

Expression of Interest (EOI)

for
**IOT based Road lighting at Gopalpuri colony & Beautification of cargo jetty
area of Deendayal Port Authority.**

INDIAN PORT RAIL & ROPEWAY CORPORATION LIMITED (IPRCL)

4TH Floor, Nirman Bhavan, Mumbai Port Trust Building,
Mazgaon (East), Mumbai-400010, India.
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Important Information For EOI

S. N	Particular	Date & Time / Details
1	Name of the Work	IOT based Road lighting at Gopalpuri colony & Beautification of cargo jetty area of Deendayal Port Authority
2	Tender ID	IFB.: IPRCL/Mumbai/DPA/lighting/EG/01 Dated 23.09.2026
3	Mode of Tender	Expression of Interest (EOI).
4	Approximate Estimated Cost of Project	To be assessed after receipt of EOI and budgetary rates from the eligible Bidders.
5	Bid Security	No Bid Security is to be submitted along with the EOI. However, a certificate stating that requisite Bid Security will be submitted along with the technical offer needs to be submitted along with the EOI. Format of undertaking for submission of Bid Security is attached as Annexure-I . Amount of Bid Security will be advised in RFP.
6	Performance Security	Not applicable for EOI.
7	Date of Publication of EOI on e-tender.gov.in	23.09.2026
8	Pre-Bid Meeting in Hybride Mode	28.09.2026 by 3.00 PM

9	Last Date & Time for Submission of EOI on e-tender.gov.in	08.10.2026 by 3.00 PM
10	Technical Bid Submission Date and Time	Will be advised to eligible bidders through e-tender portal.
11	Technical Bid Opening Date and Time	Will be advised to eligible bidders through e-tender portal.
12	Inviting Financial Bids from Shortlisted Technically Qualified Bidders	Will be advised to shortlisted bidders through e-tender portal.
13	Completion Period	180 Days from the date of LOA

Note: At any time prior to the deadline for submission of RFP, IPRCL may issue Corrigendum, Addendum or Clarification through e-tender portal only. Tenderers are requested to visit e-tender portal frequently to check Corrigendum, Addendum or Clarification uploaded.

SD/-

**Additional General Manager
(Electrical)**

Indian Port Rail & Ropeway Corporation Limited

EOI DOCUMENTS

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Disclaimer

1. The information contained in this Request for Proposals document (the “**EOI Document**”) or subsequently provided to Bidder(s), whether verbally or in documentary or any other form by or on behalf of the **Indian Port Rail & Ropeway Corporation Limited** (the “**Authority**”) or any of its employees or advisors, is provided to Bidder(s) on the terms and conditions set out in this EOI DOCUMENT and such other terms and conditions subject to which such information is provided.
2. This EOI Document is neither an agreement nor an offer by the Authority to the prospective Bidders or any other person. The purpose of this EOI Document is to provide interested parties with information that may be useful to them in making their financial offers (Bids) pursuant to this EOI Document. This EOI Document includes statements, which reflect various assumptions and assessments arrived at by the Authority in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require. This EOI Document may not be appropriate for all persons, and it is not possible for the Authority, its employees or advisors to consider the investment objectives, financial situation and particular needs of each Bidder who reads or uses this EOI Document. The assumptions, assessments, statements and information contained in the Bidding Documents, especially details regarding the project sites, may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this EOI Document and obtain independent advice from appropriate sources.
3. Information provided in this EOI Document to the Bidder(s) is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. Authority accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.
4. Authority, its employees and advisors make no representation or warranty and shall have no liability to any person, including any applicant or Bidder under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this EOI Document or otherwise, including the accuracy, adequacy, correctness, completeness or reliability of the EOI Document and any assessment,

assumption, statement or information contained therein or deemed to form part of this EOI Document or arising in any way for participation in this bid stage.

5. Authority also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this EOI Document.
6. Authority may in its absolute discretion prior to the Bid Due Date, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this EOI Document at any time during the Bidding Process.
7. The issuance of this EOI Document does not imply that the Authority is bound to select a Bidder or to appoint the Preferred Bidder or Agency, as the case may be, for the Project and Authority reserves the right to reject all or any of the Bidders or Bids without assigning any reason whatsoever. Mere submission of a responsive Bid does not ensure selection of the bidder as Agency.
8. The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by Authority, or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and Authority shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation or submission of the Bid, regardless of the conduct or outcome of the Bidding Process.

Interpretation

Definitions

In this EOI Document, unless the context otherwise requires or provides for, the following words and expressions shall have the meanings as are hereinafter respectively assigned to them:

- a) **"Authority"** or **"Licensor"** or **"IPRCL"** shall mean **Indian Port Rail & Ropeway Corporation Limited**;
- b) **"Agreement"** or **"License Agreement"** shall mean the legal document, including recitals, schedules and attachments which may be amended, supplemented or modified in accordance with the provisions, as executed between IPRCL and the Selected Agency;
- c) **"Bid"** means the documents in their entire form submitted by the Bidder in response to the Tender issued by the Licensor in accordance with the provisions thereof;
- d) **"Bidding Process"** shall mean the entire process commencing from the uploading of the EOI Documents, technical and financial bid submission, evaluation and the award of the work (unless the Authority decides to terminate the bidding process at any point of time before its successful completion)
- e) **"Bidder"** shall mean a Single Entity or a Joint Venture of two parties (including the Lead Member), both of which shall be a legal entity in the form of Proprietorship / Partnership Firm (including LLP) or a Company incorporated in India} who / which (as the case may be) has submitted a bid pursuant to the Tender;
- f) **"Bid Due Date"** shall mean the last date for submission of Bids,
- g) **"Business Day"** shall mean such day on which the offices of the Mumbai Government are open for work;
- h) **"Conflict of Interest"** shall have the meaning set out at Clause 1.2.3;
- i) **"Earnest Money Deposit"** or **"EMD"** shall mean an amount to be submitted by the Bidder along with its Bid;
- j) **"Letter of Award"** or **"LOA"** shall mean the letter issued to the Preferred Bidder by IPRCL.
- k) **"Person"** shall mean to include a Legal Entity in the form of Proprietorship / Partnership firm (including LLP) or a Company incorporated in India;
- l) **"Preferred Bidder"** or **"Agency"** shall mean the Bidder who has secured **Highest Score (Technical plus Financial)** and whose bid has been accepted by the Authority and has been issued a Letter of Award;
- m) **"Restrictive Practice"** means forming a cartel or arriving at any understanding or arrangement among Bidders with the objective of restricting or manipulating a full and fair competition in the bidding process;

- n) **"Technical Requirements"** shall mean the technical conditions, as set out in **Section 2.2**, that are to be satisfied by a Bidder
- o) **"Tender"** shall mean this EOI Document and the corrigenda (if applicable) and any other document as uploaded on the website for the Project.
- p) **"Undesirable Practice"** means (i) establishing contact with any person connected with or employed or engaged by the Authority with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the bidding process; or (ii) having a Conflict of Interest;

Section-1

Information to Bidders

1. Introduction

- 1.1 IPRCL intends to invite Expression of Interest (EOI) to shortlist the bidders for executing the work of **"IOT based Road lighting at Gopalpuri colony & Beautification of cargo jetty area of Deendayal Port Authority"**.

2. Background

- 2.1 **Indian Port Rail & Ropeway Corporation Limited (IPRCL)** having its corporate office at **4th Floor, Nirman Bhavan, Mumbai Port Trust Building, M. P. Road, Mazgaon (E), Mumbai- 400010** and is a Company (under the Companies Act 2013) set up under Ministry of Ports, Shipping & Waterways.
- 2.2 Bidders are advised to undertake site visit, prior to submission of EOI, to ascertain the condition(s) of the proposed Project Facilities that needs to be developed and apply for the tender accordingly. Neither any complaints regarding the Project Facilities or sub-standard services shall be accepted nor any additional payments beyond the accepted financial bid shall be made by the Authority.

3. General Conditions

- 3.1 **The Bidder shall be a Single Entity** .Bidders shall furnish all relevant information, as per the formats provided in the **Request for Proposal** (the **"EOI Document"**).
- 3.2 A Bidder shall be considered to be in conflict of interest with one or more Bidder in the same bidding process if they have relation with each other, directly or indirectly or through any other Person that puts them in a position to have access to information about or influence the bid of another Bidder (**"Conflict of Interest"**). Any Bidder found to have a Conflict of Interest shall be disqualified.

3.3 Clarifications and Amendment of EOI Document Documents

At any time before the submission of EOI, the Authority may for any reason, at its own initiative, modify the EOI DOCUMENTS by amendment. Any such amendment shall be issued in writing through Corrigenda. Corrigenda shall be uploaded on **www.etenders.gov.in**

and shall be binding on all Bidders. The Authority may, at its discretion, extend the deadline for the submission of Bids.

4 Procedure for evaluation:

- 4.1 EOI documents shall be downloaded from **www.etenders.gov.in** and Observations, Suggestions, Queries, Equipments required and their detailed Specification, Rate, Quantity, Amount, Taxes if any shall be submitted on e-tender portal along with the EOI documents downloaded and signed on each pages.
- 4.2 **Certificates pertaining to execution of similar nature of work** need to be submitted by the bidders along with the EOI.
- 4.3 EMD at this Stage is not required to be submitted along with the EOI. However, a certificate stating that, required EMD is to be submitted along with the technical offer.
(Performa of certificate for submission of EMD along with the technical offer is attached as ANNEXURE-I).
- 4.4 On receipt of the Observations, Suggestions, Queries, Equipments required and their detailed Specification, Rate, Quantity, Amount, Taxes from the technically **SUITABLE** bidders, pre-bid conference will be organized and based on the pre-bid conference discussion, RFP with detailed technical specifications along with Schedule of Material and Works will be uploaded on the **www.etenders.gov.in** through **Addendum & Corrigendum**.
- 4.5 List of bidders (who have experience in execution of similar nature of works) will also be intimated through **www.etenders.gov.in** E-tender portal.
- 4.6 Eligible bidders shall submit their technical proposals along with requisite EMD as mentioned in RFP.
- 4.7 List of shortlisted bidders will be intimated through **www.etenders.gov.in** E-tender portal.
- 4.8 Shortlisted bidders shall submit their financial bid through **www.etenders.gov.in** E-tender portal for the purpose of Financial evaluation as and when required.

Section-2

Evaluation of EOI and Qualification Criteria

Evaluation of EOIs

The following procedure shall be adopted for evaluating the EOIs:

1: Evaluation of Pre-qualification Criteria (PQ)

2.1	Bidders who comply with the following basic criteria are eligible for submission of EOIs:
2.2	The Sole Bidder should be a legal entity in the form of company under the Companies Act of India, 1956 (or later) OR a Partnership Firm (including LLP) OR Proprietorship Firm. The bidder should possess valid- A Class Electrical Contractor's License issued by any State/ Central licensing authority and Copy of the valid License shall be furnished All the members of JV should possess valid- A Class Electrical Contractor's License issued by any State/ Central licensing authority and Copy of the valid License shall be furnished
2.3	The Sole Bidder must have recorded a Minimum Average Annual Turnover (Standalone turnover net of taxes), of an amount of Rs. 5.2 Cr. (Rupees Five Crores Twenty Lakhs only), from Audited Balance Sheets, in last three consecutive financial years (2023-24 to 2025-26). To be eligible for evaluation of its Bid, the Bidder shall fulfil the following: a) Firms/Companies/Consortium's/Proprietary firms / Voluntarily formed Joint Ventures, as the case may be, (hereinafter referred as Party/ Parties/contractor meeting the "Minimum Eligibility Criteria" as given below, can submit the proposals. b) Applicants must read carefully the minimum conditions of eligibility (the "Conditions of Eligibility") provided herein. Proposals of only those Applicants who satisfy the Conditions of Eligibility will be considered for evaluation:
2.4	The Sole Bidder must have successfully completed any work related to "IOT based Road lighting at Gopalpuri colony & Beautification of cargo jetty

	area of Deendayal Port Authority” work during the last 07 (seven) years in any government organization/PSU/Private firm, ending last day of month before the one in which EOI is invited. One similar work with a total Cost not less than Rs. 13.8 Cr (exclusive of taxes) OR Two similar works with a total Cost not less than Rs. 8.6 Cr (exclusive of taxes) each OR Three similar works with a total Cost not less than Rs. 6.9 Cr (exclusive of taxes) each
2.5	Similar Nature of Work: Bidders must note that Proposal must fulfil the criteria of similar nature of work. Decision of the Authority towards consideration of eligible projects shall be final and binding. Similar Nature of work shall include this: - IOT based Road lighting at Gopalpuri colony & Beautification of cargo jetty area of Deendayal Port Authority Technical Capacity (Past Work Experience) The Applicant shall have, during the period of 7 (seven) years preceding the Proposal Due Date (PDD), i.e. the last date of submission of the bid, successfully completed eligible assignments as specified below. A. Mandatory Criteria For the purpose of determining the eligibility of the Applicant and evaluation of the bids under this BID, the Applicant shall have successfully completed assignment(s) involving Supply, Installation, Testing and Commissioning (SITC) of one or more of the following works: 1. Construction of LT/HT Electrical Substations, including associated electrical works. 2. Street Lighting / High Mast Lighting / Decorative Lighting / Dynamic Lighting / Road Lighting, including lighting works for colonies, roads, flyovers, FOBs, ROBs and similar infrastructure. 3. Electrical Wiring Works of buildings, hospitals, service buildings and other similar structures. 4. Construction / Installation of LT/HT Overhead Lines and/or Underground Cabling Works, including associated poles, towers and accessories. 5. Supply, Installation, Testing and Commissioning of DG Sets of various capacities, including AMF panels and associated electrical works. 6. Underground Cable Laying Works, including cable termination, jointing, testing and associated works.

	7. Supply, Installation, Testing and Commissioning of Air-Conditioning / HVAC Systems, including VRF/VRV or equivalent systems. The above mandatory experience shall be demonstrated through successfully completed works during the stipulated period of 7 (seven) years preceding the PDD. B. Desirable / Preferable Criteria In addition to the above mandatory criteria, preference may be given to Applicants having successfully completed projects involving Design, Supply, Installation, Testing and Commissioning (DSITC/SITC) of IoT-based Smart/Decorative Lighting Systems, particularly involving: • IoT-enabled Centralized Control and Monitoring System (CCMS); • Intelligent Field Devices (IFDs) and IoT-enabled lighting controllers; • Cloud/Web-based remote monitoring and control; • Communication networks/protocols for IoT devices and field controllers; • Remote monitoring of electrical parameters and lighting assets; • Automated ON/OFF, dimming and scheduling of street/road lighting; • Energy monitoring and energy-saving features; • Fault detection, alarms and predictive/condition-based monitoring; • GIS-based asset monitoring, where applicable; • Integration with centralized command/control platforms; • Automation and intelligent lighting-control features; and • Other smart-city / IoT-based lighting management and monitoring features. Note: The desirable criteria may be considered as an additional/preferable qualification and shall not dilute the mandatory technical eligibility requirements specified under Section A.
2.6	Bids qualifying as per the Pre-qualification Criteria (PQ) Criteria given above, will be eligible for the next stage of tendering process.

Section-3

Scope of Work

The scope of work shall broadly include, but shall not be limited to, the following:

1 Site Survey and Detailed Engineering

The contractor shall carry out a detailed site survey before commencement of work.

The survey shall include:

- Existing electrical infrastructure.
- Existing feeder/panel locations.
- Available power supply points.
- Road width and lighting requirements.
- Proposed pole locations.
- Existing underground utilities.
- Existing electrical/communication cables.
- Locations of trees, drains, structures and other obstructions.
- Cable routing and trench requirements.
- Illumination requirements.
- Identification of suitable locations for CCMS panels and load point panels.

Based on the survey, the contractor shall prepare detailed engineering drawings, calculations and layouts for approval from Engineer incharge before execution.

2. Drawings and Engineering Documents

The contractor shall prepare and submit, at minimum:

- Lighting layout.
- Pole location plan.
- Cable route layout.
- Single Line Diagram (SLD).
- Load schedule.
- Panel GA drawings.
- Panel wiring diagrams.
- Pole foundation drawings.
- Panel foundation drawings.
- Earthing layout.
- Lightning protection layout.

- Junction box details.
- Cable termination details.
- CCMS architecture.
- IoT communication architecture.
- Network architecture diagram.
- Cloud monitoring architecture.
- Illumination/lux calculation.
- Voltage-drop calculation.
- Cable-sizing calculation.
- Short-circuit/protection coordination calculations.
- As-built drawings after completion.

No installation shall commence without approval of relevant drawings by the Engineer/Client.

3. SYSTEM OVERVIEW

The proposed system shall comprise a centrally monitored and IoT-enabled decorative outdoor lighting network.

The basic system architecture shall be:

Utility Power Supply → Outdoor Load Point Panel → Smart CCMS Panel → Underground LT Cable → Junction Box → Decorative LED Pole/Luminaire

The Smart CCMS shall communicate with a cloud-based platform through 4G/GSM or Ethernet communication.

The system shall allow authorized users to monitor and control lighting feeders remotely through a web dashboard and/or mobile application.

4. DECORATIVE LED LIGHTING SYSTEM

The decorative lighting system shall comprise decorative poles and LED luminaires suitable for outdoor installation.

4.1 Decorative LED Pole

The decorative poles shall be manufactured from suitable steel/GI material and shall be designed for outdoor use.

Minimum requirements shall include:

- Suitable height as per approved lighting design.
- Galvanized steel construction.
- Minimum wall thickness: 4 mm, unless otherwise approved.
- Hot-dip galvanized / GI protected surface.
- PU/polyester paint finish suitable for outdoor exposure.
- Decorative architectural appearance.
- Suitable base plate and anchor bolts.
- Proper access door with locking arrangement.
- Internal cable routing.
- Provision for earthing.
- Adequate mechanical strength.
- Wind-load resistance as per applicable standards.
- Corrosion-resistant construction.

The final pole design, height, shape, decorative pattern and finish shall be approved by the Client before manufacturing.

5. DECORATIVE LED LUMINAIRE

The LED luminaires shall be energy-efficient, outdoor-rated and suitable for continuous operation under Indian environmental conditions.

Minimum technical requirements

Parameter	Minimum Requirement
Rated Voltage	140–270 V AC
Frequency	50 Hz
Power	As per approved design/BOQ
Power Factor	≥ 0.95
THD	<10%
LED Life	Minimum 50,000 hours

Parameter	Minimum Requirement
IP Protection	IP66 minimum
Impact Protection	IK08 minimum
Surge Protection	Minimum 10 kV
CRI	>70
CCT	3000K / 4000K / Warm White as approved
Housing	Die-cast aluminium
Driver	High-efficiency LED driver
Installation	Outdoor decorative pole/post-top type

The luminaire shall have adequate heat dissipation and shall be designed to maintain LED junction temperature within the manufacturer's recommended limits.

The luminaire shall be supplied complete with LED driver, connectors, mounting accessories and all necessary hardware.

6. SMART CCMS SYSTEM

A Centralized Control and Monitoring System (CCMS) shall be provided for remote monitoring and control of each lighting feeder.

The CCMS shall be IoT-enabled and shall support real-time communication between the feeder panel and cloud-based monitoring platform.

Each CCMS shall be capable of monitoring and controlling the associated lighting feeder.

6.1 Control Functions

The system shall provide:

- Remote ON/OFF control.
- Automatic switching.
- Individual feeder control.
- Manual operation.
- Automatic scheduling.
- Astronomical timer operation.

- Sunrise/sunset-based operation.
- Programmable switching schedules.
- Holiday/calendar scheduling.
- Manual override.
- Emergency switching.

The system shall continue to operate according to the last programmed schedule in the event of temporary communication failure.

7. CCMS MONITORING PARAMETERS

The Smart CCMS shall monitor, as applicable:

- Phase-to-phase voltage.
- Phase-to-neutral voltage.
- Current of each phase.
- Total current.
- Active power.
- Reactive power.
- Apparent power.
- Power factor.
- Frequency.
- Energy consumption.
- Phase sequence.
- Phase failure.
- Earth leakage.
- Overload condition.
- Under-voltage.
- Over-voltage.
- Communication status.
- Panel door status.
- Contactor status.
- MCB/MCCB trip status.

Measured values shall be available through the web dashboard/mobile application.

8. ALARM AND EVENT MANAGEMENT

The system shall generate alarms/events for abnormal operating conditions, including:

- Overload.
- Short circuit/trip indication.
- Phase failure.
- Under-voltage.
- Over-voltage.
- High/low current.
- Earth leakage.
- Contactor failure.
- Panel door opening.
- Communication failure.
- Power failure.
- Abnormal energy consumption.
- CCMS device failure.

Events shall be time-stamped and stored in the system.

9. OUTDOOR LOAD POINT PANEL

Outdoor load point panels shall be provided at approved locations for distribution and control of lighting circuits.

The panels shall generally comprise:

- Incomer MCCB/MCB.
- Outgoing MCBs.
- RCCB/RCBO wherever required.
- Contactors.
- Smart CCMS controller.
- Smart energy meter.

- Surge Protection Device.
- Control relays.
- Terminal blocks.
- Neutral links.
- Earth bar.
- Communication modem.
- GSM/4G SIM.
- Control wiring.
- Cable glands.
- Indication lamps.
- Panel door lock.
- Internal illumination/service arrangement where required.

The panel shall be suitable for outdoor installation and shall have adequate protection against dust, rain, moisture and corrosion.

10. SMART ENERGY METER

A smart energy meter shall be integrated with the CCMS.

The meter shall be capable of measuring:

- Voltage.
- Current.
- Active energy.
- Reactive energy.
- Apparent energy.
- Power factor.
- Frequency.
- Maximum demand, where applicable.

Communication shall preferably be through RS-485/MODBUS RTU or another approved communication protocol.

Energy data shall be transmitted to the cloud platform for monitoring and reporting.

11. COMMUNICATION SYSTEM

The CCMS shall communicate with the cloud platform through reliable communication technology.

The system shall support:

- 4G/GSM communication.
- Ethernet communication wherever available.
- TCP/IP-based communication.
- RS-485/MODBUS communication between field devices.
- Cloud connectivity.
- Mobile application.
- Web dashboard.

Each CCMS shall be provided with suitable industrial-grade communication hardware.

SIM connectivity/data charges, if included in the contract, shall be provided for the specified warranty/O&M period.

12. CLOUD-BASED MONITORING SOFTWARE

The contractor shall provide a cloud-based IoT monitoring platform.

The platform shall provide:

Dashboard

- Total installed lights.
- Lights ON.
- Lights OFF.
- Faulty lights/feeders.
- Energy consumption.
- Communication status.
- Active alarms.
- Feeder-wise status.
- Location-wise status.

GIS-Based Monitoring

The system shall provide GIS-based asset mapping showing:

- Pole location.
- Luminaire location.
- Feeder location.
- CCMS panel location.
- Asset identification.
- Asset status.

Each lighting asset shall preferably have a unique identification number.

(SITC) of Smart Street Lighting Management Software The proposed solution shall comprise the design and deployment of a Smart Street Lighting Management Software, endowed with a comprehensive suite of features to ensure intelligent, responsive, and efficient illumination control

throughout the urban landscape. The system shall incorporate the following salient functionalities: Web-Based User Interface: A secure and intuitive browser-accessible platform enabling remote configuration, monitoring, and control of the lighting infrastructure. Real-Time System

Visualization: Dynamic representation of the lighting network overlaid upon a city-wide digital map, reflecting live status updates of all deployed nodes. API Integration Framework: Robust Application Programming Interfaces (APIs) complete with comprehensive documentation, enabling

seamless interoperability with Smart City platforms and third-party applications. Data-Driven Command Execution: Capability to issue automated or manual commands to the lighting network, leveraging real-time data analytics to modulate luminosity in accordance with ambient light

levels, prevailing weather conditions, and other environmental parameters. Granular Control of Lighting Assets: Facility to operate each streetlight individually—enabling ON/OFF switching and brightness adjustment—based on real-time instructions issued from the central command

software. Policy-Based Automated Operations: Centralized policy configuration allowing for contextual responses, such as activating alternate luminaires during periods of low vehicular traffic, or modulating intensity levels to harmonize with ambient light availability. Cloud-Based

Architecture: Entire software ecosystem shall be hosted on a secure cloud infrastructure to facilitate scalability, availability, and resilience. Data Sovereignty Compliance: The system shall strictly utilize cloud servers physically located within the territorial jurisdiction of India, ensuring that no

data is transferred or stored outside the country. Manual Override Provision: The central software must retain the ability to override automated operations at any

time, granting full control to authorized operators during exigent scenarios.
Proactive Fault and Issue Reporting: The system

shall promptly detect and relay malfunctions, communication failures, or anomalies to the central platform for resolution and maintenance.

Sensor Integration Readiness: The software must support integration with a wide array of current and future sensor devices—communicating through

designated gateways—to enable continued system evolution. Interactive Dashboard and Map Interface: Operators shall be provided with a consolidated dashboard offering analytical insights, deployment metrics, and an interactive map view for location-based monitoring and control.

GIS Mapping of Nodes and Gateways: Every deployed lighting node and communication gateway shall be accurately geotagged and reflected in the system's GIS database.

UserDefined Scheduling: Authorized users must be empowered to select individual luminaires or defined groups, and assign

operational schedules based on user-defined preferences or astronomical clock settings (e.g., sunset/sunrise). Support for RESTful APIs: The software shall expose REST-compliant APIs, ensuring constant access to real-time system summaries and enabling secure external integration with

allied platforms and services. This system shall serve not merely as a utility platform but as a pillar of intelligent urban infrastructure—facilitating sustainability, operational efficiency, and superior citizen

13. REPORTING

The software shall generate:

- Daily energy report.
- Monthly energy report.
- Feeder-wise energy report.
- Operating-hours report.
- Fault report.
- Alarm report.
- ON/OFF status report.
- Communication report.
- Preventive maintenance report.
- Historical consumption report.

Reports shall be exportable in commonly used formats such as PDF/Excel/CSV, wherever supported by the platform.

14. MOBILE APPLICATION

A mobile application shall be provided for authorized personnel.

The application shall allow:

- Login through authorized credentials.
- Real-time monitoring.
- Feeder ON/OFF control.
- Alarm viewing.
- Fault acknowledgement.
- Energy monitoring.
- Historical data viewing.
- Dashboard access.

Access shall be controlled through user authentication.

15. USER ACCESS CONTROL

The system shall support different levels of access, such as:

- Administrator.
- Engineer.
- Operator.
- Viewer.

Only authorized personnel shall be permitted to operate/control the lighting system.

All critical control operations shall preferably be recorded in the event log with user ID and time stamp.

16. ELECTRICAL PROTECTION

The system shall incorporate adequate electrical protection.

The following shall be provided as applicable:

- MCCB.

- MCB.
- RCCB/RCBO.
- Overload protection.
- Short-circuit protection.
- Phase-failure protection.
- Under-voltage protection.
- Over-voltage protection.
- Surge Protection Device.
- Earth-leakage protection.
- Contactor protection.
- Lightning protection.
- Proper earthing.

Protection ratings shall be selected based on the calculated load and short-circuit level.

17. SURGE PROTECTION

Suitable SPDs shall be provided to protect the lighting panels, CCMS and electronic equipment against transient overvoltage.

The SPD shall be selected based on the electrical system configuration and site conditions.

The SPD shall be properly connected to the earthing system with minimum-length connections.

SPD status indication shall be provided wherever applicable.

18. EARTHING SYSTEM

Complete earthing shall be provided for:

- Decorative poles.
- Lighting panels.
- CCMS panels.
- Junction boxes.
- Cable armour.

- Electrical equipment.
- SPD.
- Lightning protection system.

The earthing system shall be designed in accordance with applicable standards and site requirements.

Each pole shall have a dedicated earth connection, where required by the approved design.

Earth resistance shall be measured and recorded during commissioning.

19. LIGHTNING PROTECTION

Lightning protection shall be provided where required based on site risk assessment and approved design.

The system shall include suitable:

- Lightning protection arrangement.
- Down conductors.
- Earth electrodes.
- Bonding arrangements.
- Surge protection.

All metallic structures shall be adequately bonded to the earthing system.

20. UNDERGROUND LT CABLE SYSTEM

LT underground cables shall be suitable for outdoor underground installation.

The cables shall generally be:

- XLPE insulated.
- PVC/HDPE sheathed.
- Suitable voltage grade.
- Copper/aluminium conductor as specified in BOQ/design.
- Armoured where required.
- Suitable for underground installation.

Cable sizes shall be determined based on:

- Connected load.

- Voltage drop.
 - Current-carrying capacity.
 - Short-circuit withstand.
 - Installation method.
 - Future loading requirements.
-

21. CABLE TRENCHING

The contractor shall undertake complete cable trenching work.

The scope shall include:

- Excavation.
- Sand bedding.
- Cable laying.
- Protective covering.
- Warning tape.
- Cable markers.
- Backfilling.
- Compaction.
- Surface restoration.

Where cables cross roads or other vulnerable areas, suitable protective pipes/ducts shall be provided.

Existing utilities shall be identified before excavation.

22. JUNCTION BOXES

Suitable outdoor junction boxes shall be provided wherever required.

Junction boxes shall have:

- Weatherproof construction.
- Suitable IP protection.
- Proper cable glands.
- Terminal blocks.
- Phase identification.

- Neutral and earth terminals.
- Adequate internal space.
- Corrosion-resistant construction.
- Lockable cover where required.

All cable joints shall be properly insulated and protected against moisture ingress.

23. CIVIL WORKS

The contractor shall execute all civil works necessary for installation.

The scope shall include:

- Pole foundations.
- Panel foundations.
- PCC works.
- RCC works.
- Excavation.
- Reinforcement.
- Formwork.
- Anchor bolt installation.
- Grouting.
- Cable trenches.
- Road cutting.
- Road restoration.
- Protective pipes.
- Cable markers.

Foundation design shall consider:

- Pole height.
- Pole weight.
- Wind load.
- Soil condition.
- Pole geometry.
- Anchor bolt arrangement.

Foundation drawings shall be submitted for approval from Engineer incharge

24. POLE INSTALLATION

Poles shall be installed vertically and properly aligned.

The contractor shall ensure:

- Correct foundation level.
- Proper anchor bolt positioning.
- Adequate grouting.
- Proper tightening of nuts.
- Verticality.
- Proper cable entry.
- Proper earthing.
- Mechanical stability.
- Protection against corrosion.

Any damaged paint/galvanizing caused during installation shall be suitably repaired.

25. LIGHTING DESIGN AND LUX LEVEL

The contractor shall prepare lighting calculations based on the actual site geometry.

The design shall consider:

- Road width.
- Pole spacing.
- Mounting height.
- Luminaire wattage.
- Beam angle.
- Lumen output.
- Utilization factor.
- Maintenance factor.
- Uniformity.
- Required illumination level.

Actual lux levels shall be measured after installation using a calibrated lux meter.

The lighting installation shall meet the approved design criteria.

26. FUNCTIONAL FEATURES OF IoT SYSTEM

The IoT platform shall provide:

- Centralized monitoring.
 - Remote control.
 - GIS-based asset management.
 - Real-time status.
 - Automatic switching.
 - Feeder-wise control.
 - Energy monitoring.
 - Fault alarms.
 - SMS alerts, where configured.
 - Email notifications, where configured.
 - Preventive maintenance alerts.
 - Historical data storage.
 - Event logging.
 - Dashboard analytics.
 - User access control.
 - Data export.
 - Asset-wise information.
-

27. DATA LOGGING AND STORAGE

The CCMS shall have adequate local data logging capability to prevent loss of data during temporary communication failure.

The system shall record important parameters and events with date and time.

The cloud platform shall maintain historical data for the period specified in the tender.

The contractor shall ensure that data remains accessible to the Client throughout the contract/warranty period.

28. CYBERSECURITY

The IoT system shall incorporate reasonable cybersecurity measures, including:

- User authentication.
- Password protection.
- Role-based access.
- Secure communication.
- Unique device identification.
- Controlled remote access.
- Event logging.
- Protection against unauthorized operation.

Default passwords shall be changed before commissioning.

29. TESTING AND COMMISSIONING

Before commissioning, the contractor shall conduct complete testing of the system.

Testing shall include:

Electrical Tests

- Insulation resistance test.
- Cable continuity test.
- Earth resistance test.
- Polarity test.
- Phase sequence test.
- Voltage measurement.
- Current measurement.
- Protection device testing.
- RCCB/RCBO operation test.
- SPD verification.

Lighting Tests

- Luminaire functional test.
- ON/OFF operation.
- Lux level measurement.

- Uniformity verification.
- Night-time trial operation.

CCMS Tests

- Remote ON/OFF test.
- Automatic schedule test.
- Astronomical timer test.
- Manual override test.
- Energy meter test.
- Voltage/current monitoring.
- Alarm generation.
- Door alarm.
- Communication failure alarm.
- Phase failure alarm.
- Cloud communication test.

30. INTEGRATED SYSTEM TEST

The contractor shall demonstrate complete system operation from field equipment to cloud platform.

The test shall demonstrate:

Field Panel → CCMS → Communication Network → Cloud Server → Web Dashboard/Mobile Application

The Client shall be able to:

- View feeder status.
- Switch feeder ON/OFF.
- View electrical parameters.
- View energy consumption.
- Receive alarms.
- View historical data.
- Generate reports.

The system shall be considered commissioned only after successful completion of integrated testing.

31. TRAINING

The contractor shall provide comprehensive training to Client personnel.

Training shall cover:

- CCMS operation.
- Web dashboard.
- Mobile application.
- Feeder control.
- Alarm management.
- Report generation.
- Energy monitoring.
- User management.
- Basic troubleshooting.
- Preventive maintenance.
- System configuration.

Training shall be conducted at site and/or online as required.

32. DOCUMENTATION

The contractor shall submit complete documentation including:

- Approved drawings.
- SLD.
- Cable schedules.
- Panel drawings.
- Equipment datasheets.
- Test certificates.
- Calibration certificates.
- Factory test reports.
- Installation test reports.
- Lux measurement reports.
- Earth resistance reports.

- CCMS commissioning report.
- Software/user manuals.
- Operation & Maintenance manuals.
- Warranty certificates.
- As-built drawings.
- Asset register.

33. OPERATION AND MAINTENANCE

During the specified O&M/warranty period, the contractor shall provide:

- Preventive maintenance.
- Breakdown maintenance.
- Remote diagnostics.
- Fault rectification.
- CCMS support.
- Cloud software support.
- Firmware updates.
- Communication troubleshooting.
- Replacement of defective equipment covered under warranty.
- Periodic inspection of panels.
- Inspection of poles and luminaires.
- Cleaning of luminaires.
- Checking of electrical connections.
- Earthing verification.

34. WARRANTY / DEFECT LIABILITY

The contractor shall provide a minimum 12 months warranty or Defect Liability Period, as specified in the tender conditions, from the date of successful commissioning and acceptance.

During the warranty period, defective equipment/materials shall be repaired or replaced by the contractor without additional cost to the Client, subject to the contract conditions.

The warranty shall cover, as applicable:

- LED luminaires.
- LED drivers.
- CCMS hardware.
- Communication equipment.
- Smart meters.
- Panels.
- Contactors.
- Controllers.
- Sensors.
- Software functionality.
- Associated accessories.

35. SPARES

The contractor shall recommend and, where specified in the BOQ/tender, supply essential spare parts.

Recommended spares may include:

- LED driver.
- LED luminaire.
- CCMS controller.
- Communication modem.
- Contactor.
- MCB.
- SPD.
- Control relay.
- Fuses.
- Communication accessories.

36. QUALITY ASSURANCE

All materials shall be new, unused and of approved make and quality.

Materials shall conform to relevant BIS/IS/IEC standards and applicable statutory requirements.

The contractor shall submit:

- Manufacturer's test certificates.
- Type-test certificates where applicable.
- Routine test certificates.
- Product datasheets.
- Compliance certificates.
- Calibration certificates.

The Client/Engineer shall have the right to inspect materials at the manufacturer's works or site before installation.

37. SAFETY REQUIREMENTS

The contractor shall comply with all applicable safety requirements during execution.

The contractor shall ensure:

- Proper barricading.
- PPE for workers.
- Safe excavation practices.
- Electrical isolation before work.
- Proper cable identification.
- Safe lifting of poles.
- Safe operation of electrical equipment.
- Traffic safety during road cutting.
- Restoration of excavated areas.
- Proper disposal of construction waste.

No electrical work shall be undertaken without appropriate safety precautions.

38. HANDING OVER

The complete system shall be handed over to the Client only after:

1. Successful installation.

2. Successful testing.
3. Successful commissioning.
4. Completion of integrated CCMS testing.
5. Verification of illumination levels.
6. Submission of test certificates.
7. Submission of as-built drawings.
8. Submission of O&M manuals.
9. Training of Client personnel.
10. Demonstration of cloud/mobile application.
11. Rectification of all commissioning defects.

The contractor shall submit a final System Completion and Commissioning Certificate for acceptance.

39. APPLICABLE STANDARDS

The equipment and installation shall comply with the latest applicable editions of relevant:

- BIS/IS Standards.
- IEC Standards.
- Electrical installation standards.
- Relevant Central/State electrical regulations.
- Applicable safety regulations.
- Local authority requirements.
- Manufacturer's installation standards.

Where an Indian Standard is available, preference shall be given to the relevant Indian Standard.

40. CONTRACTOR'S RESPONSIBILITY

The contractor shall be responsible for the complete functionality of the system irrespective of whether a particular minor item/accessory is specifically mentioned in the BOQ.

All accessories, connectors, glands, lugs, fasteners, supports, communication components, control wiring and other incidental materials necessary for completing and commissioning the system shall be deemed included in the contractor's scope.

The contractor shall not claim additional payment for items that are necessary for the complete and satisfactory functioning of the system but are not individually listed in the BOQ, unless specifically approved as a variation under the contract.

41. PERFORMANCE REQUIREMENT

The complete lighting system shall operate reliably under the environmental conditions prevailing at site.

The contractor shall ensure:

- Proper illumination.
- Reliable switching.
- Accurate monitoring.
- Reliable communication.
- Correct energy measurement.
- Proper functioning of alarms.
- Stable cloud connectivity.
- Secure user access.
- Continuous availability of software platform.
- Proper operation during scheduled switching.
- Minimum downtime during the warranty/O&M period.

The system shall be considered successfully completed only after demonstrating satisfactory operation of all major functions to the satisfaction of the Client/Engineer.

42. TRAINING AND CAPACITY BUILDING

The Contractor shall provide comprehensive training to the Client's designated personnel for operation, monitoring, maintenance and basic troubleshooting of the complete IoT-based decorative lighting system.

The training shall be provided **free of additional cost** and shall be conducted after installation and commissioning of the system and before final handover.

- **42.1 Training Coverage**

The training shall cover, but shall not be limited to, the following:

A. Smart CCMS Operation

- Introduction to the Smart CCMS system and its architecture.
- Local and remote ON/OFF operation of lighting feeders.
- Automatic switching and scheduling.
- Astronomical timer configuration.
- Manual override operation.
- Setting and modification of operating schedules.
- Monitoring of voltage, current, power, frequency and power factor.
- Monitoring of energy consumption.
- Monitoring of earth leakage and phase failure.
- Understanding of alarms and fault indications.
- Door-open and communication-failure indications.

B. Cloud-Based Monitoring Platform

- Login and secure access.
- User creation and user-right management.
- Dashboard operation.
- Feeder-wise monitoring.
- Real-time status monitoring.
- GIS-based asset monitoring.
- Remote control of feeders.
- Viewing alarms and events.
- Alarm acknowledgement.
- Historical data analysis.
- Energy consumption analysis.
- Generation and downloading of daily/monthly reports.
- Event and operation history.
- Asset management.

C. Mobile Application

- Installation and configuration of the application.
- Secure login.
- Viewing feeder and lighting status.
- Remote ON/OFF operation.
- Viewing electrical parameters.
- Viewing alarms and notifications.
- Viewing energy consumption.
- Basic fault identification.

D.Basic Maintenance and Troubleshooting

Training shall include basic troubleshooting of:

- LED luminaires.
- LED drivers.
- CCMS controllers.
- Contactors.
- MCB/MCCB/RCCB.
- Surge Protection Devices.
- Smart energy meters.
- Communication modem.
- Junction boxes.
- Control wiring.
- Communication failures.
- Common CCMS alarms.

The training shall also cover safe isolation and restoration procedures before carrying out maintenance.

• 42.2 Practical Demonstration

The Contractor shall provide practical, hands-on training at site.

The Client's personnel shall be demonstrated the complete operational sequence:

Lighting Feeder → CCMS → Communication Network → Cloud Server → Web Dashboard → Mobile Application

The Contractor shall demonstrate remote switching, scheduling, monitoring, alarm generation, fault identification and report generation.

• 42.3 Training Material

The Contractor shall provide training material in hard and/or soft copy, including:

- User manual.
- CCMS operation manual.
- Cloud software manual.
- Mobile application manual.
- Basic troubleshooting guide.
- Preventive maintenance procedure.
- Alarm/fault interpretation guide.
- Emergency operating procedure.
- System architecture diagram.
- Contact details of technical support personnel.

• 42.4 Training Duration

The Contractor shall conduct adequate training sessions to ensure that the Client's personnel are capable of independently operating and monitoring the system.

As a minimum, the Contractor shall provide:

- **One comprehensive classroom/online training session**, and
- **One practical hands-on training session at site**

or such additional sessions as required by the Client for proper familiarization with the system.

- **42.5 Training Certificate**

After completion of training, the Contractor shall provide a training completion certificate/record mentioning:

- Date of training.
- Location.
- Names/designations of trainees.
- Topics covered.
- Trainer's name.
- Contractor's representative.
- Client's representative.

- **42.6 Post-Training Support**

The Contractor shall provide technical assistance during the warranty/Defect Liability Period for any difficulty faced by Client personnel in operating the CCMS, cloud platform, mobile application or associated equipment.

Remote assistance shall be provided through telephone, email or other agreed communication channels, and site visits shall be arranged where required under the O&M/warranty provisions.

- **42.7 Refresher Training**

In case of major software upgrades, replacement of CCMS hardware, modification of system architecture or substantial change in operating procedures, the Contractor shall provide refresher training to the Client's designated personnel without additional cost during the applicable warranty/O&M period.

43. Port Entry, Security and Access Compliance

Since the work is to be executed within port premises, the Contractor shall comply with all rules, regulations, security procedures and instructions applicable to the concerned Port Authority/terminal/port administration.

The Contractor shall be responsible for:

- i) Obtaining necessary entry/access passes, permits and authorizations for its personnel and vehicles.

- ii) Submission of required personnel details and documents for security verification/background verification, wherever applicable.
 - iii) Compliance with port security procedures and restrictions applicable to personnel, vehicles, tools, equipment and materials.
 - iv) Obtaining work permits, gate passes, material passes and other permissions required for execution of the work.
 - v) Compliance with restricted-area access requirements.
 - vi) Ensuring that no unauthorized person enters the work area.
 - vii) Compliance with instructions issued by Port Security, CISF/other authorized security agencies, Port Authority and Engineer-in-Charge.
 - viii) Ensuring proper identification of all deployed personnel.
- a. Any delay arising due to failure of the Contractor to comply with applicable port access/security requirements shall be the responsibility of the Contractor.

44. Port, Safety and Statutory Compliance

The Contractor shall comply with all applicable Central/State Government laws, rules, regulations, codes, standards and statutory requirements, including all requirements applicable to working within port premises.

The Contractor shall comply with, but not be limited to:

- i) Port Authority rules and regulations.
- ii) Applicable port security requirements.
- iii) ISPS Code requirements, wherever applicable.
- iv) Occupational health and safety requirements.
- v) Electrical safety requirements.
- vi) Fire and emergency safety requirements.
- vii) Labour laws and applicable employment regulations.
- viii) Minimum wages and payment of wages requirements.
- ix) Employees' Provident Fund (EPF), ESI and other applicable statutory requirements.
- x) Workmen/employee compensation and insurance requirements.
- xi) GST, labour cess and other applicable statutory compliances.
- xii) Applicable environmental requirements.

- xiii) PPE and site safety requirements.
- xiv) Requirements relating to working at height, electrical work, cable laying, lifting and material handling.
- xv) Any other statutory or site-specific requirement stipulated by the Port Authority/Employer.

1) Safety and Personal Protective Equipment (PPE)

The Contractor shall provide, at its own cost, all necessary PPE and safety equipment to its personnel, including safety helmets, safety shoes, reflective jackets, safety belts/full-body harnesses, gloves, goggles and other equipment as required for the nature of work.

The Contractor shall ensure that its personnel follow all approved safety procedures and work permits applicable at the site.

No additional payment shall be made for compliance with safety requirements unless specifically provided for in the BOQ.

2) Tools, Tackles and Consumables

The Contractor shall arrange all necessary tools, tackles, testing instruments, lifting equipment, ladders/scaffolding, safety equipment, consumables and other resources required for successful completion of the work.

All testing instruments shall be calibrated, and valid calibration certificates shall be submitted whenever required.

3) Protection of Port Property and Existing Infrastructure

The Contractor shall take all necessary precautions to protect existing port infrastructure, buildings, roads, utilities, communication systems, electrical installations, lighting systems and other assets during execution of the work.

Any damage caused due to the Contractor's activities shall be repaired/reinstated by the Contractor at its own cost to the satisfaction of the Employer/Port Authority.

4) Housekeeping and Restoration

The Contractor shall maintain proper housekeeping at the work site throughout the execution period.

All cable scraps, packing materials, debris and waste generated during the work shall be removed from the site and disposed of in accordance with applicable port and environmental requirements.

After completion of the work, the Contractor shall restore the work area to its original/approved condition.

5) Coordination with Port Authorities and Other Agencies

The Contractor shall coordinate with the Port Authority, Security Agency/CISF, Electrical Department, IT/Communication Department, Civil Department and other concerned agencies for obtaining necessary permissions and for execution, testing and commissioning of the lighting system.

The Contractor shall plan its activities in such a manner that port operations and other essential activities are not adversely affected.

6) Responsibility for Compliance

The Contractor shall be fully responsible for obtaining and maintaining all permissions, licenses, registrations, approvals, passes and clearances required for execution of the work.

All costs associated with manpower deployment, statutory compliance, port entry requirements, security clearances, work permits, PPE, safety arrangements, tools, tackles, transportation and other incidental requirements shall be deemed to be included in the Contractor's quoted rates unless specifically stated otherwise in the BOQ.

7) No Excuse for Non-Compliance

Failure to obtain the required port permissions, security clearances, manpower documentation, work permits or statutory compliances shall not relieve the Contractor of its contractual obligations.

The Contractor shall not claim additional payment or extension of time solely on account of its failure to comply with the applicable port, security, labour, safety or statutory requirements.

Annexure-A

UNDERTAKING TO BE GIVEN BY AGENCY

(On Letter head of Firm)

I/We(Name of the bidder) do hereby undertake that we will submit the required EMD along with the technical offer for "IOT based Road lighting at Gopalpuri colony & Beautification of cargo jetty area of Deendayal Port Authority" and we have requisite experience in said work.

Date:

Place:

Seal and Signature of the Bidder