

SCOPE OF WORK

The Deendayal Port Authority is the one of the Major Port in India, under administrative control of Shipping Ministry, Govt. Of India. The Specification is intended to cover the Electrification work for newly locate Crane Sub Division and store at inside cargo jetty area , the works will be carried out simultaneously with Civil work , which includes electrical part i.e. Supply & laying of power cables from the different sources , Supply , Installation and Commissioning of LPP , internal concealed wiring for Electrical installation. The work shall be executed to the satisfaction of the Engineer-in -Charge. For installation of equipments, the contractor shall arrange all types of tool & tackles.

TECHNICAL SPECIFICATIONS

Technical Specification No. 1

This includes supply at site following size 1.1 KV grade, 4 core aluminum conductor, XLPE insulated armored cable of given sizes which confirming to IS: 7098 (Part-I) 1988 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 5 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.

- i). 4C X 150 Sq.mm XLPE Insulated.
- ii). 4C X 95 Sq.mm XLPE Insulated.
- iii). 4C X 6 Sq.mm XLPE Insulated.

Technical Specification No. 2

This includes laying of cable size up to size of cable up to 4 core x 150 Sq.mm LT armored aluminum Conductor XLPE Cable of 1.1KV Grade through.

i). In Hard / soft Soil: - the cable shall be laid 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. This includes providing & laying of half round RCC Pipe on 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 half round heavy duty RCC NP 2 Pipe. The filling of the trench shall be done with by provided Sand cover (at least 50mm from cable surface) completely & followed by 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 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.

ii) In RCC/Rail/Road through HDD method: - Cable shall be laid underneath by using Horizontal Directional Drilling (HDD) method by putting suitable diameter Dia HDPE (suitable for cable size up to LT 4C/3.5CX 150 Sq.mm} HDPE pipe having strength 10Kg/sq.cm} shall in contractor scope), the contractor shall arranged JCB Machine for excavation, water for drilling, de- watering pump, HDD equipments at their own cost. The cable shall be pass through heavy duty HDPE pipe buried at nominal minimum depth 165 cm or according to construction of RCC Road/ Rail network or as per directed by EIC. For single size/length cable, individual HDPE pipe shall be passing through a road /rail crossing, for another cable; separate HDPE pipe shall pass through the Tunnel / trench. Laying of HDPE pipes coupled by HDPE socket only after standard length in excavated trench/tunnel and also sealing of HDPE pipe ends by suitable cap. Back filling & dressing of excavated trenches as per specification. This includes all labour and material as directed by Engineer-in-Charge

iii) In RCC Trench: - The cable shall be laid after opening of RCC trench by removing the RCC Covers & cable trench shall be cleaned properly including removal of garbage, stones, bricks & old unused cables etc from the trench line without damaging the other cables laying in the trench. After laying of the cable, cable trench shall be properly covered with removed RCC covers as per original. 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.

IV). On wall through PVC Pipe & Clamp: This includes laying of cable size up to 10 sq.mm LT cable through wall /Truss / structure This includes laying of single / double length cable up to 3 ½ / 4.0 core x 35 Sq.mm LT armored aluminum Conductor XLPE Cable of 1.1KV Grade on existing wall/cement structure/Truss/ Perlin through suitable size of PVC pipe & clamp. The Clamps shall be provided of suitable size (with respect to PVC pipe 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. The work includes with all materials and labour as directed by Engineer-in-charge.

Technical Specification No. 3

This includes Design , supply, installation , Testing & commissioning of outdoor type Load Point panel at site , The works also include, testing Commissioning of outdoor pedestal Load Point Panel with top canopy, single door, handle with locking arrangement, dust, damp and vermin proof.

TYPE A Load point Panel Fabrication/construction salient feature as under:-

- The Load Point Panel board frame shall be fabricated from Heavy Duty CRCA sheet steel minimum 2.5 mm thick, pressed & shaped.
- The Board shall be enclosed by sheet steel of minimum 2.0 mm thickness smoothly finished & level, door & covers shall be made 1.6 mm thick sheet steel. Adequate stiffeners shall be provided wherever necessary.
- Dust & vermin proof Protection Class: - IP 52.
- Bottom Cable entry.

- All panel edges and door edges shall be reinforced against distortion. Cut outs shall be true in shape and devoid of sharp edges.
- The complete structure shall be rigid, self supporting free from vibration, twists & bends.
- The Load point panel shall be paint by simens grey paint & treated by 7 tank process DIP ZINC PHOSPHATING process.
- The panel then powder coated with an approved colour shade as per IS.
- The final finished thickness of paint film on steel shall not be less than 50 microns, and shall not be more than 80 microns.
- Finished painted appearance of equipment shall present an aesthetically, pleasing appearance, free from dents and uneven surfaces.

The Load Point Panel shall be specious for easy maintenance and shall be provided with following electrical Items.

- 1) 250 Amps 4P Changeover Switch – **1 No.**
- 2) 250 Amps, 36 KA, 4P MCCB. – **2 No's I/c.**
- 3) Digital VAF Meter – **1 Nos.**
- 4) Digital Energy Meter – **1 Nos.**
- 5) Suitable CT Coil Class 1, Tape Wound – **3 Nos.**
- 6) Phase R, Y & B Indication Lamp – **03 Nos.**
- 7) Control Fuse (Suitable Rating) for outgoing:-**3 Nos.**
- 8) 63 Amps. 4P MCB 10 KA, C Curve. – **4 No's O/g.**
- 9) 125 Amps, 4 P MCCB 25 KA, C curve: - **2 No's O/g.**
- 10) Main Bus & Taps :-

The board shall be provided with three phase and neutral busbars. Busbars shall be of uniform cross section throughout the length of the board and up to the incoming terminals of feeder circuit breaker/switch, The busbars shall be made of high conductivity aluminum alloy of E91E grade, Busbar joints shall be complete with high tensile steel bolt and washers and nuts. Busbars shall be thoroughly cleaned at the joint locations and suitable contact grease shall be applied just before making a joint, separate supports shall be provided for each phase of the busbars. If a common support is provided for all three phase, antitracking barriers shall be incorporated. Busbars shall be adequately supported and braced to withstand the stresses due to the specified short circuit currents. Busbar supports shall be made of hylum sheets; glass reinforced moulded plastic material or cast resin.

All these components shall be mounted/erected in the Load Point Panel 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.

Load Point Legs shall be heavy duty MS steel with chemical treated free from corrosive & rust, in reinforced foundation of suitable design, base stand of Load Point Panel 300 MM height made from 35X35X5 MM or as per proposed in drawing , SS angle & 2 nos. SS Terminal for earthing. All hinges & support will be corrosive & maintenance free.

The Load Point Panel shall be tested as per IS: 4237. Before Manufacturing the Load Point Panel, The relevant test certificate in support of Load point panel manufacturing, along with design & drawing shall be submitted to DPT for approval and also all Electrical accessories shall be used satirically as per Approved Make List of DPT.

TYPE B Load point Panel Fabrication/construction salient feature as under:-

- The Load Point Panel board frame shall be fabricated from Heavy Duty CRCA sheet steel minimum 2.5 mm thick, pressed & shaped.
- The Board shall be enclosed by sheet steel of minimum 2.0 mm thickness smoothly finished & level, door & covers shall be made 1.6 mm thick sheet steel. Adequate stiffeners shall be provided wherever necessary.
- Dust & vermin proof Protection Class: - IP 52.
- Bottom Cable entry.
- All panel edges and door edges shall be reinforced against distortion. Cut outs shall be true in shape and devoid of sharp edges.
- The complete structure shall be rigid, self supporting free from vibration, twists & bends.
- The Load point panel shall be paint by siemens grey paint & treated by 7 tank process DIP ZINC PHOSPHATING process.
- The panel then powder coated with an approved colour shade as per IS.
- The final finished thickness of paint film on steel shall not be less than 50 microns, and shall not be more than 80 microns.
- Finished painted appearance of equipment shall present an aesthetically, pleasing appearance, free from dents and uneven surfaces.

The Load Point Panel shall be specious for easy maintenance and shall be provided with following electrical Items.

- 1) 125 Amps, 25 KA, 4P MCCB. – **2 No's I/c.**
- 2) Digital VAF Meter – **1 Nos.**
- 3) Digital Energy Meter – **1 Nos.**
- 4) Suitable CT Coil Class 1, Tape Wound – **3 Nos.**
- 5) Phase R, Y & B Indication Lamp – **03 Nos.**
- 6) Control Fuse (Suitable Rating) for outgoing:-**3 Nos.**
- 7) 63 Amps. 4P MCB 10 KA, C Curve. – **4 No's O/g.**
- 8) 100 Amps, 4 P MCB 10 KA, C curve: - **2 No's O/g.**

9) Main Bus & Taps :-

The board shall be provided with three phase and neutral busbars. Bus bars shall be of uniform cross section throughout the length of the board and up to the incoming terminals of feeder circuit breaker/switch, The busbars shall be made of high conductivity aluminum alloy of E91E grade, Busbar joints shall be complete with high tensile steel bolt and washers and nuts. Busbars shall be thoroughly cleaned at the joint locations and suitable contact grease shall be applied just before making a joint, separate supports shall be provided for each phase of the busbars. If a common support is provided for all three phase, ant tracking barriers shall be incorporated. Busbars shall be adequately supported and braced to withstand the stresses due to the specified short circuit currents. Busbar supports shall be made of hylum sheets; glass reinforced moulded plastic material or cast resin.

All these components shall be mounted/erected in the Load Point Panel 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.

Load Point Legs shall be heavy duty MS steel with chemical treated free from corrosive & rust, in reinforced foundation of suitable design, base stand of Load Point Panel 300 MM height made from 35X35X5 MM or as per proposed in drawing , SS angle & 2 nos. SS Terminal for earthing. All hinges & support will be corrosive & maintenance free.

The Load Point Panel shall be tested as per IS: 4237. Before Manufacturing the Load Point Panel, The relevant test certificate in support of Load point panel manufacturing, along with design & drawing shall be submitted to DPT for approval and also all Electrical accessories shall be used satirically as per Approved Make List of DPT.

Technical Specification No. 4

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 suitable 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 grove and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe the grove 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.

Technical Specification No. 5

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 with IS: 694/1990 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 with IS: 9537 (Part-III) 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 in case 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 Bell Push/Flush type SP switch 6A x 250V modular type or as per approved list and to meet specifications of IS: 3854 & 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 consist necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

Technical Specification No. 6

The item includes providing & fixing concealed wiring for fan point from switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire with IS: 694/1990 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 with IS: 9537 (Part-III) 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 modular switches meet specifications of IS: 3854, 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 consist necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

Technical Specification No. 7

Half plug point The item includes providing & fixing half point in switch board with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire with IS: 694/1990 of size 1.5 sq. mm. for phase, neutral & earth. The work consists providing & fixing of Flush type SP switch 6A x 250V modular type with ISI mark and to meet specifications of IS: 3854, and 1Nos. 2 in 1 socket 6A x 250V made on switchboard. 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.

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.

Technical Specification No.8

This includes supply & fixing of 4 Way (4+12 way) double doors TPN DB, IP42 degree of protection. The 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. The rates shall be including the cost of MCB's, ELCB, the DB shall be supplied along with DB as under.

MCB capacity	Qty (for each DB)
63 Amps. 4P ,C series 10 KA breaking capacity	02
16 Amps. 2 pole DP , C series 10 KA breaking capacity	04
10 Amps. SP , C series 10 KA breaking capacity	06
ELCB, 30 mili amp.	01

This includes fixing & commissioning of supplied double door TPN 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, labour tools & tackles as directed by Engineer-In-charge.

Technical Specification No.9

The item includes providing & fixing concealed wiring for Power point with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire with IS: 694/1990 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 with IS: 9537 (Part-III) 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 20A & 10A with switch, socket modular type , 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.

Technical Specification No10

Providing & fixing AC point in concealed, which is including by providing required length conduit pipe in concealed with required length copper standard 4 Sq.mm & 2.5 Sq.mm (Phase & neutral respectively) cable shall laid inside from main Ckt. Or nearest source To AC power incoming. For AC incoming shall be have one along with 20Amp. 2 Pin +SC, 2 module (including 20 Amp .MCB). Providing necessary grill fitting dimensions and supporting material like S.S. Etc. fitting shall be fixed rigidly nearby

fitting through suitable size of screws/nut bolts/anchor fasteners with all material and labour and as directed by Engineer-In-charge.

Technical Specification No.11

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 with IS: 694/1990 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 with IS: 9537 (Part-III) 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 modular type as per approved make list and to meet specifications of IS: 3854, 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.

Technical Specification No.12

This includes supply of industrial general-purpose environmental friendly energy efficient 1 x 20/22 Watt LED tube fixture complete with batten (T8) as per Approved Make List. The fixture should be of low power consumption & having high efficiency Protection is provided against over voltage & over Current. Degree of Protection IP 20. The rate shall be firm and inclusive of all taxes, excise duty, octroi, packing and forwarding, insurance, loading at supplier's depot, transportation and unloading at site work.

Technical Specification for Item No. 13:

This includes fixing & commissioning of supplied 1 x 20/22W LED tube fixture complete with batten on wall/ceiling at suitable height on cemented wooden gutties as directed, and connections with 3 core flexible copper cable from nearest source of supply/ceiling rose & necessary connections with all material and labour and as directed by Engineer-In-charge.

Technical Specification No.14

Supply at site energy efficient LED 150 watt warm White LED Street light fixture. The LED fixtures should be suitable for pole pipe bracket which is including with LED.

The contractor shall take prior approval from the Engineer in charge for make of LED Street Light fixture (i.e. Bajaj / Philips /CG / C&S / SYSKA / WIPRO/ Pyrotech).

Technical Requirements for LED Street light is as under:

Sr. No.	Parameter	Requirement
1.	Input Voltage AC	130 - 260 V
2.	Input Frequency	50 Hz +/-1 HZ
3.	Life	50,000 glow hrs.
4.	Luminary mounting arrangement	Adjustable mounting arrangement
5.	Total Harmonic Distortion	<15% maximum
6.	Working Temperature	-5°C to +60°C
7.	Working Humidity	10% to 90% RH
8.	Temperature	5000° K to 6500° K
9.	Wattage	<1.2 W per LED
10.	System Efficacy (Lumens / Watt)	≥100
11.	Finishing	Excellent with Powder Coating
12.	Power factor	≥0.90
13.	Warrantee	2 years
14.	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 fins to dissipate the heat to ambient air.
15.	Working Humidity	10% to 90% RH
16.	Color	warm White
17.	Rated wattage	As above
18.	Color Rendering Index	≥70
19.	Ingress protection Level	IP 65 for lamp compartment and Driver unit
20.	Body of fitting Extrusion.	Die cast aluminum / aluminum
21.	Light Source	SMD LED array with lens
22.	Makes of LEDs	Cree/Nichia/Edison/Osram/Philips Lumileds SEOUL SEMICONDUCTOR /EPISTAR / Samsung/Citizen
23.	Certification preferred/essential	CE, ROHS, ERTL & ERDI.
24.	LM 79-80	

Technical Specification No.15

This includes fixing & commissioning of supplied 150 watt warm white LED Street Light for outer periphery on Crane sub division cum store . The supplied fitting shall be fixed on nipple on pipe/bracket at building height. This works includes supply & fixing the DB Box, the DB shall contain with one Digital timer. 3 phase 40 amps Contactor.

amps DP for switching/control the street light complete with internal wiring (with providing & connecting with 3CX 2.5 sq.mm copper flexible cable),.

The works also including necessary wiring, connections & necessary earth linking connections with all material, labour, tools & tackles as directed by Engineer-In-charge.

Technical Specification No.16

Supply at site energy efficient LED 18 watt Cool White LED surface mounted bulk head light fixture for urinal / lobby /balcony of crane section cum store or as decided by Engineer-In-Charge at the time of execution.

The contractor shall take prior approval from the Engineer in charge for make of LED Street Light fixture (i.e. Bajaj / Philips /CG / C&S / SYSKA / WIPRO/ Pyrotech).

Technical Requirements for LED Street light is as under:

Sr. No.	Parameter	Requirement
1.	Input Voltage AC	130 - 260 V
2.	Input Frequency	50 Hz +/-1 HZ
3.	Life	50,000 glow hrs.
4.	Luminary mounting arrangement	Adjustable mounting arrangement
5.	Total Harmonic Distortion	<15% maximum
6.	Working Temperature	-5°C to +60°C
7.	Working Humidity	10% to 90% RH
8.	Temperature	5000° K to 6500° K
9.	Wattage	<1.2 W per LED
10.	System Efficacy (Lumens / Watt)	≥100
11.	Finishing	Excellent with Powder Coating
12.	Power factor	≥0.90
13.	Warrantee	2 years
14.	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 fins to dissipate the heat to ambient air.
15.	Working Humidity	10% to 90% RH
16.	Color	White
17.	Rated wattage	As above
18.	Color Rendering Index	≥70
19.	Ingress protection Level	IP 66 for lamp compartment and Driver unit

20.Body of fitting	Die cast aluminum / aluminum Extrusion.
21.Power efficiency	≥ 80%
22.Light Source	SMD LED array with lens
23. Makes of LEDs	Cree/Nichia/Edison/Osram/Philips Lumilied SEOUL SEMICONDUCTOR /EPISTAR / Samsung/Citizen
24.Certification preferred/essential	CE, ROHS, ERTL & ERDI.
25.LM 79-80	

Technical Specification No.17

This includes fixing & commissioning of supplied 18 watt LED, Bulk head surface mounted, light fixture shall be erected inside the Toilet block lobby area & internal area for illumination. This also includes necessary wiring (with providing & connecting with 3CX 2.5 sq.mm copper flexible cable), connections & necessary earth linking connections with all material, labour, tools & tackles as directed by Engineer-In-charge.

Technical Specification No.18

Supply at site energy efficient LED 150 watt High Bay LED Light fixture for Dome shaped open area of crane section cum store .

The contractor shall take prior approval from the Engineer in charge for make of LED Street Light fixture (i.e. Bajaj / Philips /CG / C&S / SYSKA / WIPRO/ Pyrotech).

Technical Requirements for LED Street light is as under:

Sr. No.	Parameter	Requirement
1.	Input Voltage AC	130 - 260 V
2.	Input Frequency	50 Hz +/-1 HZ
3.	Life	50,000 glow hrs.
4.	Luminary mounting arrangement	Adjustable mounting arrangement
5.	Total Harmonic Distortion	<15% maximum
6.	Working Temperature	-5°C to +60°C
7.	Working Humidity	10% to 90% RH
8.	Temperature	5000° K to 6500° K
9.	Wattage	<1.2 W per LED
10.	System Efficacy (Lumens / Watt)	≥100
11.	Finishing	Excellent with Powder Coating
12.	Power factor	≥0.90
13.	Warrantee	2 years
14.	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 fins to dissipate the heat to ambient air.
15. Working Humidity	10% to 90% RH
16. Color	White
17. Rated wattage	As above
18. Color Rendering Index	≥70
19. Ingress protection Level	IP 66 for lamp compartment and Driver unit
20. Body of fitting Extrusion.	Die cast aluminum / aluminum
21. Power efficiency	≥ 80%
22. Light Source	SMD LED array with lens
23. Makes of LEDs	Cree/Nichia/Edison/Osram/Philips Lumiled SEOUL SEMICONDUCTOR /EPISTAR / Samsung/Citizen
24. Certification preferred/essential	CE, ROHS, ERTL & ERDI.
25. LM 79-80	

Technical Specification No.19

This includes fixing & commissioning of supplied 150 watt High Bay LED, Bulk head surface mounted, light fixture shall be erected at dome shaped open area & Hall at crane section cum store area for illumination. This also includes necessary wiring (with providing & connecting with 3CX 2.5 sq.mm copper flexible cable as when required), junction box connections & necessary earth linking connections with all material, labour, tools & tackles as directed by Engineer-In-charge.

Technical Specification for Item No. 20:

This includes supply of 1200 mm sweep ceiling fan fitted with heavy duty grease filled double ball bearing that ensures noiseless performance and long lasting smoother life of fan suitable up to 250V AC supply. The Fan blades aerodynamically balanced to ensure 3.28 Service Value. The blades shall be made of 'heavy gauge' aluminum sheet so as to retain the blade's angle over a longer period. The Fan motor made of superior grade copper wire and impregnated in special varnish for long life operation. The motor shall be totally enclosed and low-loss-silicon steel stampings ensure minimum power consumption with high optimum output. The Fan coated with a special anticorrosive enamel paint that makes them rust free and ensures a classic appearance and longer life. The supplied fan conforming to ISI specifications. The fan shall be supplied with rotary step cut electronic regulator all accessories such as down rod 30/60/120cm long, PVC Bobbin, Stainless Steel Nut Bolt with cotter pin, capacitor etc.

Technical Specification for Item No. 21:

This includes fixing & commissioning of supplied ceiling fan with all accessories in existing hook including necessary wiring and connection from nearest point / Ceiling rose through PVC flexible copper conductor wire and earth linking etc. The rotary step

cut electronic regulator shall be fixed and screwed rigidly on switch board including wiring and connection etc. with all material and labour as directed by Engineer-in-charge.

Technical Specification for Item No. 22:

This includes supply of exhaust fan of size 200 mm with capacitor start and run type motor, continuously rated, totally enclosed fitted with heavy duty grease filled double ball bearing that ensures noiseless performance and long lasting smoother life of fan suitable for single phase 220/250 Volts A.C. 50HZ. The impeller shall be used in an Exhaust Fan is of the propeller type & both hub and impeller shall be dynamically balanced, frames and arms mounted on rubber bushings, to avoid vibrations.

Technical Specification for Item No. 23:

This includes fixing & commissioning of supplied exhaust fan as per direction of EIC on exhaust hole so that discharge of exhaust air can be done easily. However if exhaust hole is not provided, it is to be done by contractor. The grouting of the fan is to be done by suitable size of anchor fastener bolts, and by providing metallic mesh/louvers as directed to other side so that birds can be restricted in the passage. This includes connections with 3 core flexible copper cable from nearest source of supply & necessary connections & earth linking with all material and labour and as directed by Engineer-In-Charge.

Technical Specification for Item No. 24:

This includes supply of heavy duty wall mounting air circulator fan of size 24 inch (600mm) sweep fitted with heavy duty grease filled double ball bearing that ensures noiseless performance and long lasting smoother life of fan suitable for single phase 220/250 Volts A.C. 50HZ with in-built/separate speed regulator. The guards shall be powder coated & blades of fan shall be Aluminum alloy one-piece powder coated. The fan shall be suitable for Vertical adjustment from 22° to 45°.

Technical Specification for Item No. 25:

This includes fixing & commissioning of supplied air circulator 2.5 meter from floor or at suitable height so that breeze air can spread over the area of floor. The fan is to fixed on suitable size of anchor fastener bolts or cemented wooden gutties as directed, and connections with 3 core flexible copper cable from nearest source of supply & necessary connections & earth linking with regulator (incase of separate regulator) with all material and labour and as directed by Engineer-In-charge.

Technical Specification No.26

This item includes providing and fixing Three Phase Electronic Energy Meter with SMC hot press moulded Meter Box having single door with SMC base and SMC door, concealed hinges, Viewing-glass, Earth bolt, Plugged Knock out and provision of wire seal of size 430 x 265 x 170 box of Sintex make product No. GSMB 3923 or equivalent to any other approved make. The meter box shall be fixed on the wall of the building rigidly screwed to cemented wooden gutties for surface wiring & embedded in the wall for concealed wiring as case may be. The item includes all wiring & connections with main switch & earth linking with 12 SWG bare copper conductor complete with all material & labour as directed by Engineer-in-charge. The Electronic meter to be fixed inside the box. The work complete with all labour tools, material man etc. as directed by EIC.

Technical Specification No.27

Supply, installation , Testing & commissioning of Ding Dong “ Electric Bell” operating voltage :- 240 V , single phase as per standard . **Before supply the bell firm shall take make approval of the same.** The work complete with all labour tools, material man etc. as directed by EIC.

Technical Specification No.28

This includes preparation of earth station with chemical treated back filled compound 50 mm dia. Pipe In Pipe GI Type 2 Mtr Depth , Maintenance free including all accessories & Masonry work Enclosure with cover plate.

A cement concrete (ratio 1:4:8) chamber of at least 30 Cm. x 30 Cm. shall be provided just below the surface of ground over the funnel for watering and having RCC/CI cover of suitable size as directed. This also includes removal of extra-excavated earth from the site. The work shall be carried out to entire satisfaction of Engineer-in-charge. This work includes all labour and material as directed by Engineer-in-Charge. The works also include earthing value marking & painting on earth strips & earthing station by suitable paints (Green Color on Strips) and also mentioned the earth value on earth pits.

Technical Specification No.29

The works include providing & fixing the following size earth strip from earth station to equipment / Main DB or as per site requirement. 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.

- i). 12 SWG GI earthing wire
- ii). 25X 3 Hot DIP GI strips, having minimum 80 Micron galvanized coating.

This includes supply, Laying & connecting, 12 SWG GI earthing wire , from DB/Meter /Switch to earth station by providing & fixing suitable Dia Medium duty PVC conduit pipe in concealed manner, the works include 8 SWG earth wire will be pass through conduit pipe. The earth wire shall be connected using cooper nut bolts rigidly or as directed by EIC.

- Note:** 1) Any ancillary work arises during the execution of work, which is required to complete the work, the Contractor shall complete the item/items by carrying out such ancillary work without any extra payment.
- 2) The work shall be carried out with entire satisfaction of Engineer-in-Charge.

Sd/-

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority

SPECIAL CONDITIONS FOR ELECTRICAL PART IN CIVIL WORK

- 1.** In the event of dimension figures upon a drawing differing from those obtained by measuring drawings shall be referred to the Chief Engineer, whose decision shall be final and binding upon the Contractor.
- 2.** The Contractor shall submit the colored three sets Hard copy of approved drawing of cable routes, circuit diagram of LT installation layout, plans of wiring with technical literature and three sets of as made drawing on completion of work.
- 3.** For successfully Execute the work, the firm shall depute or nominate their Engineer or project-In-Charge or competent person, who deal the Electrical Part of the project to Engineer-In-Charge.
- 4.** While carrying out the work of electrical nature, the Contractor shall adhere to the provisions of the Indian Electricity Rules, 1956 and as amended from time to time and shall not violate any regulations which he will be solely responsible.
- 5.** The work shall be programmed in such a way that the electric supply to the existing installations is not disturbed to the extent possible keeping in view of the work of cutting existing cables, making straight joints and terminating cable ends in the feeder pillar, switchgear etc. shall be carried out within the shortest possible shut down periods to instruction.
- 6.** Armoring of the PVC-A-PVC / XLPE armored cables shall be effectively earthed at the termination glands and connecting to the nearest earth point. The tail end shall be taped with PVC adhesive tape appropriate colour.
- 7.** The cable to be supplied by the Contractor shall be in standard drum length and straight joint shall be avoided as far as possible. Incase same cannot be avoided the Contractor shall supply the requisite number of straight joints complete with jointing materials and accessories shall carry out the jointing work at their cost.
- 8.** Necessary marking and lettering giving details of the circuits, cables etc shall be carried out on the pedestal and LT panels as per the directions given.
- 9.** All the supporting frame work of the DB/LLP and other equipment shall be painted with two coats of primer and two coats of finishing paints of grey shade no 631 of IS : 5 after proper surface cleaning, de-greasing, chemical cleaning as per the recommendation of the manufacturer.
- 10.** Caution board vitreous enameled written in three languages, one being the regional language, shall be fixed or displayed to indicate danger and supply pressure according to the Indian Electricity Rules 1956 wherever the supply is at 440 Volts and above.
- 11.** Necessary cable route indicators and cable joint indicators shall provide at an interval of 200 Meters approximately.

- 12.** The work shall be carried out in accordance with the best standards of workmanship and to the entire satisfaction of the Engineer-in-Charge.
- 13.** The electrical installation shall conform to all currently applicable ISI specification such as IS: 732, IS: 3043, IS: 2309, IS: 3045 etc. with up to date amendments including relevant IEC regulation and Indian Electricity rules 1956 with up to date amendment.
- 14.** Necessary earthing of wiring, Load Panel, etc set will be carried as per the IE rule & Act.
- 15.** For laying the new supplied cable, contractor shall take route approval in drawing from EIC same will be send to Civil Department for permission through proper channel for Civil Item like Road/Rail/RCC Crossing,.
- 16.** The Tenderers shall quote the rate for cable lying, which shall include the, cable tagging, dressing, end termination, appropriate size of glands & ferrule work as per requirement etc.
- 17.** All wiring, shall be concealed & LED fittings will be surface mounted Bulk Head, hence at the time of CIVIL work , firm shall be planed accordingly & continues touch with EIC for Concealed wiring / Points/ sub Ckt./location of LED fitting, LPP/Meter/DB , otherwise firm shall be responsible for any untoward situation & no claim what-so-ever shall be entertained
- 18.** Queries about the Technical Data
The Engineer-in-Charge will clarify queries on the Technical Data.
- 19.** Instructions
The contractor shall follow all instructions of the Engineer in Charge or his nominee which comply with applicable laws where the site is located.
- 20.** Safety
The Contractor shall be responsible for the safety of all activities on the Site.
- 21.** Quality Control
Identification of Defects
The Engineer-in-Charge or his nominee shall check the work carried out by Contractor and notify the Defects found if any. The Engineer-in-Charge or his nominee may instruct the Contractor to rectify the Defect.
- 22.** Deviations:
The bidder must read the tender document carefully and prepare the bid for submission. It is important to note that deviations, if any, must be brought out clearly in the technical offer, which shall be examined by DEENDAYAL PORT AUTHORITY. If the deviation statement submitted by the bidder does not contain any item, then it shall be construed that the bidder has accepted the same and no request from the Contractor, for any change, shall be accepted by DPA at a later stage. In any case, no change in specifications given in the tender agreement shall be permitted. However, only in unavoidable circumstances, DEENDAYAL PORT AUTHORITY may consider such requests from the Contractor, provided the Contractor submits its request with adequate justification.
- 23.** Approvals:
The Engineer-in-Charge shall give specific approval in writing within 7 Days to Contractor after written submission regarding Makes of Material to be used for the Contract and Drawings, if any to be furnished by the Contractor to Engineer-in-Charge for approval. Any corrections to be suggested by Engineer-in-Charge in

drawings, the days taken for rectification in drawings shall be in account of the Contractor.

24. Payments Terms:

All payments shall be made in Indian rupees unless specifically mentioned.

- i) 70% payment will be released against item covers supply, supply installation providing fixing together after receipt of material at site in good condition, after obtaining insurance cover as per tender condition and after inspection & certification of the same by DPA .
- ii) 20% of item rate against item covers supply, supply installation providing fixing together after completion of erection, installation, testing and commissioning etc. and 90% of item rate for item covers only laying/fixing etc. and after inspection & certification of the same by DPA .
- iii) 10% will be released after successful completion of whole work and handing over to DPA.

25. The payments toward laying of cables, Sub Circuit wiring/Point wiring, installation of Load Point Panel/DBs, LED Street Light/Bulk Head will be released only after successfully Testing, Commissioning/Charging.

26. For Erection of Load point Panel necessary civil work shall be carry out by the contractor as per direction of Engineer In charge or his nominee.

27. In case of manufacturer/ Authorized dealer/ civil contractor who do not have valid electrical contractor license, they have to provide, their employee having electrical supervisory certificate while carrying out electrical works or The whole electric work carried out by the Sub Contractor should have electric license & having experience of the work carried out in Government / PSU or any industries, in this case firm shall take prior approval from Chief Mechanical Engineer, Deendayal Port Trust

28. The contractor shall not deposit any materials at such a place that may cause inconvenience to the public or staff or nearby offices.

29. The Contractor shall execute the work in such a way that not to cause inconvenience to the public or staff or nearby offices and not to cause hindrance to traffic. Necessary barricading shall be done by the contractor at his own cost if required.

30. For the purpose of measurements the method prescribed in standard code of measurements of the concern work shall be applicable.

31. All tools, plants, scaffolding ladder etc and other machinery etc. required temporary for the purpose of execution of work will have to be arranged by the contractor at his own cost and storing of such tools, plants etc will have to be made by him.

32. All the work shall be carried out to the entire satisfaction of Engineer in Charge.

Signature & Seal of Contractor

Executive Engineer (E)

Approved Make List for Electrical Items

Sr. No.	Description	Recommended Makes
1	LT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ NICCO/ RALLISON/RAVIN/ HAVELLS/ UNIVERSAL/ UNISTAR/AVOCAB /ATLAS
2	LT PANEL	CPRI APPROVED
3	CHANGE OVER SWITCH	SIEMENS/L&T/ABB/C&S/SCHNIDER/ LEGRAND / INDOASIAN
4	SFU FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB/C&S
5	SFU FOR DISTRIBUTION PANELS & FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/HAVELLS/ C&S
6	MCCB FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB/ C&S
7	MCCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNIDER/ LEGRAND/ INDOASIAN/HAVELLS / C&S
8	MCB/ELCB/RCCB/ RCCBO FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/HAGER L&T/ABB / C&S
9	MCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/ HAVELLS/ STANDARD / C&S
10	MCB DISTRIBUTION BOARD	STANDARD / HENSEL/LEGRAND / INDOASIAN / HAVELLS / C&S
11	MULTI FUNCTION DIGITAL METER FOR MAIN LT DISTRIBUTION PANELS/DIGITAL KWH METERS	L&T/ENERCON/SECURE/L&G/ RISHABH
12	ANALOG VOLT/AMPARE METER FOR DISTRIBUTION PANELS AND FEEDER PILLERS	RISHABH/AE/ENERCON/L&T
13	SLECTOR SWITCH FOR VOLTMETER/AMPARE METER	L&T/SIEMENS/C&S

14	PVC WIRE WITH COPPER CONDUCTOR	POLYCAB/MILEX/GUJCAB/ STANDARD/ FINOLEX/ANCHOR
15	FLUSH TYPE SWITCHES, SOCKETS, HOLDERS AND CEILING ROSES & ELECTRONIC REGULATORS	ANCHOR/MK/NORTHWEST
16	DOOR BELLS/CALL BELLS	ANCHOR/LEGEND/MK/NORTHWEST
17	SEM Modular / MODULAR SWITCHES, SOCKETS, PLATES & BOXES	ANCHOR / MK / NORTHWEST / LEGRAND
18	PVC CONDUIT/OVAL CONDUIT & CASSING CAPPING AND ACCESSORIES	PRECISION/VULCAN/FINOLEX/ GARWARE/RESTOPLAST/SWASTIK/BPI/ASTRAL
19	LUMINARIES	PHILIPS/BAJAJ/WIPRO/CROMPTON GREAVES / OSRAM /C&S SURYA ROSHNI /GE/C&S
20	LED Luminaries	Philips /Bajaj/Wipro/CG/Surya/Pyrotech/Syska/Nessa/C&S having surge Protection >10KV for fittings & internal Surge Protection for Driver of >4KV, LED Chip only OSRAM/CREE/Philips Lumileds//Citizen/ with LM-79,80
21	CEILING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
22	WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
23	EXHUAUST FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
24	HEAVY DUTY INDUSTRIAL WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
25	ELECTRIC MOTOR	ALSTOM/CROMPTON GREAVES /SIEMENS/ KIRLOSKAR/ABB/LUBI
26	WATER PUMPS	SWASTIK / KSB/KIRLOSHKAR/TEXMO/LUBI
27	LUGS & CABLE GLANDS	DOWELLS / JAINSON / BRACO

**Seal & Sign of
Contractor**

Sd/-
**Executive Engineer (E)
Deendayal Port Authority**

Schedule-B

Sr. No.	Description	Qty	Unit	Rate	Amount
1	Supply at site 4 Core, LT armored aluminum conductor XLPE cable of 1.1KV grade of the following type & size as per Technical Specification No. 1				
a	4 Core, 150 Sq. mm	400	Mtr		
b	4 Core, 95 Sq. mm	150	Mtr		
c	4Core , 6 sq.mm	300	Mtr		
2	Lying Single / Double length of LT armored aluminum conductor XLPE cable of 1.1kV grade up to 150 Sq.mm through various route. <u>Laying of Cable up to size 4CX 150 sq.mm Cables</u> i). Through Hard / Soft Soil Excavation. ii) Through RCC Road/Rail HDD(Horizontal Directional Drilling) by Putting HDPE pipe iii) Through in RCC Trench. iv) On wall through PVC Pipe & Clamp As per Technical Specification No:-2	300 150 100 300	Mtr Mtr Mtr. Mtr.		
3	Supply, installation, Testing & commissioning following type Load point panel as per Technical specification No:- 03 a). Type A b). Type B	01 01	No. No.		
4	Providing & fixing following concealed wiring for single phase sub-circuit from the main switch /meter/DBs /MCBs to the switch board with 2x2.5 Sq.mm. copper conductor to be used as phase & neutral and bare copper wire as earthing as per Technical Specification	715	Mtr.		

	No. 4				
5	Providing and Fixing concealed wiring for light/tube/bell point with PVC insulated single core standard 1.5 Sq.mm. copper conductor wire as per Technical Specification No.5	55	Nos.		
6	Providing and Fixing concealed wiring for Fan point with PVC insulated single core standard 1.5 Sq.mm. copper conductor wire & single/twin module step cut electronic fan regulator as case may be as per Technical Specification No. 06	19	Nos.		
7	Providing and fixing concealed wiring for 3 x 5/6A X250 Volt Half point as per Technical Specification No. 07	34	Nos.		
8	Supply & installation of following type distribution board (type A & B) along with TP, DP,SP MCCB's & ELCB as per Technical specification No:- 08 a). 4 Way TPN (4+12 Way) Double Door Distribution Box.	03	Nos.		
9	Providing and fixing concealed wiring for 15/16A X250 Volt power point as per Technical Specification No. 9	02	Nos.		
10	Providing and fixing concealed wiring for 20A, A.C point as per Technical Specification no. 10	05	Nos.		
11	Providing and fixing concealed wiring for 3 x 5/6A X250 Volt plug point with 3nos. SP switches for computer as per Technical Specification No. 11	6	Nos.		
12	Supply of LED tube Light 20/22 watt cool white LED light complete fittings in all respect as per Technical Specification No:- 12	45	Nos.		
13	Fixing of LED tube Light 20/22 watt cool white LED light complete in all respect as per Technical Specification No:- 13	45	Nos.		

14	Supply of Street Light 150 watt warm white LED light along with connector, complete in all respect as per Technical Specification No:- 14	16	Nos.		
15	Installation , Testing commissioning of Street Light 150 watt warm white light along with connector, fasteners, hardware complete in all respect as per Technical Specification No:- 15	16	Nos.		
16	Supply of following type Surface mounted Bulkhead. a). 18 Watt. LED light complete in all respect as per Technical Specification No:- 16	16	Nos.		
17	Installation, Testing commissioning of following type Surface mounted Bulk head. b). 18 Watt. LED light complete in all respect as per Technical Specification No:- 17	16	Nos.		
18	Supply of following type High Bay LED fitting, along with FRP Junction Box (Size 150X150X1.6mm) with single compression Gland suitable Loop in loop out along with connector. a). 150 Watt. LED light complete in all respect as per Technical Specification No:- 18	25	Nos.		
19	Installation, Testing commissioning of following type Surface mounted Bulk head along with FRP junction box. b). 150 Watt. LED light complete in all respect as per Technical Specification No:- 19	25	Nos.		
20	Supply of following size 1200 mm sweep ceilings fan as per Tech. Spec. No:- 20	19	Nos.		

21	Installation, Testing commissioning of 1200 mm sweep ceilings Fan as per Tech. Spec. No:- 21	19	Nos.		
22	Supply of following size 200 mm sweep exhaust fan as per Tech. Spec. No:- 22	8	Nos.		
23	Installation, Testing commissioning of 200 mm sweep ceilings Fan as per Tech. Spec. No:- 23	8	Nos.		
24	Supply of 24", 600 mm sweep, industrial type, wall mounting Fan as per Tech. Spec. No:- 24	10	Nos.		
25	Installation, Testing & commissioning of 24", 600 mm sweep, wall mounting Fan as per Tech. Spec. No:- 25	10	Nos.		
26	Supply , Installation , Testing & commissioning of 3 Phase , 4 Wire Digital energy meter as per Technical specification NO:-26	1	Nos.		
27	Supply , installation , Testing & commissioning of Ding Dong " Electric Bell" operating voltage :- 240 V , single phase ,as per Technical Specification No:- 27	6	Nos.		
28	Preparation earthing station, chemical treated back filled compound earthing system with Pipe-In-Pipe 50 mm Dia GI type 3 Mtr Depth , Maintenance free as per Technical Specification No. 28.	6	No.		
29	Providing & connecting following type earth wire for earth station to equipments as per requirement As per Tech. spec. No:- 29. a) 12 SWG GI earthing wire. b) 25X3 Hot Dip GI Strips.	200 50	Mtr. Mtr.		
Total Amount in INR					

(In words Rupees _____ only)

(NOTE: The rates should be inclusive of all taxes, duties, fees, cess etc and all incidental charges; but exclusive of GST).

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority