

Technical Specification & Scope of Work

1. Technical Specification for Item No. 1:

This includes supply, Installation, Testing & Commissioning of Four Pole Structure for purpose of installation of CT& PT combined including metering panel of PGVCL.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

For Four Pole Structure:

(A) Supply: The work supply and erection of Four Pole structure for 11KV HT overhead line includes supply of following material with mentioned specifications: -

- (i) This includes supply at site PGVCL/ UGVCL/ DGVCL/ MGVCL approved vendor or make 4 nos. 11mtr long RSJ pole of 100mmx110mmx8mm thickness as directed by Engineer-in-charge.
- (ii) 2.2mtr long ISMC channel 8 nos. of size 75mm x 40mm x 7.3mm with G.I. hardware such as nut-bolts, clamps etc.
- (iii) 2.2mtr long M.S. angle cross arm 24 nos. of size 50mm x 50mm x 10mm with G.I. hardware.

(B) Erection of Poles:

The pit of pole shall be excavated in all kind of soil of size 0.75mtr x 0.75mtr and 2.0 mtr deep. One-sixth length of pole shall be planted inside the ground. 1:3:6 PCC base layer of thickness 150-mm shall be provided at the bottom of the pole pit. Balance portion of the pit shall be backfilled with mixture of c.c. ratio 1:3:6 using cement, sand and 6 to 20mm graded metal chips as coarse aggregate and to prepare cylindrical shape muffing 750mm above ground level duly plastered. This includes painting of poles with one coat of metal primer & two coats of silver paint (Supply of paint is in the scope of contractor), The excavated stuff shall be spread in lower level area as directed. The contractor has to arrange all required raw material cement, sand, metal, water, labours, tools tackles, crane etc. at his own cost. After erection of pole curing shall be done for bonding of cement.

The complete layout drawing of FP Structure including earthing arrangement shall be prepared as per IS by the Contractor and shall got approved from Engineer-in-Charge before commencement of work. The FP structure shall be erected as per approved drawing. The work includes all labour & material as directed by Engineer-in-Charge.

2. Technical Specification for Item No. 2:

This includes Complete dismantling of existing Four Pole Structure including its accessories. All the items dismantled have to be minutely recorded and handed over to the main store of DPT or as directed.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipment's is required to complete the job and as directed by Engineer-In-Charge.

3. Technical Specification for Item No. 3:

This includes Complete dismantling of 11kV overhead line and poles with the relevant accessories. All the items dismantled have to be minutely recorded and handed over to the substation, Gopalpuri, DPA or as directed.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

4. Technical Specification for Item No. 4:

This includes supply at site 11/11KV grade, 3 core X 300 sq.mm, Aluminum conductor, XLPE insulated armoured cable confirming to IS: 7098 (Part-II) 1985 with up to date amendments and of approved make with ISI mark. The manufacturer shall produce TYPE TEST certificate with similar size of cable, which shall not be more than 3 years old. The cable shall have marking/embossing at the interval of every meter showing its progressive length. During the cable inspection, the manufacturer shall show the relevant ROUTINE TESTS to inspecting authority or otherwise the manufacturer shall produce the routine test certificate during supply of cable at site.

The rate shall inclusive of transportation and unloading at site of work etc.

5. Technical Specification for Item No. 5:

(a) Through Hard /Soft soil excavation:

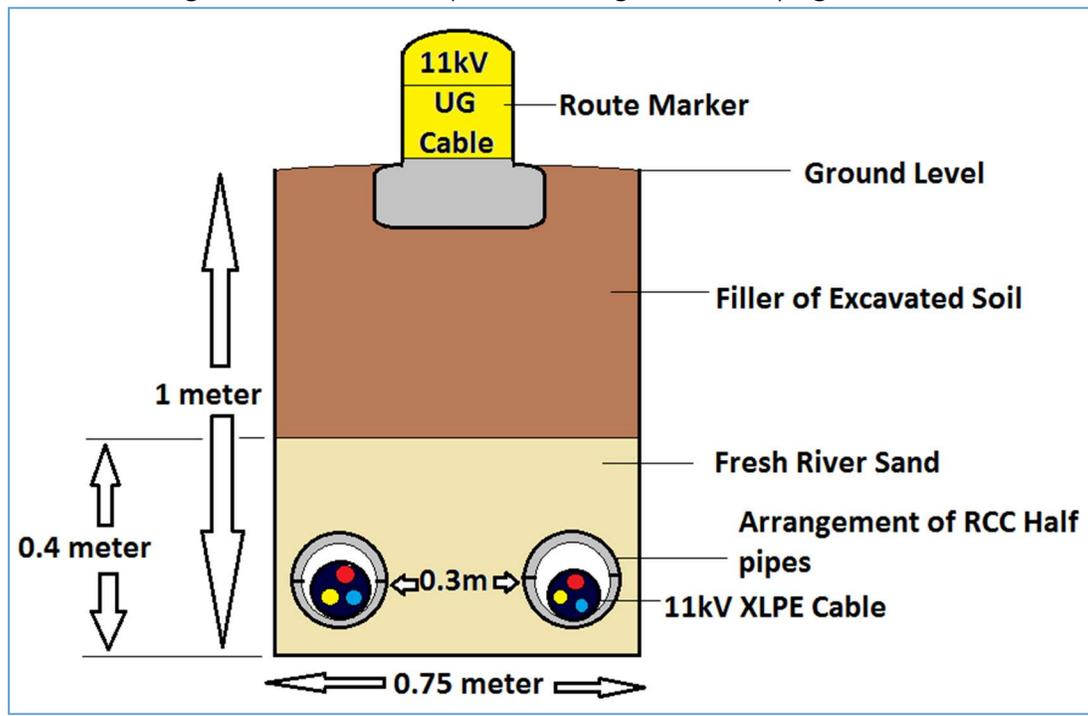
This includes laying of double circuit 3 core x 185 Sq.mm HT armored aluminum Conductor XLPE Cable of 11KV Grade (excluding supply of cable) through excavation of trench 0.75 meter wide and 1 meter deep in soft/hard soil. Each cable should be placed inside RCC Half Round Pipe of 6" inner Dia and 1 Meter length and such RCC Half Round Pipes must be placed in such a fashion so as to provide support under the cable with one half and covering over the cable with the other half. The same trench would be used to place two circuits (cables) side by side in horizontal fashion and these cables would run though two RCC pipes

individually. The minimum distance between such RCC pipe throughout the route length should be 0.3m.

The bed of 50mm of river sand shall be provided in the bottom of the excavated trench. The RCC Pipe shall be laid over the bed of river sand. This includes filling of gaps by fresh river sand and filling the trench upto atleast 400mm height from bottom by fresh river sand. The remaining filling of the trench shall be done with the excavated stuff & should be watered and rammed properly to its original position. The excess excavated stuff shall be disposed off from the Site of work and spread in low lying areas as directed by Engineer in Charge or his nominee.

This also includes supply and fixing of both side Indoor/outdoor end termination kit of approved make. Also, providing & fixing of heat shrinkable straight through joints of relevant size of approved make if the laying of cable shall be more than standard drum length. This includes all labour and material as directed by Engineer-in-Charge. Such end termination kits & cable joints shall be under the scope of work of the contractor at no extra cost or obligation from DPA. Such cable end termination & joining work is completely to be done by the contractor at his own cost.

The below figure indicates the expected arrangement of laying of cables:



CABLE ROUTE AND JOINT MARKERS

- Permanent means of indicating the positions of joints on site should be provided. During the course of permanent reinstatement cable and joint markers, should be laid directly above the route of the cable and the position of the joint respectively.

- Wherever it is not possible to place the marker directly over the cable route or joint the marker should be suitably placed near the cable route or joint on which the distance of the cable route or joint at right angles to and parallel to the marker should be clearly indicated.
- The site requirement & position of fixing the markers will be decided by the Engineer-In-charge or his nominee.
- The type of route marker & letters to be written on the route marker will be decided while execution by the Engineer-in-charge.
- Route marker should be visible and the pedestal should be buried underneath the ground firmly by providing CC foundation.
- Route Marker of C.C. (1:2:4) 150x150x750 (in mm) Concrete Stone (DPT Mark with Approved Yellow Color Embedded in Earth atleast 300 mm below the ground Level at Approx. Distance 10 Meter or as directed by EIC

Cable laying, shall include the route marker, cable tagging, dressing, removing the old unused cable from the RCC Trench, appropriate size of glands & ferrule work as per requirement etc.

(b) Through DWC HDPE for Road/Railway/RCC crossing

This includes Laying 3 core x 185 Sq.mm 11kV XLPE cable by putting suitable diameter HDPE pipe, through road/Rail/RCC crossing. If the Road/RCC crossing length more than length of HDPE seamless pipe, then the firm shall join pipes and make a strong and trouble free connection so that pushing and pulling of cable within such pipes is unaffected and fuss free & then lay across the Road crossing. Single cable shall be passed through one pipe, the excavated stuff shall be disposed off from the Site of work and spread in low laying area. After that re-filling with Fresh River sand cushioning & 300mm CC/RMC work must be done on by proper curing or its restoration to original position. In case of Rail Crossing, firm shall put earthing across rail track, both end, their own cost as per IE rule & act. The HDPE pipe should be laid using Horizontal Boring for all the Road/Railway/RCC crossings.

Cable lying, which shall include the route marker, cable tagging, dressing, removing the old unused cable from the RCC Trench, appropriate size of glands & ferrule work as per requirement etc.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

6. Technical Specification for Item No. 6:

This includes supply at site 1.1 KV grade, 4 core aluminum conductor, XLPE insulated armoured cable conforming to IS: 7098 (Part-I) 1985 with up to date amendments and of approved make with ISI mark. The manufacturer shall produce TYPE TEST certificate with similar size of cable,

which shall not be more than 3 years old. The cable shall have marking/embossing at the interval of every meter showing its progressive length. The manufacturer's routine test certificate shall produce with supply of cable at site.

The rate shall inclusive of transportation and unloading at site of work etc.

7. Technical Specification for Item No. 7:

This includes laying of cable through following type.

(a) Hard/Soft Soil:

This includes laying of single length cables up to 4.0 core x 50 Sq.mm LT armoured aluminum Conductor XLPE Cable of 1.1KV Grade (excluding supply of cable) through excavation in soft/hard soil. The trench to be excavated 0.3 Mtr. wide 0.6 Mtr. deep. The bed of 50mm of river sand shall be provided in the bottom of the excavated trench. The cable shall be laid over the bed of river sand. The cable shall be protected by providing and laying bricks both the sides lengthwise parallel to the cable & the gaps shall be filled with river sand. The cable shall be covered by keeping two bricks over the side bricks. The filling of the trench shall be done with the excavated stuff & should be watered and rammed properly to its original position. The excess excavated stuff shall be disposed off from the Site of work and spreader in low laying area as directed.

The contractor shall provide heat shrinkable straight through joint of relevant size of approved make if the laying of cable shall be more than standard drum length. This includes all labour and material as directed by Engineer-in-Charge.

(b) Road/RCC Crossing:

This includes laying of single length cable up to 4.0 core x 50 Sq.mm LT armoured aluminum Conductor XLPE Cable of 1.1KV Grade (excluding supply of cable) through road crossing in the trench to be excavated 0.3 Mtr wide 1.0 Mtr deep. by providing of 1 lengths of RCC NP2 Class pipe of 150mm diameter, in which cable shall be passed through. The excavated stuff shall be disposed off from the Site of work and spreaded in low laying area as directed. The filling of the trench shall be done with material in layers of 20 cm thickness and each layer should be watered and rammed properly and road position shall be properly re-done to its original position with all material and labour as directed by Engineer- in-charge.

(c) On wall through saddles & clamps:

This includes laying of supplied single length cable up to 4.0 core x 50 Sq.mm LT armoured aluminum Conductor XLPE Cable of 1.1KV Grade (excluding supply of cable) on existing wall/cement structure. The G.I. Saddle set with base & Clamps shall be provided of suitable size (with respect to cable outer diameter) made from G.I. flat 25 x 3 mm with G.I. Nut bolts/heavy duty screws for clamping. The base shall be fixed rigidly on wall/cement

structure through cemented wooden gutties at 0.50 mtr. Intervals & the cable shall be laid on 3mm thick G.I. saddle base on wall/cement structure and clamped rigidly by G.I. screwing/bolting of clamps. The work includes with all materials and labour as directed by Engineer-in-charge.

(d) In GI Class-B Pipe:

This includes laying of single length cable up to 4.0 core x 50 Sq.mm LT armoured aluminum Conductor XLPE Cable of 1.1KV Grade (excluding supply of cable) in class-B G.I. Pipe of suitable size (with respect to cable outer diameter) on existing Wall/DP/Four Pole Structure/steel Structure/Street Light Pole with G.I. base & Clamps of suitable size made from G.I. flat 25 x 3 mm including G.I. Nut bolts of suitable size at 0.50 mtr. Intervals. The work includes with all materials and labour as directed by Engineer-in-charge

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

8. Technical Specification for Item No. 8:

(a) 15 Way (2 I/C, 1 Bus Coupler, 12 (O/G) LT Distribution Panel:

This includes design, supply at site 15 ways, 1000 Amps, LT Distribution cubical Panel suitable for 415 Volts, 3 ϕ , 4 wires, 50 Hz. AC supply system including all switchgears and internal wiring.

The panel shall be dust and vermin proof, free standing, compartmentalized made from 14 SWG, indoor type, and fabricated from CRCA sheet on robust angle iron frame painted with two coats of Zink rich primer paint and two coats of colour Pigmented epoxy paint shade NO.631 of IS: 5 before painting the panel, the surface treatment shall be carried out by 7-tank process including degreasing etc. The panel shall be painted with SIEMENS grey paint.

LT distribution panel shall have 3 nos. of The busbars shall be made of high conductivity aluminium alloy of E91E grade, Bus bar joints shall be complete with high tensile steel bolt and washers and nuts bus bar of 1000 Amp (Main bus on Incoming and 800 Amps for each outgoing feeder with half of the size for Neutral Bus) rating for three Phases and Half the size of Neutral including and PVC sleeving. All the bus bar shall be supported on hylem/epoxy insulator. The Bakelite sheet of 12 mm (Minimum) thickness shall be provided in side enclosure of panel and wherever it is found necessary under relevant IS specification and IER -1956 rules.

The panel shall be provided with metallic engraved/Radium film labels on front for identification of Incoming & Outgoing feeders.

The neoprene gaskets shall be provided on the periphery of the doors of all feeders.

The sleeved electrolytic copper busbars with epoxy insulators with Bakelite support and separators shall be provided with colour code.

The panel shall be complete in all respect with cable glands, lugs for incoming & outgoing cables and also shall be provided with 2 nos. of earthing terminals.

The panel shall be comprised with following accessories: -

1). INCOMER FEEDERS

a) Main Incomer Feeders (2 nos.).

The Main Incomer Feeder shall be provided with 2 nos. 800 Amps. 30 KA, 415 Volts Four Pole – MDO (Draw out type) ACBs (Air Circuit Breaker) with Microprocessor released over current, Short circuit and Earth fault relay for each feeder, with Shunt Trip & under Voltage Coil.

The Digital Multi-function Meter 1 No. for each feeder with LCD display shall be provided with parameters like KWH, MD, Voltages of each phase, Line current for each Phase, P.F of each Phase, P.F average, Instantaneous kW, Frequency & Date & Time.

The LED Indication lamps 6 nos. for R, Y, B, ON, OFF and trip indication shall be provided on each feeder.

The 3 nos. CTs having ratio of 800/5 Amps, class-1 tape wound, shall be provided for metering on each feeder and 4 nos. control fuses / neutral links are to be provided with each incomer & the control wiring shall be done with copper wire. Also ELR (Earth Leakage Relay with CBCT to in provided in both Incomer.

The Incomers shall be mechanically and electrically interlocked.

b) Bus coupler Feeder: 1 No.

The Bus Coupler shall be provided with 1 nos. 800 Amps, 30 KA. 415 Volts Four Pole – MDO (Draw out type) ACBs (Air Circuit Breaker) with Static Release Over current, Short circuit and instantaneous relay, with Shunt Trip & Under Voltage Coil.

The LED Indication lamps 3 nos. for ON, OFF and trip indication shall be provided on Bus Coupler feeder.

Control fuses and neutral links are to be provided with Bus Coupler & the control wiring shall be done with copper wire.

The Bus Coupler shall be mechanically and electrically interlocked.

1) **OUTGOING FEEDERS (12 Nos.):**

This type of Outgoing Feeders shall be provided with following.

- 02 nos. 400 Amps Panel Mounted SDFU (Switch Disconnecter Fuse Unit) suitable for 440V AC Application shall be with extended operating handle and door interlock & Padlock facility.
- 05 nos. 200 Amps Panel Mounted SDFU (Switch Disconnecter Fuse Unit) suitable for 440V AC Application shall be with extended operating handle and door interlock & Padlock facility.
- 05 nos. 250 Amps, 415 Volts, 10 KA breaking capacity Panel Mounted MCCB Microprocessor based for each feeder with extended rotary handle.

The LED Indication lamp 1 no. for ON indication shall be provided on each feeder. The control wiring & power wiring shall be done with cooper wire properly and the power wiring shall be brought up to the Power terminal block of suitable ampere capacity.

The panel shall be design, fabricated and supplied from manufactures having CPRI/ERDA type test certificate of similar capacity for not less than 3 years. Before manufacturing of the panel the drawing shall be submitted to DPA for approval All the material shall be used as per approved make list of DPA.

(b) **12 Way (2 I/C, 1 Bus Coupler, 9 O/G) LT Distribution Panel:**

This includes design, supply at site 15 ways, 1000 Amps, LT Distribution cubical Panel suitable for 415 Volts, 3 ϕ , 4 wires, 50 Hz. AC supply system including all switchgears and internal wiring.

The panel shall be dust and vermin proof, free standing, compartmentalized made from 14 SWG, indoor type, and fabricated from CRCA sheet on robust angle iron frame painted with two coats of Zink rich primer paint and two coats of colour Pigmented epoxy paint shade NO.631 of IS: 5 before painting the panel, the surface treatment shall be carried out by 7-tank process including degreasing etc. The panel shall be painted with SIEMENS grey paint.

LT distribution panel shall have 3 nos. of The busbars shall be made of high conductivity aluminium alloy of E91E grade, Bus bar joints shall be complete with high tensile steel bolt and washers and nuts bus bar of 1000 Amp (Main bus on Incoming and 800 Amps for each outgoing feeder with half of the size for Neutral Bus) rating for three Phases and

Half the size of Neutral including and PVC sleeving. All the bus bar shall be supported on hylem/epoxy insulator. The Bakelite sheet of 12 mm (Minimum) thickness shall be provided in side enclosure of panel and wherever it is found necessary under relevant IS specification and IER -1956 rules.

The panel shall be provided with metallic engraved/Radium film labels on front for identification of Incoming & Outgoing feeders.

The neoprene gaskets shall be provided on the periphery of the doors of all feeders.

The sleeved electrolytic copper busbars with epoxy insulators with Bakelite support and separators shall be provided with colour code.

The panel shall be complete in all respect with cable glands, lugs for incoming & outgoing cables and also shall be provided with 2 nos. of earthing terminals.

The panel shall be comprised with following accessories: -

1). INCOMER FEEDERS

c) Main Incomer Feeders (2 nos.).

The Main Incomer Feeder shall be provided with 2 nos. 800 Amps. 30 KA, 415 Volts Four Pole – MDO (Draw out type) ACBs (Air Circuit Breaker) with Microprocessor released over current, Short circuit and Earth fault relay for each feeder, with Shunt Trip & under Voltage Coil.

The Digital Multi-function Meter 1 No. for each feeder with LCD display shall be provided with parameters like KWH, MD, Voltages of each phase, Line current for each Phase, P.F of each Phase, P.F average, Instantaneous kW, Frequency & Date & Time.

The LED Indication lamps 6 nos. for R, Y, B, ON, OFF and trip indication shall be provided on each feeder.

The 3 nos. CTs having ratio of 800/5 Amps, class-1 tape wound, shall be provided for metering on each feeder and 4 nos. control fuses / neutral links are to be provided with each incomer & the control wiring shall be done with copper wire. Also ELR (Earth Leakage Relay with CBCT to in provided in both Incomer.

The Incomers shall be mechanically and electrically interlocked.

d) Bus coupler Feeder: 1 No.

The Bus Coupler shall be provided with 1 nos. 800 Amps, 30 KA. 415 Volts Four Pole – MDO (Draw out type) ACBs (Air Circuit Breaker) with Static Release Over current, Short circuit and instantaneous relay, with Shunt Trip & Under Voltage Coil.

The LED Indication lamps 3 nos. for ON, OFF and trip indication shall be provided on Bus Coupler feeder.

Control fuses and neutral links are to be provided with Bus Coupler & the control wiring shall be done with copper wire.

The Bus Coupler shall be mechanically and electrically interlocked.

2) OUTGOING FEEDERS (12 Nos.):

This type of Outgoing Feeders shall be provided with following.

- 02 nos. 400 Amps Panel Mounted SDFU (Switch Disconnecter Fuse Unit) suitable for 440V AC Application shall be with extended operating handle and door interlock & Padlock facility.
- 02 nos. 200 Amps Panel Mounted SDFU (Switch Disconnecter Fuse Unit) suitable for 440V AC Application shall be with extended operating handle and door interlock & Padlock facility.
- 05 nos. 250 Amps, 415 Volts, 10 KA breaking capacity Panel Mounted MCCB Microprocessor based for each feeder with extended rotary handle.

The LED Indication lamp 1 no. for ON indication shall be provided on each feeder. The control wiring & power wiring shall be done with copper wire properly and the power wiring shall be brought up to the Power terminal block of suitable ampere capacity.

The panel shall be design, fabricated and supplied from manufactures having CPRI/ERDA type test certificate of similar capacity for not less than 3 years. Before manufacturing of the panel the drawing shall be submitted to DPA for approval All the material shall be used as per approved make list of DPA.

The rate shall inclusive of transportation and unloading at site of work etc.

9. Technical Specification for Item No. 9:

This works includes preparation of foundation and installation, Testing & commissioning, Termination of cable in supplied LT Distribution panel of 15 ways & 12 ways at various location

S/s or as per directed by EIC.

Distribution board shall be equipped with base frames made of structural steel sections along with necessary mounting hardware required for bolting/welding down the base frame to the foundation. The contractor will provide plate in the concrete floor. Floor finishing will be done at a later date, hence door/module door/removable covers shall be suitably placed so that finished floor does not obstruct the movement of such doors/covers etc.

If underground trench is not available in any substation then contractor has to prepare MS platform using suitable size of C Channel, MS Angle, MS strips etc. platform shall be 800 to 1000 mm above the ground level so that cable can easily bend & terminate in the RMUs. About 1 to 1.25 meter of platform also be made at front side to RMU panel for operation and maintenance of RMUs.

All alignment, leveling, grouting, anchoring, adjustments shall be carried out in accordance with manufacturer's instruction and/or as directed by the engineer-in-charge. All connections in distribution panel shall be completed, checked and adjusted to ensure safety and satisfactory operation of the equipment. After installation of Distribution Panel testing and commissioning, Termination, Jointing the cable shall be done as directed by Engineer in charge, material shall be used as per approved make list DPA. same should be deposited in Store as directed by EIC.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

10. Technical Specification for Item No. 10:

(a) This includes Supply of 9 mtr GI Octagonal Pole of approved make top dia. 70mm, Bottom dia. 155 mm and base plate 16mm thick having 4mm thickness along with 4 Nos. of J type foundation bolts (Tension bolt) of size 20 mm dia and 750 mm long with 3 Nos. of nuts and 2 Nos. spring and flat washers in each, with Single arm bracket 1500mm length for mounting the light fittings. The pole shall be GI hot dipped galvanized with 80microns coating. This also includes supply and fixing of 140-150 W cool white LED street light fitting with IP 66 of approved make with each pole.

The rate shall inclusive of transportation and unloading at site of work etc.

(b) This includes installation, testing & commissioning of each pole on RCC foundation including the cost of foundation, foundation bolts, excavation & back filling and Required T&P complete in all respect. After the erection of pole fixing the lighting fixtures and its aiming is in the scope of the contractor.

The work includes all labour & material, tools & tackles, transportation to & from site,

loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

11. Technical Specification for Item No. 11:

- (a) This includes Complete dismantling & removal of tubular pole with dome light and relevant accessories. Before dismantling & removal of pole the dome light shall be removed from each pole in such a way that same shall not be get damaged and can be reused. Also, in the same way the tubular pole shall be removed so that same can be used in future if required. All the items dismantled have to be minutely recorded and handed over to the substation, Gopalpuri, DPA or as directed.
- (b) This includes Complete dismantling & removal of PSC pole with overhead conductor & street light including relevant accessories. Before dismantling & removal of PSC Pole the conductor & street light shall be removed from each pole in such a way that same shall not be get damaged and can be reused. Also, in the same way the tubular pole shall be removed so that same can be used in future if required. All the items dismantled have to be minutely recorded and handed over to the substation, Gopalpuri, DPA or as directed.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

12. Technical Specification for Item No. 12:

High Mast Specification

The work includes design, supply at site and erection, testing & commissioning of 20 M high mast flood lighting towers, including the installation, testing and commissioning of LED cool white flood light and other electrical accessories, arrangement for raising and lowering the lights during maintenance.

APPLICABLE STANDARDS:

The following shall be the Reference Standards for the loading of the high mast:

BS Code of Practice, CP-3, Gradient of wind related to height Chapter-V,
BS 4360 Grades of MS Plates
BS 5135 Welding
BD 729 Galvanising
Technical Report (TR) No.7 – 1996 Specification for Mast and Foundation.
IS 875 (Pt-III) 1987 Code of Practice for Design Loads for structure

TECHNICAL SPECIFICATIONS HIGH MAST

Structure The High mast shall be of continuously tapered, polygonal cross section, 20 sided or as per proven design, presenting a pleasing appearance and shall be based on proven In-Tension design conforming to standards, to give an assured performance and reliable service. The mast height shall be 20 meters, with minimum diameters as per proven design. Minimum plate thickness of bottom section shall be 6 mm. and other sections 5 mm. The PCD of the mast flange shall be minimum 740 mm. or as per proven design. The structure shall be suitable for wind loading as per IS-875, part-3, 1987 or relevant to site condition. Essentially mast should be capable of withstanding the 3-second gust of 55 m/sec. The factor of safety for wind load shall be 1.25 and for other loads 1.15.

Construction:

The mast shall be capable of safely withstanding the strong winds prevailing at site. The deflection at the top during heavy storm periods shall therefore be considered in the design and the mast designed in such way that the above deflection during worst periods is kept to a minimum value. The mast shall be fabricated from special steel plates, conforming to BS- EN10-025, cut & folded to form a polygonal section as stated above and shall be telescopically jointed & fillets welded. The welding shall be in accordance with BS:5135. The procedural weld geometry and the workmanship shall be exhaustively tested on the completed welds. The 20-meter size mast shall be delivered in sections and shall be jointed of the entire section. The base flange shall be provided with supplementary gussets between the bolt holes to ensure elimination of helical stress concentration. For the environmental protection of the mast, the entire fabricated mast shall be hot dip galvanized, internally & externally, having a uniform thickness of 65 microns.

Door Opening:

An adequate door opening shall be provided at the base of the mast and the opening shall be such that it permits clear access to equipment like winches, cables, plug and socket, etc. and also facilitate easy removal of the winch. The door opening shall be complete with a close fitting, vandal resistant, weather proof door, provided with a heavy duty double internal lock with special paddle key. The door opening shall be carefully designed and reinforced with welded steel section, so that the mast section at the base shall be unaffected and undue buckling of the cut portion is prevented.

Dynamic Loading for the Mast:

The mast structure shall be suitable to sustain an assumed maximum reaction arising from a wind speed as per IS 875 and shall be measured at a height of 10 meters above ground level.

LANTERN CARRIAGE

Fabrication

A fabricated Lantern Carriage shall be provided for fixing and holding the flood light LED fitting. It shall be suitable for symmetric & asymmetric loading as per the requirement of Schedule-B. The Lantern Carriage shall be of special design and shall be of steel tube

construction, the tubes acting as conduits for wires, with holes fully protected by grommets. The Lantern Carriage shall be so designed and fabricated to hold the required number of LED floodlight fittings and junction boxes and also to have a perfect self-balance. The 360° (Inner & Outer Page 35 of 56 Rings) Lantern Carriage shall be fabricated in two halves and joined by bolted flanges with stainless steel bolts and plastic lock type stainless steel nuts to enable easy installation or removal from the erected mast. The inner lining of the carriage shall be provided with protective PVC arrangement, so that no damage is caused to the surface of the mast during the raising and lowering operations of the carriage. The entire Lantern Carriage shall be hot dip galvanized after fabrication. For raise & lower, a suitable Winch Arrangement shall be provided. The winch shall be fixed at the base of the mast and the specially designed head frame assembly shall be at the top.

Winch

The winch shall be of double drum type as per IS 807, suitable to lift optimum mechanical load and shall be operated manually & electrically. Permanent oil bath of SAE 90 or equivalent of proven design. The gear ratio may be according to manufacturer's standard. However, the minimum working load shall be not less than 400 Kg. The winch drums shall be grooved to ensure perfect seat for stable and tidy rope lay with no chances of rope slippage. The rope termination in the winch shall be such that distortion or twisting is eliminated and at least 5 to 6 runs of rope remains on the drum even when lantern carriage is fully lowered and rested on the rest pads.

It shall be possible to remove the double drum after dismantling, through the door opening provided at the base of mast. Also, a winch gear box for simultaneous and reversible operations of the double drum winch shall be provided as part of the contract.

Head Frame

The head frame which is to be designed as a capping unit of the mast, shall be of welded steel construction, galvanized both internally and externally after assembly. The top pulley shall be of appropriate diameter, large enough to accommodate the stainless steel wire ropes and the multi-core electric cable. The pulley block shall be made of non-corrosive material and shall be of die casted aluminium alloy (LM-6). Self-lubricating bearings and stainless steel shaft shall be provided to facilitate smooth and maintenance free operation for a long period. The pulley assembly shall be fully protected by a canopy galvanized externally and internally. Close fittings guides and sleeves shall be provided to ensure that the ropes and cables do not dislodge from their respective positions in the grooves. The head frame shall be provided with guides and stops with PVC buffer for docking the lantern carriage.

Stainless Steel Wire Ropes

The suspension system shall be essentially without intermediate joint and shall consist of any non-corrosive stainless steel of AISI 316 or better grade. The stainless steel wire ropes shall be of 7/19 construction, the central core being of the same material. The overall diameter of the rope shall not be less than 6 mm. The breaking load of each rope shall not

be less than 2350 Kg. individually, giving factor of safety or over 5 for system at full load, the minimum recommended value as per the TR-7 referred to in the beginning of the specification. The end construction of rope to winch drum shall be fitted with tellurite. The thimbles shall be secured on ropes by compression splices. Two continuous lengths of stainless steel wire ropes shall be used in the system and no intermediate joints are acceptable in view of the required safety. No intermediate joints, either bolted or else is provided on the wire ropes between winch and lantern carriage.

CABLE:

Trailing cable EPR Insulated and PCP sheathed 2.5 sq. mm. 5 core annealed copper cable.

Power TOOL (Integral to system)

3 Phase, 415 V, 50 Hz., AC +/- 5% Rating of the motor shall be suitable to the design with control & torque limiting protection single speed. Also it shall be remote control operated for raising and lowering operations of the carriage. Remote also to be provide with each High Mast.

Erection, Testing & Commissioning: Erection, testing & commissioning of High Mast towers which include complete CIVIL foundation work including filling & rolling the land/cutting of saplings. The foundation of High Mast shall be Raft Foundation. However, before making a Civil Foundation for High Mast towers, firm shall take drawing/items approval from concern Civil Department or as directed by EIC.

This also includes Supply, Installation, testing & commissioning of guarding to 20 Mtr. High Mast GI tower along with guarding civil foundation. The guarding is to be fabricated from MS angle of 75X75X6 mm. duly welded and bolted to form square guarding of 5 mtr. X 5 mtr. complete with painting with two coats of metal primer & two coats of final finish enamel paint.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

13. Technical Specification for Item No. 13:

This includes removal 40 Watt RGB lights including its DRX panel from existing place and New RGB Light of same specification i.e. 40 watt, cool white, IP65/66, light fixtures with optical lens of reputed make to be install at new location including its testing & commissioning at. The contractor shall fabricate and install the same type New MS enclosures at his own cost. The RGB Light with its MS Enclosures shall fixed rigidly at proposed locations using anchor fastener or as directed.

This also includes removal of old DRX Panel of RGB Lights and fixing of New DRX panel of suitable capacity. The work includes removal of old wiring and supply & laying of new

wiring/cabbling from Main DRX panel to Sub DRX Panel and Sub DRX Panel to individual RGB Fixtures including its testing & commissioning.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

14. Technical Specification for Item No. 14:

This includes supply, installation, testing & commissioning of LED RGB underwater light fixtures of 12/15 Watt for fountain. The light fixtures shall be water proof IP 68 with optical lens. The light fixtures shall be made of 316 grade stainless steel material and glass of light shall be tempered glass. The LED RGB underwater light shall be of CE and Rohs certification in order to providing high quality LED underwater light.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

15. Technical Specification for Item No. 15:

This includes design, supply, installation, testing of Neon Light sign board at the main entrance of DPA Gopalpuri Township. The minimum height neon letters shall be 300 mm & width shall be as per the requirement and shall be pleasant look. The letters for neon sign board are "DPA Township, Gopalpuri". Before finalising the design and colours of neon light are to be get approved from Engineer-In-Charge.

The neon sign board shall be fixed rigidly at entrance of township considering heavy cyclonic wind in the region.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

16. Technical Specification for Item No. 16:

This includes design, supply, installation, testing of multi coloured ribbon LED Lights at the main entrance of DPA Gopalpuri Township. The ribbon lights shall be of approved make and shall be provide at least 450 lumens per foot (1500 lumens per meter). The width of light shall be 12mm. The light shall be fixed at main entrance of Gopalpuri Township as directed by Engineer-In Charge.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as

directed by Engineer-In-Charge.

17. Technical Specification for Item No. 17:

(a) Supply: This includes supply of outdoor type power coated MS Feeder pillar panel made from 14SWG. The feeder pillar panel shall be with canopy, door, handle with locking arrangement, dust, damp, & vermin proof. Feeder pillar shall be specious for easy maintenance and with bottom cable entry.

The feeder Pillar Panel shall be provided with following electrical items.

1. 200 Amp, 10 KA, 4 Pole MCCB -1 No. as Incomer
2. 32 Amps, 10KA, TPN MCCB 'C' Curve - 5 Nos as Outgoing
3. 50 Amps, 415 Volt, coil voltage 215-240V, three phase Contactor- 1 No.
4. Time Switch - Analog time switch
5. Timer control MCB, 10 A - 1 No.
6. R-Y-B Phase Indication lamp - 3 Nos.
7. Control Fuse of suitable rating for outgoing - 3 Nos.

(b) Installation, testing & commissioning: This also include angle frame of M.S. duly painted of size 25 X 25 X 6mm having 300mm grouted in ground including PCC Work and the feeder pillar shall be 600mm above ground level

with complete installation at site inclusive of labour & materials.

18. Technical Specification for Item No. 18:

(A) End Termination Kit (Outdoor)

This includes providing and fixing of heat shrinkable outdoor end termination suitable for 3 core HT 11 KV XLPE Cables of size 3C X 300 sq.mm including providing fixing of Aluminum Solder less lugs of suitable size with all required materials. The work includes all labour, tools tackles, heat shrinkable outdoor end termination kit of approved make and necessary fabrication work on Double Pole/Four Pole structure if required as directed by Engineer-in-Charge.

(B) End Termination Kit (Indoor)

This includes providing and fixing of heat shrinkable indoor end termination suitable for 3 core HT 11 KV XLPE Cables of size 3C X 300 sq.mm including providing fixing of Aluminum Solder less lugs for HT switchgears and copper lugs for transformer of suitable size with all required materials. The work includes all labour, tools tackles, heat shrinkable indoor end termination kit of approved make and necessary fabrication work on gland plate of the panel if required as directed by Engineer-in-Charge.

(C) Straight Through Kit (LT)

This includes providing and fixing of Heat Shrinkable Straight through joint to 4 core LT 1.1 KV, XLPE Cables of size 4C X 16-150 sq.mm, including providing fixing of Aluminum Solder less ferrules of suitable size with all required materials. The work includes all

labour, tools tackles, heat shrinkable straight through joint kit of approved make and necessary excavation in soft soil/removal for RCC trench cover and re-fixing of the same if required as directed by Engineer-in-Charge.

19. Technical Specification for Item No. 19:

Supply, Installation, Testing and Commissioning of 250kVA 11/0.43kV Outdoor Type Compact Substation with HT Panel, Transformer, LT Panel, Protection and Metering Device, etc. and other relevant accessories in a suitable enclosure with IP54

Supply, Installation, Testing and Commissioning of Outdoor Type Foundation Mounted Compact Substation of 11kV/415 Volts, equipped with 250kVA Cast Resin Dry Type Transformer, 630A at 11KV fault making load breaking switch with one as SF6 Circuit Breaker for the primary side controls & with MV 800A Air Circuit Breaker as secondary side control. The components shall be enclosed, by either common enclosure or by an assembly of enclosure. All the components shall comply with their relevant IS/IEC standards Protection with Metering Device. This includes all labour and material as directed by Engineer-in- Charge.

The Outdoor Package:

Single integrated metal housing, comprising three compartments accommodating:

- HV switchgear (Protection degree of this compartment: IP65)
- Transformer (Protection degree of this compartment: IP65)
- LV switchgear (Protection degree of this compartment: IP65)

Enclosure of Compact Substation:

- The Outdoor enclosure of compact Substation shall be fabricated from Galvanized sheet steel 2mm thick build on heavy channel skid frame tropicalized to local weather conditions.
- Four nos. of Lifting lugs to be provided on top to enable lifting total package unit without any problem for site handling / lifting by crane. The metal base shall ensure rigidly for easy transport and installation to withstand the weight of the Transformer, MV & LV component.
- Ventilation openings shall be so arranged or shielded that same degree of specified for enclosure is obtained to reduce the equipment ambient temperature and prevent heating through the roof due to sun radiation the roof is to be made of double layer with foam insulation in between.
- The roof of the CSS should be Removable canopy type made from 2 mm thick Galvanized sheet metal with 10-degree Slope.
- Separation between RMU & transformer compartment and Separation between Transformer compartment & L.V compartment should be made from 2mm thick G.I sheet steel.

- The covers and door are the part of the enclosures when they are closed they shall provide the degree of the protection specified for the enclosure. All cover, doors or roof shall be provided with locking facility. The doors shall open outward at an angle of at least 90 degree and to be equipped with a device able to maintain them in an open position.
- Gland plate for RMU compartment should be made from 3mm thick M.S plate suitable for 3C x 185 Sq.mm XLPE cable 2 no's. The gland pate should be Split type.
- Gland Plate for LV Compartment should be made from 3mm thick M.S plate suitable for 4 nos. outgoing cable. The gland pate should be Split type.
- The space between Transformer, MV component and LT component shall be provided in accordance with latest IEC recommendations standard.
- The enclosure shall be made in such a way that the above components shall be accommodated and the accommodation of components shall be maintained as per IEC recommendation. The enclosure shall be tested by OEM as per Type Test and the relevant documents be submitted. This includes all labour and material as directed by Engineer-in-Charge.

HV Switchgear/TRANSFORMER CIRCUIT BREAKER:

a)	Type	Three pole operated simultaneously by a common shaft
b)	No of phase	3
c)	Arc interruption in dielectric medium	SF-6
d)	Type of Charging, Mechanism:	Manual (spring assisted) as well as motorized with 230 VAC operated motor
e)	Continuous Rating	630Amp at ambient design 40 deg C
f)	Short Ckt Withstand	21 KA for 3Sec
g)	Fault making Capacity	52.5 KA
h)	Fault Breaking Capacity	21 KA minimum
i)	Current transformer	3 nos. epoxy cast Current Transformers with 15 VA burden STR of 21 KA for 3 second metering accuracy Class 0.5 and protection accuracy 10P10 and having of CTR 150/75/5A.
j)	Potential Transformer	3-phase draw out type PT of Ratio 11000/110 Volts of 50 VA burden to meet with auxiliary requirement with Class 0.5 accuracy including HT fuses on both incomer end.

k)	Protection Relay	Numeric type or updated version (Make: SCHNEIDER/ALSTOM/SIEMENS/C&S) with the protection of inverse, definite time, short circuit, over current, instantaneous and earth fault, master trip and trip supervision.
l)	Metering Compartment	Multi-Function meter having digital type (single) with voltage, current, PF, frequency, KW and KWH (Make – ENCRON/L&T / Conzerv)
m)	Accessories	2 sets of operating handle, spring charging handle, spanner set and other required accessories.
n)	Optional	One no. shunt trip and tripping coil operating on 12VDC. 2 nos. of space heater with ON/OFF switch and thermostat in each side of panel & Cable chamber

The SF-6 breaker shall be completed with necessary interconnection with fine wiring, ferruled properly including foundation bolts, earthing etc. The layout drawing, dimensional drawings and electrical wiring diagram and operation & maintenance manuals shall be supplied with SF-6 Breaker. The SF-6 breaker shall be supplied in conformity with relevant ISS i.e. with up to date amendments along with manufacturers test certificate. This includes all labour and material as directed by Engineer-in-Charge.

TRANSFORMER:

The transformer shall be fully tested for routine tests, as per BIS-1985. The tenderer shall furnish date regarding adequacy DIN of Transformer capacity.

a)	Transformer capacity	250 KVA (DRY TYPE)
b)	Primary voltage	11 KV +/- 10%
c)	Frequency	50 HZ
d)	No. of Phases	3
e)	Insulation Class	'F'
f)	Cooling	Natural Air
g)	Temperature	Max 115 C by RTD
h)	Percentage Rise	As per IS
i)	In winding	90 degree C
j)	Winding connection	Star/Delta
k)	Impedance	As per IS/BIS/DIN
l)	Vector Group	Dyn 11
m)	Neutral Grounding	HV ungrounded LV Solidly Grounded
n)	Winding material	Copper

o)	Noise Level	As per IEEE 141
p)	Vibration Level	3 G (min.)
q)	Painting	632 Shed of IS:5 or BIS/DIN Standard
r)	Tapping Range	+/- 5%
s)	Losses	Maintain as per IS/BIS/DIN
t)	Make	Siemens/Crompton/BHEL/Schneider

LV SWITCHGEAR.

The L.V side should be designed to equip the following: -

(a) Low voltage Bus bar system

The equipment shall have all the following features -

a)	LV bus bar	From transformer LV bushing to ACB and from ACB to MCCBs
b)	Bus bar size for phase & neutral	Tinned copper busbar, size shall be as per manufacturer design. All the phases and neutral busbar shall be same rating / size. Bus bar size for phase & neutral Suitable spreader to be provided at outgoing side of MCCB to connect 120sqmm cable through aluminum lug.
c)	Bus bar support	insulators 1 kV voltage class, SMC epoxy
d)	Bus bar sleeve	insulation Color coded, for 1kv
e)	Bus bar rated current	Suitable for 800A continuous current rating within the 10K class enclosure @ 400 C ambient temp
f)	Bus bar short circuit	withstand 50 kA for 1 sec

(b) Low voltage switchgear, ACB.

The equipment shall have all the following features -

a)	Rated operational voltage (V) at 50 Hz	440V
b)	Rated frequency (Hz)	50Hz
c)	Current rating Amps (rms)	325Amps
d)	Rated insulation voltage (V) at 50 Hz	1000
e)	Number of poles	4
f)	Rated impulse withstand voltage(kV)	8

g)	Rated Ultimate Short circuit breaking capacity at 415 V, 50 Hz (kA rms) Icu	50
h)	Rated Service Short circuit breaking capacity at 415 V,50 Hz (kA rms), Ics	50
i)	Rated short circuit making capacity at 50Hz (kA peak), expressed as multiples of Icu	105
j)	Rated short time withstand current for 1 sec at 50 Hz (kA rms), Icw, expressed as percentage of Icu	50
k)	Category of utilization	B
l)	Shutters on 'Trip' & 'Close' push button with sealing facility	Yes
m)	Accessory mounting	Accessories shall be front accessible plug in type. Accessories namely motor shunt trip & closing coil, UVT etc. should be common for the entire range & shall be suitable for both AC & DC voltages.
n)	Operating mechanism	Spring charging stored energy type, manual & Automatic
o)	Mechanical life (Operating cycles)	20000
p)	Indications	Breaker shall have following mechanical indications: 1. ON, 2. OFF, 3. TRIP 4. SPRING CHARGE STATUS
q)	Sensing	True RMS based
r)	Type	Microprocessor based
s)	Control Terminal	Should be front accessible and minimum NO/NC contacts shall be provided for electrical interlocking.

t)	Protection	<p><u>Overload protection:</u> Pick p 0.4 to 1.0 Time delay 0.2 to 40 sec</p> <p><u>Short Circuit:</u> Pick up 2 to 10 Time delay 20 to 400 Micro sec</p> <p><u>Instantaneous Over current:</u> Pick up 4 to 16 & OFF</p> <p><u>Earth Fault:</u> Pick up 0.2 to .6 & OFF Time delay 100 to 400 msec</p>
u)	Metering required	Multi-Function meter for measuring 3 Ph current, 3 Ph Voltage, KWH, KVAH, Power Factor, Max Demand (KVA), Fault History of Minimum Events,
v)	Indication	Release shall give individual indication for each type of fault

(C) Low voltage switchgear, MCCB.

a)	For 325 Amps For 160 Amps For 100 Amps. For 63 Amps	Outgoing feeders – 1 nos Outgoing feeders – 2nos . Outgoing feeders – 2 nos. Outgoing feeders – 4 nos
b)	MCCB rated voltage & Rated frequency (Hz)	415v +/- 10% at 50Hz
c)	Number of poles	4
d)	Current rating Amps (rms)	325/250/125Amps
e)	MCCB rated 3 phase short circuit breaking capacity $I_{cs} = I_{cu}$ Rated impulse withstand voltage (kV)	50/35/25/16 KV minimum at 415v and 50Hz
f)	MCCB rated 3 phase short circuit withstand capacity, I_{cw}	8kA/8KA/8KA /6 for 1sec

g)	Rated insulation voltage (V) at 50 Hz MCCB mechanical & electrical Endurance	1000 As per IS 13947 / IEC
h)	MCCB category of duty	B as per IS / IEC 947
i)	MCCB indications	ON, OFF & TRIP
j)	MCCB protection	Adjustable / front accessible thermal and magnetic setting. (Thermal setting for overload adjustable from 70% - 100% of the rated current & magnetic setting for short circuit adjustable 4-10 times / 5-10 times).

Safety Devices:

Rubber Mats, Fire Extinguisher & First Aid Box should have included along with the Compact Substation.

The work includes all labour & material, tools & tackles, transportation to & from site, loading & & unloading & whatever earth moving equipments is required to complete the job and as directed by Engineer-In-Charge.

20. Technical Specification for Item No. 20:

The item includes providing & fixing concealed wiring for single phase sub-circuit from the main switch /meter /DBs / MCBs to the switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 2.5 sq. mm. for phase & neutral wire and 1.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 25 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. Complete work consists of necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

21. Technical Specification for Item No. 21:

The item includes providing & fixing concealed wiring for light/tube/bell point from switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 1.5 sq. mm. for phase & neutral wire and 1.0 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 20 mm

Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe in the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work also includes providing & fixing of Bell Push/Flush type SP switch 6A x 250V with ISI mark and 3 plate Ceiling Rose/Angle Holder made from polycarbonate on suitable size of PVC box with cover. The PVC box shall be embedded properly in the wall and the switches shall be fixed on cover of the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

22. Technical Specification for Item No. 22:

The item includes providing & fixing concealed wiring for fan point from switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 1.5 sq. mm. for phase & neutral wire and 1.0 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 20 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of Flush type SP switch 6A x 250V with ISI mark and Step cut electronic fan regulator with rotary steps & 3 plate Ceiling Rose made from polycarbonate on suitable size of PVC box with cover. The PVC box shall be embedded properly in the wall and the switches shall be fixed on cover of the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

23. Technical Specification for Item No. 23:

(a) Full Plug Point:

The item includes providing & fixing concealed wiring for plug point with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 1.5 sq. mm. for phase & neutral wire and 1.0 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 20 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of Flush type SP switch 6A x 250V with ISI mark and 2 in 1 socket 6A x 250V made from polycarbonate on suitable size of PVC box

with cover. The PVC box shall be embedded properly in the wall and the switch & Socket shall be fixed on cover of the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

(b) Half Plug Point:

The item includes providing & fixing half point in existing switch board with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 1.5 sq. mm. for phase, neutral & earth. The work consists providing & fixing of Flush type SP switch 6A x 250V with ISI mark and 2 in 1 socket 6A x 250V made from polycarbonate on existing switchboard. The complete work consists necessary wiring connections and earth linking with all materials and labour as directed by Engineer-in-charge.

24. Technical Specification for Item No. 24:

The item includes providing & fixing concealed wiring for Power point with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 4.0 sq. mm. for phase & neutral wire and 2.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 25 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe in prepared grew the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of 5 in 1 combined unit suitable for 1 with switch, socket, fuse & indicator with ISI mark. The PVC box of suitable size shall be embedded properly in the wall and the combined unit shall be fixed on embedded PVC box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

25. Technical Specification for Item No. 25:

The item includes providing & fixing concealed wiring for A.C point with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 4.0 sq. mm. for phase & neutral wire and 2.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 25 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe, the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work also includes providing & fixing of 20A Socket near the AC Indoor Unit and 20A two modular Switch at 1/1.5 Mtr above ground level on in the switch board as the case may be including necessary wiring from switch to socket. The PVC box for socket & Switch of suitable size shall be embedded properly in the wall. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-

charge.

26. Technical Specification for Item No. 26:

The item includes providing & fixing concealed wiring for plug point for computers (With 3nos. 2 in 1 socket 6A x 250V & 3 nos. Flush type SP switch 6A x 250V) with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 2.5 sq. mm. for phase & neutral wire and 1.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 20 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe, the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of 3 nos. Flush type SP switch 6A x 250V with ISI mark and 3 nos. 2 in 1 socket 6A x 250V made from polycarbonate on suitable size of PVC box with cover. The PVC box shall be embedded properly in the wall and the switches & Sockets shall be fixed on cover of the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

27. Technical Specification for Item No. 27:

(a) Supply: This includes supply at site 6 way double door SPN DB with IP42 degree of protection. TH DB shall be made from special grade of CRCA sheet and powder coated. The DB shall be fitted with Bus Bar, DIN Rail and neutral link. Along with each DB box, the following MCBs & ELCB shall be supplied and accordingly calculate the quantity. The rates shall be including the cost of MCBs & RCCB supplied along with DB.

S/N	Description for 1 Box	Qty. for each DB
1	MCB (C-Curve), 6-10 Amp.	3
2	MCB (C-Curve), 32 Amp.	1
3	RCCB, 30 AMp	1

(b) Fixing: This includes fixing and commissioning of supplied double door DB on wall / structure as directed. The DB shall be fixed rigidly on wall through suitable size of nut bolts / anchor fasteners / cemented wooden gutties as directed. This includes necessary wiring, connections & earth linking with all material and labour as directed by Engineer-in-Charge.

28. Technical Specification for Item No. 28:

This includes Supply and preparation of earth station with chemical treated back filled compound corrosion protection by hot dip 25-30mm dia. Pipe-In-Pipe GI type 2 Mtr. Depth, maintenance free including all accessories. This also includes necessary masonry work for preparing of earth pit.

29. Technical Specification for Item No. 29:

- (a) **Supply:** This includes supply at site of G.I strip of size 25x3 mm. G.I. Strip shall be hot dip galvanized with minimum 80 Micron uniform coating.
- (b) **Laying & Connecting:** This includes laying & connecting of G.I. Strip from earth station/existing earthing system to equipment/ Main DBs or as per site requirement. The work includes all material & labour required shall done as directed by Engineer-in-charge.

30. Technical Specification for Item No. 30:

This includes supply at site, laying, fixing and connecting of G.I wire of size 8 SWG from earth station/existing earthing system to Junction Boxes/Distribution Boards/lighting accessories etc. as directed. The 8 SWG earth wire shall be passed through conduit pipe.

**Seal & Signature of
Contractor**

**Executive Engineer (E)
Deendayal Port Authority**

