POWER GRID COMPANY OF BANGLADESH LIMITED
Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1)
(Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1/2).
Invitation for Bids No.: 27.21.0000.101.07.315.22.420 dated January 23, 2022

ADDENDUM NO. 1
(Date: March 10, 2022)

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

Volume 1 of 2

1. Price Schedule_Lot-1, Scope-A, Schedule-1, Page-P2 and Schedule-2, Page-P5

   The Item no. "A7.1 and A7.2" shall be replaced by the Item No. "A6.1 and A6.2", and the text "Item No. A8.1 & A8.2" shall be replaced by the text "Item No. A6.1 & A6.2".

2. Price Schedule_Lot-1, Scope-A and Lot-2, Scope-B, Schedule-1 and Schedule-2

   The following item shall be added in the above mentioned schedule after item S2.2.

S2.3	Single 210kN Insulator unit set complete with all fittings	set	6

3. Price Schedule_Lot-1, Scope-B and Scope-C

   The schedules of Scope-B and Scope-C shall be replaced with revised schedules. In this regard, Page P8-Page P27 shall be replaced by revised page P8(rev)-P27(rev).

4. Price Schedule_Lot-2, Scope-B, Scope-D and Scope-F

   The schedules of Scope-B, Scope-D and Scope-F shall be replaced with revised schedules. In this regard, Page P7-P12, Page P19-P24 and Page P31-P40 shall be replaced by revised Page P7(rev)-P12(rev), Page P19(rev)-P24(rev) and Page P31(rev)-P40(rev).

5. Section-2: Bid Data Sheet, Clause ITB 11.2 (k)

   Item vi) shall be deleted, and item vii) shall be newly represented as item vi).

6. Scetion-4, Bidding Forms, Page 4-29

   Item 7.11: EXP-3: Subcontractors (attached) shall be added after Item 7.10.

Volume 2 of 2

1. **Section 1**

i. Annex-1-1, Page 1-5, lot-1

Clause 3

The paras

"Reconductoring of the existing Ishurdi-Baghabari 132kV single circuit transmission line from Ishurdi 132/33kV Substation to LILO tower (for Pabna Substation).

The existing Ishurdi-Baghabari 132 kV single circuit transmission line from the existing Ishurdi 132/33kV Substation to LILO tower (for Pabna Substation), approximate route length 18 km shall be reinforced.

All existing hardware fittings-parts/accessories subjected to the system voltage with the phase conductor shall be replaced. The new conductor type shall be ACSR Hawk equivalent ACCC."

is replaced with

"Reconductoring of the existing Ishurdi-Baghabari 132kV single circuit transmission line from Ishurdi 132/33kV Substation to LILO tower (for Pabna Substation) and installation of OPGW and OPGW fittings.

The existing Ishurdi-Baghabari 132 kV single circuit transmission line from the existing Ishurdi 132/33kV Substation to LILO tower (for Pabna Substation), approximate route length 18 km shall be reinforced.

All existing hardware fittings-parts/accessories subjected to the system voltage with the phase conductor shall be replaced. The new conductor type shall be ACSR Hawk equivalent ACCC. The OPGW shall consist of 24 fibres and equivalent to 7x 3.25mm earthwire."

ii. Annex-1-1, Page 1-6, Lot-2

Clause 2

The para

"All existing hardware fittings-parts/accessories subjected to the system voltage with the phase conductor shall be replaced. The new conductor type shall be ACSR Grosbeak equivalent ACCC."

is replaced with

"All existing hardware fittings-parts/accessories subjected to the system voltage with the phase conductor shall be replaced. The new conductor type shall be twin ACSR Linnet equivalent twin ACCC Linnet."

Clause 4

The paras

"The existing Barapukuria-Rangpur 132kV double circuit transmission line, from the existing Barapukuria 132kV Substation to the existing Rangpur 132/33kV Substation, approximate route length 42 km, shall be reinforced.

All existing hardware fittings-parts/accessories subjected to the system voltage with the phase conductor shall be replaced. The new conductor type shall be ACSR Grosbeak equivalent ACCC Grosbeak."

Is replaced with

"The existing Barapukuria-Rangpur 132kV double circuit transmission line, from the existing Barapukuria 132kV Substation to the existing Rangpur 132/33kV Substation, approximate route length 42 km, shall be reinforced. Dismantling and storing of the existing 12 fibres OPGW. Installation of new 24 fibres OPGW & OPGW fittings.

All existing hardware fittings-parts/accessories subjected to the system voltage with the phase conductor shall be replaced. The new conductor type shall be ACSR Grosbeak equivalent ACCC Grosbeak. The new OPGW shall consist of 24 fibres and equivalent to 7x 3.25mm earthwire."

iii. Annex-1-1, Page 1-11, Lot-2

Clause 6 (p)

The para

"All costs for above mentioned terminations shall be deemed to be included in the contract price."

is deleted.

iv. Annex-1-2, Page 1-16
The para
"The line conductor ACCC will be terminated from the terminal tower to the gantry of the relevant 132kV substation. From the gantry to each 132kV bus – through each existing bay equipment viz LA, PT/VT, ES, DS, CT, CB etc, all phase conductors for jumper/loop/drop-in/drop-out/down-drop etc, along with the connecting fittings/accessories in each relevant bay/circuit will be replaced by the Contractor with twin ACSR-Grosbeak per phase along with new connecting fittings/accessories suitable for the twin ACSR-Grosbeak. Connection between line phase conductor (single ACCC Grosbeak per phase) and bay phase conductor (twin ACSR-Grosbeak per phase) as well as between existing bus conductor and bay phase conductor shall have to be made by the Contractor."

is replaced with

"The line conductor ACCC will be terminated from the terminal tower to the gantry of the relevant 132kV substation. From the gantry to each 132kV bus – through each existing bay equipment viz LA, PT/VT, ES, DS, CT, CB etc, all phase conductors for

jumper/loop/drop-in/drop-out/down-drop etc, along with the connecting fittings/accessories in each relevant bay/circuit will be replaced by the Contractor with quad ACSR-Linnet per phase along with new connecting fittings/accessories suitable for the quad ACSR-Linnet. Connection between line phase conductor (twin ACCC Linnet per phase) and bay phase conductor (quad ACSR-Linnet per phase) as well as between existing bus conductor and bay phase conductor shall have to be made by the Contractor."

2. **Section 8 Tower**

   i. **Annex 8-3: Designation & Uses of Towers**

   Page 8-34- is replaced by enclosed revised page -8-34-Rev.01

   ii. **Annex 8-4(1) Support Extensions**

   Page 8-36- is replaced by enclosed revised page -8-36-Rev.01

3. **Section 9 Insulators**

   i. **Annex 9-1: Insulator Types and Uses**

   - Page 9-13- is replaced by enclosed revised page -9-13-Rev.01
   - Page-9-13 (i) is added.

   ii. **Annex 9-2: Electrical & Mechanical Characteristics**

   - Page 9-19- is replaced by enclosed revised page -9-19-Rev.01
   - Page-9-19 (i) is added.

4. **Section 10 Insulator and Conductor Fittings**

   i. **Annex 10-1(6): Insulator Fittings - Types & Uses - 132kV (Overland Portion)**

   - Page 10-23- is replaced by enclosed revised page -10-23-Rev.01
   - Page-10-23 (i) is added.

   ii. **Annex 10-3(5): 132kV (Overland Portion) (For Lot-1)**

   Page 10-31- is replaced by enclosed revised page -10-31-Rev.01

   iii. **Clause 10.2.11 Full Tension Joints (Dead End):**

   a) Compression

   The para
   "Compression dead ends shall have either integral jumper terminals or jumper terminal flags for use with bolted jumper palms. Integral jumper terminals shall either be straight or 30 degree line type."

   Is replaced with
   "Compression dead ends shall have either integral jumper terminals or jumper terminal flags for use with bolted jumper palms. Integral jumper terminals shall either be straight or 30 degree line type. A special type of jumper terminal may be required to connect conductors of different configuration."

5. **Section 11 Conductor**

(i) Page 11-21 and 11-22- is replaced by enclosed revised page -11-21-Rev.01 and 11-22-Rev.01

(ii) Page 11-26- is replaced by enclosed revised page -11-26-Rev.01

6. **Section 11 Conductor**

Page 12-12- is replaced by enclosed revised page -12-12-Rev.01

7. **Section 13 Spacer Dampers**

- Page 13-11- is replaced by enclosed revised page -13-11-Rev.01
- Page-13-11 (i) is added.

8. **Section 14 OPGW and Optical Fibre Cable & Fittings**

(i) Page 14-10- is replaced by enclosed revised page -14-10-Rev.01

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

Enclosure: As stated

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)						
Scope B	**Double Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Single Circuit Transmission Line**					
	Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Abroad					
Item	**Description**	**Country of origin[1]**	**Unit**	**Quantity (1)**	**Unit Price[2] [XXX] CIP (2)**	**Total Price[2] [XXX] CIP (1) x (2)**
1	**Supply of 132 kV double circuit towers, complete with all stubs, nuts, bolts, locking nuts, washers, phase conductors and earthwire swivels/shackles, step bolts, tower notice and identification plates, ACDs etc.**					
1.1	**Tower type 1DL**					
1.1.1	**Tower Type 1DL+9.0 m**		each	3		
1.2	**Tower type 1D1**					
1.2.1	**Tower Type 1D1+15.0 m**		each	2		
1.3	**Tower type 1D25**					
1.3.1	**Tower Type 1D25+9.0 m**		each	3		
1.4	**Tower type 1DT6**					
1.4.1	**Tower Type 1DT6+6.0 m**		each	3		
1.4.2	**Tower Type 1DT6+9.0 m**		each	1		
1.5	**Auxiliary Crossarm for tower type 1DT6**		Per set of three	1		
1.6	**Galvanized tower steel**					
1.6.1	Fabricated		ton	15		
1.6.2	Non-fabricated		ton	1		
2	**Phase conductor, earthwire and OPGW cable, complete with repair sleeves and joints**					
2.1	Conductor **ACSR HAWK equivalent ACCC Hawk** type including necessary midspan joints, repair sleeves and any other accessories (Double circuit line, both circuits erected, one conductor per phase)		Route km	3.00		
2.2	7 x 3.25mm GSW earthwire equivalent OPGW (48 fibres) inclusive of joint boxes, fixing clamps, fusion splices and connections to the joint boxes. One OPGW earthwire on the line		Route km	3.00		

Name of Bidder: Signature of Bidder:

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)						
Scope B	Double Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Single Circuit Transmission Line					
	Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Abroad					
Item	Description	Country of origin[1]	Unit	Quantity (1)	Unit Price[2] [XXX] CIP (2)	Total Price[2] [XXX] CIP (1) x (2)
3	**Insulator strings, complete with insulators and all hardware fittings including suspension clamps, tension dead ends, armour rods, arcing horn, Arcing ring etc. for the ACCC Hawk conductor**					
3.1	a) 70kN Single Suspension Insulators Set (Suspension) - disc only		set	18		
	b) 70kN Single Suspension Insulators Fittings set for ACCC Hawk (Suspension) - hardware fittings only		set	18		
3.2	a)70kN Single Pilot Suspension Insulators Set - disc only		set	21		
	b) 70kN Single Pilot Suspension Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	21		
3.3	a) 120kN Single Suspension Insulators set (Heavy Suspension) - disc only		set	12		
	b) 120kN Single Suspension Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	12		
3.4	a) 120kN Single Tension Insulators Set - disc only		set	42		
	b) 120kN Single Tension Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	42		
3.5	a) 70kN Single Upright Low Duty Insulators Set - disc only		set	12		
	b) 70kN Single Upright Low Duty Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	12		
3.6	a) 70kN Single Inverted Low Duty Insulators Set - disc only		set	12		
	b) 70kN Single Inverted low Duty Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	12		
4	**OPGW sets, complete with all accessories, incl. armour rods and earth bounds**					
4.1	OPGW (7 x 3.25mm GSW type earthwire equivalent) Suspension Set, complete assembly		set	5		
4.2	OPGW (7 x 3.25mm GSW type earthwire equivalent) Tension Set, complete assembly		set	14		
5	**Dampers**					
5.1	Vibration damper for phase conductor ACCC Hawk		Span-Phase	60		
	Span-phase = number of span x 6 (double circuit) or 12 (four circuit). Total quantities of dampers shall be 'Span-phase x N', where N = number of dampers for each phase in each span which shall be determined by contractor based on the design of dampers. The price quoted shall remain unchanged, even if the value of N increases during final design of the dampers and the approval thereof.					

Name of Bidder: Signature of Bidder:

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)						
Scope B	Double Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Single Circuit Transmission Line					
	Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Abroad					
Item	**Description**	**Country of origin[1]**	**Unit**	**Quantity (1)**	**Unit Price[2] [XXX] CIP (2)**	**Total Price[2] [XXX] CIP (1) x (2)**
5.2	Vibration damper for OPGW (7 x 3.25mm GSW earthwire equivalent), One OPGW earthwire on the line.		Span	10		
6	**Aerial Markers**					
6.1	Bird diverters		each	1		
6.2	Bird guards		set of six	1		
6.3	Aircraft warning spheres		each	5		
6.4	Air craft obstruction lights solar powered complete with lamps, solar, panels, batteries, control equipment cables, support framework, tower work platform etc.		each	1		
7	**Tower Earthing**					
7.1	Earthing type A		each	2		
7.2	Earthing type B		each	2		
7.3	Earthing type C		each	2		
7.4	Earthing type D (If required by specific soil conditions)		each	2		
8	**Tower Paint and Counterweights**					
8.1	Tower Paint					
(a)	Coal tar epoxy coatings on all tower steel work up to 3.0m or HFL, whichever is greater in accordance with the requirements of the Technical Specification		per tower	2		
(b)	Painting of tower having total height above GL exceeds 60m for aircraft navigation in accordance with the requirements of the Technical Specification		per tower	1		
(c)	Painting of tower (Reflecting Paint) up to 3 meter above epoxy coat in submerge area in accordance with the requirements of the Technical Specification		per tower	1		
8.2	Counterweights for 120kN suspension insulator sets complete with yoke plate attachment bolts to be used for 1D1 towers:					
(a)	- 40kg set		each	1		
(b)	- 80kg set		each	1		
(c)	- 120kg set		each	1		
9	**Mandatory Spare Parts and Tools**					
9.1	Conductor ACCC Hawk type		km	1		
9.2	One optical fibre ground wire, 48 fibres OPGW, equivalent to7 x 3.25mm GSW earthwire		km	1		

Name of Bidder: Signature of Bidder:

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)						
Scope B	Double Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Single Circuit Transmission Line					
	Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Abroad					
Item	Description	Country of origin[1]	Unit	Quantity (1)	Unit Price[2] [XXX] CIP (2)	Total Price[2] [XXX] CIP (1) x (2)
9.3	Single suspension string, 70 kN (including insulators, fittings, suspension clamp)		each	5		
9.4	Single suspension string, heavy 120 kN (including insulators, fittings, suspension clamp)		each	5		
9.5	Single tension string, 120 kN (including insulators, jumper, fittings, tension clamp)		each	5		
9.6	OPGW 48 fibres(7 x 3.25mm GSW type earthwire equivalent) suspension set		each	6		
9.7	OPGW 48 fibres (7 x 3.25mm GSW type earthwire equivalent) tension set		each	6		
9.8	OPGW joint box		each	2		
9.9	Vibration damper for ACCC Hawk conductor		each	5		
9.10	Vibration damper for OPGW (7 x 3.25mm GSW type earthwire equivalent)		each	5		
9.11	Repair sleeve for ACCC Hawk conductor		each	5		
9.12	Midspan joints for ACCC Hawk conductor		each	5		
9.13	Bird diverters		each	1		
9.14	Bird guard		each	1		
9.15	Aircraft warning spheres		each	5		
10	**Miscellaneous**					
10.1	Set of temporary earthing equipment, as described in Annex 16-1		set	2		
10.2	Terminal ground resistance tester (tools)		each	1		
10.4	Fusion splicer OPGW (tools)		each	1		
Total (to Schedule No. 5. Grand Summary)						

1 Bidders shall enter a code representing the country of origin of all imported plant and equipment.

2 In accordance with specifications in Bid Data Sheet under ITB 19.1.

3 Definition of Route km: Route km is the transmission line distance between two terminal points in plan view.
Route km is exclusive sag and other electrical clearances, elevation differences etc. The Contractor shall incorporate all such extra costs in his unit rate.

P11(rev)

Name of Bidder: Signature of Bidder:

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)							
Scope B	Double Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Single Circuit Transmission Line						
Schedule No. 2. Plant and Mandatory Spare Parts Supplied within the Employer's Country							
Item	Description	Unit	Quantity (1)	Foreign currency in XXX		Local currency in BDT	
				EXW Unit Price[1] (2)	EXW Total Price[1] (1) x (2)	EXW Unit Price[1] (3)	EXW Total Price[1] (1) x (3)
1	**Supply of 132 kV double circuit towers, complete with all stubs, nuts, bolts, locking nuts, washers, phase conductors and earthwire swivels/shackles, step bolts, tower notice and identification plates, ACDs etc.**						
1.1	**Tower type 1DL**						
1.1.1	**Tower Type 1DL+9.0 m**	each	3				
1.2	**Tower type 1D1**						
1.2.1	**Tower Type 1D1+15.0 m**	each	2				
1.3	**Tower type 1D25**						
1.3.1	**Tower Type 1D25+9.0 m**	each	3				
1.4	**Tower type 1DT6**						
1.4.1	**Tower Type 1DT6+6.0 m**	each	3				
1.4.2	**Tower Type 1DT6+9.0 m**	each	1				
1.5	**Auxiliary Crossarm for tower type 1DT6**	Per set of three	1				
1.6	**Galvanized tower steel**						
1.6.1	Fabricated	ton	15				
1.6.2	Non-fabricated	ton	1				
2	**Phase conductor, earthwire and OPGW cable, complete with repair sleeves and joints**						
2.1	Conductor **ACSR Hawk equivalent ACCC** type including necessary midspan joints, repair sleeves and any other accessories (Double circuit line, both circuits erected, one conductor per phase)	Route km	3.00				
2.2	7 x 3.25mm GSW earthwire equivalent OPGW (48 fibres) inclusive of joint boxes, fixing clamps, fusion splices and connections to the joint boxes. One OPGW earthwire on the line	Route km	3.00				

Name of Bidder: Signature of Bidder:

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1).
(Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Scope B **Double Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Single Circuit Transmission Line**

Schedule No. 2. Plant and Mandatory Spare Parts Supplied within the Employer's Country

Item	Description	Unit	Quantity (1)	Foreign currency in XXX		Local currency in BDT	
				EXW Unit Price[1] (2)	EXW Total Price[1] (1) x (2)	EXW Unit Price[1] (3)	EXW Total Price[1] (1) x (3)
3	**Insulator strings, complete with insulators and all hardware fittings including suspension clamps, tension dead ends, armour rods, arcing horn, Arcing ring etc. for ACCC Hawk conductor**						
3.1	a) 70kN Single Suspension Insulators Set (Suspension) - disc only	set	18				
	b) 70kN Single Suspension Insulators Fittings set for ACCC Hawk (Suspension) - hardware fittings only	set	18				
3.2	a)70kN Single Pilot Suspension Insulators Set - disc only	set	21				
	b) 70kN Single Pilot Suspension Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	21				
3.3	a) 120kN Single Suspension Insulators set (Heavy Suspension) - disc only	set	12				
	b) 120kN Single Suspension Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	12				
3.4	a) 120kN Single Tension Insulators Set - disc only	set	42				
	b) 120kN Single Tension Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	42				
3.5	a) 70kN Single Upright Low Duty Insulators Set - disc only	set	12				
	b) 70kN Single Upright Low Duty Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	12				
3.6	a) 70kN Single Inverted Low Duty Insulators Set - disc only	set	12				
	b) 70kN Single Inverted low Duty Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	12				
4	**OPGW sets, complete with all accessories, incl. armour rods and earth bounds**						
4.1	OPGW (7 x 3.25mm GSW type earthwire equivalent) Suspension Set, complete assembly	set	5				
4.2	OPGW (7 x 3.25mm GSW type earthwire equivalent) Tension Set, complete assembly	set	14				
5	**Dampers**						
5.1	Vibration damper for phase conductor ACCC Hawk	Span-Phase	60				
	Span-phase = number of span x 6 (double circuit) or 12 (four circuit). Total quantities of dampers shall be 'Span-phase x N', where N = number of dampers for each phase in each span which shall be determined by contractor based on the design of dampers. The price quoted shall remain unchanged, even if the value of N increases during final design of the dampers and the approval thereof.						

Name of Bidder: Signature of Bidder:

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)							
Scope B	Double Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Single Circuit Transmission Line						
Schedule No. 2. Plant and Mandatory Spare Parts Supplied within the Employer's Country							
Item	Description	Unit	Quantity (1)	Foreign currency in XXX		Local currency in BDT	
				EXW Unit Price[1] (2)	EXW Total Price[1] (1) x (2)	EXW Unit Price[1] (3)	EXW Total Price[1] (1) x (3)
5.2	Vibration damper for OPGW (7 x 3.25mm GSW earthwire equivalent), One OPGW earthwire on the line.	Span	10				
6	**Aerial Markers**						
6.1	Bird diverters	each	1				
6.2	Bird guards	set of six	1				
6.3	Aircraft warning spheres	each	5				
6.4	Air craft obstruction lights solar powered complete with lamps, solar, panels, batteries, control equipment cables, support framework, tower work platform etc.	each	1				
7	**Tower Earthing**						
7.1	Earthing type A	each	2				
7.2	Earthing type B	each	2				
7.3	Earthing type C	each	2				
7.4	Earthing type D (If required by specific soil conditions)	each	2				
8	**Tower Paint and Counterweights**						
8.1	Tower Paint		0				
(a)	Coal tar epoxy coatings on all tower steel work up to 3.0m or HFL, whichever is greater in accordance with the requirements of the Technical Specification	per tower	2				
(b)	Painting of tower having total height above GL exceeds 60m for aircraft navigation in accordance with the requirements of the Technical Specification	per tower	1				
(c)	Painting of tower (Reflecting Paint) up to 3 meter above epoxy coat in submerge area in accordance with the requirements of the Technical Specification	per tower	1				
8.2	Counterweights for 120kN suspension insulator sets complete with yoke plate attachment bolts to be used for 1D1 towers:						
(a)	- 40kg set	each	1				
(b)	- 80kg set	each	1				
(c)	- 120kg set	each	1				

Name of Bidder: Signature of Bidder:

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1).
(Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Scope B **Double Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Single Circuit Transmission Line**

Schedule No. 2. Plant and Mandatory Spare Parts Supplied within the Employer's Country

Item	Description	Unit	Quantity (1)	Foreign currency in XXX		Local currency in BDT	
				EXW Unit Price[1] (2)	EXW Total Price[1] (1) x (2)	EXW Unit Price[1] (3)	EXW Total Price[1] (1) x (3)
9	**Mandatory Spare Parts and Tools**						
9.1	Conductor ACCC Hawk type	km	1				
9.2	One optical fibre ground wire, 48 fibres OPGW, equivalent to7 x 3.25mm GSW earthwire	km	1				
9.3	Single suspension string, 70 kN (including insulators, fittings, suspension clamp)	each	5				
9.4	Single suspension string, heavy 120 kN (including insulators, fittings, suspension clamp)	each	5				
9.5	Single tension string, 120 kN (including insulators, jumper, fittings, tension clamp)	each	5				
9.6	OPGW 48 fibres(7 x 3.25mm GSW type earthwire equivalent) suspension set	each	6				
9.7	OPGW 48 fibres (7 x 3.25mm GSW type earthwire equivalent) tension set	each	6				
9.8	OPGW joint box	each	2				
9.9	Vibration damper for ACCC Hawk conductor	each	5				
9.10	Vibration damper for OPGW (7 x 3.25mm GSW type earthwire equivalent)	each	5				
9.11	Repair sleeve for ACCC Hawk conductor	each	5				
9.12	Midspan joints for ACCC Hawk conductor	each	5				
9.13	Bird diverters	each	1				
9.14	Bird guard	each	1				
9.15	Aircraft warning spheres	each	5				
10	**Miscellaneous**						
10.1	Set of temporary earthing equipment, as described in Annex 16-1	set	2				
10.2	Terminal ground resistance tester (tools)	each	1				
10.3	Fusion splicer OPGW (tools)	each	1				
			Total (to Schedule No. 5. Grand Summary)				

1 In accordance with specifications in Bid Data Sheet under ITB 19.1.

2 Definition of Route km: Route km is the transmission line distance between two terminal points in plan view.
Route km is exclusive sag and other electrical clearances, elevation differences etc. The Contractor shall incorporate all such extra costs in his unit rate.

Name of Bidder: Signature of Bidder:

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)							
Four Circuit LILO at Pabna Substation from Ishwardi-Baghabari 132kV Double Circuit Transmission Line							
Scope B	Schedule No. 3. Design Services						
Item	Description	Unit	Quantity (1)	Unit Price[1]		Total Price[1]	
				Foreign Currency Portion [XXX] (2)	Local Currency Portion [BDT] (3)	Foreign [XXX] (1) x (2)	Local [BDT] (1) x (3)
1	Detailed line design including plan and profiles; conductor, earthwire and OPGW sag tension calculations; tower spotting, establishment of line schedule; Design of insulator strings, OPGW and earthwire attachments	Lot		Not Applicable	Not Applicable		
Total (to Schedule No. 5. Grand Summary)							

1 In accordance with specifications in Bid Data Sheet under ITB 19.1.
2 Please specify the currency.

P16(rev)

Name of Bidder: Signature of Bidder:

Scope B DC LILO of Ishwardi-Baghabari 132kV Single Circuit Transmission Line to Pabna Substation

Item	Description	Unit	Quantity	Unit Price1	Total Price1
				Local Currency Portion [BDT]	Local Currency Portion [BDT]
1	2	3	4	5	6 = 4 x 5
	Schedule No. 4 Installation and Other Services				
1	**Survey and soil investigation works**				
1.1	**Survey Work**				
1.1.1	Check survey in accordance with the requirements of the technical specification, incl. Full ground survey with change of route, if any, tower plotting and preparation and submission of route maps, profile drawings, SIMM documents, etc.	Route-km	3		
1.1.2	Payment for Compensation (For resettlement of affcetd people, dwelling/commercial structures, trees, crops etc. on the Right of Way)	Route-km	3		
1.1.3	Payment of compensation for using private land to construct transmission line towers [based on area of tower footprint]	Route-km	3		
1.2	**Geotechnical Investigations incl. taking samples, logging and lab testing**				
1.2.1	Boreholes for geotechnical investigation, incl. laboratory test, borehole logs, sampling and interpretive report as per geotechnical specification				
(a)	Level 2	borehole	1		
(b)	Level 4	borehole	1		
1.2.2	Soil resistivity tests (one per tower)	unit	12		
2	**Foundations for towers including all setting out, Concrete, Reinforcement, Excavation, Pumping, Stub-Setting, Geotechnical Investigation (Level 2), Shuttering, Leveling, Timbering, supply & Installation of foundation steelwork, Earthing Materials,Backfilling, approved Protective Coating & site clearing etc.**				
2.1	**Tower type "`1DL"**				
2.1.1	Pile Foundation for any Soil Category	per tower	1		
2.1.2	Piled Foundation with 1.0m raised chimney for any Soil Category	per tower	1		
2.1.3	Piled Foundation with 2.0m raised chimney for any Soil Category	per tower	1		

Item	Description	Unit	Quantity	Unit Price1	Total Price1
				Local Currency Portion [BDT]	Local Currency Portion [BDT]
1	2	3	4	5	6 = 4 x 5
	Schedule No. 4 Installation and Other Services				
2.2	**Tower type "1D1"**				
2.2.1	Pile Foundation for any Soil Category	per tower	1		
2.2.2	Piled Foundation with 1.0m or 2.0m raised chimney for any Soil Category	per tower	1		
2.3	**Tower type "1D25"**				
2.3.1	Pile Foundation for any Soil Category	per tower	1		
2.3.2	Piled Foundation with 1.0m raised chimney for any Soil Category	per tower	1		
2.3.3	Piled Foundation with 2.0m raised chimney for any Soil Category	per tower	1		
2.4	**Tower type "1DT6"**				
2.4.1	Pile Foundation for any Soil Category	per tower	2		
2.4.2	Piled Foundation with 1.0m raised chimney for any Soil Category	per tower	1		
2.4.3	Piled Foundation with 2.0m raised chimney for any Soil Category	per tower	1		
3	**Erection of 132kV double circuit towers complete with all stubs, nuts, bolts, locking nuts, washers, phase conductor and earthwire swivels/shackles, step bolts, tower notice and identification plates, ACDs, ptotective coating, earthing etc.**				
3.1	**Tower type 1DL**				
3.1.1	Tower Type 1DL+9.0 m	each	3		
3.2	**Tower type 1D1**				
3.2.1	Tower Type 1D1+15.0 m	each	2		
3.3	**Tower type 1D25**				
3.3.1	Tower Type 1D25+9.0 m	each	3		
3.4	**Tower type 1DT6**				
3.4.1	Tower Type 1DT6+6.0 m	each	3		
3.4.2	Tower Type 1DT6+9.0 m	each	1		
3.5	**Auxiliary Crossarm for tower type 1DT6**	each	1		
3.6	**Galvanized Tower Steel Works**	ton	15		

Item	Description	Unit	Quantity	Unit Price1	Total Price1
				Local Currency Portion [BDT]	Local Currency Portion [BDT]
1	2	3	4	5	6 = 4 x 5
Schedule No. 4 Installation and Other Services					
4	**Testing of Foundations**				
4.1	**Supply (incl. Foundation, steel works), install and test foundation for pad & chimney type foundation to prove compliance with Technical specification, payment for successful test only**				
(a)	Uplift test	per test	1		
(b)	Compression test	per test	1		
5.2	**Individual Pile test including supply,install and test to prove compliance with technical specification, payment for successful test only (applicable for all tower types selected by the Employer's Engineer):**				
(a)	Compression test	per test	1		
(b)	Uplift test	per test	1		
(c)	Pile Integrity test	per test	36		
6	**Stringing of double circuit line, one conductor per phase, OPGW (length approx. Route km)**				
6.1	"Single ACSR equivalent ACCC Hawk " (double circuit line, all circuits erected, one conductors per phase) including: Installation of insulation strings, compressed dead-ends, compression junction sleeves, suspension clamps, Sagging and clipping, Installation of armour rods and Dampers, Pilot strings and jumpers and any other works required as per specification.	route km	3		
6.2	One optical fibre ground wire, 48 fibres 7×3.25 steel earthwire equivalent OPGW shield wire, including joint box, including:Tension and semi-tension joints, suspension clamps, armour rods and dampers,Sagging and clipping, Installation of intermediate junction boxes and terminal junction boxes at substation gantries ,Earthing jumpers	route km	3		
7	**Documentation**				
7.1	Establishment of as-built drawings, manuals and all requested documents as per specifications	lump sum	1		
8	**Miscellaneous**				
8.1	General and other works and services, not mentioned before	lump sum	1		
8.2	Transport of the material and equipment supplied from Employer's Country	lump sum	1		
8.3	Insurance of material and equipment supplied from Employer's Country during transport	lump sum	1		

Item	Description	Unit	Quantity	Unit Price[1]	Total Price[1]
				Local Currency Portion [BDT]	Local Currency Portion [BDT]
1	2	3	4	5	6 = 4 x 5
Schedule No. 4 Installation and Other Services					
8.4	Painting of bottom part of towers in accordance with Section 21	lump sum	1		
8.5	Erection of OPGW connection from terminal tower to substation Gantry/Mast	per wire	2		
8.6	Additional counterpoise earthing in accordance with requirement of the Technical specification	per meter	2		
8.7	Miscellaneous Rates for works certified by the Engineer in accordance with method of Payment				
(a)	Additional Excavation	cu.m	50		
(b)	Additional Concrete	cu.m	50		
(c)	Additional Reinforcement	kg	200		
(d)	Extra for surface resisting cement per cu.m of concrete	cu.m	25		
(e)	Additional Boring (500mm diameter)	rm	50		
(f)	Additional Boring (600mm diameter)	rm	50		
(g)	Additional Boring (750mm diameter)	rm	50		
(h)	Sand Filling	cu.m	50		
9	Dismantling of existing line section whichever is required for turn in/out, storing the dismantled materials at PGCB store. By-passing the required line section will be done with pole. Pole for by-passing shall be supplied by PGCB. Finally, dismantling of by-pass line and completing rerouting work, the pole shall be stored at PGCB store.	Lot	1		

Name of Bidder

Signature of Bidder

1 Specify currencies in accordance with ITB 19.1 of the BDS. Create additional columns for up to a maximum of three foreign currencies, if so required.

2 As described in SCC 22.2.7

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document
for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1).(Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Scope C: Reconductoring of Ishurdi-Baghabari 132kV Single Circuit Transmission Line from Ishurdi substation to LILO Tower (Pabna substation)

Schedule No.1 - Plant and Mandatory Spare Parts Supplied from Abroad

Item	Description	Code[1]	Unit	Qty	Foreign Currency (in...)	
					Unit Price[2] CIP	Total Price[2] CIP
1	2	3	4	5	6	7
A1	**Supply of phase conductor and OPGW**					
A1.1	ACCC-Hawk conductor (ACCC conductor with equal diameter of ACSR Hawk), as per specification, including necessary midspan joints and repair sleeves, extra length for sag & jumper etc ; three (3) nos. single conductors on the single circuit transmission line		route-km	18		
A1.2	ACSR Hawk conductor as per specification (for purpose of terminating the transmission line with substation equipments)		km	1		
A1.3	7 x 3.25mm GSW earthwire equivalent OPGW (24 fibres) inclusive of joint boxes, fixing clamps, fusion splices and connections to the joint boxes. One OPGW earthwire on the line		route-km	18		
A2	**Supply of Hardware fittings (Suspension)**					
	Insulator strings, complete with insulators and all hardware fittings including suspension clamps, armour rods, arcing horn, Arcing ring etc. for ACCC Hawk conductor					
A2.1	a) 70kN Single Suspension Insulators Set (Suspension) - disc only		set	162		
	b) 70kN Single Suspension Insulators Fittings set for ACCC Hawk (Suspension) - hardware fittings only		set	162		
A2.2	a)70kN Single Pilot Suspension Insulators Set - disc only		set	30		
	b) 70kN Single Pilot Suspension Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	30		
A2.3	a) 120kN Single Suspension Insulators set (Heavy Suspension) - disc only		set	48		
	b) 120kN Single Suspension Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	48		
A3	**Supply of Hardware fittings (Tension)**					
	Insulator strings, complete with insulators and all hardware fittings including suspension clamps, tension dead ends, armour rods, arcing horn, Arcing ring etc. for ACCC Hawk conductor					
A3.1	a) 120kN Single Tension Insulators Set - disc only		set	48		
	b) 120kN Single Tension Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	48		
A3.2	a) 70kN Single Upright Low Duty Insulators Set - disc only		set	6		
	b) 70kN Single Upright Low Duty Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	6		
A3.3	a) 70kN Single Inverted Low Duty Insulators Set - disc only		set	6		
	b) 70kN Single Inverted low Duty Insulators Fittings Set for ACCC Hawk - hardware fittings only		set	6		
A4	OPGW sets, complete with all accessories, incl. armour rods and earth bounds					
A4.1	OPGW (7 x 3.25mm GSW type earthwire equivalent) Suspension Set, complete assembly		set	100		
A4.2	OPGW (7 x 3.25mm GSW type earthwire equivalent) Tension Set, complete assembly		set	30		

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document
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Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1).(Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Scope C: Reconductoring of Ishurdi-Baghabari 132kV Single Circuit Transmission Line from Ishurdi substation to LILO Tower (Pabna substation)

Schedule No.1 - Plant and Mandatory Spare Parts Supplied from Abroad

Item	Description	Code[1]	Unit	Qty	Foreign Currency (in...)	
					Unit Price[2] CIP	Total Price[2] CIP
1	2	3	4	5	6	7
A5	Vibration Damper for ACCC conductor with equal diameter of ACSR Hawk		per span	70		
A6	Vibration Damper for OPGW		per span	70		
A7	Fabricated and galvanized tower steel (Mild steel & High tensile) including nut-bolts, washers etc for strengthening/ repair of existing any tower(s), as/if required		per tonne	5		
	Sub-total Price to be carried forward					
	Sub-total brought forward					
A8	**Supply of Fittings/accessories related to the termination of the transmission line with each relevant substation equipment upto each 132kV bus in the 132kV substation**					
	All fittings/accessories required for completing the termination of the transmission line in each of the mentioned below 132kV substations from substation gantry up to each 132kV Bus via each existing equipment in the relevant two (2) bays/circuits ; existing phase conductor (single conductor per phase) as jumper/loop/drop-in/drop-out conductor etc along with its connecting fittings/accessories (i.e. the fittings/accessories which connect the phase conductor with the bay equipments viz LA, CT/PT, ES, DS , CB, Busbar conductor etc) in the relevant 2 bays of each substation to be replaced with new phase conductor twin ACSR Hawkper phase and new connecting fittings/accessories suitable for twin ACSR Hawk ; all the fittings/accessories to be of such design & material that they can continuously conduct without raising the temperature above allowable limit of the substation equipments the current that is two times the maximum continuous operating current of ACSR Hawk at prevailing conditions; the connector (T-pad/ T-connector or any other kind fitting as appropriate) required nearby the gantry for making connectivity between the line phase conductor ACCC (terminated at the gantry) and the relevant bay phase conductor (twin ACSR Hawk per phase) to be of such design & material that the temperature of the ACSR Hawk will not exceed the limit as mentioned above while maximum continuous operating current (two times the maximum continuous current of ACSR Hawk) flowing [illegible]					
A8.1	Ishurdi 132/33kV substation - all fittings as mentioned above		lot	1		
A8.2	Baghabari 132/33kV substation - all fittings as mentioned above		lot	NIL		
S	**Spares**					
S1	**Phase conductor**					
S1.1	Phase conductor ACCC Hawk (same conductor as mentioned in item A1.1) with 2 Nos. core retainers per drum		km	3		
S2	**Insulators**					
S2.1	70 kN insulator unit		each	192		
S2.2	120 kN insulator unit		each	231		
S3	**Fittings & Accessories**					
S3.1	Mid-span compression joint for phase conductor ACCC with equal diameter of ACSR Hawk		set	10		
S3.2	Repair sleeve for phase conductor ACCC with equal diameter of ACSR Hawk		set	6		
S3.3	Vibration damper for phase conductor ACCC with equal diameter of ACSR Hawk		each	5		
S3.4	132kV 70kN single suspension(SS) complete fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal		set	6		
S3.5	132kV 120kN single tension (ST) fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Hawk		set	6		
S3.6	Compression type I clamp for jumper		pcs	1		
S3.7	ACCC Conductor pulling shocks		pcs	1		

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document
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Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1).(Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Scope C: Reconductoring of Ishurdi-Baghabari 132kV Single Circuit Transmission Line from Ishurdi substation to LILO Tower (Pabna substation)

Schedule No.1 - Plant and Mandatory Spare Parts Supplied from Abroad

Item	Description	Code[1]	Unit	Qty	Foreign Currency (in...)	
					Unit Price[2] CIP	Total Price[2] CIP
1	2	3	4	5	6	7
S3.8	Supply of fittings for termination of Transmission Line [similar lot (item) as described in item No. **A 8.1 & A 8.2**] -					
	(i) Ishurdi 132/33kV substation		lot	1		
	(ii) Baghabari 132/33kV substation		lot	NIL		
E	**Erection & Test Equipment**					
E1	Motorized Compressor Jointing Equipment for ACCC Hawk and variable size		each	1		
	TOTAL Column 7 to be carried forward to Schedule No.5: Grand Summary					

Name of Bidder.....

Signature of Bidder.....

[1]Bidder shall enter a code representing the country of origin of all imported plant and equipment.

[2]Specify currency in accordance with ITB 19.1 of the Bid Data Sheet and create additional columns as required accordingly.

Country of Origin Declaration Form

Item	Description	Code	Country

Name of Bidder.....

Signature of Bidder.....

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document

for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Scope C: Reconductoring of Ishurdi-Baghabari 132kV Single Circuit Transmission Line from Ishurdi substation to LILO Tower (Pabna substation)

Schedule No.2 - Plant and Mandatory Spare Parts Supplied from within Employer's Country

Item	Description	Unit	Qty	Unit Price[1] EXW		Total Price[1] EXW	
				Foreign Currency (in .....)	Local Currency (BDT)	Foreign Currency (in .....)	Local Currency (BDT)
1	2	3	4	5	6	7	8
A1	**Supply of phase conductor**						
A1.1	ACCC-Hawk conductor (ACCC conductor with equal diameter of ACSR Hawk), as per specification, including necessary midspan joints and repair sleeves, extra length for sag & jumper etc ; three (3) nos. single conductors on the single circuit transmission line	route-km	18				
A1.2	ACSR Hawk conductor as per specification (for purpose of terminating the transmission line with substation equipments)	km	1				
A1.3	7 x 3.25mm GSW earthwire equivalent OPGW (24 fibres) inclusive of joint boxes, fixing clamps, fusion splices and connections to the joint boxes. One OPGW earthwire on the line	route-km	18				
A2	**Supply of Hardware fittings (Suspension)**						
	Insulator strings, complete with insulators and all hardware fittings including suspension clamps, armour rods, arcing horn, Arcing ring etc. for ACCC Hawk conductor						
A2.1	a) 70kN Single Suspension Insulators Set (Suspension) - disc only	set	162				
	b) 70kN Single Suspension Insulators Fittings set for ACCC Hawk (Suspension) - hardware fittings only	set	162				
A2.2	a)70kN Single Pilot Suspension Insulators Set - disc only	set	30				
	b) 70kN Single Pilot Suspension Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	30				
A2.3	a) 120kN Single Suspension Insulators set (Heavy Suspension) - disc only	set	48				
	b) 120kN Single Suspension Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	48				
A3	**Supply of Hardware fittings (Tension)**						
	Insulator strings, complete with insulators and all hardware fittings including suspension clamps, tension dead ends, armour rods, arcing horn, Arcing ring etc. for ACCC Hawk conductor						
A3.1	a) 120kN Single Tension Insulators Set - disc only	set	48				
	b) 120kN Single Tension Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	48				
A3.2	a) 70kN Single Upright Low Duty Insulators Set - disc only	set	6				
	b) 70kN Single Upright Low Duty Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	6				
A3.3	a) 70kN Single Inverted Low Duty Insulators Set - disc only	set	6				
	b) 70kN Single Inverted low Duty Insulators Fittings Set for ACCC Hawk - hardware fittings only	set	6				
A4	**OPGW sets, complete with all accessories, incl. armour rods and earth bounds**						
A4.1	OPGW (7 x 3.25mm GSW type earthwire equivalent) Suspension Set, complete assembly	set	100				
A4.2	OPGW (7 x 3.25mm GSW type earthwire equivalent) Tension Set, complete assembly	set	30				
A5	Vibration Damper for ACCC conductor with equal diameter of ACSR Hawk	each	70				
A6	Vibration Damper for OPGW	each	70				
A7	Fabricated and galvanized tower steel (Mild steel & High tensile) including nut-bolts, washers etc for strengthening/ repair of existing any tower(s), as/if required	per tonne	5				
	Sub-total Price to be carried forward						

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document

for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Scope C: Reconductoring of Ishurdi-Baghabari 132kV Single Circuit Transmission Line from Ishurdi substation to LILO Tower (Pabna substation)

Schedule No.2 - Plant and Mandatory Spare Parts Supplied from within Employer's Country

Item	Description	Unit	Qty	Unit Price[1] EXW		Total Price[1] EXW	
				Foreign Currency (in .....)	Local Currency (BDT)	Foreign Currency (in .....)	Local Currency (BDT)
1	2	3	4	5	6	7	8
	Sub-total brought forward						
A8	**Supply of Fittings/accessories related to the termination of the transmission line with each relevant substation equipment upto each 132kV bus in the 132kV substation**						
	All fittings/accessories required for completing the termination of the transmission line in each of the mentioned below 132kV substations from substation gantry up to each 132kV Bus via each existing equipment in the relevant two (2) bays/circuits ; existing phase conductor (single conductor per phase) as jumper/loop/drop-in/drop-out conductor etc along with its connecting fittings/accessories (i.e. the fittings/accessories which connect the phase conductor with the bay equipments viz LA, CT/PT, ES, DS , CB, Busbar conductor etc) in the relevant 2 bays of each substation to be replaced with new phase conductor twin ACSR Hawk per phase and new connecting fittings/accessories suitable for twin ACSR Hawk ; all the fittings/accessories to be of such design & material that they can continuously conduct without raising the temperature above allowable limit of the substation equipments the current that is two times the maximum continuous operating current of ACSR Hawk at prevailing conditions; the connector (T-pad/ T-connector or any other kind fitting as appropriate) required nearby the gantry for making connectivity between the line phase conductor ACCC (terminated at the gantry) and the relevant bay phase conductor (twin ACSR Hawk per phase) to be of such design & material that the temperature of the ACSR Hawk will not exceed the limit as mentioned above while maximum continuous operating current (two times the maximum continuous current of ACSR Hawk) flowing through the circuit (supply of phase						
A8.1	Ishurdi 132/33kV substation - all fittings as mentioned above	lot	1				
A8.2	Baghabari 132/33kV substation - all fittings as mentioned above	lot	NIL				
S	**Spares**						
S1	**Phase conductor**						
S1.1	Phase conductor ACCC-Hawk (same conductor as mentioned in item A1.1) with 2 Nos. core retainers per drum.	km	3				
S2	**Insulators**						
S2.1	70 kN insulator unit	each	192				
S2.2	120 kN insulator unit	each	231				
S3	**Fittings & Accessories**						
S3.1	Mid-span compression joint for phase conductor ACCC with equal diameter of ACSR Hawk	set	15				
S3.2	Repair sleeve for phase conductor ACCC with equal diameter of ACSR Hawk	set	10				
S3.3	Vibration damper for phase conductor ACCC with equal diameter of ACSR Hawk	each	10				
S3.4	132kV 70kN single suspension(SS) complete fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Hawk	set	6				
S3.5	132kV 120kN single tension (ST) fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Hawk	set	6				
S3.6	Compression type I clamp for jumper	pcs	1				
S3.7	ACCC Conductor pulling shocks	pcs	1				
S3.8	Supply of fittings for termination of Transmission Line [similar lot (item) as described in item No. **A 8.1 & A 8.2**] -						
	(i) Ishurdi 132/33kV substation	lot	1				
	(ii) Baghabari 132/33kV substation	lot	NIL				
E	**Erection & Test Equipment**						
E1	Motorized Compressor Jointing Equipment for ACCC-hawk and variable size	each	1				
	TOTAL Column 7 and 8 to be carried forward to Schedule No.5: Grand Summary						

Name of Bidder.....

Signature of Bidder.....

[1]Specify currency in accordance with ITB 19.1 of the Bid Data Sheet. The Price of column 5 and 6 (and consequently column 7 and 8) shall not include VAT on EXW Price. VAT on EXW Price shall not be included in the Contract Price.

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document
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Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Schedule-3: Design Services

Scope C: Reconductoring of Ishurdi-Baghabari 132kV Single Circuit Transmission Line from Ishurdi substation to LILO Tower (Pabna substation)

				Design Cost	
Item	Description	Unit	Qty	Foreign Currency	Local Currency (BDT)
1	**All Design Cost (including termination of the transmission line) shall be deemed to be included in respective Schedule Nos. 1 (and/or 2, as applicable) and 4.**	–	–	**Not applicable**	**Not applicable**
	Total			–	–

Name of Bidder.....

Signature of Bidder.....

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document
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Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No. PGCB/CEEGSTL/TL/Package-1/Lot-1)

Scope C: Reconductoring of Ishurdi-Baghabari 132kV Single Circuit Transmission Line from Ishurdi substation to LILO Tower (Pabna substation)

Schedule No.4- Installation and Other Services

Item	Description	Unit	Qty	Prices in Local Currency (Bangladesh Taka)	
				Unit Price	Total Price
1	*2*	*3*	*4*	*5*	*6=4x5*
A1	**Route Survey & Clearance**				
A1.1	Profile survey in accordance with the requirements of technical specification, incl. full ground survey, preparation and submission of route maps, mouza maps, profile drawings, SIMM documents etc.	route-km	18		
A1.2	Route clearance in accordance with requirements of the technical specification including payment of compensation for crops, trees, houses, etc. and all kinds of damage compensation	route-km	18		
A2	**Stringing**				
A2.1	Installation of insulator strings complete with all necessary hardwares, installing & stringing of **conductor** including fixing of conductor accessories, necessary midspan joints and repair sleeves using phase conductor **ACCC-Hawk**; 3 nos. single conductor on the single circuit line and **under single circuit live line condition for double circuit line,** re-stringing of the earthwire/OPGW in any sections (if required) also to be included in this item;	route-km	18		
A3	**Dismantling and Storing**				
A3.1	Dismantling of existing phase conductor ACSR Hawk [three (3) nos. single conductors on the line], OPGW and fittings etc, drumming/packing of dismantled materials as per instruction of engineer in-charge	route-km	18		
A3.2	Storing of the dismantled materials at respective GMD store of PGCB as per instruction of engineer in-charge	route-km	18		
A4	**Works for termination of the transmission line to the substation equipments in the 132kV substation**				
A4.1	Erection of single downleads including downdrop from terminal tower to sub-station gantry	set of three	1		
A4.2	All works required for completing the termination of the transmission line at **Ishwardi 132/33kV substation** [two (2) circuits/bays for 132kV single circuit Ishwardi-Baghabari Transmission line] - from substation gantry to each 132kV Bus via each existing equipment in the relevant 2 nos. bays/circuits ; the Contractor shall replace all the existing phase conductors (jumper/loop/drop-in conductors etc which connect all relevant equipments) and their connecting fittings/accessories in the relevant 2nos. bays/circuits with new conductor twin AAAC Hawk per phase and suitable new connecting fittings/accessories from the gantry up to each 132kV bus; they have to do all other works as required for completion of the termination	lot	1		
A4.3	All works required for completing the termination of the transmission line at Baghabari **132/33kV substation** [two (2) circuits/bays for 132kV single circuit Ishwardi-Baghabari Transmission line] - from substation gantry to each 132kV Bus via each existing equipment in the relevant 2 nos. bays/circuits ; the Contractor shall replace all the existing phase conductors (jumper/loop/drop-in conductors etc which connect all relevant equipments) and their connecting fittings/accessories in the relevant 2nos. bays/circuits with new conductor twin AAAC Hawk per phase and suitable new connecting fittings/accessories from the gantry up to each 132kV bus; they have to do all other works as required for completion of the termination	lot	NIL		
A5	Miscellaneous				
A5.1	Strengthening/ Repair of existing tower, as/if required	per tonne	5		
TOTAL Column 6 to be carried forward to Schedule No.5: Grand Summary					

Name of Bidder.....

Signature of Bidder.....

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope B: Reconductoring of RPCL-Mymensingh 132kV Double Circuit Transmission Line

Schedule No.1 - Plant and Mandatory Spare Parts Supplied from Abroad

Item	Description	Code[1]	Unit	Qty	Foreign Currency (in....)	
					Unit Price[2] CIP	Total Price[2] CIP
1	2	3	4	5		
B1	**Supply of phase conductor**					
B1.1	ACCC-Linnet conductor (ACCC conductor with equal diameter of ACSR Linnet), as per specification, including necessary midspan joints and repair sleeves, extra length for sag & jumper etc ; six (6) nos. twin conductors on the double circuit transmission line		route-km	4		
B1.2	ACSR Linnet conductor as per specification (for purpose of terminating the transmission line with substation equipments)		km	1		
B2	**Supply of Hardware fittings (Suspension) and Insulator**					
	Insulator strings, complete with insulators and all hardware fittings including suspension clamps, armour rods, arcing horn, Arcing ring etc. for ACCC Linnet conductor					
B2.1	a) 70kN Twin Suspension Insulators Set (Suspension) - disc only		set	42		
	b) 70kN Twin Suspension Insulators Fittings set for ACCC Linnet (Suspension) - hardware fittings only		set	42		
B2.2	a)70kN Twin Pilot Suspension Insulators Set - disc only		set	6		
	b) 70kN Twin Pilot Suspension Insulators Fittings Set for ACCC Linnet - hardware fittings only		set	6		
B2.3	a) 70kN Twin Suspension Insulators set (Heavy Suspension) - disc only		set	6		
	b) 70kN Twin Suspension Insulators Fittings Set for ACCC Linnet - hardware fittings only		set	6		
B3	**Supply of Hardware fittings (Tension) and Insulator**					
	Insulator strings, complete with insulators and all hardware fittings including suspension clamps, tension dead ends, armour rods, arcing horn, Arcing ring etc. for ACCC Linnet					
B3.1	a) 120kN Twin Tension Insulators Set - disc only		set	108		
	b) 120kN Twin Tension Insulators Fittings Set for ACCC Linnet - hardware fittings only		set	108		
B3.2	a) 70kN Twin Upright Low Duty Insulators Set - disc only		set	6		
	b) 70kN Twin Upright Low Duty Insulators Fittings Set for ACCC Linnet - hardware fittings only		set	6		
B3.3	a) 70kN Twin Inverted Low Duty Insulators Set - disc only		set	6		
	b) 70kN Twin Inverted low Duty Insulators Fittings Set for ACCC Linnet - hardware fittings only		set	6		
B4	Vibration Damper for ACCC conductor with equal diameter of ACSR Linnet		per span	16		
B5	Aircraft warning spheres for River crossing OPGW/Earthwire		each	5		
B6	Air craft obstruction lights solar powered complete with lamps, solar, panels, batteries, control equipment cables, support framework, etc.		each	5		
B7	Fabricated and galvanized tower steel (Mild steel & High tensile) including nut-bolts, washers etc for strengthening/ repair of existing any tower(s), as/if required		per tonne	5		
	Sub-total Price to be carried forward					

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope B: Reconductoring of RPCL-Mymensingh 132kV Double Circuit Transmission Line

Schedule No.1 - Plant and Mandatory Spare Parts Supplied from Abroad

Item	Description	Code[1]	Unit	Qty	Foreign Currency (in....)	
					Unit Price[2] CIP	Total Price[2] CIP
1	2	3	4	5		
	Sub-total brought forward					
B8	**Supply of Fittings/accessories related to the termination of the transmission line with each relevant substation equipment upto each 132kV bus in the 132kV substation**					
	All fittings/accessories required for completing the termination of the transmission line in each of the mentioned below 132kV substations from substation gantry up to each 132kV Bus via each existing equipment in the relevant two (2) bays/circuits ; existing phase conductor (Twin conductor per phase) as jumper/loop/drop-in/drop-out conductor etc along with its connecting fittings/accessories (i.e. the fittings/accessories which connect the phase conductor with the bay equipments viz LA, CT/PT, ES, DS , CB, Busbar conductor etc) in the relevant 2 bays of each substation to be replaced with new phase conductor twin ACSR Linnet per phase and new connecting fittings/accessories suitable for twin ACSR Linnet ; all the fittings/accessories to be of such design & material that they can continuously conduct without raising the temperature above allowable limit of the substation equipments the current that is two times the maximum continuous operating current of ACSR Linnet at prevailing conditions; the connector (T-pad/ T-connector or any other kind fitting as appropriate) required nearby the gantry for making connectivity between the line phase conductor ACCC (terminated at the gantry) and the relevant bay phase conductor (twin ACSR Linnet per phase) to be of such design & material that the temperature of the ACSR Linnet will not exceed the limit as mentioned above while maximum continuous operating current (two times the maximum continuous current of ACSR Linnet) flowing through the circuit (supply of phase conductor ACSR Linnet is not included in this item)					
B8.1	RPCL 132/33kV substation - all fittings as mentioned above		lot	1		
B8.2	Mymensingh 132/33kV substation - all fittings as mentioned above		lot	1		
S	**Spares**					
S1	**Phase conductor**					
S1.1	Phase conductor ACCC-Linnet (same conductor as mentioned in item 1.1) with 2 nos. core retainers per drum.		km	4		
S2	**Insulators**					
S2.1	70 kN insulator unit		each	150		
S2.2	120 kN insulator unit		each	350		
S2.3	Single 210kN Insulator unit set complete with all fittings		set	6		
S3	**Fittings & Accessories**					
S3.1	Mid-span compression joint for phase conductor ACCC with equal diameter of ACSR Linnet		set	5		
S3.2	Repair sleeve for phase conductor ACCC with equal diameter of ACSR Linnet		set	5		
S3.3	Vibration damper for phase conductor ACCC with equal diameter of ACSR Linnet		per span	1		
S3.4	132kV 70kN Twin suspension(SS) complete fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Linnet		set	6		
S3.5	132kV 120kN Twin tension (ST) fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Linnet		set	6		
S3.6	Compression type I clamp for jumper		pcs	5		
S3.7	ACCC Conductor pulling shocks		pcs	5		
S3.8	Supply of fittings for termination of Transmission Line [similar lot (item) as described in item No. **B 8.1 & B 8.2**] -					
	(ii) RPCL 132/33kV substation		lot	1		
	(ii) Mymensingh 132/33kV substation		lot	1		
E	**Erection & Test Equipment**					
E1	Motorized Compressor Jointing Equipment for ACCC-Linnet and variable size		each	1		
	TOTAL Column 7 to be carried forward to Schedule No.5: Grand Summary					

Name of Bidder.....

Signature of Bidder.....

[1]Bidder shall enter a code representing the country of origin of all imported plant and equipment.

[2]Specify currency in accordance with ITB 19.1 of the Bid Data Sheet and create additional columns as required accordingly.

Country of Origin Declaration Form

Item	Description	Code	Country

Name of Bidder.....

Signature of Bidder.....

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the Procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope B: Reconductoring of RPCL-Mymensingh 132kV Double Circuit Transmission Line

Schedule No.2 - Plant and Mandatory Spare Parts Supplied from within Employer's Country

Item	Description	Unit	Qty	Unit Price[1] EXW		Total Price[1] EXW	
				Foreign Currency (In .....)	Local Currency (BDT)	Foreign Currency (In .....)	Local Currency (BDT)
1	2	3	4	5	6	7	8
1	**Supply of phase conductor**						
1.1	ACCC-Linnet conductor (ACCC conductor with equal diameter of ACSR Linnet), as per specification, including necessary midspan joints and repair sleeves, extra length for sag & jumper etc ; six (6) nos. twin conductors on the double circuit transmission line	route-km	4				
1.2	ACSR Linnet conductor as per specification (for purpose of terminating the transmission line with substation equipments)	km	1				
2	**Supply of Hardware fittings (Suspension) and Insulator**						
	Insulator strings, complete with insulators and all hardware fittings including suspension clamps, armour rods, arcing horn, Arcing ring etc. for ACCC Linnet conductor						
2.1	a) 70kN Twin Suspension Insulators Set (Suspension) - disc only	set	42				
	b) 70kN Twin Suspension Insulators Fittings set for ACCC Linnet (Suspension) - hardware fittings only	set	42				
2.2	a)70kN Twin Pilot Suspension Insulators Set - disc only	set	6				
	b) 70kN Twin Pilot Suspension Insulators Fittings Set for ACCC Linnet - hardware fittings only	set	6				
2.3	a) 70kN Twin Suspension Insulators set (Heavy Suspension) - disc only	set	6				
	b) 70kN Twin Suspension Insulators Fittings Set for ACCC Linnet - hardware fittings only	set	6				
3	**Supply of Hardware fittings (Tension) and Insulator**						
	Insulator strings, complete with insulators and all hardware fittings including suspension clamps, tension dead ends, armour rods, arcing horn, Arcing ring etc. for ACCC Linnet						
3.1	a) 120kN Twin Tension Insulators Set - disc only	set	108				
	b) 120kN Twin Tension Insulators Fittings Set for ACCC Linnet - hardware fittings only	set	108				
3.2	a) 70kN Twin Upright Low Duty Insulators Set - disc only	set	6				
	b) 70kN Twin Upright Low Duty Insulators Fittings Set for ACCC Linnet - hardware fittings only	set	6				
3.3	a) 70kN Twin Inverted Low Duty Insulators Set - disc only	set	6				
	b) 70kN Twin Inverted low Duty Insulators Fittings Set for ACCC Linnet - hardware fittings only	set	6				
4	Vibration Damper for ACCC conductor with equal diameter of ACSR Linnet	per span	16				
5	Aircraft warning spheres for River crossing OPGW/Earthwire	each	5				
6	Air craft obstruction lights solar powered complete with lamps, solar, panels, batteries, control equipment cables, support framework, etc.	each	5				
7	Fabricated and galvanized tower steel (Mild steel & High tensile) including nut-bolts, washers etc for strengthening/ repair of existing any tower(s), as/if required	per tonne	5				
	Sub-total Price to be carried forward						

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the Procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope B: Reconductoring of RPCL-Mymensingh 132kV Double Circuit Transmission Line

Schedule No.2 - Plant and Mandatory Spare Parts Supplied from within Employer's Country

Item	Description	Unit	Qty	Unit Price[1] EXW		Total Price[1] EXW	
				Foreign Currency (in .....)	Local Currency (BDT)	Foreign Currency (in .....)	Local Currency (BDT)
1	2	3	4	5	6	7	8
	Sub-total brought forward						
8	**Supply of Fittings/accessories related to the termination of the transmission line with each relevant substation equipment upto each 132kV bus in the 132kV substation**						
	All fittings/accessories required for completing the termination of the transmission line in each of the mentioned below 132kV substations from substation gantry up to each 132kV Bus via each existing equipment in the relevant two (2) bays/circuits ; existing phase conductor (Twin conductor per phase) as jumper/loop/drop-in/drop-out conductor etc along with its connecting fittings/accessories (i.e. the fittings/accessories which connect the phase conductor with the bay equipments viz LA, CT/PT, ES, DS , CB, Busbar conductor etc) in the relevant 2 bays of each substation to be replaced with new phase conductor twin ACSR Linnet per phase and new connecting fittings/accessories suitable for twin ACSR Linnet ; all the fittings/accessories to be of such design & material that they can continuously conduct without raising the temperature above allowable limit of the substation equipments the current that is two times the maximum continuous operating current of ACSR Linnet at prevailing conditions; the connector (T-pad/ T-connector or any other kind fitting as appropriate) required nearby the gantry for making connectivity between the line phase conductor ACCC (terminated at the gantry) and the relevant bay phase conductor (twin ACSR Linnet per phase) to be of such design & material that the temperature of the ACSR Linnet will not exceed the limit as mentioned above while maximum continuous operating current (two times the maximum continuous current of ACSR Linnet) flowing through the circuit (supply of phase conductor ACSR Linnet is not included in this item)						
B8.1	RPCL 132/33kV substation - all fittings as mentioned above	lot	1				
B8.2	Mymensingh 132/33kV substation - all fittings as mentioned above	lot	1				
S	**Spares**						
S1	**Phase conductor**						
S1.1	Phase conductor ACCC-Linnet (same conductor as mentioned in item 1.1) with 2 nos. core retainers per drum.	km	4				
S2	**Insulators**						
S2.1	70 kN insulator unit	each	150				
S2.2	120 kN insulator unit	each	350				
S2.3	Single 210kN Insulator unit set complete with all fittings	set	6				
S3	**Fittings & Accessories**						
S3.1	Mid-span compression joint for phase conductor ACCC with equal diameter of ACSR Linnet	set	5				
S3.2	Repair sleeve for phase conductor ACCC with equal diameter of ACSR Linnet	set	5				
S3.3	Vibration damper for phase conductor ACCC with equal diameter of ACSR Linnet	per span	1				
S3.4	132kV 70kN Twin suspension(SS) complete fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Linnet	set	6				
S3.5	132kV 120kN Twin tension (ST) fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Linnet	set	6				
S3.6	Compression type I clamp for jumper	pcs	5				
S3.7	ACCC Conductor pulling shocks	pcs	5				
S3.8	Supply of fittings for termination of Transmission Line [similar lot (item) as described in item No. B 8.1 & B 8.2] -						
	(ii) RPCL 132/33kV substation	lot	1				
	(ii) Mymensingh 132/33kV substation	lot	1				
E	**Erection & Test Equipment**		0				
E1	Motorized Compressor Jointing Equipment for ACCC-Linnet and variable size	each	1				
	TOTAL Column 7 and 8 to be carried forward to Schedule No.5: Grand Summary						

Name of Bidder..... Signature of Bidder.....

[1]Specify currency in accordance with ITB 19.1 of the Bid Data Sheet. The Price of column 5 and 6 (and consequently column 7 and 8) shall not include VAT on EXW Price. VAT on EXW Price shall not be included in the Contract Price.

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1).
(Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope B: Reconductoring of RPCL-Mymensingh 132kV Double Circuit Transmission Line

Schedule No. 3: Design Services

				Design Cost	
Item	Description	Unit	Qty	Foreign Currency	Local Currency (BDT)
-	**All Design Cost (including termination of the transmission line) shall be deemed to be included in respective Schedule Nos. 1 (and/or 2, as applicable) and 4.**	–	–	**Not applicable**	**Not applicable**
	Total			–	–

Name of Bidder·····

Signature of Bidder·····.

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope B: Reconductoring of RPCL-Mymensingh 132kV Double Circuit Transmission Line

Schedule No.4- Installation and Other Services

Item	Description	Unit	Qty	Prices in Local Currency (Bangladesh Taka)	
				Unit Price	Total Price
1	*2*	*3*	*4*	*5*	*6=4x5*
B1	**Route Survey & Clearance**				
B1.1	Profile survey in accordance with the requirements of technical specification, incl. full ground survey, preparation and submission of route maps, mouza maps, profile drawings, SIMM documents etc.	route-km	4		
B1.2	Route clearance in accordance with requirements of the technical specification including payment of compensation for crops, trees, houses, etc. and all kinds of damage compensation	route-km	4		
B2	**Stringing**				
B2.1	Installation of insulator strings complete with all necessary hardwares, installing & stringing of **conductor** including fixing of conductor accessories, necessary midspan joints and repair sleeves using phase conductor **ACCC-Linnet**; 6 nos. twin conductor on the double circuit line **under single circuit live line condition for double circuit line,** re-stringing of the earthwire/OPGW in any sections (if required) also to be included in this item;	route-km	4		
B3	Installation of Aircraft Warning spheres on **River crossing OPGW/earthwire** (river crossing with Tower height above 60M) as per requirement	each	5		
B4	Installation of Air craft obstruction lights (solar powered complete with lamps, solar, panels, batteries, control equipment cables, support framework,etc.) on the river crossing towers with height above 60M, as per requirement, including any modification work required on the tower for installation of Air craft obstruction lights	per tower	2		
B5	Painting of tower having height above 60M in accordance with the requirements of the Technical Specification including supply of paint.	per tower	2		
B6	**Dismantling and Storing**				
B6.1	Dismantling of existing phase conductor ACSR-Linnet [six (6) nos.twin conductors on the line] and fittings etc, drumming/packing of dismantled materials as per instruction of engineer in-charge	route-km	4		
B6.2	Storing of the dismantled materials at respective GMD store of PGCB as per instruction of engineer in-charge	route-km	4		
B7	**Works for termination of the transmission line to the substation equipments in the 132kV substation**				
B7.1	Erection of single downleads including downdrop from terminal tower to sub-station gantry	set of three	4		
B7.2	All works required for completing the termination of the transmission line at **RPCL 132/33kV substation** [two (2) circuits/bays for 132kV double circuit Ghorasal-Joydebpur Transmission line] - from substation gantry to each 132kV Bus via each existing equipment in the relevant 2 nos. bays/circuits ; the Contractor shall replace all the existing phase conductors (jumper/loop/drop-in conductors etc which connect all relevant equipments) and their connecting fittings/accessories in the relevant 2 nos. bays/circuits with new conductor twin ACSR Linnet per phase and suitable new connecting fittings/accessories from the gantry up to each 132kV bus; they have to do all other works as required for completion of the termination	lot	1		
B7.3	All works required for completing the termination of the transmission line at **Mymensingh 132kV/33kV substation** [two (2) circuits/bays for 132kV double circuit RPCL-Mymensingh Transmission line] - from substation gantry to each 132kV Bus via each existing equipment in the relevant 2 nos. bays/circuits ; the Contractor shall replace all the existing phase conductors (jumper/loop/drop-in conductors etc which connect all relevant equipments) and their connecting fittings/accessories in the relevant 2 nos. bays/circuits with new conductor twin ACSR LInnet per phase and suitable new connecting fittings/accessories from the gantry up to each 132kV bus; they have to do all other works as required for completion of the termination	lot	1		
B8	Miscellaneous				
B8.1	Strengthening/ Repair of existing tower, as/if required	per tonne	2		
TOTAL Column 6 to be carried forward to Schedule No.5: Grand Summary					

Name of Bidder..... Signature of Bidder.....

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope D: Reconductoring of Barapukuria-Rangpur 132kV Double Circuit Transmission Line

Schedule No.1 - Plant and Mandatory Spare Parts Supplied from Abroad

Item	Description	Code[1]	Unit	Qty	Foreign Currency (in....)	
					Unit Price[2] CIP	Total Price[2] CIP
1	2	3	4	5		
B1	**Supply of phase conductor and OPGW**					
B1.1	ACCC-Grosbeak conductor (ACCC conductor with equal diameter of ACSR Grosbeak), as per specification, including necessary midspan joints and repair sleeves, extra length for sag & jumper etc ; six (6) nos. single conductors on the double circuit transmission line		route-km	42		
B1.2	ACSR Grosbeak conductor as per specification (for purpose of terminating the transmission line with substation equipments)		km	1		
B1.3	7 x 3.25mm GSW earthwire equivalent OPGW (24 fibres) inclusive of joint boxes, fixing clamps, fusion splices and connections to the joint boxes. One OPGW earthwire on the line		route-km	42		
B2	**Supply of Hardware fittings (without insulators) - Suspension type**					
	Suspension type hardware fittings set as the integral parts of each complete Hardware fittings/insulator (suspension type) set (excluding insulators), being subjected to system voltage with phase conductor while in service; the integral parts include the fittings/components such as suspension clamp, socket eye/ ball link etc as applicable, subjected to system voltage, and exclude the fittings/ components not subjected to system voltage ; the hardware fittings shall be compatible with: (a) existing fittings/ components not to be replaced and (b) new phase conductor ACCC with equal diameter of ACSR Grosbeak ; for below type and kN rating :					
B2.1	Fittings set for 132kV 70kN **single suspension(SS)** insulator set for ACCC conductor with equal diameter of ACSR Grosbeak, set comprising the integral parts subjected to system voltage (without insulators)		set	780		
B2.2	Fittings set for 132kV 120kN heavy suspension insulator set (if required) for ACCC conductor with equal diameter of ACSR Grosbeak, set comprising the integral parts subjected to system voltage (without insulators)		set	42		
B2.3	Fittings set for 132kV 70kN jumper suspension (single suspension, **SS**) insulator set (if required)for ACCC conductor with equal diameter of ACSR Grosbeak, set comprising the integral parts subjected to system voltage(without insulators)		set	69		
B3	**Supply of Hardware fittings (without insulators) - Tension type**					
	132kV Tension fittings **complete set** (without insulators), each set comprising both the live parts fittings/components and non-live parts fittings/components, for phase conductor ACCC with equal diameter of ACSR Grosbeak ; the tension fittings set to be designed with arcing horn; for below type and kN rating :					
B3.1	132kV 120kN single tension (**ST**) fittings set, complete set (without insulators) for ACCC conductor with equal diameter of ACSR Grosbeak		set	276		
B3.2	132kV 70kN single upright low duty Tension fittings set, complete set (without insulators) for ACCC conductor with equal diameter of ACSR Grosbeak		set	12		
B3.3	132kV 70kN single inverted low duty Tension fittings set, complete set (without insulators) for ACCC conductor with equal diameter of ACSR Grosbeak		set	12		
B4	**OPGW sets, complete with all accessories, incl. armour rods and earth bounds**					
B4.1	OPGW (7 x 3.25mm GSW type earthwire equivalent) Suspension Set, complete assembly		set	130		
B4.2	OPGW (7 x 3.25mm GSW type earthwire equivalent) Tension Set, complete assembly		set	50		
B5	Vibration Damper for ACCC conductor with equal diameter of ACSR Grosbeak		per span	160		
B6	Vibration Damper for OPGW		per span	160		
B7	Fabricated and galvanized tower steel (Mild steel & High tensile) including nut-bolts, washers etc for strengthening/ repair of existing any tower(s), as/if required		per tonne	5		
	Sub-total Price to be carried forward					

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope D: Reconductoring of Barapukuria-Rangpur 132kV Double Circuit Transmission Line

Schedule No.1 - Plant and Mandatory Spare Parts Supplied from Abroad

Item	Description	Code[1]	Unit	Qty	Foreign Currency (in....)	
					Unit Price[2] CIP	Total Price[2] CIP
1	2	3	4	5		
	Sub-total brought forward					
B8	**Supply of Fittings/accessories related to the termination of the transmission line with each relevant substation equipment upto each 132kV bus in the 132kV substation**					
	All fittings/accessories required for completing the termination of the transmission line in each of the mentioned below 132kV substations from substation gantry up to each 132kV Bus via each existing equipment in the relevant two (2) bays/circuits ; existing phase conductor (single conductor per phase) as jumper/loop/drop-in/drop-out conductor etc along with its connecting fittings/accessories (i.e. the fittings/accessories which connect the phase conductor with the bay equipments viz LA, CT/PT, ES, DS , CB, Busbar conductor etc) in the relevant 2 bays of each substation to be replaced with new phase conductor twin ACSR Grosbeak per phase and new connecting fittings/accessories suitable for twin ACSR Grosbeak ; all the fittings/accessories to be of such design & material that they can continuously conduct without raising the temperature above allowable limit of the substation equipments the current that is two times the maximum continuous operating current of ACSR Grosbeak at prevailing conditions; the connector (T-pad/ T-connector or any other kind fitting as appropriate) required nearby the gantry for making connectivity between the line phase conductor ACCC (terminated at the gantry) and the relevant bay phase conductor (twin ACSR Grosbeak per phase) to be of such design & material that the temperature of the ACSR Grosbeak will not exceed the limit as mentioned above while maximum continuous operating current (two times the maximum continuous current of ACSR Grosbeak) flowing through the circuit (supply of phase conductor ACSR Grosbeak is not included in this item)					
B8.1	Barapukuria 132/33kV substation - all fittings as mentioned above		lot	1		
B8.2	Rangpur 132/33kV substation - all fittings as mentioned above		lot	1		
S	**Spares**					
S1	**Phase conductor**					
S1.1	Phase conductor ACCC-Grosbeak (same conductor as mentioned in item B1.1) with 2 nos. core retainers per drum.		km	4		
S2	**Insulators**					
S2.1	70 kN insulator unit		each	150		
S2.2	120 kN insulator unit		each	300		
S3	**Fittings & Accessories**					
S3.1	Mid-span compression joint for phase conductor ACCC with equal diameter of ACSR Grosbeak		set	15		
S3.2	Repair sleeve for phase conductor ACCC with equal diameter of ACSR Grosbeak		set	10		
S3.3	Vibration damper for phase conductor ACCC with equal diameter of ACSR Grosbeak		per span	5		
S3.4	132kV 70kN single suspension(**SS**) complete fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Grosbeak		set	6		
S3.5	132kV 120kN single tension (**ST**) fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Grosbeak		set	6		
S3.6	Compression type I clamp for jumper		pcs	5		
S3.7	ACCC Conductor pulling shocks		pcs	5		
S3.8	Supply of fittings for termination of Transmission Line [similar lot (item) as described in item No. **B 8.1** & B **8.2**] -					
	(ii) Barapukuria 132/33kV substation		lot	1		
	(ii) Rangpur 132/33kV substation		lot	1		
E	**Erection & Test Equipment**					
E1	Motorized Compressor Jointing Equipment for ACCC-Grosbeak and variable size		each	1		
	TOTAL Column 7 to be carried forward to Schedule No.5: Grand Summary					

Name of Bidder.....

Signature of Bidder.....

[1]Bidder shall enter a code representing the country of origin of all imported plant and equipment.

[2]Specify currency in accordance with ITB 19.1 of the Bid Data Sheet and create additional columns as required accordingly.

Country of Origin Declaration Form

Item	Description	Code	Country

Name of Bidder.....

Signature of Bidder.....

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the Procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope D: Reconductoring of Barapukuria-Rangpur 132kV Double Circuit Transmission Line

Schedule No.2 - Plant and Mandatory Spare Parts Supplied from within Employer's Country

Item	Description	Unit	Qty	Unit Price[1] EXW		Total Price[1] EXW	
				Foreign Currency (in .....)	Local Currency (BDT)	Foreign Currency (in .....)	Local Currency (BDT)
1	2	3	4	5	6	7	8
1	**Supply of phase conductor and OPGW**						
1.1	ACCC-Grosbeak conductor (ACCC conductor with equal diameter of ACSR Grosbeak), as per specification, including necessary midspan joints and repair sleeves, extra length for sag & jumper etc ; six (6) nos. single conductors on the double circuit transmission line	route-km	42				
1.2	ACSR Grosbeak conductor as per specification (for purpose of terminating the transmission line with substation equipments)	km	1				
1.3	7 x 3.25mm GSW earthwire equivalent OPGW (24 fibres) inclusive of joint boxes, fixing clamps, fusion splices and connections to the joint boxes. One OPGW earthwire on the line	route-km	42				
2	**Supply of Hardware fittings (without insulators) - Suspension type**						
	Suspension type hardware fittings set as the integral parts of each complete Hardware fittings/insulator (suspension type) set (excluding insulators), being subjected to system voltage with phase conductor while in service; the integral parts include the fittings/components such as suspension clamp, socket eye/ ball link etc as applicable, subjected to system voltage, and exclude the fittings/ components not subjected to system voltage ; the hardware fittings shall be compatible with: (a) existing fittings/ components not to be replaced and (b) new phase conductor ACCC with equal diameter of ACSR Grosbeak ; for below type and kN rating :						
2.1	Fittings set for 132kV 70kN **single suspension(SS)** insulator set for ACCC conductor with equal diameter of ACSR Grosbeak, set comprising the integral parts subjected to system voltage (without insulators)	set	780				
2.2	Fittings set for 132kV 120kN heavy suspension insulator set (if required) for ACCC conductor with equal diameter of ACSR Grosbeak, set comprising the integral parts subjected to system voltage (without insulators)	set	42				
2.3	Fittings set for 132kV 70kN jumper suspension (single suspension, **SS**) insulator set (if required)for ACCC conductor with equal diameter of ACSR Grosbeak, set comprising the integral parts subjected to system voltage(without insulators)	set	69				
3	**Supply of Hardware fittings (without insulators) - Tension type**						
	132kV Tension fittings **complete set** (without insulators), each set comprising both the live parts/components and non-live parts/components, for phase conductor ACCC with equal diameter of ACSR Grosbeak ; the tension fittings set to be designed with arcing horn; for below type and kN rating :						
3.1	132kV 120kN single tension (**ST**) fittings set, complete set (without insulators) for ACCC conductor with equal diameter of ACSR Grosbeak	set	276				
3.2	132kV 70kN single upright low duty Tension fittings set, complete set (without insulators) for ACCC conductor with equal diameter of ACSR Grosbeak	set	12				
3.3	132kV 70kN single inverted low duty Tension fittings set, complete set (without insulators) for ACCC conductor with equal diameter of ACSR Grosbeak	set	12				
B4	OPGW sets, complete with all accessories, incl. armour rods and earth bounds						
B4.1	OPGW (7 x 3.25mm GSW type earthwire equivalent) Suspension Set, complete assembly	set	130				
B4.2	OPGW (7 x 3.25mm GSW type earthwire equivalent) Tension Set, complete assembly	set	50				
5	Vibration Damper for ACCC conductor with equal diameter of ACSR Grosbeak	each	160				
6	Vibration Damper for OPGW	each	160				
7	Fabricated and galvanized tower steel (Mild steel & High tensile) including nut-bolts, washers etc for strengthening/ repair of existing any tower(s), as/if required	per tonne	5				
	Sub-total Price to be carried forward						

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the Procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope D: Reconductoring of Barapukuria-Rangpur 132kV Double Circuit Transmission Line

Schedule No.2 - Plant and Mandatory Spare Parts Supplied from within Employer's Country

Item	Description	Unit	Qty	Unit Price[1] EXW		Total Price[1] EXW	
				Foreign Currency (in .....)	Local Currency (BDT)	Foreign Currency (in .....)	Local Currency (BDT)
1	2	3	4	5	6	7	8
	Sub-total brought forward						
8	**Supply of Fittings/accessories related to the termination of the transmission line with each relevant substation equipment upto each 132kV bus in the 132kV substation**						
	All fittings/accessories required for completing the termination of the transmission line in each of the mentioned below 132kV substations from substation gantry up to each 132kV Bus via each existing equipment in the relevant two (2) bays/circuits ; existing phase conductor (single conductor per phase) as jumper/loop/drop-in/drop-out conductor etc along with its connecting fittings/accessories (i.e. the fittings/accessories which connect the phase conductor with the bay equipments viz LA, CT/PT, ES, DS , CB, Busbar conductor etc) in the relevant 2 bays of each substation to be replaced with new phase conductor twin ACSR Grosbeak per phase and new connecting fittings/accessories suitable for twin ACSR Grosbeak ; all the fittings/accessories to be of such design & material that they can continuously conduct without raising the temperature above allowable limit of the substation equipments the current that is two times the maximum continuous operating current of ACSR Grosbeak at prevailing conditions; the connector (T-pad/ T-connector or any other kind fitting as appropriate) required nearby the gantry for making connectivity between the line phase conductor ACCC (terminated at the gantry) and the relevant bay phase conductor (twin ACSR Grosbeak per phase) to be of such design & material that the temperature of the ACSR Grosbeak will not exceed the limit as mentioned above while maximum continuous operating current (two times the maximum continuous current of ACSR Grosbeak) flowing through the circuit (supply of phase conductor ACSR Grosbeak is not included in this item)						
8.1	Barapukuria 132/33kV substation - all fittings as mentioned above	lot	1				
8.2	Rangpur 132/33kV substation - all fittings as mentioned above	lot	1				
S	**Spares**						
S1	**Phase conductor**						
S1.1	Phase conductor ACCC-Grosbeak (same conductor as mentioned in item B1.1) with 2 nos. core retainers per drum.	km	4				
S2	**Insulators**						
S2.1	70 kN insulator unit	each	150				
S2.2	120 kN insulator unit	each	300				
S3	**Fittings & Accessories**						
S3.1	Mid-span compression joint for phase conductor ACCC with equal diameter of ACSR Grosbeak	set	15				
S3.2	Repair sleeve for phase conductor ACCC with equal diameter of ACSR Grosbeak	set	10				
S3.3	Vibration damper for phase conductor ACCC with equal diameter of ACSR Grosbeak	each	5				
S3.4	132kV 70kN single suspension(**SS**) complete fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Grosbeak	set	6				
S3.5	132kV 120kN single tension (**ST**) fittings set, each set comprising both the live parts/components and non-live parts/components (without insulator discs) for ACCC with equal diameter of ACSR Grosbeak	set	6				
S3.6	Compression type I clamp for jumper	pcs	5				
S3.7	ACCC Conductor pulling shocks	pcs	5				
S3.8	Supply of fittings for termination of Transmission Line [similar lot (item) as described in item No. **B 6.1** & B **6.2**] -						
	(ii) Barapukuria 132/33kV substation	lot	1				
	(ii) Rangpur 132/33kV substation	lot	1				
E	**Erection & Test Equipment**						
E1	Motorized Compressor Jointing Equipment for ACCC-Grosbeak and variable size	each	1				
	TOTAL Column 7 and 8 to be carried forward to Schedule No.5: Grand Summary						

Name of Bidder..... Signature of Bidder.....

[1]Specify currency in accordance with ITB 19.1 of the Bid Data Sheet. The Price of column 5 and 6 (and consequently column 7 and 8) shall not include VAT on EXW Price. VAT on EXW Price shall not be included in the Contract Price.

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1).
(Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope D: Reconductoring of Barapukuria-Rangpur 132kV Double Circuit Transmission Line

Schedule No. 3: Design Services

				Design Cost	
Item	Description	Unit	Qty	Foreign Currency	Local Currency (BDT)
-	**All Design Cost (including termination of the transmission line) shall be deemed to be included in respective Schedule Nos. 1 (and/or 2, as applicable) and 4.**	–	–	**Not applicable**	**Not applicable**
	Total			–	–

Name of Bidder·····

Signature of Bidder·····.

POWER GRID COMPANY OF BANGLADESH LIMITED

Bidding Document for the procurement of

Construction and Reconductoring of 132kV Transmission Lines on Turnkey Basis (Package-1). (Contract No.PGCB/CEEGSTL/TL/Package-1/Lot-2)

Scope D: Reconductoring of Barapukuria-Rangpur 132kV Double Circuit Transmission Line

Schedule No.4- Installation and Other Services

Item	Description	Unit	Qty	Prices in Local Currency (Bangladesh Taka)	
				Unit Price	Total Price
1	*2*	*3*	*4*	*5*	*6=4x5*
B1	**Route Survey & Clearance**				
B1.1	Profile survey in accordance with the requirements of technical specification, incl. full ground survey, preparation and submission of route maps, mouza maps, profile drawings, SIMM documents etc.	route-km	42		
B1.2	Route clearance in accordance with requirements of the technical specification including payment of compensation for crops, trees, houses, etc. and all kinds of damage compensation	route-km	42		
B2	**Stringing**				
B2.1	Installation of insulator strings complete with all necessary hardwares, installing & stringing of **conductor** including fixing of conductor accessories, necessary midspan joints and repair sleeves using phase conductor **ACCC-Grosbeak**; 6 nos. single conductor on the double circuit line **under single circuit live line condition for double circuit line,** re-stringing of the earthwire/OPGW in any sections (if required) also to be included in this item;	route-km	42		
B3	**Dismantling and Storing**				
B3.1	Dismantling of existing phase conductor ACSR-Grosbeak [six (6) nos. single conductors on the line] and 12 fibres OPGW and fittings etc, drumming/packing of dismantled materials as per instruction of engineer in-charge	route-km	42		
B3.2	Storing of the dismantled materials at respective GMD store of PGCB as per instruction of engineer in-charge	route-km	42		
B4	**Works for termination of the transmission line to the substation equipments in the 132kV substation**				
B4.1	Erection of single downleads including downdrop from terminal tower to sub-station gantry	set of three	4		
B4.2	All works required for completing the termination of the transmission line at **Barapukuria 132/33kV substation** [two (2) circuits/bays for 132kV double circuit Rangpur-Barapukuria Transmission line] - from substation gantry to each 132kV Bus via each existing equipment in the relevant 2 nos. bays/circuits ; the Contractor shall replace all the existing phase conductors (jumper/loop/drop-in conductors etc which connect all relevant equipments) and their connecting fittings/accessories in the relevant 2 nos. bays/circuits with new conductor twin ACSR Grosbeak per phase and suitable new connecting fittings/accessories from the gantry up to each 132kV bus; they have to do all other works as required for completion of the termination	lot	1		
B7.3	All works required for completing the termination of the transmission line at **Rangpur 400/230/132kV substation** [two (2) circuits/bays for 132kV double circuit Barapukuria-Rangpur Transmission line] - from substation gantry to each 132kV Bus via each existing equipment in the relevant 2 nos. bays/circuits ; the Contractor shall replace all the existing phase conductors (jumper/loop/drop-in conductors etc which connect all relevant equipments) and their connecting fittings/accessories in the relevant 2 nos. bays/circuits with new conductor twin ACSR Grosbeak per phase and suitable new connecting fittings/accessories from the gantry up to each 132kV bus; they have to do all other works as required for completion of the termination	lot	1		
B8	Miscellaneous				
B8.1	Strengthening/ Repair of existing tower, as/if required	per tonne	5		
TOTAL Column 6 to be carried forward to Schedule No.5: Grand Summary					

Name of Bidder..... Signature of Bidder.....

F	4C LILO of Mymensingh-Netrokona 132kV Double Circuit Transmission Line at RPCL Substation						
Item	Description	Country of origin[2]	Unit	Quantity	Unit Price[1]	Total Price[1]	Taxes and Duties
					Foreign Currency [xxx] CIP	Foreign Currency [xxx] CIP	Local Currency [BDT]
1	2	3*	4	5	6	7= 5 x 6	9
	Schedule No. 1 Plant and Mandatory Spare Parts Supplied from Abroad						
1	**Supply of 132 kV Double circuit towers, complete with all stubs, nuts, bolts, locking nuts, washers, phase conductors and earthwire, swivels/shackles, step bolts, tower notice and identification plates, ACDs, protective coating, earthing, etc.**						
1.1	**Tower Type 1DT6**						
1.1.1	Tower Type 1DT6+6.0 m		each	1			
1.1.2	Tower Type 1DT6+9.0 m		each	1			
2	**Supply of 132 kV Four circuit towers, complete with all stubs, nuts, bolts, locking nuts, washers, phase conductors and earthwire, swivels/shackles, step bolts, tower notice and identification plates, ACDs, protective coating, earthing, etc.**						
2.1	**Tower Type 1QL**						
2.1.1	Tower Type 1QL+9.0 m		each	3			
2.2	**Tower Type 1Q15**						
2.2.1	Tower type 1Q15 +15.0 m		each	2			
2.3	**Tower Type 1Q30**						
2.3.1	Tower type 1Q30 +6.0 m		each	2			
2.3.2	Tower type 1Q30 +9.0 m		each	1			
2.4	**Tower Type 1QT6**						
2.4.1	Tower Type 1QT6+6.0 m		each	3			
2.4.2	Tower Type 1QT6+9.0 m		each	1			
2.5	**Galvanized tower steel**						
2.5.1	Fabricated		ton	15			
2.5.2	Non-fabricated		ton	1			
3	**Auxiliary Crossarm for tower**						
3.1	Auxiliary Crossarm for Tower Type 1QT6		per set of three	4			
4	**Phase conductor, earthwire and OPGW cable, complete with repair sleeves and joints**						
4.1	"Single ACSR Grosbeak equivalent ACCC Grosbeak Conductor" (four circuit line, all circuits erected, one conductors per phase) [3]		Route km[3]	3			
4.2	Two optical fibre ground wire, 24 fibres 7×3.25 steel earthwire equivalent OPGW, including joint box		Route km[3]	3			

Item	Description	Country of origin[2]	Unit	Quantity	Unit Price[1]	Total Price[1]	Taxes and Duties
					Foreign Currency [xxx] CIP	Foreign Currency [xxx] CIP	Local Currency [BDT]
1	2	3*	4	5	6	7= 5 x 6	9
Schedule No. 1 Plant and Mandatory Spare Parts Supplied from Abroad							
5	**Insulator strings, with associated suspension and tension clamps for single "ACCC Grosbeak" Conductor**						
5.1	a) 70kN suspension Insulators set for single "ACCC Grosbeak" Conductor (Suspension) - disc only		Set	36			
	b) 70kN suspension Insulators set for single "ACCC Grosbeak" Conductor (Suspension) - hardware fittings only		Set	36			
5.2	a) 120kN tension Insulators Set for single "ACCC Grosbeak" Conductor - disc only		Set	240			
	b) 120kN tension Insulators Set for single "ACCC Grosbeak" Conductor - hardware fittings only		Set	240			
5.3	a) 70kN jumper suspension Insulators Set for single "ACCC Grosbeak" Conductor - disc only		Set	78			
	b) 70kN jumper suspension Insulators Set for single "ACCC Grosbeak" Conductor - hardware fittings only		Set	78			
5.4	a) 70kN single upright low duty Insulators Set for single "ACCC Grosbeak" Conductor - disc only		Set	12			
	b) 70kN single upright low duty Insulators Set for single "ACCC Grosbeak" Conductor - hardware fittings only		Set	12			
5.5	a) 70kN single inverted low duty Insulators Set for single "ACCC Grosbeak" Conductor - disc only		Set	12			
	b) 70kN single inverted low duty Insulators Fittings Set for single "ACCC Grosbeak" Conductor - hardware fittings only		Set	12			
6	**OPGW sets, complete with all accessories, incl. armour rods and earth bounds**						
6.1	Suspension set (including all fittings and accessories for surplus and to guide the OPGW to the joint box)		set	6			
6.2	Tension set (including all fittings and accessories for surplus and to guide the OPGW to the joint box)		set	44			
7	**Dampers**						
7.1	Vibration damper for phase conductor		per span	13			
7.2	Vibration damper for OPGW		per span	13			
8	**Aerial Markers**						
8.1	Air craft obstruction lights solar powered complete with lamps, solar, panels, batteries, control equipment cables, support framework, tower work platform etc.		Per tower	NIL			
8.2	Bird diverters		pcs.	10			
8.3	Bird guards, one bird guard per each crossarm applied on intermediate towers		pcs.	36			
8.4	Aircraft warning spheres		pcs.	NIL			
8.5	Painting of 60 meter and over tower in accordance with the requirements of the Technical Specification		per tower	NIL			
8.6	Painting of tower (Reflecting Paint) upto 3 meter in submerge area in accordance with the requirements of the Technical Specification		per tower	NIL			
9	**Mandatory Spare Parts and Tools**						

Item	Description	Country of origin[2]	Unit	Quantity	Unit Price[1]	Total Price[1]	Taxes and Duties
					Foreign Currency [xxx] CIP	Foreign Currency [xxx] CIP	Local Currency [BDT]
1	2	3*	4	5	6	7= 5 x 6	9
Schedule No. 1 Plant and Mandatory Spare Parts Supplied from Abroad							
9.1	Conductor "ACCC Grosbeak" type		km	1			
9.2	Optical fibre ground wire, 24 fibres 7×3.25 steel earthwire equivalent OPGW		km	1			
9.3	a) 70kN suspension Insulators set for single "ACCC Grosbeak " Conductor (Suspension) - disc only		set	4			
	b) 70kN suspension Insulators set for single "ACCC Grosbeak " Conductor (Suspension) - hardware fittings only		set	4			
9.4	a) 120kN tension Insulators Set for single "ACCC Grosbeak" Conductor - disc only		set	6			
	b) 120kN tension Insulators Set for single "ACCC Grosbeak" Conductor - hardware fittings only		set	6			
9.5	OPGW 24 fibres suspension set		set	2			
9.6	OPGW 24 fibres tension set		set	2			
9.7	OPGW junction box		set	8			
9.8	Vibration damper for phase conductor single "ACCC Grosbeak" Conductor		each	6			
9.9	Vibration damper for OPGW		each	3			
9.10	Repair sleeve for conductor - single "ACCC Grosbeak" Conductor		pcs	5			
9.11	Midspan joints for conductor single "ACCC Grosbeak" Conductor		pcs	5			
9.12	Bird diverters		pcs	2			
9.13	Bird guard		pcs	3			
9.14	Terminal ground resistance tester (tools)		pcs	1			
9.15	**Temporary earthing equipment**		each	1			
9.16	**Motorised jointing compressor for conductor complete with dies suitable for conductors & earthwires to be used for this Contract**		each	1			
Total Columns 8 to be carried forward to Schedule No. 5 - Grand Summary							

Name of Bidder _____

Signature of Bidder _____

1 Specify currencies in accordance with ITB 19.1 of the BDS. Create additional columns for up to a maximum of three foreign currencies, if so required.

2 Bidders shall enter a code representing the country of origin of all imported plant and equipment.

3 Definition of route km: Route km is the transmission line distance between two terminal points in plan view. Route km is exclusive sag and other electrical clearances, elevation differences etc. The Contractor shall incorporate all such extra costs in his unit rate.

Country of Origin Declaration Form

Item	Description	Code	Country

P33 (rev)

Design, Supply, Installation, Testing & Commissioning of 132 kV 4C LILO transmission line from Mymensingh-Netrokona to RPCL Power Plant on Turnkey Basis

F LILO of Mymensingh-Netrokona 132kV Double Circuit Transmission Line at RPCL Substation

Item	Description	Unit	Quantity	EXW Price [XXX]		Sales and Other Taxes
				Unit EXW Price1	Total EXW Price	Local Currency [BDT]
1	2	3	4	5	6=4x5	7
	Schedule No. 2 Plant and Mandatory Spare Parts Supplied from Within the Employer's Country					
1	**Supply of 132 kV Double circuit towers, complete with all stubs, nuts, bolts, locking nuts, washers, phase conductors and earthwire, swivels/shackles, step bolts, tower notice and identification plates, ACDs, protective coating, earthing, etc.**					
1.1	**Tower Type 1DT6**					
1.1.1	Tower Type 1DT6+6.0 m	each	1			
1.1.2	Tower Type 1DT6+9.0 m	each	1			
2	**Supply of 132 kV Four circuit towers, complete with all stubs, nuts, bolts, locking nuts, washers, phase conductors and earthwire, swivels/shackles, step bolts, tower notice and identification plates, ACDs, protective coating, earthing, etc.**					
2.1	**Tower Type 1QL**					
2.1.1	Tower Type 1QL+9.0 m	each	3			
2.2	**Tower Type 1Q15**					
2.2.1	Tower type 1Q15 +15.0 m	each	2			
2.3	**Tower Type 1Q30**					
2.3.1	Tower type 1Q30 +6.0 m	each	2			
2.3.2	Tower type 1Q30 +9.0 m	each	1			
2.4	**Tower Type 1QT6**					
2.4.1	Tower Type 1QT6+6.0 m	each	3			
2.4.2	Tower Type 1QT6+9.0 m	each	1			
2.5	Galvanized tower steel					
2.5.1	Fabricated	ton	15			
2.5.2	Non-fabricated	ton	1			
3	**Auxiliary Crossarm for tower**					
3.1	Auxiliary Crossarm for Tower Type 1QT6	per set of three	4			
4	**Phase conductor, earthwire and OPGW cable, complete with repair sleeves and joints**					
4.1	"Single ACSR equivalent ACCC Grosbeak Conductor" (four circuit line, all circuits erected, one conductors per phase) [3]	Route km^3	3			
4.2	Two optical fibre ground wire, 24 fibres 7×3.25 steel earthwire equivalent OPGW, including joint box	Route km^3	3			

Item	Description	Unit	Quantity	EXW Price [XXX]		Sales and Other Taxes
				Unit EXW Price1	Total EXW Price	Local Currency [BDT]
1	2	3	4	5	6=4x5	7
Schedule No. 2 Plant and Mandatory Spare Parts Supplied from Within the Employer's Country						
5	**Insulator strings, with associated suspension and tension clamps for single "ACCC Grosbeak" Conductor**					
5.1	a) 70kN suspension Insulators set for single "ACCC Grosbeak" Conductor (Suspension) - disc only	Set	36			
	b) 70kN suspension Insulators set for single "ACCC Grosbeak" Conductor (Suspension) - hardware fittings only	Set	36			
5.2	a) 120kN tension Insulators Set for single "ACCC Grosbeak" Conductor - disc only	Set	240			
	b) 120kN tension Insulators Set for single "ACCC Grosbeak" Conductor - hardware fittings only	Set	240			
5.3	a) 70kN jumper suspension Insulators Set forsingle "ACCC Grosbeak" Conductor - disc only	Set	78			
	b) 70kN jumper suspension Insulators Set forsingle "ACCC Grosbeak" Conductor - hardware fittings only	Set	78			
5.4	a) 70kN single upright low duty Insulators Set for single "ACCC Grosbeak" Conductor - disc only	Set	12			
	b) 70kN single upright low duty Insulators Set for single "ACCC Grosbeak" Conductor - hardware fittings only	Set	12			
5.5	a) 70kN single inverted low duty Insulators Set for single "ACCC Grosbeak" Conductor - disc only	Set	12			
	b) 70kN single inverted low duty Insulators Fittings Set for single "ACCC Grosbeak" Conductor - hardware fittings only	Set	12			
6	**OPGW sets, complete with all accessories, incl. armour rods and earth bounds**					
6.1	Suspension set (including all fittings and accessories for surplus and to guide the OPGW to the joint box)	set	6			
6.2	Tension set (including all fittings and accessories for surplus and to guide the OPGW to the joint box)	set	44			
7	**Dampers**					
7.1	Vibration damper for phase conductor	per span	13			
7.2	Vibration damper for OPGW	per span	13			
8	**Aerial Markers**					
8.1	Air craft obstruction lights solar powered complete with lamps, solar, panels, batteries, control equipment cables, support framework, tower work platform etc.	Per tower	NIL			
8.2	Bird diverters	pcs.	10			
8.3	Bird guards, one bird guard per each crossarm applied on intermediate towers	pcs.	36			
8.4	Aircraft warning spheres	pcs.	NIL			
8.5	Painting of 60 meter and over tower in accordance with the requirements of the Technical Specification	per tower	NIL			
8.6	Painting of tower (Reflecting Paint) upto 3 meter in submerge area in accordance with the requirements of the Technical Specification	per tower	NIL			
9	**Mandatory Spare Parts and Tools**					
9.1	Conductor "ACCC Grosbeak" type	km	1			
9.2	Optical fibre ground wire, 24 fibres 7×3.25 steel earthwire equivalent OPGW	km	1			

Item	Description	Unit	Quantity	EXW Price [XXX]		Sales and Other Taxes
				Unit EXW Price1	Total EXW Price	Local Currency [BDT]
1	2	3	4	5	6=4x5	7
Schedule No. 2 Plant and Mandatory Spare Parts Supplied from Within the Employer's Country						
9.3	a) 70kN suspension Insulators set for single "ACCC Grosbeak" Conductor (Suspension) - disc only	set	4			
	b) 70kN suspension Insulators set for single "ACCC Grosbeak" Conductor (Suspension) - hardware fittings only	set	4			
9.4	a) 120kN tension Insulators Set for single "ACCC Grosbeak" Conductor - disc only	set	6			
	b) 120kN tension Insulators Set for single "ACCC Grosbeak" Conductor - hardware fittings only	set	6			
9.5	OPGW 24 fibres suspension set	set	2			
9.6	OPGW 24 fibres tension set	set	2			
9.7	OPGW junction box	set	8			
9.8	Vibration damper for phase conductor single "ACCC Grosbeak " Conductor	each	6			
9.9	Vibration damper for OPGW	each	3			
9.10	Repair sleeve for conductor - single "ACCC Grosbeak " Conductor	pcs	5			
9.11	Midspan joints for conductor single "ACCC Grosbeak " Conductor	pcs	5			
9.12	Bird diverters	pcs	2			
9.13	Bird guard	pcs	3			
9.14	Terminal ground resistance tester (tools)	pcs	1			
9.15	**Temporary earthing equipment**	each	1			
9.16	**Motorised jointing compressor for conductor complete with dies suitable for conductors & earthwires to be used for this Contract**	each	1			
Total Columns 6 to be carried forward to Schedule No. 5 - Grand Summary						

Name of Bidder

Signature of Bidder

1 Specify currencies in accordance with ITB 19.1 of the BDS. Create additional columns for up to a maximum of three foreign currencies, if so required.

2 Bidders shall enter a code representing the country of origin of all imported plant and equipment.

3 Definition of route km: Route km is the transmission line distance between two terminal points in plan view. Route km is exclusive sag and other electrical clearances, elevation differences etc. The Contractor shall incorporate all such extra costs in his unit rate.

Design, Supply, Installation, Testing & Commissioning of 132 kV 4C LILO transmission line from Mymensingh-Netrokona to RPCL Power Plant on Turnkey Basis							
H.	4C LILO of Mymensingh-Netrokona 132kV Double Circuit Transmission Line at RPCL Substation						
Item	Description	Unit	Quantity	Unit Price[1]		Total Price[1]	
				Local Currency Portion [BDT]	Foreign Currency Portion [xxx]	Local Currency Portion [BDT]	Foreign Currency Portion [xxx]
1	2	3	4	5	6	7 = 4 x 5	8 = 4 x 6
Schedule No. 3 Design Services							
1	Line Design						
1.1	Detailed line design including plan and profiles; conductor, earthwire and OPGW sag tension calculations; tower spotting, establishment of line schedule; Design of insulator strings, OPGW and earthwire attachments	Lump sum		Not Applicable	Not Applicable		
Total Columns 7 & 8 to be carried forward to Schedule No. 5 - Grand Summary							

Name of Bidder _____

Signature of Bidder _____

1. Specify currencies in accordance with ITB 19.1 of the BDS. Create additional columns for up to a maximum of three foreign currencies, if so required.

2. Bidder shall quote the amount considering clause 14.1 of section 8(Special Conditions of Contract), Volume 1 of 3 of the bidding document. The amount quoted by bidder is subject to arithmatic correction by Employer as required.

Design, Supply, Installation, Testing & Commissioning of 132 kV 4C LILO transmission line from Mymensingh-Netrokona Power Plant on Turnkey Basis

F. LILO of Mymensingh-Netrokona 132kV Double Circuit Transmission Line at RPCL Substation

Item	Description	Unit	Quantity	Unit Price1	Total Price1
				Local Currency [BDT]	Local Currency [BDT]
1	2	3	4	5	6 = 4 x 5
	Schedule No. 4 Installation and Other Services				
1	**Survey and soil investigation works**				
1.1	**Survey Work**				
1.1.1	Check survey in accordance with the requirements of the technical specification, incl. Full ground survey with change of route, if any, tower plotting and preparation and submission of route maps, profile drawings, SIMM documents, etc.	Route-km	3		
1.1.2	Payment for Compensation (For resettlement of affcetd people, dwelling/commercial structures, trees, crops etc. on the Right of Way)	Route-km	3		
1.1.3	Payment of compensation for using private land to construct transmission line towers [based on area of tower footprint]	Route-km	3		
1.2	**Geotechnical Investigations incl. taking samples, logging and lab testing**				
1.2.1	Boreholes for geotechnical investigation, incl. laboratory test, borehole logs, sampling and interpretive report as per geotechnical specification				
(a)	Level 2	borehole	1		
(b)	Level 4	borehole	1		
1.2.2	Soil resistivity tests (one per tower)	unit	14		
2	**Foundations for towers including all setting out, Concrete, Reinforcement, Excavation, Pumping, Stub-Setting, Geotechnical Investigation (Level 2), Shuttering, Leveling, Timbering, supply & Installation of foundation steelwork, Earthing Materials,Backfilling, approved Protective Coating & site clearing etc.**				
2.1	**Tower type "`1DT6"**				
2.1.1	Pile Foundation for any Soil Category	per tower	1		
2.1.2	Piled Foundation with 1.0m or 2m raised chimney for any Soil Category	per tower	1		
2.2	**Tower type "1QL"**				
2.2.1	Pile Foundation for any Soil Category	per tower	1		
2.2.2	Piled Foundation with 1.0m raised chimney for any Soil Category	per tower	1		
2.2.3	Piled Foundation with 2.0m raised chimney for any Soil Category	per tower	1		
2.3	**Tower type "1Q15"**				
2.3.1	Pile Foundation for any Soil Category	per tower	1		
2.3.2	Piled Foundation with 1.0m or 2m raised chimney for any Soil Category	per tower	1		

Item	Description	Unit	Quantity	Unit Price	Total Price
				Local Currency [BDT]	Local Currency [BDT]
1	2	3	4	5	6 = 4 x 5
	Schedule No. 4 Installation and Other Services				
2.4	**Tower type "1Q30"**				
2.4.1	Pile Foundation for any Soil Category	per tower	1		
2.4.2	Piled Foundation with 1.0m raised chimney for any Soil Category	per tower	1		
2.4.3	Piled Foundation with 2.0m raised chimney for any Soil Category	per tower	1		
2.5	**Tower type "1QT6"**				
2.5.1	Pile Foundation for any Soil Category	per tower	2		
2.5.2	Piled Foundation with 1.0m raised chimney for any Soil Category	per tower	1		
2.5.3	Piled Foundation with 2.0m raised chimney for any Soil Category	per tower	1		
3	**Erection of 132kV double circuit towers complete with all stubs, nuts, bolts, locking nuts, washers, phase conductor and earthwire swivels/shackles, step bolts, tower notice and identification plates, ACDs, ptotective coating, earthing etc.**				
3.1	**Tower type "1DT6"**				
3.1.1	Tower type 1DT6+6 m	each	1		
3.1.2	Tower type 1DT6+9 m	each	1		
4	**Erection of 132kV four circuit towers complete with all stubs, nuts, bolts, locking nuts, washers, phase conductor and earthwire swivels/shackles, step bolts, tower notice and identification plates, ACDs, ptotective coating, earthing etc.**				
4.1	**Tower Type 1QL**				
4.1.1	Tower Type 1QL+9.0 m	each	3		
4.2	**Tower Type 1Q15**				
4.2.1	Tower type 1Q15 +15.0 m	each	2		
4.3	**Tower Type 1Q30**				
4.3.2	Tower type 1Q30 +6.0 m	each	2		
4.3.3	Tower type 1Q30 +9.0 m	each	1		
4.4	**Tower type "1QT6"**				
4.4.2	Tower Type 1QT6+6.0 m	each	3		
4.4.3	Tower Type 1QT6+9.0 m	each	1		
4.5	**Galvanized Tower Steel Works**	ton	15		
5	**Testing of Foundations**				
5.1	**Supply (incl. Foundation, steel works), install and test foundation for pad & chimney type foundation to prove compliance with Technical specification, payment for successful test only**				
(a)	Uplift test	per test	1		
(b)	Compression test	per test	1		
5.2	**Individual Pile test including supply,install and test to prove compliance with technical specification, payment for successful test only (applicable for all tower types selected by the Employer's Engineer):**				
(a)	Compression test	per test	1		
(b)	Uplift test	per test	1		
(c)	Pile Integrity test	per test	56		

Item	Description	Unit	Quantity	Unit Price[1]	Total Price[1]
				Local Currency [BDT]	Local Currency [BDT]
1	2	3	4	5	6 = 4 x 5
	Schedule No. 4 Installation and Other Services				
6	**Stringing of four circuit line, one conductors per phase, two OPGW (length approx. Route km)**				
6.1	"Single ACCC Grosbeak " (four circuit line, all circuits erected, one conductors per phase) including: Installation of insulation strings, compressed dead-ends, compression junction sleeves, suspension clamps, Sagging and clipping, Installation of armour rods and Dampers, Pilot strings and jumpers and any other works required as per specification.	route km	3		
6.2	Two optical fibre ground wire, 24 fibres 7×3.25 steel earthwire equivalent OPGW shield wire, including joint box, including:Tension and semi-tension joints, suspension clamps, armour rods and dampers,Sagging and clipping, Installation of intermediate junction boxes and terminal junction boxes at substation gantries ,Earthing jumpers	route km	3		
7	**Documentation**				
7.1	Establishment of as-built drawings, manuals and all requested documents as per specifications	lump sum	1		
8	**Miscellaneous**				
8.1	General and other works and services, not mentioned before	lump sum	1		
8.2	Transport of the material and equipment supplied from Employer's Country	lump sum	1		
8.3	Insurance of material and equipment supplied from Employer's Country during transport	lump sum	1		
8.4	Painting of bottom part of towers in accordance with Section 21	lump sum	1		
8.5	Erection of OPGW connection from terminal tower to substation Gantry/Mast	per wire	2		
8.6	Additional counterpoise earthing in accordance with requirement of the Technical specification	per meter	2		
8.7	Miscellaneous Rates for works certified by the Engineer in accordance with method of Payment				
(a)	Additional Excavation	cu.m	50		
(b)	Additional Concrete	cu.m	50		
(c)	Additional Reinforcement	kg	200		
(d)	Extra for surface resisting cement per cu.m of concrete	cu.m	25		
(e)	Additional Boring (500mm diameter)	rm	50		
(f)	Additional Boring (600mm diameter)	rm	50		
(g)	Additional Boring (750mm diameter)	rm	50		
(h)	Sand Filling	cu.m	50		
9	Dismantling of existing line section whichever is required for turn in/out, storing the dismantled materials at PGCB store. By-passing the required line section will be done with pole. Pole for by-passing shall be supplied by PGCB. Finally, dismantling of by-pass line and completing rerouting work, the pole shall be stored at PGCB store.	lot	1		
	Total Columns 7 & 8 to be carried forward to Schedule No. 5 - Grand Summary				

Name of Bidder

Signature of Bidder

1 Specify currencies in accordance with ITB 19.1 of the BDS. Create additional columns for up to a maximum of three foreign currencies, if so required.

2 As described in SCC 22.2.7

7.11 Form EXP - 3: Subcontractors

Fill out one (1) form per contract.

Contract No . . . . . of	**Contract Identification**		
Award Date		**Completion Date**	
Role in Contract	❑ **Contractor**	❑ **Management Contractor**	❑ **Subcontractor**
Total Contract Amount	**$**		
If partner in a Joint Venture or Subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**	
Employer's name **Address** **Telephone number** **Fax number** **E-mail**			

Designation	Angle of Deviation / Entry	Description	Type of Insulator Set
2Q15	0°-15°	Angle	Tension
2Q30	0° - 30°	Angle/Section	Tension
2QT6	30° - 60°	Angle	Tension
	0° - 30° (Angle of Entry)	Terminal	Tension
132kV single circuit tower			
A	0°-3°	Intermediate	Suspension
B	3° - 15°	Angle	Tension
C	15° – 30°	Angle/Section	Tension
D	30° – 60° 0° – 30°	Angle Terminal	Tension Tension
132kV double circuit tower			
1DL	0°	Intermediate	Suspension
1D1	0° - 10°	Angle	Heavy Suspension
1D25	0° – 25°	Angle/Section	Tension
1DT6	25° – 60° 0° – 30°	Angle Terminal	Tension Tension
132kV four circuit tower			
1QL	0°	Intermediate	Suspension
1Q15	0° - 15°	Angle	Heavy Suspension
1Q30	0° – 30°	Angle/Section	Tension
1QT6	30° – 60°	Angle	Tension
	0° – 30° (Angle of Entry)	Terminal	Tension
132kV double circuit tower for single ACSR Finch– Not applicable			
1DLF	0°-1°	Intermediate	Suspension
1D1F	0° - 5°	Angle	Heavy Suspension
1D25F	0° – 25°	Angle/Section	Tension
1DT6F	25° – 60°	Angle	Tension
	0° – 30° (Angle of Entry)	Terminal	Tension

2Q15	Body/leg extension	Std., 1.5, 3.0, 6.0, 9.0
2Q30	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
2QT6	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0 & 9.0
132kV single circuit towers		
A	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
B	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0, 12.0, 15.0
C	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
D	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
132kV double circuit towers		
1DL	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
1D1	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0, 12.0, 15.0
1D25	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
1DT6	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
132kV four circuit towers		
1QL	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
1Q15	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0, 12.0, 15.0
1Q30	Body/leg extension	Std., 3.0, 4.5, 6.0, 9.0
1QT6	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0 & 9.0
132kV double circuit towers for Single Finch– Not applicable		
1DLF	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0
1D1F	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0, 9.0, 12.0, 15.0, 18.0
1D25F	Body/leg extension	Std., 3.0, 4.5, 6.0, 9.0
1DT6F	Body/leg extension	Std., 1.5, 3.0, 4.5, 6.0 & 9.0

Note:

(i) Std. means Standard height.

(ii) D25 towers shall be designed to accommodate crossarms and clearance for transposing the line.

(iii) DT6 towers shall be designed to accommodate the loads of slack span coming through auxiliary crossarm.

Annex 8-4(2) Basic Dimension of Supports

(a)400kV Towers – Not applicable

Tower Type	Max. base width of standard height tower at k-point (m)	Max. width of Bottom Cross-arm waist (m)	Min. height of standard height tower bottom conductor attachment point after creep or after load condition from k-point (m)
	x	y	z
4DL	8.860	3.0	24.57

7. 230kV Line (River Crossing Portion) – Not Applicable

Insulator Set Type	Suspension	Tension
Nominal system voltage	400kV	
String configuration	Twin	Twin
Reference drawing		
Insulator unit type	Cap & pin type disc insulator	
Coupling type as per IEC60305	Ball & socket	
Insulating material	Porcelain	
Security clip type	R	
Zinc sleeve	Required	
Head design	Straight head	

8. 132kV Line (Overland Portion)

Lot-1

Insulator Set Type	Suspension / Heavy Suspension	Tension	Low Duty Tension	Jumper Suspension
Nominal system voltage	132kV			
String configuration	Single	Single	Single	Single
Reference drawing				
Insulator unit type	Cap &pin type disc insulator			
Coupling type as per IEC60305	Ball &socket			
Insulating material	Porcelain			
Security clip type	R			
Zinc sleeve	Required			
Head design	Straight head			

8 (a) 132kV Line (Overland Portion)

Lot-2

Insulator Set Type	Suspension / Heavy Suspension	Tension	Low Duty Tension	Jumper Suspension
Nominal system voltage	132kV			
String configuration	Single/twin	Single/twin	Single/twin	Single/twin
Reference drawing				
Insulator unit type	Cap &pin type disc insulator			
Coupling type as per IEC60305	Ball &socket			
Insulating material	Porcelain			
Security clip type	R			
Zinc sleeve	Required			
Head design	Straight head			

8 (b) 132kV Line (Overland Portion)

Lot-2

Insulator Set Type	Suspension / Heavy Suspension	Tension	Low Duty Tension	Jumper Suspension
Nominal system voltage	132kV			
String configuration	Twin	Twin	Twin	Twin
Reference drawing				
Insulator unit type	Cap &pin type disc insulator			
Coupling type as per IEC60305	Ball &socket			
Insulating material	Porcelain			

Insulator Set Type	Suspension / Heavy Suspension	Tension	Low Duty Tension	Jumper Suspension
Security clip type	R			
Zinc sleeve	Required			
Head design	Straight head			

7. 132kV Line (River Crossing Portion) – Not applicable

Insulator Set Type	Suspension	Tension
Nominal System Voltage	{.....132kV..... .....}	
String Configuration	Twin	Twin
Reference Drawing		
Insulator Unit type	{.....Cap & Pin type disc insulator.....}	
Coupling Type as per IEC 60305	{..... Ball & Socket .....}	
Insulating Material	{..... Porcelain .....}	
Security Clip type	{.....R .....}	
Zinc Sleeve	{.....Required.....}	
Head design	{.....Straight Head.....}	

6. 132kV line (Overland Portion)

Lot-1

Parameter / Insulator Set Type		Suspension/ Jumper Suspension	Heavy Suspension	Tension	Upright Low Duty	Inverted Low Duty
Pollution category		Medium II				
Nominal creepage	mm	2900				
Insulator type		Cap &pin type disc insulators				
Insulator unit reference		U70BL	U120B	U120B	U70BL	U70BL
Glaze colour		Brown	Grey	Grey	Brown	Brown
Unit puncture voltage	kV	110	110	110	110	110
Number of insulator units per string		10	10	11	11	11
Dielectric material		Porcelain				
Dry lightning impulse withstand voltage	kV	650				
Wet power frequency withstand voltage	kV	275				
Power arc for insulator set						
• Current	kA	31,5				
• Duration	s	0.5				
Power arc for string insulator units: Current for duration	kA for s	12 for 0.1 or 6 for 0.2				
Arc gap nominal	mm	1120	1120	1120	1000	1000
RIV level per unit	δB	30				
RIV level per set	δB	40				
Test voltage for RIV & Corona	kV	85				
Mechanical/electromechanical Failing load	kN	70	120	120	70	70

6(a). 132kV line (Overland Portion)

Lot-2

Parameter / Insulator Set Type		Suspension/ Jumper Suspension	Heavy Suspension	Tension	Upright Low Duty	Inverted Low Duty
Pollution category		Medium II				
Nominal creepage	mm	2900				
Insulator type		Cap &pin type disc insulators				
Insulator unit reference		U70BL	U120B	U120B	U70BL	U70BL
Glaze colour		Brown	Grey	Grey	Brown	Brown
Unit puncture voltage	kV	110	110	110	110	110
Number of insulator units per string		10	10	11	11	11
Dielectric material		Porcelain				
Dry lightning impulse withstand voltage	kV	650				
Wet power frequency withstand voltage	kV	275				
Power arc for insulator set						
• Current	kA	31,5				

Parameter Insulator Set Type		Suspension/ Jumper Suspension	Heavy Suspension	Tension	Upright Low Duty	Inverted Low Duty
• Duration	s	0.5				
Power arc for string insulator units: Current for duration	kA for s	12 for 0.1 or 6 for 0.2				
Arc gap nominal	mm	1120	1120	1120	1000	1000
RIV level per unit	δB	30				
RIV level per set	δB	40				
Test voltage for RIV & Corona	kV	85				
Mechanical/electromechanical Failing load	kN	70	120	120	70	70

6(b). 132kV line (Overland Portion)

Lot-2

Parameter Insulator Set Type		Suspension/ Jumper Suspension	Heavy Suspension	Tension	Upright Low Duty	Inverted Low Duty
Pollution category		Medium II				
Nominal creepage	mm	2900				
Insulator type		Cap &pin type disc insulators				
Insulator unit reference		U70BL	U120B	U120B	U70BL	U70BL
Glaze colour		Brown	Grey	Grey	Brown	Brown
Unit puncture voltage	kV	110	110	110	110	110
Number of insulator units per string		10	10	11	11	11
Dielectric material		Porcelain				
Dry lightning impulse withstand voltage	kV	650				
Wet power frequency withstand voltage	kV	275				
Power arc for insulator set						
• Current	kA	31,5				
• Duration	s	0.5				
Power arc for string insulator units: Current for duration	kA for s	12 for 0.1 or 6 for 0.2				
Arc gap nominal	mm	1120	1120	1120	1000	1000
RIV level per unit	δB	30				
RIV level per set	δB	40				
Test voltage for RIV & Corona	kV	85				
Mechanical/electromechanical Failing load	kN	2x70	2x120	2x120	2x 70	2x70

Annex 10-1(6): Insulator Fittings - Types & Uses - 132kV (Overland Portion) Lot-1

Insulator Fittings Type	Suspension	Heavy Suspension	Tension	Low Duty	Pilot Suspension
Reference drawing					
Set configuration	Single	Single	Single	Single	Single
No. of insulator strings	1	1	1	1	1
Min. separation between centres of parallel strings (mm)	-	-	-	-	-
Coupling type	Ball & Socket	Ball & Socket	Ball & Socket	Ball & Socket	Ball & Socket
Security clip type	R	R	R	R	R
No. of sub-conductor	1	1	1	1	1
Sub-conductor spacing (mm)	-	-	-	-	-
Live line working	Required	Required	Required	Not Required	Required
Sag adjuster type	-	-	Quadrant	Turnbuckle	-
Linear range (mm)	-	-	75 - 225	230	-
Increment (mm)	-	-	-	-	-
Overall set length (mm)	2000	2000	2400	2350 (A) 2900 (B)	1950
Min. failing load complete set					
• Common to all conductor (kN)	70	120	120	70	70
• Common to individual Conductor (kN)	70	120	120	70	70
Insulator protective devices: Type					
• Live end	Single Point	Single Point	Single Point	Single Point	Single Point
• Earth end	Single Point	Single Point	Single Point	Single Point	Single Point

(A) Upright (B) Inverted

Annex 10-1(6a): Insulator Fittings - Types & Uses - 132kV (Overland Portion) Lot-2

Insulator Fittings Type	Suspension	Heavy Suspension	Tension	Low Duty	Pilot Suspension
Reference drawing					
Set configuration	Single	Single	Single	Single	Single
No. of insulator strings	1	1	1	1	1
Min. separation between centres of parallel strings (mm)	-	-	-	-	-
Coupling type	Ball & Socket	Ball & Socket	Ball & Socket	Ball & Socket	Ball & Socket
Security clip type	R	R	R	R	R
No. of sub-conductor	1	1	1	1	1
Sub-conductor spacing (mm)	-	-	-	-	-
Live line working	Required	Required	Required	Not Required	Required
Sag adjuster type	-	-	Quadrant	Turnbuckle	-
Linear range (mm)	-	-	75 - 225	230	-
Increment (mm)	-	-	-	-	-
Overall set length (mm)	2000	2000	2400	2350 (A) 2900 (B)	1950
Min. failing load complete set					

Insulator Fittings Type	Suspension	Heavy Suspension	Tension	Low Duty	Pilot Suspension
• Common to all conductor (kN)	70	120	120	70	70
• Common to individual Conductor (kN)	70	120	120	70	70
Insulator protective devices: Type					
• Live end	Single Point	Single Point	Single Point	Single Point	Single Point
• Earth end	Single Point	Single Point	Single Point	Single Point	Single Point

(A) Upright (B) Inverted

Annex 10-1(6b): Insulator Fittings - Types & Uses - 132kV (Overland Portion) Lot-2

Insulator Fittings Type	Suspension	Heavy Suspension	Tension	Low Duty	Pilot Suspension
Reference drawing					
Set configuration	Twin	Twin	Twin	Twin	Twin
No. of insulator strings	2	2	2	2	2
Min. separation between centres of parallel strings (mm)	450	450	450	450	450
Coupling type	Ball & Socket	Ball & Socket	Ball & Socket	Ball & Socket	Ball & Socket
Security clip type	R	R	R	R	R
No. of sub-conductor	2	2	2	2	2
Sub-conductor spacing (mm)	450	450	450	450	450
Live line working	Required	Required	Required	Not Required	Required
Sag adjuster type	-	-	Quadrant	Turnbuckle	-
Linear range (mm)	-	-	75 - 225	230	-
Increment (mm)	-	-	-	-	-
Overall set length (mm)	2000	2000	2400	2350 (A) 2900 (B)	1950
Min. failing load complete set					
• Common to all conductor (kN)	2x70	2x120	2x120	2x70	2x70
• Common to individual Conductor (kN)	70	120	120	70	70
Insulator protective devices: Type					
• Live end	Single Point	Single Point	Single Point	Single Point	Single Point
• Earth end	Single Point	Single Point	Single Point	Single Point	Single Point

(A) Upright (B) Inverted

Annex 10-3(5): 132kV (Overland Portion) (For Lot-1 & Lot-2)

Joint & Clamp Type	Phase	OPGW
Conductor	ACSR Grosbeak/ ACSR Hawk/ AAAC Hawk/ACSR Linnet equiv. dia ACCC	7 x 3.25 S equiv.
Suspension clamp type	Trunnion Corona free	Armour Grip
Armour rods	Required	Required
Counterweights (kg)	50	
Tension joints:		
• Dead end type	Compression	Helical
• Jumper terminal type	Compression	
• Mid-spans type	Compression	
• Repair sleeves type	Compression	
• Tee connectors type	Compression	
Non-tensile joints:		
• Disconnectable		
• Non-disconnectable		
Jumper palms type	Bolted 0° & 30°	
Line termination fittings type		
Jumper weights (kg)		
Tubular jumpers		
Earthwire bonds end fitting type		Lug-lug

Annex 10-3(6): 132kV (River Crossing Portion) – Not applicable

Joint & Clamp Type	Conductor	Earthwire	
	ACSR Mallard	7 x 4.25S Grade 1150	OPGW
Suspension Clamp-type	-	Trunnion	Armour grip
Armour Rods	Required	Required	Required
Counterweights (kgs)	-	-	-
Tension Joints : Dead end-type Jumper terminal-type Midspans-type Repair Sleeves – type	 Compression Bolted Compression Helical	 Compression - Compression Compression/Helical	 Helical - - -
Non-Tensile Joints : Jumper palms –type	Bolted 0° & 30°	-	-
Earthwire bonds – end fitting type	-	Lug-lug	Pin-lug Lug-lug

Conductor	Phase	Earthwires	
Creep period of conductor to be considered (years)	-	-	-
No. and diameter of aluminium wire (No./mm)	-	-	-
No. and diameter of steel wire (No./mm)	-	-	Not applicable
Overall diameter of conductor (mm)	Max. 28.95	18.35	-
Overall sectional area of conductor (mm^2)	-		158
Rated tensile strength of conductor (kN)	Max. 170		-
Weight (kg/km)	Max. 1888		-
Direction of external lay	Right hand	Right hand	Right hand
Cross Sectional Area of Al (mm^2)	-	-	-
Cross Sectional Area of Composite Core (mm^2)	-	-	-
No. of Composite Core (mm)	1	-	-
Shape of wires	All trapezoidal	Round	Round
Diameter of Composite Core (mm)	8.76	-	-
Rated tensile strength of core (kN)	-	-	-
Current carrying capacity at 180 Deg C	-	-	-
Max. allowable emergency operating temp. (Deg C)	200	-	-
Maximum DC Resistance at 20 Deg C (ohm/km)	0.0514	-	0.323

Annex 11-1(5): 132kV

Conductor	Phase						OPGW
Designation (Code Name)	ACCC Grosbeak (ACSR Grosbeak equiv. diameter)	ACCC Hawk (ACSR Hawk/AAAC Hawk equiv.	ACCC Linnet (ACSR Linnet equiv.)	Grosbeak	Hawk	Linnet	
Type	ACCC	ACCC	ACCC.	ACSR	ACSR	ACSR	
Reference standards	ASTM/IEC / BSEN	ASTM/IEC/ BSEN	ASTM/IEC/BSEN	ASTM B232	ASTM B232	ASTM B232	IEEE 1138/ IEC 60794
Aluminium/Aluminium alloy grade	1350 O	1350 O	1350 O				As appropriate
Steel grade	-	-	-				As appropriate
Galvanising Thickness	-	-	-				
Aluminium class (AS wire)	-	-	-	Ref IEC 61232	Ref IEC 61232	Ref IEC 61232	
Aluminium type (AS wire)	-	-	-				As
Conductor Max continuous operating temp (°C)	180	180	180	80	80	80	
Minimum mass of grease	-	-	-				
Creep period of conductor to be considered (years)	20	20	20	20	20	20	
No. and diameter of aluminium wire (No./mm)	Refer Note	Refer Note	Refer Note	26/3.973		26/2.89	
No. and diameter of steel	-	-	-	7/3.089		7/2.25	
Overall diameter of conductor	25.16	21.8	18.28	25.16	21.8	18.31	11.5

Conductor	Phase						OPGW
(mm) (max.)							
Overall sectional area of conductor (mm^2)							
Ultimate tensile strength of conductor (kN)	133.9	102.3	72.8	112	85.8	62.76	60
Rated Strength of Core (kN)	110.8	85	59.5	-	-	-	
Weight (kg/km) (max.)	1280	975	664	1303	975	690	
Direction of external lay	Right hand	Right hand	Right hand	Right hand	Right hand	Right hand	Right hand
Nominal Aluminium Cross-sectional area (mm^2)	416.2	309.8	219		241.6	170.6	
Cross Sectional Area of Composite Core (mm^2)				-	-	-	
No. of Composite Core (mm)	1	1	1	-	-	-	
Shape of wires	All trapezoidal	All trapezoidal	All trapezoidal				
Diameter of Composite Core				-	-	-	
Rated tensile strength of core				-	-	-	
Current carrying capacity at 120	1220 Min.	1026 Min.	806 Min	-	-	-	
Current carrying capacity at 180	1537 Min.	1289 Min.	956 Min	-	-	-	
Max allowable emergency operating temp (°C)	200	200	200				
Maximum DC Resistance at 20 Deg C (ohm/km)	0.068	0.090	0.1288		0.19	0.1693	
Designation (Code name)	ACCC Grosbeak (ACSR Grosbeak equiv. diameter)	ACCC Hawk (ACSR Hawk/AAAC Hawk equiv. diameter)	ACCC Linnet (ACSR Linnet equiv.)	Grosbeak	Hawk	Linnet	
Co-efficient of linear expansion (per Deg C)							

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

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

(iii) Absorptivity 0.9/0.5 (ACCC Linnet) and Emissivity 0.7/0.5 (ACCC Linnet)

(iv) ACSR conductor shall be applied with grease in all layers for protection of steel from corrosion according to the relevant standard.

(v) "A"- Maximum diameter of OPGW must not exceed the diameter and weight of earthwire.

Annex 11-2: Subconductor Configuration (For Lot-02)

Configuration	Spacing (mm x mm)	Orientation	Notes
Twin	450	Horizontal	132 kV
Twin	450	Horizontal	230 kV
Quad	450 x 450	Square	400 kV

Annex 11-3(5): Conductor System Loading - 132kV

Conductor	Unit	Phase	OPGW
Code Name		ACCC Grosbeak/ ACSR Grosbeak/ ACCC Hawk/ ACSR Hawk/ACCC Linnet/ACSR Linnet	GS 7x3.25 equiv.
Maximum Working Tension Conditions (MWT)			
Maximum allowable tension	kN	as per Section 8: Tower	
Wind pressure	N/m²	Please refer to the note	
Temperature	°C	5	5
Every-day conditions (still air):			
Maximum tension	kN	as per Section 8: Tower	
Temperature	°C	30	
Erection Conditions (still air)			
Max. tangential tension	kN	n.a.	n.a.
Temperature	°C		
Sagging limits of earthwire:			
Sagging limits of OPGW as a percentage of conductor sag	%	n.a.	Max 90
Conductor temperature	°C	180	50

Note:
For Sag-Tension calculation in plan & profile/optimum tower spotting, zone wise Basic wind speed shall be obtained from Figure 6.2.1 or Table 6.2.8 of Bangladesh National Building Code (BNBC) 2020. In case of different Basic wind speed for the same transmission line terminal zones, then maximum value among the two shall be considered. Other necessary values are tabulated as below.

Wind load factor	1.0
Exposure category	C
Wire Wind Height Adjust Model	ASCE 74-2009
Wire Gust Response Factor	ASCE 74-2009

Annex 11-4: Test Procedures of Conductor

Annex 11-4(1): Tests on ACCC Conductor

1.1 UTS Test on Stranded Conductor

Circles perpendicular to the axis of the conductor shall be marked at two places on a sample of conductor of minimum 5 m length between fixing arrangement suitably fixed by appropriate fittings on a tensile testing machine. The load shall be increased at a steady rate up to 50% of minimum specified UTS and held for one minute. The circles drawn shall not be distorted due to relative movement of strands. Thereafter the load shall be increased at steady rate to minimum UTS and held for one minute. The Conductor sample shall not fail during this period. The applied load shall then be increased until the failing load is reached and the value recorded.

Parameters	Conductor Type		
	Phase	Earthwire	OPGW
Everyday temperature (°C)	as per Section 2. Technical Particulars	as per Section 2. Technical Particulars	as per Section 2. Technical Particulars
Everyday tension (kN)	Sag equalized to 90% of conductor sag	Sag equalized to 90% of conductor sag	Sag equalized to 90% of conductor sag
Vibration damper type	Stockbridge, four vibration type	Stockbridge, four vibration type	Stockbridge, four vibration type

Note: Requirement of vibration damper for bundle conductor shall be subject to the outcome of damping study during execution of Contract.

Annex 12-1(5): 132 kV Line

Parameters	Conductor Type	
	Phase	OPGW
Conductor designation	Grosbeak/Hawk/Linnet	As per Section 11. Conductors
Conductor material	ACCC/ACSR	
Armour rods fitted	YES	YES
Basic span (m)	as per Tower Section	as per Tower Section
Everyday temperature (°C)	as per Section 2. Technical Particulars	as per Section 2. Technical Particulars
Everyday tension (kN)	as per Section 8. Tower	Sag matched to earthwire
Vibration damper Type	4R Stockbridge vibration damper	4R Stockbridge vibration damper

Annex 12-1(7): 132 kV Line (ACSR Finch) – Not applicable

Parameters	Conductor Type	
	Phase	OPGW
Conductor designation	Finch	To match 7 x 3.25 steel earthwire
Conductor material	ACSR	AS
Armour rods fitted	YES	YES
Basic span (m)	as per Tower Section	as per Tower Section
Everyday temperature (°C)	as per Section 2. Technical Particulars	as per Section 2. Technical Particulars
Everyday tension (kN)	as per Section 8. Tower	Sag matched to earthwire
Vibration damper Type	Stockbridge	Stockbridge

Annex 13-4: Spacers & Spacer Dampers - Types and Uses: 230kV – River Crossing Portion– Not applicable

Parameter		Spacer	Spacer Damper
Conductor Designation		ACSR Mallard equal dia.	ACSR Mallard equal dia.
Conductor Material		ACCC	ACCC
Basic Span	(m)	-	800
Maximum Single Span	(m)	-	800
Everyday Temperature	(°C)	-	As per Section 2. Technical Particulars
Everyday Tension	(kN)	-	As per Tower/Conductor Section
Sub-Conductor Configuration		Twin	Twin
Sub-Conductor Spacing	(mm)	450	450
Tolerance on sagging sub-conductors	(mm)	-	±40
Spacer damper to be fitted adjacent to tension joint(dead-end)Clause13.4.3		-	Yes
Nominal System Voltage	(kV)	230	230
Short Circuit Condition:			
Current	(kA)	31.5	31.5
Duration	(s)	1	1

Note: Spacers are only required to be fitted to jumper loops and downleads.

Annex 13-4: Spacers & Spacer Dampers - Types and Uses: 132kV – (for Lot-2)

Parameter		Spacer	Spacer Damper
Conductor Designation		ACSR Linnet equal dia.	ACSR Linnet equal dia.
Conductor Material		ACCC	ACCC
Basic Span	(m)	-	300
Maximum Single Span	(m)	-	330
Everyday Temperature	(°C)	-	As per Section 2. Technical Particulars
Everyday Tension	(kN)	-	As per Tower/Conductor Section
Sub-Conductor Configuration		Twin	Twin
Sub-Conductor Spacing	(mm)	450	450
Tolerance on sagging sub-conductors	(mm)	-	±40
Spacer damper to be fitted adjacent to tension joint(dead-end)Clause13.4.3		-	Yes
Nominal System Voltage	(kV)	132	132
Short Circuit Condition:			
Current	(kA)	31.5	31.5
Duration	(s)	1	1

Note: Spacers are only required to be fitted to jumper loops and downleads.

Annex 13-4: Engineering Documents to be Submitted by Contractor

Clause Reference	Document Description	Comments
13.4.1	Spacer, spacer damper - contract drawings	
13.4.3	Installation procedures	
13.6.1	Type test-programme and procedures	
13.6.1	Spacer, spacer damper - type test certificates	
13.6.15	Galvanising test results	
13.6.15	Ingot zinc certificates	
13.6.16	Metallic, non-metallic material test certificate	
13.6.16	Bolts & nuts material test certificates	
13.6.16	Spacer, spacer damper - type test results	
13.6.16	Spacer, spacer damper - sample test results	
13.6.17	Certificate of conformity	

Annex 14-1: OPGW Design Requirements

Description	Unit	400kV– Not applicable	230kV– Not applicable	132kV (Lot-1)	132kV (Lot-1 & Lot-2)
Number of fibres		48	48	48	24
Fault current (1 second)	(kA)	11.83	5	5	5
Initial temperature	(°C)	40	40	40	40
Leading edge	(µs)	1.2	1.2	1.2	1.2
Lightning initial peak current (0.5 second)	(A)	Class 3 as per IEC 60794	Class 1 as per IEC 60794	Class 1 as per IEC 60794	Class 1 as per IEC 60794
Tail	(µs)	50	50	50	50
Power follow through	(Coulomb)	Class 3 as per IEC 60794	Class 1 as per IEC 60794	Class 1 as per IEC 60794	Class 1 as per IEC 60794
Temperature cycling test T_A	(°C)	5	5	5	5
Temperature cycling test T_B	(°C)	40	40	40	40

Annex 14-2: Single Mode Optical Fibre Cable Requirements

Coating diameter		µm	250 ± 15
Cladding diameter		µm	125 ± 3
Cladding non-circularity		%	≤2
Mode field diameter		µm	8.6 ~ 9.5
Mode field concentricity error		µm	≤1
Cut off wave length		nm	≤1,270
Attenuation at (maximum average)	1285 nm 1330	dB/km	≤0.40
Attenuation at (maximum average)	1550 nm	dB/km	≤0.25
Zero dispersion wave length		nm	≤1,321
Chromatic dispersion at	1285 nm 1330	ps/(km-nm)	≤3.50
Chromatic dispersion at	1550 nm	ps/(km-nm)	≤20
Individual splice loss		dB	≤0.10
Mean splice loss		dB	≤0.06

Annex 14-3: Test Equipment

OTDR