SCHEDULE A-E- BPS01 SOW WITH TR

Summary & Main System Parameters

Site and substation condition	400/132/33 kV AAWDCP (MAIN SS) substation
	New SS
Substation type	GIS
Site Altitude (m a.s.l.)	≤1000
Minimum ambient temperature (°C)	-10
Design temperature	
Outdoor	50 (°C)
Indoor	40 (°C)
Highest average daily temperature (°C)	38
Relative humidity (%)	4÷100
The climate –day	Dry & Hot
The climate – night	Cold
Pollution level	Heavy airborne contamination
Insulator creepage distance (mm/kV)	38
Wind velocity (m/s)	50
Ice loading, radial thickness (mm)	10
Isoceraunic level (days/annum)	15
Average annual rainfall (cm)	cca. 23
Seismic Conditions	Zone 2B
Solar radiation (W/m2)	1150
Short circuit rating	
400 kV switchgear	40 / 1 sec.
132 kV switchgear	40 / 3 sec.
33 kV switchgear	31.5 / 3 sec.
11 KV side	40 kA / 1 sec.
BUSBAR current rating (A)	
400 kV switchgear	3150
132 kV switchgear	3150
33 kV switchgear	2500
11 KV side	3150

- All outdoor equipment must be suitable for live washing.
- The insulator outdoor creepage distance should be based on 420 kV for 400 kV, 145kV for 132kV, 36kV for 33kV and 12kV for 11 kV.

SUMMARY OF DEFINITE WORK
A/E – BPS01 33/11KV SUBSTATION --

SECTION FOR PURPOSE OF PAYMENT AND TAKING OVER	**SECTION A/E**	
APPROXIMATE LOCATION OF SUBSTATION	**AQABA (GOVERNORATE) – BPS01**	
RATED VOLTAGE / HIGHEST VOLTAGE	**33 KV / 36KV**	**11 KV / 12KV**
NORMAL CURRENT RATING OF BUSBARS	**2500 A**	**3150 A**
TYPE OF SWITCHING ARRANGEMENT	**AIS, SINGLE BUSBAR 33KV SWITCHGEAR**	**-**
NUMBER OF OHL / FEEDER CIRCUITS	**4**	**-**
NUMBER OF TRANSFORMER CIRCUITS	**5**	**-**
NUMBER OF BUS SECTION CIRCUITS	**1**	**-**
NUMBER OF BUS COUPLER CIRCUITS	**-**	**-**
NUMBER OF CAPACITOR CIRCUITS	**-**	**-**
RATING OF TRANSFORMER BAY	**2500 A**	**3150 A**
RATING OF OHTL / FEEDER BAY	**1250 A**	**-**
RATING OF CAPCITOR BAY	**-**	**-**
RATING OF BS / BC BAY	**2500 A**	**-**
SHORT CIRCUIT CURRENT	**31.5KA/3 SEC.**	**40 KA/1 SEC.**
REQUIRED COMPLETION DATE	**AS SPECIFIED IN SCHEDULE B OF THE TENDER**	

- All outdoor equipment must be suitable for live washing.
- The insulator creepage distance should be based on 145kV for 132kV and 36kV for 33kV.

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
	E1: 33KV SWITCHGEAR IN BPS1		
E1.1	**33 kV Switchgear**	**33 kV Air-Insulated Switchgear (AIS), Metal Clad type (LSC 2B, IAC AFLR, PM), for 36 kV (70/ 170 kV) rated voltage, for 2500 A rated current and for 31.5 kA rated short-time (3 s) withstand current, for indoor installation with IP41 degree of mechanical protection, all in accordance with IEC 62271-200, comprising of the following Cubicles/Panels:**	
E1.1.1	Cable Feeder Cubicle	33 kV Cable Feeder Cubicle/Panel with the following installed equipment per Cubicle:	4 sets
		Three-phase busbars for 2500 A rated current.	1 set
		Three-pole, withdrawable (floor-rolling), vacuum type, 33 kV Circuit Breaker (CB), for 1250 A rated current and for 31.5 kA/3 s rated breaking current, complete with motor wound-spring operating mechanism, shunt closing & opening coils, auxiliary equipment, all in accordance with IEC 62271-100.	1 set
		Single-phase, cast in epoxy resin Current Transformer (CT) all in accordance with IEC 61869-1&2, with five (5) cores with the following characteristics: – I Core: Rated transformation ratio: 800/400/1 A, accuracy class PX for Line Differential Protection. – II Core: Rated transformation ratio: 800/400/1 A, accuracy class 5P20/1, minimum rated output of 15VA for over-current protection, earth fault protection and CB failure protection. – III Core: Rated transformation ratio: 800/400/1 A, accuracy class 0.2s, minimum rated output of 10 VA for instrumentation. – IV Core: Rated transformation ratio: 2500/1250/1A, accuracy class PX for Busbar zone Main protection, – V Core: Rated transformation ratio: 2500/1250/1A, accuracy class PX for Busbar zone Check protection.	3 sets
		Single-phase, single pole insulated, cast in epoxy resin, fixed type Voltage Transformer (VT), without primary fuses, all in accordance with IEC 61869-1&3, with two (2) secondary windings with the following characteristics:	3 sets

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		– Winding I: Rated transformation ratio: $\frac{33}{\sqrt{3}}/\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.2 for instrumentation with appropriate rated output, – Winding II: Rated transformation ratio: $\frac{33}{\sqrt{3}}/\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.5 for synchronization with appropriate rated output.	
		Three-pole Earthing Switch (ES) all in accordance with IEC 62271-102.	1 set
		LV compartment, completely wired, equipped with the following equipment and devices: – Mimic diagram with spring return lockable control switch for circuit breaker (ON/Normal/OFF), indicators for earthing switches and position indication for CB in "open" and "close", "Service" and "Test" positions. – Lockable control selector switch ("Local/Remote"), All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.	1 set
		Cable compartment suitable for connection of 33 kV XLPE insulated cables. ***Note:*** The exact characteristics of incoming 33 kV cables (conductor material, cross-sectional area, number of single-core cables per phase, etc.) shall be determined in Engineering/Design stage.	1 set
E1.1.2	33/11KV Transformer Cubicle	33 kV Transformer Cubicle/Panel with the following installed equipment per Cubicle:	4 sets
		Three-phase busbars for 2500 A rated current.	1 set
		Three-pole, withdrawable (floor-rolling), vacuum type, 33 kV Circuit Breaker (CB), for 2500 A rated current and for 31.5 kA/3 s kA rated breaking current, complete with motor wound-	1 set

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		spring operating mechanism, shunt closing & opening coils, auxiliary equipment, all in accordance with IEC 62271-100.	
		Single-phase, cast in epoxy resin Current Transformer (CT) all in accordance with IEC 61869-1&2, with five (5) cores with the following characteristics: – I Core: Rated transformation ratio: 600/300/1 A, accuracy class PX for transformer differential & REF protection. – II Core: Rated transformation ratio: 600/300/1 A, accuracy class 5P20/1, minimum rated output of 15 VA for transformer directional over-current protection, earth fault protection, CB failure protection and instrumentation. – III Core: Rated transformation ratio: 600/300/1 A, accuracy class 0.2S, minimum rated output of 10 VA for instruments. – IV Core: Rated transformation ratio: 2500/1250/1A, accuracy class PX for Busbar zone Main protection, – V Core: Rated transformation ratio: 2500/1250/1A, accuracy class PX for Busbar zone Check protection.	3 sets
		Single-phase, single pole insulated, cast in epoxy resin, primary fused, withdrawable type Voltage Transformer (VT), all in accordance with IEC 61869-1&3, with two (2) secondary windings with the following characteristics: – Winding I: Rated transformation ratio: $\frac{33}{\sqrt{3}}/\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 3P for directional over-current protection & instrumentation with appropriate rated output. – Winding II: Rated transformation ratio: $\frac{33}{\sqrt{3}}/\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.2 for instruments with appropriate rated output.	3 sets
		Three-pole Earthing Switch (ES) all in accordance with IEC 62271-102.	1 set
		LV compartment, completely wired, equipped with the following equipment and devices: – Mimic diagram with spring return lockable control switch for circuit breaker (ON/Normal/OFF), indicators for	1 set

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		earthing switches and position indication for CB in "open" and "close", "Service" and "Test" positions. – Lockable control selector switch ("Local/Remote"), All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.	
		Cable compartment suitable for connection of 33 kV cables with copper conductor and XLPE insulation with HV side of transformer. ***Note:*** The exact characteristics of outgoing 33 kV cables to transformer (conductor cross-sectional area, number of single-core cables per phase, etc.) shall be determined in Engineering/Design stage.	1 set
		Three-pole Earthing Switch (ES) all in accordance with IEC 62271-102.	1 set
E1.1.3	Bus-Section Cubicle	33 kV Bus-Section Cubicle/Panel with the following installed equipment:	1 set
		Three-phase busbars for 2500 A rated current.	1 set
		Three-pole, withdrawable (floor-rolling), vacuum type, 33 kV Circuit Breaker (CB), for 2500 A rated current and for 31.5 kA/3s rated breaking current, complete with motor wound-spring operating mechanism, shunt closing & opening coils, auxiliary equipment, all in accordance with IEC 62271-100.	1 set
		Single-phase, cast in epoxy resin Current Transformer (CT) for bus-section I, all in accordance with IEC 61869-1&2, with two (2) cores with the following characteristics: – Core I: Rated transformation ratio: 2500/1250/1 A, accuracy class 5P20, minimum rated output of 15 VA for over-current protection, earth fault protection, CB failure protection. – Core II: Rated transformation ratio: 2500/1250/1A, accuracy class PX for Busbar zone Main protection.	3 sets
		Single-phase, cast in epoxy resin Current Transformer (CT) for bus-section II, all in accordance with IEC 61869-1&2, with two (2) cores with the following characteristics:	3 sets

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		– Core I: Rated transformation ratio: 2500/1250/1 A, accuracy class 0.5, minimum rated output of 10 VA for instrumentation. – Core II: Rated transformation ratio: 2500/1250/1A, accuracy class PX for Busbar zone Main protection.	
		Three phases, three pole insulated, cast in epoxy resin, primary fused, withdrawable type Voltage Transformer (VT) for bus-bar section I & II, all in accordance with IEC 61869-1&3, with one (1) secondary winding with the following characteristics: – Winding I: Rated transformation ratio: $\frac{33}{\sqrt{3}}/\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.5 for instrumentation & synchronization with appropriate rated output.	2set
		Three-pole Earthing Switch (ES) all in accordance with IEC 62271-102 in bus-bar section I and II (Bus coupler and Bus Riser Panels)	2 sets
		LV compartment, completely wired, equipped with the following equipment and devices: – Mimic diagram with spring return lockable control switch for circuit breaker (ON/Normal/OFF), indicators for earthing switches and position indication for CB in "open" and "close", "Service" and "Test" positions. – Lockable control selector switch ("Local/Remote"), All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.	1 set
E1.1.4	33/0.4KV Transformer Cubicle	33 kV Transformer Cubicle/Panel with the following installed equipment per Cubicle:	1 set
		Three-phase busbars for 2500 A rated current.	1 set
		Three-pole, withdrawable (floor-rolling), vacuum type, 33 kV Circuit Breaker (CB), for 2500 A rated current and for 31.5 kA/3 s kA rated breaking current, complete with motor wound-spring operating mechanism, shunt closing & opening	1 set

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		coils, auxiliary equipment, all in accordance with IEC 62271-100.	
		Single-phase, cast in epoxy resin Current Transformer (CT) all in accordance with IEC 61869-1&2, with TWO (2) cores with the following characteristics: – I Core: Rated transformation ratio: x/x depends on contractor design for transformer protection. – II Core: Rated transformation ratio: 2500/1250/1A, accuracy class PX for Busbar zone Main protection, – III Core: Rated transformation ratio: 2500/1250/1A, accuracy class PX for Busbar zone Check protection.	3 sets
		Single-phase, single pole insulated, cast in epoxy resin, primary fused, withdrawable type Voltage Transformer (VT), all in accordance with IEC 61869-1&3, with two (2) secondary windings with the following characteristics: – Winding I: Rated transformation ratio: $\frac{33}{\sqrt{3}}/\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 3P for directional over-current protection & instrumentation with appropriate rated output. – Winding II: Rated transformation ratio: $\frac{33}{\sqrt{3}}/\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.2 for instruments with appropriate rated output.	3 sets
		Three-pole Earthing Switch (ES) all in accordance with IEC 62271-102.	1 set
		LV compartment, completely wired, equipped with the following equipment and devices: – Mimic diagram with spring return lockable control switch for circuit breaker (ON/Normal/OFF), indicators for earthing switches and position indication for CB in "open" and "close", "Service" and "Test" positions. – Lockable control selector switch ("Local/Remote"), All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.	1 set

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		Cable compartment suitable for connection of 33 kV cables with copper conductor and XLPE insulation with LV side of main transformer. ***Note:*** The exact characteristics of incoming 33 kV cables (conductor cross-sectional area, number of single-core cables per phase, etc.) shall be determined in Engineering/Design stage.	1 set
		Three-pole Earthing Switch (ES) all in accordance with IEC 62271-102.	1 set
E2	**33 kV Control, Protection & Metering Equipment**	**33 kV Control, Protection & Metering equipment, comprising of the following panels, equipment & devices:**	
E2.1	Control & Protection Panel for 33 kV Cable Feeder Cubicle	Control & Protection Panel for 33 kV Cable Feeder Cubicle for indoor installation with IP41 degree of mechanical protection, completely wired, with the following equipment and devices: – Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for earthing switches and position indication for CB in "open" and "close" positions with buzzer to indicate discrepancy conditions, – Lockable control selector switch ("Remote/Supervisory"), – Lockable selector switch ("Off/Synchro") with indicating lamp for OFF position, – Digital multi-function meter, – Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare). Alarms list shall be decided during detailed engineering stage. – Auxiliary relays for supervisory control of the CB (50 V DC), – Line Differential Protection relay.	4 sets

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		– Overcurrent protection relay with Earth fault protection, Circuit breaker failure protection. with synchronizing and Synchro-check feature. – Trip circuit supervision relay, – Self-reset trip relay, – Transducers (Programmable Transducers with multi outputs) for supervisory indications as follows: - 3 phase current transducer and three-phase voltage transducer for NEPCO NCC, - 3 phase current transducer and three-phase voltage transducer for another center, All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.	
E2.2	Control & Protection Panel for 33\11 kV Transformer Bay	Control & Protection Panel for 33 kV Transformer Bay for indoor installation with IP41 degree of mechanical protection, completely wired, arranged in two (2) parts/sections (upper and lower section). The upper section of Control & Protection Panel for 33 kV Transformer Bay shall be equipped with the following equipment and devices: – Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for disconnectors and earthing switches with buzzer to indicate discrepancy conditions, – Lockable control selector switch ("Remote/Supervisory"), – Lockable control selector switch ("Synch/off") with indicating lamp for Off position. – Multifunction Digital Meter – Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare), – Auxiliary relays for supervisory control of the circuit breaker (50 V DC),	4 sets

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		– Transducers for supervisory indications. (Programmable Transducers with multi outputs). The lower section of Control & Protection Panel for 33 kV Transformer Bay shall be equipped to provide the following: – Transformer biased differential protection relay with HV Restricted Earth Fault (REF) high impedance protection. – Overcurrent, earth fault and synchro check protection relay. – LV Restricted Earth Fault (REF) high impedance protection relay. – Transformers mechanical (physical) protection voltage operated relays with hand reset indicators flags for the alarms according to Contractor's Design, – Trip circuit supervision relays, – (Electrical / Hand) reset trip relays, All necessary switches, MCBs, auxiliary relays, interposing transformers (if applicable), transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.	
		Note : Regarding the protection of the 11 kV cable for the 33kv/11 kV transformer, in case a low-impedance differential protection scheme is adopted, the protection relay shall be provided by another contractor as a loose item. The Contractor shall be responsible for installing the relay at the NEPCO substation and carrying out all required testing and commissioning works.	
E2.3	Control & Protection Panel for 33\0.4 kV Transformer Bay	Control & Protection Panel for 33 kV Transformer Bay Cubicle for indoor installation with IP41 degree of mechanical protection, completely wired, with the following equipment and devices: – Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for earthing switches and position indication for CB in "Open" and "Close" positions with buzzer to indicate discrepancy conditions, – Lockable Control selector switch ("Remote/Supervisory"),	1 set

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		– Lockable selector switch ("Off/Synchro") with indicating lamp for off position, – Programmable Digital Ammeter and Voltmeter, – Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare) Alarms list shall be decided during detailed engineering stage. – Auxiliary relays for supervisory control of the CB (50 V DC), – The protection of the 33/0.4 kV transformer will be as per the Contractor's design suitable for protecting the transformer; using 33KV fuses or other appropriate protection methods. – Trip circuit supervision relay, – (Electrical / Hand) reset trip relays, – Transformers mechanical (physical) protection voltage operated relays with hand reset indicators flags for the alarms according to Contractor's Design, – Transducers for supervisory indications, All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.	
E2.4	Control & Protection Panel for 33 kV Bus Section Bay	Control & Protection Panel for 33 kV Bus Section Cubicle for indoor installation with IP41 degree of mechanical protection, completely wired, with the following equipment and devices: – Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for earthing switches and position indication for CB in "Open" and "Close" positions with buzzer to indicate discrepancy conditions,	1 set

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		– Lockable Control selector switch ("Remote/Supervisory"), – Lockable selector switch ("Off/Synchro") with indicating lamp for off position, – Two Programmable Digital Ammeter and Voltmeter, – Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare) Alarms list shall be decided during detailed engineering stage. – Auxiliary relays for supervisory control of the CB (50 V DC), – Overcurrent protection relay with Earth fault protection, Circuit breaker failure protection with synchronizing and Synchro-check feature. – Trip circuit supervision relay, – Self-reset trip relay, – Transducers for supervisory indications, All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.	
E2.5	33 kV High Impedance Busbar Protection Panel	33 kV High Impedance Busbar Protection Panel (comprising of two panels) for indoor installation with IP41 degree of mechanical protection, completely wired, with the following equipment and devices: – Three (3) High Impedance Busbar protection relays for Main 1, main 2 & Check Zones, – Hand/Electrical reset trip relays for tripping the required circuits (1 trip relay for each circuit + 2 trip relays for Bus Section + 4 spare trip relays),	1 set

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		– Any necessary test blocks for testing the Busbar protection relays and any alarm relays necessary for remote alarms and indications, – Isolation switches (In & Out of service) for each High Impedance Busbar protection relay with indicating lamps for In & out of service status. – Isolation switches (In & Out of service) to isolate BREAKER FAILURE stage 2 for each zone with indication lamps. – Signaling lamps for each Zone (i.e., Busbar protection operated for each Zone, Busbar protection fail for each Zone, DC healthy, Busbar protection in/out of service for each zone…), – Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare), – Three (3) CT supervision relays, All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme. The panel shall be equipped with four (4) spare (future) circuits, three circuits at each side of the busbar (trip relays, test blocks, open short link.etc.).	
E2.6	Supervisory Control & Telemetering Marshalling Cabinets	Supervisory Control & Telemetering Marshalling Cabinet for indoor installation with IP41 degree of mechanical protection, completely wired, equipped for the following: – four (4) 33 kV feeder circuits, – five (5) 33 kV TR circuits, – One (1) 33 kV bus section circuit, – Four (4) 33 kV spare (future) circuits,	1 set
E2.7	Alarm and Control Station Desk	Alarm and Control Station Desk in 33 kV control room for indoor installation, completely wired, equipped with the following equipment and devices:	1 set

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		- Annunciator with accept, reset and lamp test push buttons with station alarms according to Contractor's Design (with at least 20% spare), - Selector switch for "Substation unattended/Substation attended". The selector switch shall disconnect all audible alarms when in the "Unattended" position. Two (2) pairs of potential free contacts, one pair arranged to close in the "Attended" position and the other pair "Unattended position", shall be wired to the remote control and supervisory marshalling cabinet. A further set of two (2) pairs of contacts (closed with the switch in the "Attended" position) shall be provided as well, - For accept / reset command for acceptable and cancellation of alarms should be controllable from NCC,\ - Common push button to accept all alarms for all annunciators. - Common push button to reset all alarms for all annunciators. - three differentiated audible alarms for trip signal, non-trip signals, and discrepancy alarms. - Temperature and humidity indicator (0-10 mA DC) and range scale for temperature (-20 ºC ÷ 60 ºC) and for humidity (0 ÷ 100%). – A suitable padded, swivel type office chair shall be provided with the work station control desk.	
E2.8	Interface Panel	For termination of control, alarm, and protection circuits between the TR 33\11KV bays (BPS1) and remote end substation with 20% spares. To be equipped with heater, lighting and terminal blocks, etc...) As needed to complete the connection.	1 Set
E3	**Outdoor Equipment**		
E3.1	Current transformer for	Single-phase, oil-insulated, post type Current Transformer (CT), for outdoor installation, complete with supporting steel	4 sets

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
	Main Transformer LV Artificial Neutral Point (33/11 KV)	structure, all in accordance with IEC 61869-1&2, with ONE (1) cores with the following characteristics: – I Core: Rated transformation ratio: 1600/800/1 A, accuracy class PX for transformer LV REF protection, Current Transformer shall be for Insulation Level as per IEC and shall be supplied with all necessary conductors and fittings for connection to the main transformer LV Artificial neutral bushing and to the earthing system and NER.	
E3.2	Neutral Earthing Resistance	Suitable Neutral Earth Resistance for connecting the neutral point in the LV side of 33/11KV transformers. One NER is required to be connected for all transformers. The final design and specifications of this NER is the scope of the Contractor.	1 set
E4	400V LVAC	**400 V AC Equipment, comprising of the following equipment**	1 SET
	400 V AC Distribution Board/Switchgear	400VAC distribution Board/Switchgear	
		400 V AC Distribution Board/Switchgear, metalclad, free-standing type, for indoor installation with IP41 degree of mechanical protection, with two (2) busbar sections for suitable rated current and for 40 kA rated short-time (1 s) withstand current, completely wired, with alarm fascia/display, with all cable glands for cables entering from the bottom side, with interlocking specified in Particular Technical Specifications for and shown on the Tender Drawing , with the following installed equipment:	1 set
		Automatic Transfer Switch (ATS) with all necessary switching and control equipment (incoming supply automatic changeover contactor mechanical and electrical interlock) for quickly and reliably switching between power supply sources from two (2) supplies.	1 set
		Main incoming Circuit Breaker for main incoming power supplies from the Earthing & Auxiliary transformers, for suitable rated current. Main incoming Circuit Breakers shall be mutually interlocked with Bus section Circuit Breaker as per Tender technical specification.	2 sets

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		Stand-by incoming Circuit Breaker for stand-by incoming power supply, interlocked with Main incoming Circuit Breaker & Bus section Circuit Breaker as per Tender technical specification and Drawing.	1 set
		Bus section Circuit Breaker for suitable rated current, interlocked with Main incoming Circuit Breakers & Stand-by incoming Circuit Breaker as per Tender technical specification and Drawing.	1 set
		Incoming ammeter scaled 0 ÷ xx A with phase selector switch.	2 sets
		Bus section ammeter scaled 0 ÷ xx A with phase selector switch	1 set
		Incoming voltmeter scaled 0 ÷ 420 V with selector switch.	2 sets.
		Incoming 3-phase kWh meter.	2 sets
		Moulded Case Circuit Breakers (MCCBs) of adequate ratings for all substation equipment/consumers according to the Contractors Design.	1 set
		Miniature Circuit Breakers (MCBs) of adequate ratings for all substation equipment/consumers according to the Contractors Design.	1 set
		One (1) spare MCCB of each type/rating.	1 set
		One (1) spare MCB of each type/rating.	1 set
		Note: the rated current for the LVAC SWG shall be determined by the calculations and design of the contractor.	
E5	**110 V DC Equipment for Substation -New substation**	**110 V DC Equipment, comprising of the following equipment:**	**1 set**
E5.1	110 V DC Batteries	High-performance, Nickel-Cadmium (Ni-Cd), vented (open) or semi-sealed type, pocket plate or sintered plate, housed in a totally enclosed polystyrene translucent plastic containers. Each battery shall have capacity to meet the	2 sets

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		total requirements of the actual complete equipment to be supplied for substation, plus 50% spare capacity, but not less than 450 Ah/5 h. Batteries shall be supplied complete with adequate battery racks/stands and accessories stated in Particular Technical Specifications.	
E5.2	Fuse Boxes	Wall mounted fuse box with double-pole fuses of adequate rating.	2 sets
E5.3	110 V DC Battery Charger – Rectifier	110 V DC Battery Charger – Rectifier Panel, free-standing type, for indoor installation with IP41 degree of mechanical protection, completely wired, with the following installed equipment per Panel:	2 sets
		110 V Battery Charger – Rectifier, with float & boost charging modes, with rated capacity according to Contractor's calculation, but not less than 150 A.	1 set
		Incoming Circuit Breaker of adequate rating according to the Contractors Design.	1 set
		Voltage dropping diodes of adequate rating.	1 set
		Outgoing Circuit Breaker of adequate rating according to the Contractors Design.	1 set
		Measuring instruments & indicators according to Particular Technical Specifications.	1 set
E5.4	110 V DC Distribution Board	110 V DC Distribution Board, free-standing type, for indoor installation with IP41 degree of mechanical protection, completely wired, with the following installed equipment:	1 set
		Incoming Circuit Breaker of adequate rating according to the Contractors Design.	2 sets
		Bus Section Circuit Breaker of adequate rating according to the Contractors Design.	1 set
		Double-pole Miniature Circuit Breakers (MCBs) of adequate ratings with alarm contact for all substation equipment/consumers according to the Contractors Design.	1 set
		Incoming Voltmeter	2 sets

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		Incoming Ammeter	2 sets
		Earth fault relay	2 sets
		One (1) spare MCB of each type/rating.	1 set
		Note: interlocking between 110 V DC switchboards shall be provided with electrical type and hard-wired interlocks.	
E6	**Cables and Cable Accessories**	**Cables and Cable Accessories, comprising of the following equipment:**	
E6.1	cables between LV artificial neutral point CT and NER	cable (single phase) with copper conductor and XLPE insulation, from the current transformer for main transformer LV artificial neutral point to the NER cubicle, including cable terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design.	4 sets
E6.2	Power, Control and signaling cables	AC power from 33/0.4 KV TR to LVAC, AC & DC cables Control, signaling and measuring cables for proper functioning of complete substation, including all accessories, with ratings and other characteristics according to the Contractors Design. (SWA)	1 set
E6.3	33KV cables from BPS1 SWG to 33/11KV Transformers	33 kV cables (3 - phase circuits) with copper conductor and XLPE insulation, from BPS1 SWG to 33/11KV Transformers, including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design.	4 sets
E6.4	33KV cables from BPS1 SWG to 33/0.4KV Transformer	33 kV cables (3 - phase circuits) with copper conductor and XLPE insulation, from BPS1 SWG to 33/0.4KV Transformer, including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design. Design of transformer 33kV cable box shall be coordinated by contractor.	1 set
E6.5	Standby Diesel Generator for BPS01 SS	**Automatic, Mains Failure, Standby Diesel Generator** Complete with all fuel filling facilities, storage tanks, generator circuit breaker, control board, batteries, power cable to connections to the LVAC Services Board, also it shall be under an appropriate enclosure with it is auxiliary equipment keeping protected from the direct sun.	**1 set**

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		Installation will be safe from accidental trips. Generator is to be installed in the dedicated building; however, noise levels will be below those defined OSHA standards. **Note: the rated power for the Diesel Generator (Not less than 200 kVA) shall be determined by the contractor, with spare of 20%.**	
E7	**Substation Earthing System**	**Substation Earthing System, comprising of the following equipment and materials:**	**1 set**
		Stranded copper (Cu) conductor for substation earthing grid, with characteristics and quantities according to the Contractors Design, approved by Client.	1 set
		Copper (Cu) earthing rods with preferred dimensions of Ø 15 mm & 3.5 m length, complete with clamps.	1 set
		Joints of stranded Cu conductor of different sizes. The joints shall be exothermic CADWELD.	1 set
		Earthing leads for connection of equipment metal parts (HV apparatuses metal bases, operating mechanisms cubicles, terminal boxes, etc.) and earthing grid conductor.	1 set
		Note: The exact quantities and characteristics of substation earthing system equipment & materials shall be determined according to the Contractors Design and earthing system calculation, approved by Client. (earthing system coverage shall include all building inside SS)	
E8	**Lightning Protection System**	**Lightning Protection System, comprising of the all required equipments to cover the substation**	**1 set**
		Note: – The exact quantity & height of Lightning Mast and quantities & characteristics of other lighting protection system equipment & materials shall be determined according to the Contractors Design	

A/E -AAWDCP 400/132/33KV SUBSTATION (33KV SWG'S)- BPS01 LOCATION			
List No.	**Name of Goods**	**Brief Description**	**Quantity**
		and lightning protection calculation, approved by Client. The system shall cover the buildings inside substation (separate system can accepted upon NEPCO approval)	

	Scope of work		
E9	**33/11KV 30MVA TRANSFORMER FOR BPS1 33/11KV S/S**		
E9.1	**33/11KV 30MVA TRANSFORMER**	Three-phase, two-winding, oil immersed transformer, for outdoor installation with rated output of 30 MVA for ONAN type of cooling, rated transformation ratio of 33/11 kV with on-load tap changer on HV side (+4×1.25%/-12×1.25%), vector group Dyn1, Z% 10%, all in accordance with IEC 60076. **33 KV terminals shall be inside cable box (Air insulated), provided on HV side of transformer, suitable for transformer cable termination connection, in accordance with relevant IEC standards.** **11 kV line terminals shall be located inside an air-insulated cable box provided on the LV side of the transformer, suitable for connection of 11 kV cables. The number of cables runs per phase shall be determined during the engineering stage.** Ring Type CTs shall be mounted in 11KV side for each phase (inside the 11KV cable box) with the following specifications: Single-phase, Ring Type Current Transformer (CT), all in accordance with IEC 61869-1&2 and relevant IEC standards, with two (2) cores with the following characteristics: – I Core: Rated transformation ratio: 1600/800/1 A, accuracy class PX for differential protection. – II core: Rated transformation ratio: 1600/800/1 A, accuracy class PX for line differential protection. **Neutral terminal shall be at air bushing suitable for overhead conductor connection.** **Note: The Particular Technical Specification for the 132 kV Transformer shall apply to this transformer, wherever applicable.**	**4 sets**

	Scope of work (transformer for auxiliary SS service)		
E10	**33/0.4KV 200KVA TRANSFORMER FOR BPS1 33/11KV S/S**		
E10.1	**33/0.4KV 200KVA TRANSFORMER**	Three-phase, two-winding, oil immersed transformer, for outdoor installation with rated output of at least min. 200 kVA for ONAN type of cooling (The rated ETR according to actual SS load), rated transformation ratio of 33/0.4 kV with off-load tap changer, vector group Dyn11, all in accordance with IEC 60076**.** **33KV terminals shall be inside cable box (Air insulated), provided on HV side of transformer, suitable for transformer cable termination connection, in accordance with relevant IEC standards.** **0.4KV line terminals shall be inside cable box (air insulated) provided on LV side of transformer, suitable for connection of 0.4KV cables.** **Neutral terminal shall be at air bushing suitable for overhead conductor connection.** **Shall cover the demand load of BPS01 Ss.**	**1 set**