**Name of work: Providing illumination to the Pipe Line in the license area of DPA as per PFSAC (As per ISPS code) by the side of K.K. Road at Kandla.**

**Scope of work & Technical Specifications**

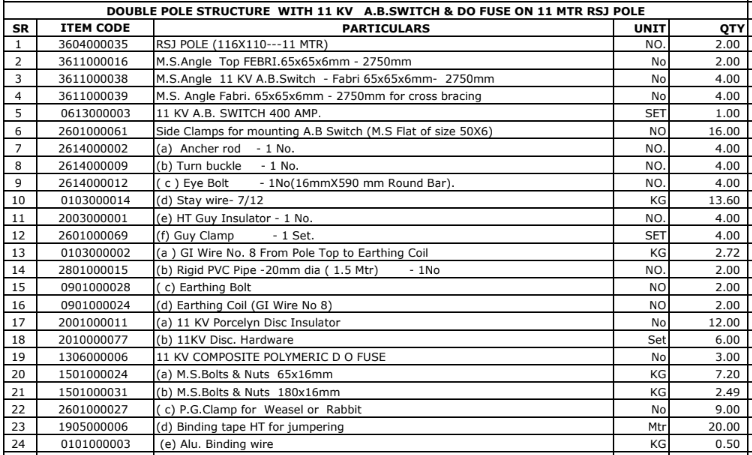
Deendayal Port Trust (earlier Known as Kandla Port Trust), is under Govt. of India, Ministry of Shipping; Deendayal port Trust intend to get the following work done at Kandla. The details of work are mentioned in schedule-B & below are brief of work. Though detailed work may not be explained but the firm will complete it perfectly, precisely & accurately to the entire satisfaction of Engineer in Charge.

* TPIA agency appointment by DPT for monitoring the work.
* After successful completion of whole work in all respect to carry out testing and commissioning of the complete work to the entire satisfaction of DEENDAYAL PORT TRUST.
* After Completion of all work successfully, contractor shall submit the four set work compendium which shall contain, complete lay out Drawing, All Testing & commissioning Report etc to EIC.
* The broad details of each item & Technical Specification of the work are shown in the Schedule “B” attached herewith.
* Any correction should be signed / initialed. White ink corrections not allowed & lead to rejection of quotation.
* All the rules and regulations governing DPT will be applicable.
* Force measure restricted only to the acts of the god.

The scope of work envisages the following. Bringing of all materials at site, assessment of site requirement, carrying out of site survey and check survey, etc.

* 1. **Technical Specification for Item No. 1:**

The work involves Supply, Installation, Testing and commissioning of DP structure with 11KV A.B. Switch & H.G Fuse on 11MTR RSJ POLE. The Double pole structures have to be firmly installed on the site and two layers of anticorrosive coating and three layers of high quality paint with best workmanship is to be done. This also includes painting numbering the poles in 100mm round dia. Double pole structure should be solidly earthed from two points with individual earthing and a ‘Danger’ sign board should be provided on the Double Pole structure as instructed by Engineer in Charge. The below table shows tentative items (but not limited) to be used for this work. The same may be used for reference. However, the bidder is suggested to visit the site for ascertaining actual requirement of items.



* 1. **Technical Specification for Item No. 2:**

**Four Pole Structure:**

**Supply of Poles:** The work supply and erection of Four Pole structure for 11KV HT overhead line includes supply of following material with mentioned specifications:

1. 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.
2. 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.
3. 2.2mtr long M.S. angle cross arm 24 nos. of size 50mm x 50mm x 10mm with G.I. hardware.

**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.

* 1. **Technical Specification for Item No. 3:**

**Supply**: This includes supply at site PGVCL/UGVCL/DGVCL/MGVCL approved vendor or make bare All Aluminum Alloy Rabbit Conductor (AAAC) of size 55 Sq.mm. and Dog Conductor (AAAC) 100 sq.mm as directed by Engineer-in-charge. The conductor shall be manufactured as per IS: 398(Part-IV). The approval of PGVCL/UGVCL/DGVCL/MGVCL and test certificates of Conductor to be submitted by Contractor at the time of supply of item. This includes all the labour, taxes loading, unloading at site as directed by Engineer-in-Charge, but excluding GST.

**Stringing, testing & commissioning:** This includes stringing of supplied AAAC Rabbit Conductor of size 55 Sq.mm. and AAAC Rabbit Conductor of size 55sq.mm on HT transmission /distribution overhead line. The conductor shall be tied rigidly with existing pin/disc/shackle insulators by providing binding wires at least of 12 SWG. The stringing of the conductor shall be done as per IS norms & maximum sag 3% of each span shall be maintained and joint between span shall not be done in any case. The work includes providing & binding of jumpers at shackle point to maintain continuity of the conductor. The rates shall be inclusive of all material, required tools tackles and labour and as directed by Engineer-In-charge, but excluding GST.

* 1. **Technical Specification for Item No. 4:**

This includes making of muffing around the pole using cement concrete foundation of 1:2:3 (cement, sand, gravel). The dimension of muffing shall be as desired by EIC. This also includes dismantling of existing muffing wherever required and removal of debris from site. The muffing shall be paint with white Lime (chuna) paint. The work includes all labour & material as directed by Engineer-in-Charge, but excluding GST.

* 1. **Technical Specification for Item No. 5:**

This includes supply at site 11/11KV grade, 3 core Aluminum conductor, HT 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. This includes all the labour, taxes loading, unloading at site as directed by Engineer-in-Charge, but excluding GST.

* 1. **Technical Specification for Item No. 6:**

This includes supply at site 1.1 KV grade, 4 core aluminum conductor of the given sizes, XLPE insulated armoured cable confirming 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. 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. This includes all the labour, taxes loading, unloading at site as directed by Engineer-in-Charge, but excluding GST.

* 1. **Technical Specification for Item No. 7:**

**Laying of Cable**:

**(a) In Hard/Soft Soil:** This includes laying of single length HT/LT armoured aluminum Conductor XLPE Cable of 11KV Grade (excluding supply of cable) through excavation in soft/hard soil. The trench to be excavated 0.3 mtr. wide 1.0 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. This includes providing & laying of bricks on both sides of cable lengthwise i.e. parallel to the cable and the gaps shall be filled by fresh river sand. The cable shall be covered by keeping two bricks over the side bricks shown in the sketch. 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 spreaded in low laying area as directed. The same trench would be used to place two circuits (cables) side by side in horizontal fashion.

The contractor shall provide 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 cable joints shall be under the scope of work of the contractor at no extra cost or obligation from DPA. Such cable joining work is completely to be done by the contractor at his own cost. The rates shall be inclusive of all material, required tools tackles and labour and as directed by Engineer-In-charge, but excluding GST.

**(b) Through HDPE Pipe under rail/road crossing/muddy area:** This includes making of Horizontal Directional Drilling of suitable dia including putting suitable diameter HDPE. HDPE pipe shall have strength of 10Kg/Sq.cm. Providing of HDPE pipe is also in the scope of contractor. Depth of horizontal boring shall be minimum 165 cm or according to construction of Road/Rail network/muddy area or as per direction of Engineer-In-Charge. Laying of HDPE pipe coupled by HDPE socket only after standard length in excavated trench / tunnel and also sealing of HDPE pipe ends by suitable cap at both end. After completion of boring job back filling & dressing of excavated trench to be carried out as per the original. The contractor shall arrange JCB machine for excavation, water for drilling, de-watering pump, HDD equipment at their own cost. The rates shall be inclusive of all material, required tools tackles and labour and as directed by Engineer-In-charge, but excluding GST. The two circuits (cables) to be laid in the separate HDPE pipe. side by side in horizontal fashion.

This includes also includes passing of HT/LT cable through buried HDPE pipe. The pipe shall be sealed at both the end by suitable cap after the laying of cable in HDPE pipe. The rates shall be inclusive of all material, required tools tackles and labour, as directed by Engineer-In-charge, but excluding GST.

**(c) In G.I. Class-B pipe:** This includes laying of cable of double length HT/LT armoured aluminum Conductor XLPE Cable of 11KV Grade (excluding supply of cable) in class-B G.I. Pipe of size 100 mm. on existing DP/Four Pole Structure/steel Structure with G.I. Clamps made from G.I. flat 25 x 3 mm including G.I. Nut bolts of suitable size at 0.50 mtr. Intervals. The rates shall be inclusive of all material, required tools tackles and labour and as directed by Engineer-In-charge, but excluding GST.

**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.

* 1. **Technical Specification for Item No. 8:**

This includes providing & making end Termination kit on HT (11 KV) 3CX185 Sq.mm (E) cable at both end, HT Joint shall be carried out by certified jointer. Make:- 3M, Raychem , Mahindra , Compaq. This work includes all labour and material as directed by Engineer-in-Charge. The Heat Shrinkable Outdoor Termination offered shall be complete with all parts necessary for their effective and trouble-free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated. It is not the intent to specify herein complete details of design and construction of Heat Shrinkable Outdoor Termination. The Heat Shrinkable Outdoor Termination offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements. The Heat Shrinkable Outdoor Termination offered shall be reliable, fast and easy-to install jointing termination system to assure and maintain high network reliability in the most severe conditions and under high electrical, thermal, mechanical and environmental stress. The design, manufacture and performance of the Heat Shrinkable Outdoor Termination shall comply with all currently applicable statutes, regulations and safety codes. Nothing in this specification shall be construed to relieve the bidder off his responsibilities. Unless otherwise specified, the Heat Shrinkable Indoor and Outdoor Termination offered shall conform to the latest applicable Indian, IEC, British, U.S.A. or International Standards and in particular.

The outdoor cable termination is to be mandatorily used for 11kV 185sqmm XLPE cables termination. The cable termination at Double pole structures and four pole structures should be done with HDPE pipe of suitable diameter and as per standard practice of PGVCL. Each such HDPE pipe should contain only one cable.

* 1. **Technical Specification for Item No. 9:**

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.

**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 dislodged 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.

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

* 1. **Technical Specification for Item No. 10:**

**Supply:**

This includes Supply at site 350 watt (with optical lens) energy efficient LED flood light suitable for high mast tower , the LEDs details as under.

Technical Requirement for LED 350 Watt, Warm white fixture.

|  |  |  |
| --- | --- | --- |
| **Sr** | **DESCRIPTION** | **MINIMUM VALUE** |
| 01 | Input Power | **350 W** |
| 02 | Input voltage AC | 90-300 V |
| 03 | Input Frequency | 50 HZ +/-1 HZ |
| 04 | Life | 50,000 glow hrs. |
| 05 | Inter-changeability | Suitable for wall /pole pipe bracket |
| 06 | Total Harmonic Distortion | <15% maximum |
| 07 | Working Temperature | -20°C to +50°C |
| 08 | Working Humidity | 10% to 90% RH |
| 09 | Temperature | 6500° K |
| 10 | Colour rendering index | ˃75 |
| 11 | Lumens / Watt | 105Lum/W |
| 12 | Finishing | Excellent with Powered Coating |
| 13 | Power factor | Not less than 0.90 |
| 14 | Warrantee | **Minimum 02 year** |
| 15 | Heat sink | Good thermal management System should be provided & LED must be mounted on heat Sink conductive aluminum bars With suitable large surface area by Means of fines to dissipate the heat to ambient air. |
| 16 | Working Humidity | 10% to 90% RH |
| 17 | Lamp Housing | Pressure Die cast aluminum housing |
| 18 | LENS Material | Convex Lens (Polycarbonate cover/PMMA) 65mm dia. |
| 19 | Ingress protection Level | IP 67 |
| 20 | Power efficiency | Min. 80% |
| 22 | Road viewing angle  Light Source | **Horizontal 120 Degree & Vertical 70 Degree SMD LED array with lens** |
| 23 | Makes of LEDs | Cree/Nichia/Edison/Osram/Philips Lumileds / Seoul Semiconductor /Epistar / Samsung ( The contractor should produce the certificate of LED Make in the particular luminary used.) |
| 24 | Certification preferred/  essential | LM79/ LM 80 |
|  |  |  |

The contractor shall take prior approval from the Engineer in charge for make of LED Tube fixture.

**Installation:** This includes Installation of LED fittings on Lantern ring, complete with all wiring connection from JB to individual LED’s fittings on towers, complete with man, material, Tools & tackles, connection etc.

* 1. **Technical Specification for Item No. 11:**

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 complete labour & materials.

* 1. **Technical Specification for Item No. 12:**

**Supply:** This includes supply of 3 Star BEE rating copper wound transformer at site PGVCL/ UGVCL/ DGVCL/ MGVCL approved vendor or make of 200 KVA, 11/0.433KV, oil filled, outdoor type suitable for pole mounting TC as directed by Engineer-in-Charge.

The approval of PGVCL/UGVCL/ DGVCL/ MGVCL and test certificate of Distribution Transformer to be submitted by Contractor at the time of supply of item.

This includes all the labour, taxes loading, unloading at site as directed by Engineer-in-Charge, but excluding GST.

**Installation, Testing & Commissioning:** This includes installation of supplied transformer on prepared DP/FP with suitable locking arrangement of transformer with suitable size of angles both side of transformer and the angles shall be bolted with poles with suitable MS clamps. The work also includes body earthing of Transformer and neutral earthing of transformer. The necessary test for testing and commissioning to be carried out on after installation of transformer at site. The work includes all labour & material as directed by Engineer-in-Charge, but excluding GST.

* 1. **Technical Specification for Item No. 13:**

**Supply:**

This includes Design, Supply at site, installation, testing and commissioning of Outdoor pole mounted type L.T. Feeder Pillar Panel with top canopy, double shutter, handle with locking arrangement (pad lock – 5 lever with keys), dust, damp and vermin proof. The Street Light Feeder Pillar shall be fabricated from Stainless Steel Sheet of 2mm thick, 316 grade SS Angle and S.S. flat of suitable size.

The Feeder Pillar Panel shall be of suitable size; however, it shall be specious for easy maintenance.

|  |  |  |
| --- | --- | --- |
| (1) | 250A, MCCB with fixed thermal & magnetic setting, 35kA breaking capacity, 4 Pole MCCB | 1 No. |
| (2) | 63A, 10KA TPN MCB and a Neutral Link of suitable size and rating | 6 No. |
| (3) | Indicating lamp Red, Green and Amber Blue 230/240V AC, with in built resistance | 1 each |
| (4) | 3phase, 4wire Electronic energy meter of Class 1 in poly carbonate body with electro mechanical counter of suitable range for Feeder Pillar | 1 No. |
| (5) | Surface mounted light sensor timer Switch | 1 No. |
| (6) | 3 phase Air Break Contractor of 200A | 1 No. |

All these components shall be mounted in the Feeder Pillar by means of suitable cadmium passivated hardware. The panel shall be complete in all respects with cable glands, lugs for incoming and outgoing cables including interconnection with PVC insulated cable single core, standard copper conductor of 650/1100V grade.

The Feeder Pillar shall be tested as per IS 4237. All the components shall be panel mounted type and hardware cadmium passivated. The panel shall be provided with 2 Nos. GI terminals for earthing. Before placing the order for manufacturing the panel drawing should be approved by inspection agencies / Engineer-in-charge showing the accommodation of the electrical components and should fulfil the needs IE rules. The relevant test certificate in support of SS grade 316 shall be supplied along with drawing for approval. The Street Light Feeder Pillar shall be manufactured from type test certificate holder for Feeder Pillar of similar or above rating.

**Erection, testing & commissioning:** The Feeder Panel shall be erected on prepared DP/FP with suitable locking arrangement of Panel with suitable size of angles both side of Panel and the angles shall be bolted with poles with suitable MS clamps. The work also includes body earthing of Panel . The necessary test for testing and commissioning to be carried out after installation of Feeder Panel at site.

This also includes the incoming and outgoing Cable termination. The work includes all labour and material as directed by Engineer-in-charge.

* 1. **Technical Specification for Item No. 14:**

This includes providing & fixing chemical treated back filled compound gel earthing station in pipe for 2000 Amps (LT) capacity, complete with civil work. On the earthing pit, the required size chamber shall be made by bricks with cover and plastering including all masonry work. The work includes all labour & material as directed by Engineer-in-Charge, but excluding GST.

* 1. **Technical Specification for Item No. 15:**

This includes providing & fixing of following size earth strip / wire from earth station to equipment / pole / DB or as per requirement. The complete work consists of necessary connection and earth linking at both ends. The work includes all labour & material as directed by Engineer-in-Charge, but excluding GST.

**Executive Engineer (E)**

**Deendayal Port Authority**