall attach a copy of the current Change Order Log in the monthly progress report to be submitted to the Employer.

3. References for Changes

- (1) Request for Change as referred to in GCC Clause 64 shall be serially numbered CR-X-nnn.
- (2) Estimate for Change Proposal as referred to in GCC Clause 64 shall be serially numbered CN-X-nnn.
- (3) Acceptance of Estimate as referred to in GCC Clause 64 shall be serially numbered CA-X-nnn.
- (4) Change Proposal as referred to in GCC Clause 64 shall be serially numbered CP-X-nnn.
- (5) Change Order as referred to in GCC Clause 64 shall be serially numbered CO-X-nnn.

Note: (a) Requests for Change issued from the Employer's Home Office and the Site representatives of the Employer shall have the following respective references:

| | |
|-------------|----------|
| Home Office | CR-H-nnn |
| Site | CR-S-nnn |

- (b) The above number "nnn" is the same for Request for Change, Estimate for Change Proposal, Acceptance of Estimate, Change Proposal and Change Order.

Annex 1. Request for Change Proposal
(Employer's Letterhead)

To:

Date:

Attention:

Contract Name:

Contract Number:

With reference to the captioned Contract, you are requested to prepare and submit a Change Proposal for the Change noted below in accordance with the following instructions within _____ days of the date of this letter _____.

1. Title of Change: _____
2. Change Request No. _____
3. Originator of Change: Employer: _____
Contractor (by Application for Change Proposal No. _____¹⁶:
4. Brief Description of Change: _____
5. Facilities and/or Item No. of equipment related to the requested Change: _____
6. Reference drawings and/or technical documents for the request of Change:

| | |
|---------------------------------|--------------------|
| <u>Drawing No./Document No.</u> | <u>Description</u> |
|---------------------------------|--------------------|

7. Detailed conditions or special requirements on the requested Change: _____

8. General Terms and Conditions:

- (a) Please submit your estimate to us showing what effect the requested Change will have on the Contract Price.
- (b) Your estimate shall include your claim for the additional time, if any, for completion of the requested Change.
- (c) If you have any opinion negative to the adoption of the requested Change in connection with the conformability to the other provisions of the Contract or the safety of the Plant or Facilities, please inform us of your opinion in your proposal of revised provisions.
- (d) Any increase or decrease in the work of the Contractor relating to the services of its personnel shall be calculated.
- (e) You shall not proceed with the execution of the work for the requested Change until we have accepted and confirmed the amount and nature in writing.

| | |
|-------------------------|--|
| Signature: | <i>[insert signature of authorised representative of the Employer]</i> |
| Name: | <i>[insert full name of signatory with National ID Number]</i> |
| Title of the Signatory: | <i>[insert title of the Signatory]</i> |
| Name of the Employer: | <i>[insert name of the Employer]</i> |

Annex 2. Estimate for Change Proposal

(Contractor's Letterhead)

To:

Date:

Attention:

Contract Name:

Contract Number:

With reference to your Request for Change Proposal, we are pleased to notify you of the approximate cost of preparing the below-referenced Change Proposal in accordance with GCC Sub-Clause 64.2.1 of the General Conditions. We acknowledge that your agreement to the cost of preparing the Change Proposal, in accordance with GCC Sub-Clause 64.2.2, is required before estimating the cost for change work.

1. Title of Change: _____
2. Change Request No./Rev.: _____
3. Brief Description of Change: _____
4. Scheduled Impact of Change: _____
5. Cost for Preparation of Change Proposal: _____¹⁷

(a) Engineering (Amount)

(i) Engineer _____ hrs x _____ rate/hr =
(ii) Draftsperson _____ hrs x _____ rate/hr =
Sub-total _____ hrs

Total Engineering Cost

(b) Other Cost

Total Cost (a) + (b)

| | |
|-------------------------|--|
| Signature: | <i>[insert signature of authorised representative of the Employer]</i> |
| Name: | <i>[insert full name of signatory with National ID Number]</i> |
| Title of the Signatory: | <i>[insert title of the Signatory]</i> |
| Name of the Employer: | <i>[insert name of the Employer]</i> |

¹⁷ Costs shall be in the currencies of the Contract.

Annex 3. Acceptance of Estimate

(Employer's Letterhead)

To:

Date:

Attention:

Contract Name:

Contract Number:

We hereby accept your Estimate for Change Proposal and agree that you should proceed with the preparation of the Change Proposal.

1. Title of Change: _____
2. Change Request No./Rev.: _____
3. Estimate for Change Proposal No./Rev.: _____
4. Acceptance of Estimate No./Rev.: _____
5. Brief Description of Change: _____
6. Other Terms and Conditions: In the event that we decide not to order the Change accepted, you shall be entitled to compensation for the cost of preparation of Change Proposal described in your Estimate for Change Proposal mentioned in para. 3 above in accordance with GCC Clause64 of the General Conditions.

| | |
|-------------------------|--|
| Signature: | <i>[insert signature of authorised representative of the Employer]</i> |
| Name: | <i>[insert full name of signatory with National ID Number]</i> |
| Title of the Signatory: | <i>[insert title of the Signatory]</i> |
| Name of the Employer: | <i>[insert name of the Employer]</i> |

| | |
|--------------------|---------------------------|
| Equipment engineer | _____ hrs @ _____ rate/hr |
| Procurement | _____ hrs @ _____ rate/hr |
| Draftsperson | _____ hrs @ _____ rate/hr |
| Total | _____ hrs |

- (h) Extraordinary costs (computer, travel, etc.)
- (i) Fee for general administration, _____ % of Items
- (j) Taxes and customs duties

Total lump sum cost of Change Proposal
(Sum of items (a) to (j))

Cost to prepare Estimate for Change Proposal
(Amount payable if Change is not accepted)

- 9. Additional time for Completion required due to Change Proposal
- 10. Effect on the Functional Guarantees
- 11. Effect on the other terms and conditions of the Contract
- 12. Validity of this Proposal: within *[Number]* days after receipt of this Proposal by the Employer
- 13. Other terms and conditions of this Change Proposal:
 - (a) You are requested to notify us of your acceptance, comments or rejection of this detailed Change Proposal within _____ days from your receipt of this Proposal.
 - (b) The amount of any increase and/or decrease shall be taken into account in the adjustment of the Contract Price.
 - (c) Contractor's cost for preparation of this Change Proposal:²

| | |
|-------------------------|--|
| Signature: | <i>[insert signature of authorised representative of the Contractor]</i> |
| Name: | <i>[insert full name of signatory with National ID Number]</i> |
| Title of the Signatory: | <i>[insert title of the Signatory]</i> |
| Name of the Contractor: | <i>[insert name of the Contractor]</i> |

² Specify where necessary.

Annex 6. Pending Agreement Change Order

(Employer's Letterhead)

To:

Date:

Attention:

Contract Name:

Contract Number:

We instruct you to carry out the work in the Change Order detailed below in accordance with GCC Clause 64 of the General Conditions.

1. Title of Change: _____
2. Employer's Request for Change Proposal No./Rev.: _____
dated: _____
3. Contractor's Change Proposal No./Rev.: _____ dated:

4. Brief Description of Change: _____
5. Facilities and/or Item No. of equipment related to the requested Change:

6. Reference Drawings and/or technical documents for the requested Change:

| <u>Drawing/Document No.</u> | <u>Description</u> |
|-----------------------------|--------------------|
|-----------------------------|--------------------|
7. Adjustment of Time for Completion:
8. Other change in the Contract terms:
9. Other terms and conditions:

| | |
|-------------------------|--|
| Signature: | <i>[insert signature of authorised representative of the Employer]</i> |
| Name: | <i>[insert full name of signatory with National ID Number]</i> |
| Title of the Signatory: | <i>[insert title of the Signatory]</i> |
| Name of the Employer: | <i>[insert name of the Employer]</i> |

Annex 7. Application for Change Proposal

(Contractor's Letterhead)

To:

Date:

Attention:

Contract Name:

Contract Number:

We hereby propose that the below-mentioned work be treated as a Change in the Facilities.

1. Title of Change: _____
2. Application for Change Proposal No./Rev.: _____ dated:

3. Brief Description of Change: _____
4. Reasons for Change:
5. Order of Magnitude Estimation (in the currencies of the Contract):
6. Scheduled Impact of Change:
7. Effect on Functional Guarantees, if any:
8. Appendix:

| | |
|-------------------------|--|
| Signature: | <i>[insert signature of authorised representative of the Contractor]</i> |
| Name: | <i>[insert full name of signatory with National ID Number]</i> |
| Title of the Signatory: | <i>[insert title of the Signatory]</i> |
| Name of the Contractor: | <i>[insert name of the Contractor]</i> |
| | |

Signature

Seal

6.6 Supplementary Information

[The Tenderer shall furnish additional description/information covering all activities, if any]