# DEENDAYAL PORT AUTHORITY

An ISO 9001 : 2008 & ISO 14001 : 2004 Certified Port

Office of Executive Engineer (Electrical),
Ground Floor, Nirman Building, New
Kandla, Kutch– 370210

No.: EL/ AC-Budgetary Offer/2910/ Date: 28/03/2026.

## "Budgetary Offer"

Sub: **"Supply, Installation, Testing & Commissioning of Smart Roadway Street Lighting System from KASEZ ROB to Kandla ROB and Kandla ROB to North Gate including Comprehensive Annual Maintenance Contract."**

Executive Engineer (Electrical), DPA invites Budgetary Offers for the work of "Supply, Installation, Testing & Commissioning of Smart Roadway Street Lighting System from KASEZ ROB to Kandla ROB and Kandla ROB to North Gate including Comprehensive Annual Maintenance Contract" from the firms from those who have executed similar work in Government / Public Sector and other leading private organizations as per Scope of Work and Technical Specifications enclosed herewith.

The interested firms are requested to submit their Budgetary Offers for the work in BOQ format enclosed herewith along with the completion certificate for the similar work to the office of the undersigned on or before 20/04/2026 through hard or soft copy. A soft copy of Budgetary Offer shall be submitted through e-mail Id cme@deendayalport.gov.in, and copy to deepak.hazra@deendayalport.gov.in.

Sd/-
Executive Engineer (E)
Deendayal Port Authority

Sub.: **Supply, Installation, Testing & Commissioning of Smart Roadway Street Lighting System from KASEZ ROB to Kandla ROB and Kandla ROB to North Gate.**

## BILL OF QUANTITY

| Sr. No. | Description | Qty. | Unit | Rate | Amount |
|---|---|---|---|---|---|
| 1 | Supply at site 10-Meter-long galvanized octagonal street light pole with 1.5 Mtr. long detachable double Arm as per Technical Specification No. 1. | 340 | Nos. | | |
| 2 | Erection of supplied 10-Meter-long galvanized octagonal street light pole with 1.5 Mtr. long detachable double Arm along with civil foundation as per Technical Specification No. 2. | 340 | Nos. | | |
| 3 | Supply of Energy Efficient 250 W **(±5%)** LED Street Light luminary as per Technical Specification No. 3. | 680 | Nos. | | |
| 4 | Fixing of 250 W **(±5%)** LED Street Light Luminary with all accessories as per Technical Specification No. 4. | 680 | Nos. | | |
| 5 | Supply, Installation, Testing & Commissioning of IoT Base smart feeder Pillar with all accessories as per Technical Specification No. 5.<br>(a)Supply | 09 | Nos. | | |
| | (b)Installation, Testing & Commissioning | 09 | Nos. | | |
| 6 | Providing IoT, Dashboard, Software, Network & Cloud services for ILM & CCMS for 5 years as per Tech Spec No. 6. | 02 | No. | | |
| 7 | Supply at site 4 Core, LT armoured aluminium conductor XLPE cable of 1.1 KV grade of the following type & size as per Tech Spec No. 7.<br>4 Core, 16 Sq. mm.<br>4 Core, 50 Sq. mm.<br>4 Core, 70 Sq. mm.<br>4 Core, 120 Sq. mm. | <br>10000<br>2000<br>4000<br>4000 | <br>Meter<br>Meter<br>Meter<br>Meter | | |
| 8(a) | Laying of 4.0 Core LT armoured alluminium conductor XLPE cable of 1.1KV grade of the following type & size through excavation in soft/hard soil as per Tech Speci No. 8(a).<br>i) Single length up to 4.0 Core x 120 Sq. mm. | 3000 | Meter | | |
| 8(b) | Laying of 4.0 Core LT armoured alluminium conductor XLPE cable of 1.1 KV Grade of | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | following type & size in half round RCC pipe of 6" internal dia. as per TechSpec No. 8(b).<br>i) Up to 4.0 Core x 120 Sq. mm. in 6" half round pipe | 4000 | Meter | | |
| 8(c) | Laying of LT armoured aluminium conductor XLPE cable of 1.1 KV grade of size up to 120 Sq. mm. through Road crossing in Horizontal boring with suitable size of HDPE heavy duty pipe as per Tech Spec No. 8(c).<br>i) Up to 4.0 Core x 120 Sq. mm. through horizontal boring in suitable size HDPE pipe | 2000 | Meter | | |
| 8(d) | Laying of LT armoured aluminium conductor XLPE cable of 1.1 KV grade of size up to 120 Sq. mm. through suitable size of HDPE heavy duty pipe as per Tech Spec No. 8(d).<br>i) Up to 4.0 Core x 120 Sq. mm. through suitable size HDPE pipe | 1000 | Meter | | |
| 8(e) | Laying of 4 Core, 16 Sq. mm. LT armoured aluminium conductor XLPE cable of 1.1 KV grade existing octagonal pole by inserting flexible pipe of hard PVC of size 50 mm. two length from ground level to Termination Point fixing with heavy duty cable tie. as per Technical Specification No. 8(e).<br>i) 4.0 Core x 16 Sq. mm. in flexible pipe of 50 mm. dia. | 10000 | Meter | | |
| 9 | Supply, Installation, Testing and Commissioning of Double Pole Structure with D.O. Fuse on 11 Mtr. RCC/PSC pole of 200KG complete with Labour and Material as per Tech Spec No. 9.<br>(a)Supply | 8 | Nos. | | |
| | (b)Installation, Testing & Commissioning | 8 | Nos. | | |
| 10 | Supply, Installation, Testing & Commissioning of Street Light Feeder Pillar fabricated from M. S. Steel as per Tech Spec No. 10.<br>(a)Supply | 9 | Nos. | | |
| | (b)Installation, Testing & Commissioning | 9 | Nos. | | |
| 11 | Preparation of poles earthing system with GI pipe as per Technical Spec No. 11. | 340 | Nos. | | |
| 12 | Preparation of Feeder Pillar earthing system with GI earth plate including required accessories and civil work as per Tech Speci No. 12. | 26 | Nos. | | |
| 13 | Supply and Erection of protection guard having the height of 1.5 Mtr. above ground level fabricated from main horizontal and vertical members of MS angle of size 75×75×10 mm. with cross bracing of MS | 8 | Nos. | | |

| | | | | | |
|---|---|---|---|---|---|
| | angle of size not less than 50×50×6 mm. including necessary foundation work as per technical specification no. 13. | | | | |
| 14 | Supply, Installation, Testing & Commissioning of 11/0.433 KV, 50 Hz., 100 KVA outdoor type 3-star rating distribution transformer, complete with its accessories & protective, measuring devices and as per Tech Spec no.14.<br>(a)Supply<br>(b)Installation, Testing & Commissioning | <br><br><br><br>4<br>4 | <br><br><br><br>Nos.<br>Nos. | | |
| 15 | Liasioning work with PGVCL authority for allotment for 3 phase LT Supply & Connection at various locations with complete work as per Tech spec no. 14. | 1 | Lump-sum | | |
| 16 | Comprehensive Maintenance Contract for the entire system for 5 years after free warranty maintenance of 1 year from the date of completion of the capital work. | 60 | Month | | |
| | | | | Total | |

(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**

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

# Scope of Work and Technical Specification

## 1.0 Scope of work

The scope of work envisages the following:

- Design, Manufacture, Supply, Installation, Testing & Commissioning of Road Lighting System as per the BoQ, Technical Specifications with all Labours, Materials, Transportations, Loading and un-loading etc. The work shall be carried out at Kandla and the Site shall be cleaned after completion of the work.
- The work shall be carried out strictly as per the IER and IEA.
- The Contractor shall submit the Design of the Illumination with Minimum 40 Lux with uniformity factor of 0.4

## Technical Specification

### Technical Specification No. 1

**Supply of 10 Meter Octagonal Pole with 1.5- Meter dual arm Bracket with complete its accessories.**

- The Product should be designed for the specific climatic and environmental conditionsof the region to ensure full durability and safety throughout its designed life.
- All the Octagonal Poles shall be designed to withstand the maximum wind speed of 180 km/Hr. and as per IS 875 or latest. The top loading i.e. area and the weight of fixtures are to be considered to calculate maximum deflection of the pole and the same shall meet the requirement of BS EN 40-2-1&3 or as per latest.
- The pole shaft shall have octagonal cross section and shall be continuously tapered with single longitudinal welding. There shall not be any circumferential welding of the pole shaft. The welding of the pole shaft shall be done by Submerged Welding process.
- All octagonal pole shafts shall be provided with the rigid flange plate MS FE410 conforming to IS 2062 of suitable thickness with provision for fixing minimum 4 foundation bolts. The base plate shall be fillet welded to the pole shaft at two locations i.e. from inside and outside. The welding shall be done as per qualified MMAW process or as directed by Engineer in charge.

  The materials of the pole as follows:

  (a) Pole - Conforming to grade S355J0, with 4 mm. wall thickness.
  Pole Dimensions: - Top (A/F)-Min 70mm, Bottom(A/F)- Min 175mm ,
  Base Plate-275x275x16mm
  (b) Base Plate: - Fe 410 Conforming to IS 226/ IS 2062, b/w poles & Base plate four Nos. of shifters in each pole shall be provided.
  (c) Foundation Bolts: - Hot dipped 6.8 Gr. as per IS 1367 or as per latest.
  (d) Pole Sections: - The Octagonal Poles shall be in single piece with single longitudinal welding joint,
  (e) Galvanization: - The poles shall be hot dip galvanized as per IS 2629 / IS 2633/ IS 4759 and BSEN ISO 1461 standards or as per latest with average coating thickness of 100 micron & above. The galvanizing shall be done in single dipping.

- The pole manufacturing & galvanizing unit shall be ISO 9001: 2000 & ISO 14001 or latest certified to ensure consistent quality & environmental protection.

- The poles shall have integrated Junction box with openable door with secured arrangement for opening of the door and shall be of adequate size (Not less than 500 mm. length) at the elevation of 1500 mm. from the base plate. The door shall be hinged type with mechanical interlock, dust proof, weather proof and vandal resistance and shall ensure safety of inside connections and components. The door shall be flush with the exterior surface and shall have suitable locking arrangement. The pole shall be adequately strengthened at the location of the door to compensate for the loss in section.
- The suitable cutout for door opening may be 500 mm. with reinforced & whether proof having locking arrangement by allen key (same shall be submitted to DPA in 4 Sets) of the Junction Box shall permit clear access to the components inside viz., insulated termination strips, connectors, MCBs, cables etc. There shall also be suitable bolt arrangement for the purpose of earthing.
- Two nos. Earth Boss shall be provided at the bottom of the pole or on base plate (diagonally opposite) suitable for connecting 25X6 mm. GI/ CU earth strip or SWG wire for earthing of the poles.
- Earthing of each pole shall be carried out with one dedicated earth coil. The earth coil shall be GI as recommended in the latest version of IS. The earth coil shall be connected with 8 swg two GI wire to the two distinct earth boss on the pole.
- Aesthetic appearance - All the grooves and carvings of the pole unit shall be free from any kind of distortion for a pleasing aesthetic appearance.
- Top Mountings –The octagonal 10mtr pole should be supplied along with galvanized double arm bracket made from GI Pipe of suitable size of dia., 1.5-Meter- long suitable for it to install on top with its accessories as directed by Engineer in charge prior to approval of Engineer in charge with drawing, Luminaries fixing at dual arm as per design of LED Luminaries.
- The Poles shall be bolted on a pre-cast RCC or at site along with set of foundation bolts for greater rigidity under supervision & certified by Civil Department, DPA.
- The Contractor shall carry out all the relevant tests and inspection in the presence of the DPA or Third-Party Inspection Agency appointed by DPA, before the dispatch of the poles at no extra cost to be borne by DPA.
- All the material/equipment/accessories shall be supplied with manufacturer's test certificates at site.
- Contractor shall submit the Proposed Product Catalogue, Detail Data sheet, spareparts list and drawing of Pole & Bracket along with the BID for each product quoted.

**Technical Specification No. 2**

**Erection of 10 Meter Octagonal Pole with 1.5-Meter dual arm with complete its accessories.**

The poles shall be erected in plumb at a distance of 30 Meter, bolted on a precast RCC foundation with a set of four foundation bolts for greater rigidity. This includes fixing & erection of 10-Meter-long with detachable type double arm octagonal pole on foundation to be prepared by excavation of pit of 600 mm.(W) x 600 mm.(L) x 1800 mm.deep after carrying out necessary excavation in the existing divider. All the waste material is to be dumped as directed by Engineer-In Charge.

This also includes Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying including the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge."(Note :- Cement content considered in this item is @ 330 kg/cum. "Excess/ less cement used as per design mix is payable/recoverable separately). Providing M-30 grade concrete instead of M-25 (Concrete with minimum cement content of 350 kg /cum at all floor levels) Steel reinforcement for R.C.C.

work including straightening, cutting, bending, placing in position and binding all complete up to plinth level and above. Thermo-Mechanically Treated bars of grade Fe-500 D or more. Foundation hot dipped GI bolt of size 900mm.long "J" type of M24mm.dia. shall be buried in the RCC up to the length of 775 mm. and 125 mm. should be projected length over the foundation thereafter pit shall be filled with 1:2:4 CC mix of cement concrete and 6 to 20mm.graded metal course aggregate concrete. DWC pipe of suitable size shall be kept while concreting for IN & OUT of cable. This also includes supply and installation of GI Coil earthing to each pole of 7 to 10 Meter.

The termination and connection through insulated connector and DIN rail MCB with junction box shall provide, cable brass glands of suitable size including earth linking to the pole and junction box with 8 SWG GI wire with all materials and labours as directed by Engineer-in-charge.

**Technical Specification No. 03**

Supply at site energy efficient 250W (±5%) LED Street Light (Natural White). The rate shall be firm and inclusive all taxes, packing and forwarding, insurance, loading at supplier's depot, transportation and unloading at site work. The LED fixtures should be suitable for pole pipe bracket.

The contractor shall take prior approval from the Engineer-In-Charge for make of LED Street Light fixture.

Technical Requirements for LED Street Light are as under:

| Sr. No. | Parameter | Requirement / Details |
|---|---|---|
| 1 | Type | 250W (±5%) Street light LED (Natural White) Luminaire complete with IoT based control node for remote monitoring, switching, dimming, energy monitoring and fault detection for individual control and monitoring of Input Parameters of the street lights, with all accessories, wiring, installation and commissioning. |
| 2 | Luminaire Housing | Housing to be made of Pressure Die-Cast Aluminum ADC12 alloy. Large surface area with fins to dissipate the heat to ambient air. Luminaire must have separate led driver and optical compartments to ensure easy serviceability and thermal management. Construction standards according to: IS 10322-1, IS 10322-5-3. |
| 3 | Finish | Surface Finish: UV resistant aliphatic polyurethane/epoxy polyester hybrid Powder Coating.<br>Corrosion Resistance: Suitable for C5 highly corrosive environment with high humidity and aggressive environments. |
| 4 | Heat Sink | Well-designed thermal management system with defined heat sink for heat dissipation |
| 5 | MCPCB (Metal Core Printed Circuit Board) | Highly heat-dissipating aluminium MCPCB base with copper thickness ≥75-micron & 2 W/mK thermal conductivity using proper thermal interface material. |
| 6 | Front Cover | 4 mm. thick extra-clear Toughened Safety glass |
| 7 | Optics | Optical System shall be provided with dedicated lenses array for LEDs. Lenses to be made of UV stabilized, Injection moulded non yellowing PC/PMMA cluster lens ensuring low glare & best in class uniformity. |
| 8 | LED chip make | As per Approved Make list ----- Nichia, Osram, CREE, Bridgelux |
| 9 | LED wattage | 1.5-6 Watt |

| | | |
|---|---|---|
| 10 | SDCM | SDCM ≤ 5 |
| 11 | Correlate Color Temperature: CCT | CCT: ≥ 4000°K ± 275 (Tolerance as per ANSI C78:377A). |
| 12 | Color Rendering Index: CRI | CRI: ≥70 |
| 13 | LED lumen maintenance | L90B10 ≥100,000 Hrs. @ 35°C |
| 14 | LED chip Efficacy | >180 Lm/Watt system lumen output at 25 degree C, supported by LM80 report, to be submitted. |
| 15 | Rated Voltage | 240V AC |
| 16 | Input Voltage range | Single Phase 140V – 270V AC, 50 Hz |
| 17 | Frequency | 50 Hz ±3% |
| 18 | Power Factor | ≥0.95 |
| 19 | Total Harmonics Distortion (THD) | <10% at full Load |
| 20 | System Wattage | 250 W (±5%) |
| 21 | Total Lumen Output | ≥36000 lumens |
| 22 | System efficacy | ≥ 150 lm/W |
| 23 | Ingression Protection- IP Rating | IP-66 |
| 24 | Impact Resistance- IK rating | IK-08 |
| 25 | Operating Temperature Range | -10°C to + 50°C |
| 26 | Electrical Insulation Class | Class-I |
| 27 | Surge Protection | Inbuilt surge protection of 6KV (Common & Differential Mode) and additional SPD of 20KV/10KA surge protection to be provided within the driver compartment. |
| 28 | Driver Make | Inventronics / MOSO / Osram/Meanwell |
| 29 | Driver Type | Constant Current based Electronic Driver, shall support Analog dimming Support - 0 to 10V for energy saving, support auxiliary power for IoT controller 5 to 12V DC @mA. |
| 30 | LED Drive current | >=350 mA<700 mA |
| 31 | Driver Efficiency | > 90% |

| | | |
|---|---|---|
| 32 | Driver Life | > 50,000 hours and MTBF of LED driver should be > 2,00,000 hrs at nominal operating temperatures |
| 33 | Junction Temperature (Tj) | Should be less than value at which LM80 (IS16105) data published |
| 34 | Operating Humidity | 10% to 95% RH |
| 35 | Clip / Fasteners | Corrosion free/ Stainless steel. |
| 36 | Wire | The connecting wires used inside the luminaries, shall be Low Smoke Halogen Free, fire retardant e beam cable. |
| 37 | Testing Compliance | LM-79/1S: 16105 Test Report from Third Party NABL Approved Lab LM-80/1S: 16106 Test Report from LED Manufacturer TM21 life projection calculations |
| 38 | Safety & EMI & EMC Compliance for Driver | BIS: IS 15885(Part2/Sec13)EN/IEC 61347-1, EN/IEC 61347-2-13 EN 61000, EN55015, EN 61547 |
| 39 | BIS Luminaire | As per IS 10322 (Part 5/ Section 3) |
| 40 | Protection Required in Driver Module | Over Temperature, Under Voltage / Short Circuit, Over Voltage / Open Circuit & Output failure protections |
| 41 | Control | Luminaire Pre fitted with NB-IoT / 4G/ 5G technology-based controller for individual control and monitoring of Input Parameters of the street lights. ON, OFF, dimming, fault detection, schedule-based operation and manual operation for controlling of luminaries |
| 42 | Communication | The Induvial Light Monitoring (ILM) shall have onboard nano SIM slot for communication with NB-IoT / 4G / 5G network and exchange data over Secure communication with Secure Socket Layer (SSL). ILMC shall have high end chipset / microprocessor or equivalent with memory onboard for data processing, no communication antenna shall be outside ILMC unit. |
| 43 | LED ROHS Compliance (self-certification) | Manufacturer shall submit the Photo Biological safety Report for the LEDs as per IEC62471 |
| 44 | Warranty / Guarantee | 5 Years |

**Technical Specification No. 4**

This includes fixing & commissioning of supplied 250 W ($\pm$5%) LED (Natural White) Street Light Luminary. The supplied fitting shall be fixed on 1.5 Mtr. double arm GI pipe bracket or as directed by EIC on nipple on the Octagonal Pole cross arm. This includes Electrical connections - Four-way connectors shall be provided along with Slide lock suitable for connecting 1.1 kV grade, 4 core X16 Sq. mm. Al cable. It shall also inhouse1 no. 6-10 amps DP MCB, 2.5 Sq. mm. connectors for looping with 2.5 Sq. mm. Copper wires for connecting to the luminaries through 0.6 KV grade, 3 core X 2.5 mm² PVC insulated copper conductor flexible un-armoured Cable from the terminal block to the fixture within the pole. All the cables laid through the pipe shall be without any joint. This also includes necessary wiring, connections & necessary earth linking connections with all material, labour, tools & tackles as directed by Engineer-In-charge.

**Technical Specification No. 5**

**Supply, Installation, Testing & Commissioning of IoT Base smart feeder Pillar**

Supply, Installation, Testing & Commissioning of NB-IoT / 4G LTE based Smart CCMS Meter Based Lighting Control Panel suitable for centralized control and monitoring of street lighting feeder, complete with smart energy Meter, inbuilt communication controller with SIM connectivity, cloud-based lighting management software and web/mobile monitoring system for remote operation of feeder panel.

The panel enclosure shall be fabricated from CRCA sheet steel (minimum 16 SWG body, 14 SWG mounting plate and gland plate) with IP65 ingress protection and IK10 impact resistance, powder coated RAL 7032 with 7-tank process, complete with locking arrangement, proper earthing terminal, engraved aluminium name plate and internal wiring with ferrules, terminals and connectors as per industrial standards.

The 3-phase smart lighting control panel shall have load capacity up to 20 KW (25 kVA) (or as required) and include reputed make electrical components such as MCBs, contactors, busbars, terminals (Connectwell/Elmex) and accessories like ABB / Schneider /L&T or equivalent.

The system shall monitor phase voltage, phase current, power factor, frequency, total kW, kVA and cumulative kWh, and detect faults such as MCB trip, contactor fault, mains failure, door open status, over-voltage, under-voltage, over-current and over voltage alerts.

The CCMS shall support remote ON/OFF control, schedule-based operation (Astro timer / configurable schedule), real-time monitoring, energy reporting, event alerts and data logging through cloud-based street light management software, with two-way communication, firmware OTA upgrade capability and minimum 30 days data storage, accessible through web and mobile application dashboards.

The system shall comply with IS-16444 and IS-15959 communication protocol standards, communicate securely over 4G / 5G / NB-IoT cellular network, and provide features such as dashboard monitoring, asset management, daily operational reports, energy consumption reports, SMS/email alerts and GIS map view of feeder panels.

**Technical Specification No. 6**

**Providing IoT, Dashboard, Software, Network & Cloud services for ILM & CCMS for 5 years with following specifications:**

Network Services specifications: The advanced and latest technology for communication is must and preferred likes of NB-IoT/ 4G/ 5G. The network readiness at site location shall be 100% and it shall be public network only. The network up-time must be 99% as per DoT guidelines and shall have license to deploy and maintain the network from Department of telecom, Govt. of India. The network service provider (NSP) shall have experience of providing network service under Make in India Initiative in any Public/Private sector and have capability to scale and maintain the network during project term.

Cloud Services specifications: The CCMS based lighting management software shall be monitored and controlled from any internet connected device(s) like laptop, desktop, mobile apps with 2 steps / factor login authentication for security of data access. This CCMS Lighting Management software / app shall be developed under Make in India by Indian registered agency only and must have experience of building scalable software's or mobile apps in the past for India based users / subscribers in any sector. The software must be hosted on MeitY (Ministry of electronics and IT dept, Govt. of India) approved cloud server and managed by clous service provider (CSP) agency empaneled on GoI, MEGHARAJ portal as CSP. The encrypted data should not cross or storage (shall not be done or accesses physically or virtually) it should be within boundaries of India. The CSP shall have data

centers (DC) and data recovery center (DR) in India and must have previous experience of handling data communication. The cloud server infrastructure shall be certified to International Organization for Standardization (ISO) 27001. It must be scalable platform for easy future upgrade developments and efficient maintenance. The server availability (SA) must be 99.5% or higher. The server shall be designed in such a way that, the CPU utilization < 60% and disk utilization <75%. The cloud server shall use cloud services or stack of Azure /AWS.

CCMS Software specifications: The CCMS Lighting Management Software shall support both CCMS feeder and individual light monitoring and control the same platform with single login to the system, no separate software or login required for end user. The inventory management feature is must. The Lighting Management Software (LMS) should be deigned, hosted, and managed by Indian origin organization within India under Make-In-India policy, GoI. This LMS software shall support and scalable, support virtual Group creation and operation, manual operation (ON/OFF), Individual dimming or virtual group-based dimming, schedule On/Off and dimming, Metering data collection, Scheduling based on astronomical clock (default), Seamless dimming 10-100%, display real time Alert status, data polling time minimum every 1 hours (default) and configurable up to 1 minute. Software shall support, graphical representation for project KPI's.

The software shall have provision for selection of astronomical Mode, Calendar (Schedule mode), Manual Mode. The dashboard must have Street Light & CCMS Panel Status, energy saving status of whole system, Summary of all devices connected – Online, Offline, faulty, maintenance mode and no power details. Also, alert, project inventory details shall be displayed on dashboard. The operation response time in maintenance mode shall be < 10 sec, data update time on LMS < 10 min, Alert reflection time < 10 sec, can map all switching point on the map / Google map interface or web based digital map. All control point's data/status visualization on a map for monitoring On/Off/Dimming commands from Map/List View, Wattage on each control points, Voltages on each control points, Current on each control points, PF on each control points, Metering kWh cumulative for total system, Metering kVAh cumulative for total system, Incoming supply status on each control points, High / Low voltage on each control points, Overload on each control points, Overcurrent of all control points, Over / Under voltage of all control points, Power outage of all control points, Manual ON or OFF of all control points, Power Theft of all control points, Relay failure of all control points, Lamp Failure of all control points, Lamp Life of all control points, Node loss of all control points, Alert Status, All alert records / history, Alert level & ID, Ability to clear / acknowledge or auto resolved the alarms, Display alarm list with date and time stamping, Display details for each alarm type, status, area Easily navigate between maps and alarms, Alarm details along with corrective suggestions, "Provision to configure max 3 Mobile Number`s for getting alerts on email, SMS or from dedicated WhatsApp number to group", Alert Configurations (severity), Escalation Matrix Management & Reporting, Setting new ON / OFF timings, Setting the Real Time Count (RTC) time of Automation unit, Reset the unit.

The remote FOTA upgrade facility support is must. The software application support "Create hierarchy ex) City > Region / Ward > Lane / Road > Street Light", Grouping control points, Alert level with ID and probable condition must be mentioned under alert ID. The LMS server should support Real time data storage for last 24 Months, archive data on cloud for 5 years. All historical data shall be stored for 5 years. The LMS shall support reports for Energy saving report, Lamp failure report, Actual hours of operation, Lamp up-time (%), Export as CSV format, Manual & Auto Generated Reports, Events & Log Management, Daily, Monthly, Yearly Trends, Hierarchy Definition & Creation, Group Creations, User authorization Management, log-in credentials, Group & Role Management, Add/remove control points by admin user, Semi-manual commissioning through application, all control points continue working in local mode as per Astro time in case of no communication or network failure.

The hardware commissioning must be done through mobile app and upload details to LMS during installation and commissioning. The QR code reader app must be provided for onsite commissioning, and QR code sticker shall present on CCMS panel, individual controller and lights comprising of OEM details, model, year and month of manufacturing, unique serial number, wattage details, panel details etc.

**Technical Specification No. 7**

(a) This includes supply at site 1.1 KV grade, 4 Core, 16 Sq. mm. Aluminum conductor, XLPE insulated armored cable confirming to IS: 7098 (Part-I) 1985 with up to date amendments and of approved make with ISI mark. The cable shall have marking/embossing at the interval of every Meter showing its progressive length. The contractor shall produce the routine test certificate during supply of cable at site. The rate shall inclusive of all taxes, duties, packing, forwarding, insurance, transportation and unloading at site of work etc.

(b) This includes supply at site 1.1 KV grade, 4 Core, 50 Sq. mm. Aluminum conductor, XLPE insulated armored cable confirming to IS: 7098 (Part-I) 1985 with up to date amendments and of approved make with ISI mark. The cable shall have marking/embossing at the interval of every Meter showing its progressive length. The contractor shall produce the routine test certificate during supply of cable at site. The rate shall inclusive of all taxes, duties, packing, forwarding, insurance, transportation and unloading at site of work etc.

(C) This includes supply at site 1.1 KV grade, 4 Core, 70 Sq. mm. Aluminum conductor, XLPE insulated armored cable confirming to IS: 7098 (Part-I) 1985 with up to date amendments and of approved make with ISI mark. The cable shall have marking/embossing at the interval of every Meter showing its progressive length. The contractor shall produce the routine test certificate during supply of cable at site. The rate shall inclusive of all taxes, duties, packing, forwarding, insurance, transportation and unloading at site of work etc.

(D) This includes supply at site 1.1 KV grade, 4 Core, 120 Sq. mm. Aluminum conductor, XLPE insulated armored cable confirming to IS: 7098 (Part-I) 1985 with up to date amendments and of approved make with ISI mark. The cable shall have marking/embossing at the interval of every Meter showing its progressive length. The contractor shall produce the routine test certificate during supply of cable at site. The rate shall inclusive of all taxes, duties, packing, forwarding, insurance, transportation and unloading at site of work etc.

**Technical Specification No. 8**

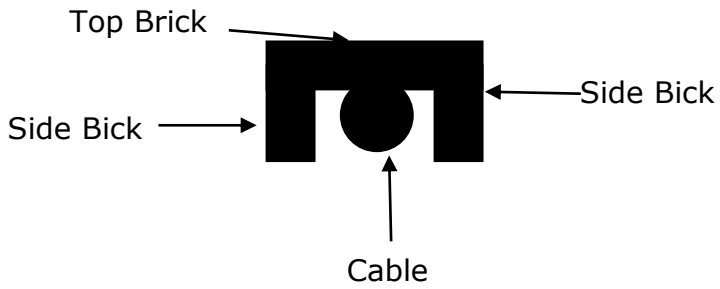
This includes laying & end termination of 1.1 KV XLPE armoured L.T. cable in proposed hard & soft Soil /Laying on half round ”6” RCC pipe / Laying through horizontal boring / laying through double walled corrugated HDPE pipe of suitable size.

**Method of Laying.**

(a) This includes laying of single length cable of size up to 4 core, 120 Sq.mm. LT armoured aluminum Conductor XLPE Cable of 1.1 KV Grade through excavation in soft/hard soil. The trench to be excavated 300mm.wide, 600mm.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 as per Sketch shown below 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 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

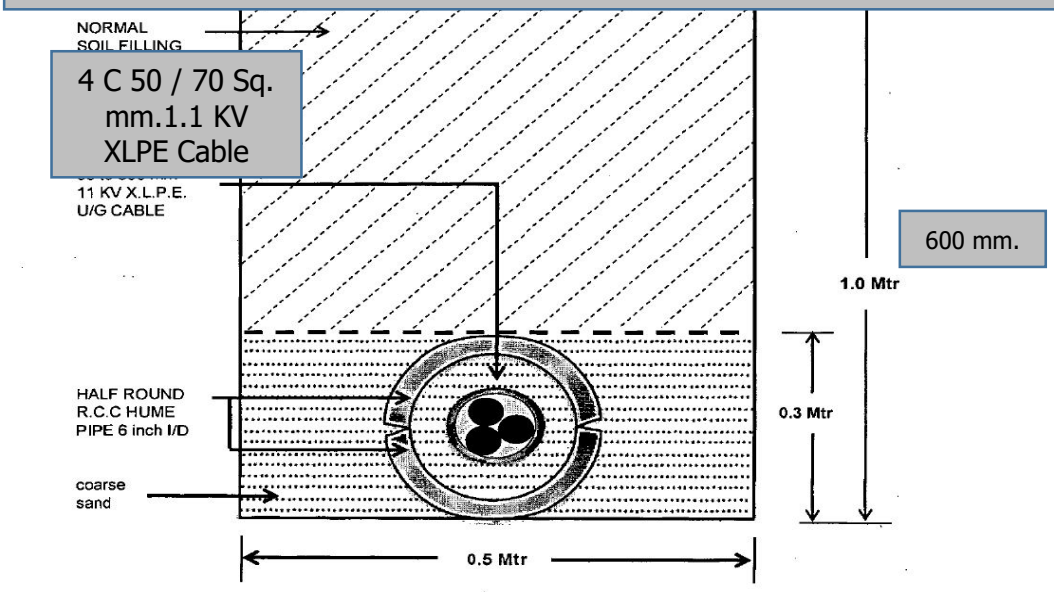
directed. Contractor has to places cable route marker at and interval of 20-Meter length the route marker shall be of heavy duty HDPE plate width red radium colour. The work includes complete labour and materials and to entire satisfaction of Engineer-in-charge.

Sketch




(b) The item includes laying of single length cable of size 4 Core x 50 Sq. mm.& 4 Core x 70 Sq. mm. LT armoured aluminum Conductor XLPE Cable of 1.1KV Grade both in the ½ round RCC hume Pipe 6" I/D the half round pipe should be laid on the coarse sand. The cable shall be laid on the existing half round pipe as shown in the drawing after laying of cable the pipe should be filled with fine sand and covered with half round pipe. At every approximately 15mtr length of there should be inspection chamber provided. The item includes required material and labour as directed by Engineer in charge.

Tentative Diagram of laying of 1.1 KV XLPE cable through Half Round pipe




(c) This includes laying of single length cable of size up to 4 core, 120 Sq. mm. LT armoured aluminum Conductor XLPE Cable of 1.1 KV. The contractor has to arrange horizontal boring machine and should bore minimum 2 Meter below ground level this also, include insertion of HDPE Pipe of size 75 mm. or more, pipe thickness 6.6 mm. wall having coupler arrangement at one side or flexible pipe of same dia, 400-Meter length may be used for above work. The work is to be executed at various locations and will be of different length After completion of boring and cable insertion, contractor has to places cable route marker at and interval of 20-Meter length the route marker shall be of heavy duty HDPE plate width red radium colour. The work includes complete labour and materials and to entire satisfaction of Engineer-in-charge.

(d) This includes laying of single length cable of size up to 4 core, 120 Sq.mm. LT armoured

aluminum Conductor XLPE Cable of 1.1KV Grade through excavation in soft/hard soil. The trench to be excavated 300 mm. wide, 600 mm. deep. The bed of 50 mm. of river sand shall be provided in the bottom of the excavated trench. The cable shall be laid over the bed of river sand in HDPE Pipe. 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. Contractor has to places cable route marker at and interval of 20-Meter length the route marker shall be of heavy duty HDPE plate width red radium colour. The work includes complete labour and materials and to entire satisfaction of Engineer-in-charge.

(e) This includes laying/ Fixing of single length cable of size 4 core, 16 Sq. mm. LT armoured aluminum Conductor XLPE Cable of 1.1KV Grade through existing octagonal pole by inserting flexible pipe of hard PVC of size 50 mm. two length from ground level to junction box fixing with heavy duty cable tie. This also includes necessary cable termination at the Street Light Pole with required material as directed by Engineer in charge.

**Technical Specification No. 9**

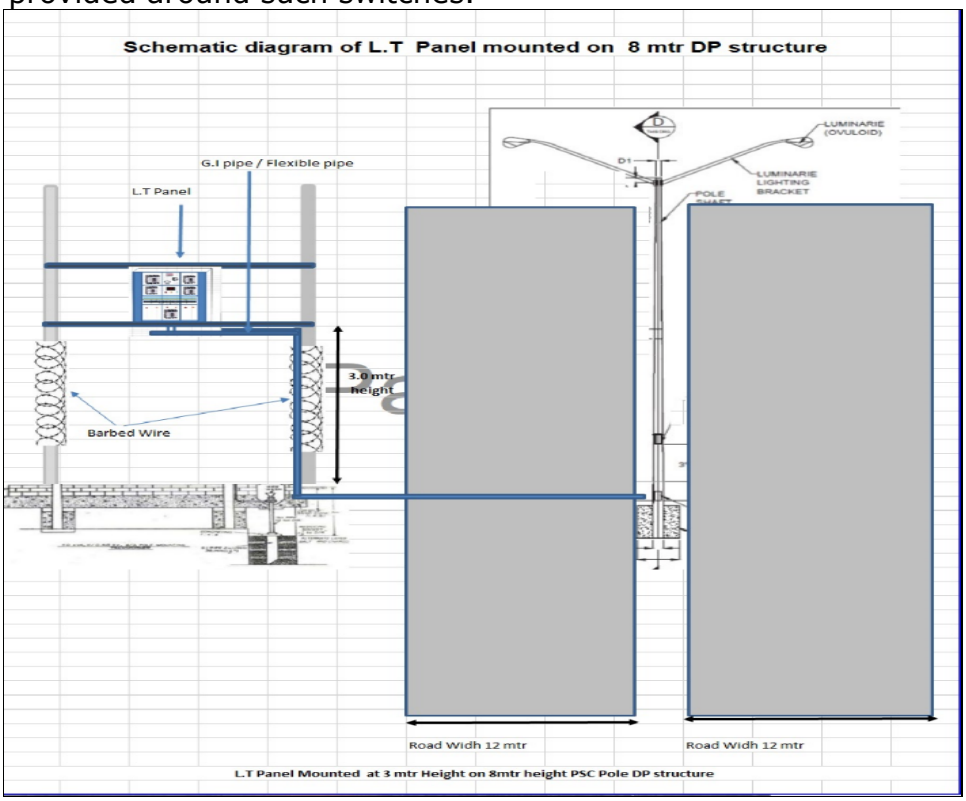
The item includes Supply and fixing Double Pole Structure with DO Fuse on 11 Meter RCC/PSC pole. The DP structure should be erected near the PGVCL tapping point from where the LT cable from the Meter box will be directly terminated on the M.S Distribution board incomer & outgoing cable should be laid from the Distribution board through timer circuit to the lighting pole. The Distribution panel is to be fitted at least 3 mt form the ground level on proper size and length of M. S Channel /Angle on top & bottom also the earthing should be provided to the Distribution panel, however location may get changed as per site situation.

| Sr. No. | Particulars | Unit | Qty. |
|---|---|---|---|
| 1 | RCC/PSC pole 11 Mtr. (working load 200Kg) | No. | 2.00 |
| 2 | M.S. Angle Top FEBRI.65x65x6mm.- 3000mm | No | 2.00 |
| 3 | M.S. Angle Bottom FEBRI.65x65x6mm.- 3000mm | No | 4.00 |
| 4 | M.S. Angle Fabri. 65x65x6mm.- 3000mm.for cross bracing | No | 4.00 |
| 5 | (a) Ancher rod - 1 No. | NO. | 4.00 |
| 6 | (b) Turn buckle - 1 No. | NO. | 4.00 |
| 7 | (c) Eye Bolt - 1No.(16mmX590 mm. Round Bar). | NO. | 4.00 |
| 8 | (d) Stay wire- 7/12 | KG | 13.60 |
| 9 | (e) LT Guy Insulator - 1 No. | NO. | 4.00 |
| 10 | (f) Guy Clamp - 1 Set. | SET | 4.00 |
| 11 | (a ) GI Wire No. 8 From Pole Top to Earthing Coil | KG | 2.72 |
| 12 | (b) Rigid PVC Pipe -20mm.dia (1.5 Mtr) - 1No | NO. | 2.00 |
| 13 | ( c) Earthing Bolt | NO | 2.00 |
| 14 | (d) Earthing Coil (GI Wire No 8) | NO | 2.00 |
| 15 | (e) Alu. Binding wire | KG | 0.50 |
| 16 | ( f) Barbed wire as per requirement | | |

Note: Above table is just for reference and summarizes minimum requirement of materials for one DP structure without 11KV A.B. Switch on 11MTR RCC/PSC POLE. Any item with MS has to be Hot Dip Galvanized.

The Contractor has to supply and to install the same at the site as directed by Engineer-in-charge which also include cement concreting of ratio (1:2:4) by proper excavation and insertion of Pole complete with labour and material and same should be in proper alignment and same shall be approved from Civil Department, DPA by Contractor. Thereafter, two coat of metal primer and

three coat of silver paint is to be applied on its ancillary items, barbered wire should be wound on the pole from ground level to 2.5 to 3-meter height similarly danger plate and associated items required to complete the work will be in scope of contractor. The work is to be carried out as per Indian Electricity Rules and as per norms of PGVCL/GETCO. However, fabricated M.S fencing duly painted shall be provided around such switches.




**Technical Specification No. 10**

This includes design, supply at site, installation, testing and commissioning of Outdoor mounted type Feeder pillar panel double shutter, Top Canopy, handle with locking arrangement, dust, damp and vermin proof. The feeder pillar shall be fabricated from 3mm.thick M. S sheet outer frame using suitable size of M.S. angle and M.S Flat for the frame structure the inner sheet and the door should be made from 1.8 mm. thick M.S sheet. The feeder pillar shall be powdered coated using simens grade paint.

The feeder pillar shall be specious for easy maintenance and shall be specious to be provided with all the material mentioned below.

| Sr. No. | Description | Qty. |
|---|---|---|
| 1 | 200 / 250 Amps, 415 V, 50 Hz. ICTPN Switch. | 1 No. |
| 2 | 100 A, 415 Volt, 4 Pole MCCB C-curve for outgoing cable | 6 No. |
| 3 | 20 A, 10 KA 2 Pole MCB for Panel Power Supply | 1 No. |
| 4 | Indicating lamp Red, yellow & blue 230/240 V AC, with in built resistance | 1 No. |
| 5 | Surface mounted light sensor timer Switch | 1 No. |
| 6 | 3-phase 4-pole heavy duty Contractor suitable for 150 A (Load Current) | 1 No. |

| | | |
|---|---|---|
| 7 | Analog Time Switch | 1 No. |
| 8 | Multifunction Meter | 1 No. |
| 9 | Suitable size of Aluminium bus bar for Phase & Neutral, PVC sleeved with colour code. Danger Board, tie belt etc. | Lump sum |

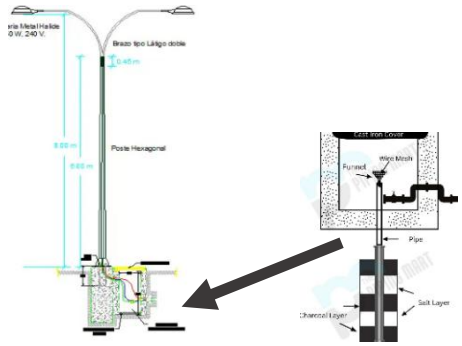
All these components shall be mounted in the feeder pillar by means of suitable cadmium passivated hardware. The feeder pillar shall be complete in all respects with cable glands, lugs for incoming and outgoing cables including interconnection with PVC insulated cable single core, standard copper conductor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

The feeder pillar shall be erected on DP structure at suitable height by using proper M.S. channel frame of Proper size. The M.S. channel frame shall be fitted with proper GI bolt & nut on the so that it shall withstand the load of the panel properly.

The feeder pillar shall be tested as per IS. The feeder pillar shall be provided with 2 Nos. SS terminals for earthing. The Panel shall be manufactured from type test holder having type test certificate of feeder panel of similar or above ratings. The above panel drawing should have to be approved by inspection agencies / Engineer-in-charge before placing the order showing the position of the components as mentioned in Sr. No. 1 to 9. This includes all labour and material as directed by Engineer-in-charge.

**Technical Specification No. 11**

This includes preparation of Pole earthing with GI earth pipe 40 mm. internal dia., 3 mm. pipe thickness (No minus tolerance allowed) and 1.5-Meter-long of standard quality class – B. The pipe should be provided with 10 mm. holes in diagonally opposite directions throughout the length of the pipe at 150 mm. intervals center to center. The connection between the earthing stud inside pole and the earthing Pipe shall be done with two runs of 8 SWG GI wire with necessary clamps and nut bolts. The work includes all labour and material as directed by Engineer-in-charge.



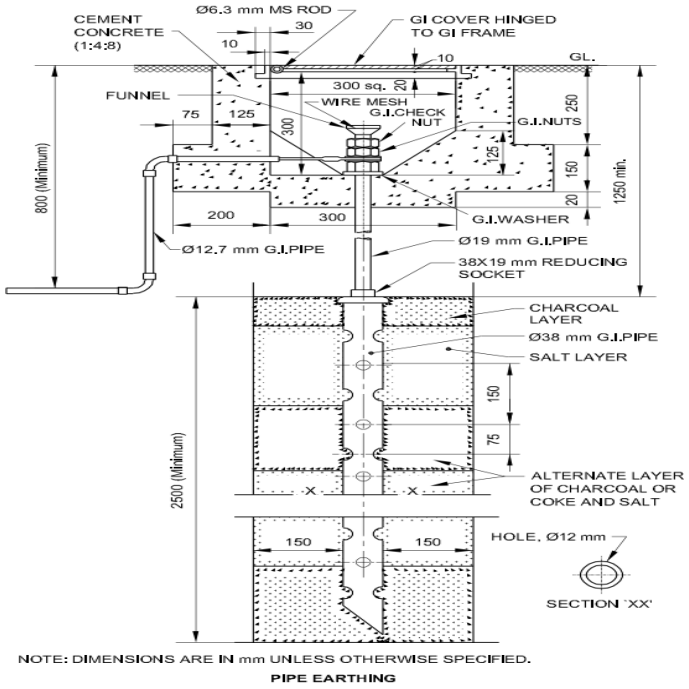

**Technical Specification No. 12**

This includes preparation of earth station with G.I. Earth plate 600 mm. x 600 mm. x 10 mm. thickness and shall be buried in such a way that its top edge is at a depth of not less than 1.5 Meter from the surface of ground. It shall have a G.I pipe (Class-B) for watering of size 20 mm. dia. buried vertically and adjacent to plate electrode and other end shall be provided with funnel. The two runs of G.I. flat of size 50 mm. x 6 mm. thick shall be clamped near funnel and to be taken from main earth plate. The value of earth pit shall be less than 5Ω.

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. The pit shall be filled with alternative layer of 15 cm. each of charcoal and salt. This also includes removal of extra-excavated earth from the site.

This also includes two runs of G.I. flat strip of size 50 mm. x 6 mm. thick shall be connected from

earth pit to Street Light Feeder Pillar as directed by Engineer-in-charge. This work includes all labour and material. The work shall be carried out to entire satisfaction of Engineer-in- charge.




## Technical Specification No. 13

This includes providing of protection guard fencing to DP Structure consisting of suitable size of MS angle of not less than 75 x 75 x 10 mm. including cross bracing angle of size not less than 50 x 50 x 6 mm. The height of fencing shall be not less than 1.5 Mtr. from the ground level. The foundation of the angles shall be provided with cement concreting including providing muffing not less than 45 cm. above the ground level. The work shall be carried out to the entire satisfaction of Engineer in charge. The vertical main members of the guarding shall be cement concreted to depth of 0.45 Mtr. below the ground level. All the members of guard fencing shall be pretreated and then painted with two coats of primer and two coats of finish paint. The protection guard shall be designed and approved by Engineer-In-Charge prior to manufacturing and execution of work. The protected area surrounding the DP Structure shall not be less than 5 Mtr. x 5 Mtr. This work includes all material, labour, tools & tackles as directed by Engineer-In-Charge.

## Technical Specification No. 14

Supply, Installation, Testing and Commissioning of outdoor type 100kVA 11/0.43 KV Oil immersed Transformer.

Supply, Installation, Testing and Commissioning of Outdoor Type Pole mounted Transformer of 11kV/415 Volts, equipped with 100kVA Oil filled Type Transformer, All the components shall comply with their relevant IS/IEC standards. This includes all labour and material as directed by Engineer-in- Charge.

| Sr. No. | Item | 11 LV Distribution Transformers |
|---|---|---|
| 1 | Rated KVA (ONAN rating) | 100 KVA |
| 2 | Rated voltage HV | 11 KV |
| 3 | Rated voltage LV | 430-250 V |
| 4 | Frequency | 50 Hz. +/- 3% |
| 5 | No. of Phases | Three |

| | | |
|---|---|---|
| 6 | Connection HV | Delta |
| 7 | Connection LV | Star (Neutral brought out) |
| 8 | Vector group | Dyn-11 |
| 9 | Type of cooling | ONAN |
| 10 | Cooling medium | Insulating oil IS:335-2018 |
| 11 | No of windings | 2 |
| 12 | System earthing | Neutral of LV side to be solidly earthed |
| 13 | Percentage impedance at normal tap at $75^0$C | As per Standards |
| 14 | Neutral terminal to be brought out | On LV side |
| 15 | Max flux density in any part of the core or yoke at rated voltage and frequency with + 12.5% combined voltage and frequency | As per Standards |
| 16 | Permissible temperature rise over ambient temperature of $50^0$ C | |
| i) | Of top oil measured by thermometer | As per Standards |
| ii) | Of winding measured by resistance | As per Standards |
| 17 | Mini HV clearance in mm | |
| i) | Phase to phase | As per Standards |
| ii) | Phase to ground | As per Standards |
| 18 | Mini LV clearance in mm | |
| i) | Phase to phase | As per Standards |
| ii) | Phase to ground | As per Standards |
| 19 | Bushings and terminals | As per IS 3347 and IS 7421 |
| i) | HV bushings | 12 KV rating oil filled porcelain type |
| ii) | Creepage distance | 25mm./KV |
| iii) | LV bushings | 1.0 KV rating oil filled porcelain type |
| 20 | Material of HV and LV conductor | Aluminium |
| 21 | Max current density for HV and LV winding for rated current | As per Standards |
| 22 | Insulation level of windings | |
| i) | Basic Impulse level (BIL) | 75 KVP |
| ii) | Power frequency voltage withstand | |
| a) | HV winding | 28 KVrms |
| b) | LV winding | 03 KVrms |
| 23 | Bushing stem for 100 KVA with nuts | |
| ii) | HV side | standard |
| iii) | LV side | standard |

**Technical Specification No. 15**

The contractor has to execute liaison work with PGVCL for allotment of 3 phase CT operating Meter or direct type as the case may be at nearby location where the power is available of PGVCL and for ease of connection. The required document will be handed over to contractor from DPA However, required fees for 04 Number Electrical Connections of approx., 50 KW each is to be arranged by the contractor Hence, contractor is directed to evaluate the same, this includes all the required materials such as electrical Meters MCB, ELCB, Cable, Earthing, Meter

DB & its Installation Earthing etc.

Initial registration fee will be borne by the contractor, However, the remaining charges, whatever will be paid by DPA to PGVCL for 4 Nos. of New LT 3- Phase Connections. The work includes complete labour and materials and to entire satisfaction of Engineer-in-charge.

**Technical Specification No. 16**

Comprehensive Maintenance Contract for the entire system for 5 years with manpower, material on 24x7 basis including watch keeping etc. and attending and solving of complaints/faults of entire Electrical and IoT System etc. within stipulated period.