

# **PRE-QUALIFICATION REQUIREMENTS FOR** **TECHNICAL COMPATIBILITY**

Repair and Replacement of Parts for Glacial Lake Outburst  
Flood Early Warning System (GLOF EWS)



No. I&P/Spares/GLOF/26-27

Pakistan Meteorological Department  
Sector H-8/2,  
Islamabad,  
September, 2026

## **PRE-QUALIFICATION NOTICE THROUGH PPRA E-PADS (2.0)**

Pakistan Meteorological Department invites the applications for pre-qualification of firms registered with sales tax/ income tax departments and are on Active Tax Payer List (ATL) of FBR for the **REPAIR AND REPLACEMENT OF PARTS FOR GLACIAL LAKE OUTBURST FLOOD EARLY WARNING SYSTEM (GLOF EWS)** during the financial year 2026-27 under PPRA rules detail is as under.

| <b>Sr. No.</b> | <b>Name of Work</b>                                                                                    |
|----------------|--------------------------------------------------------------------------------------------------------|
| 01             | <b>REPAIR AND REPLACEMENT OF PARTS FOR GLACIAL LAKE OUTBURST FLOOD EARLY WARNING SYSTEM (GLOF EWS)</b> |

Schedule for collection, submission and opening of pre-qualification documents / proposals is as under:

|                                                                                             |                                                                                          |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>Collection and submission of documents (free of cost through the concerned websites)</b> | Till 01 <sup>st</sup> of October, 2026 by 10.30 Hrs. through PPRA EPADS 2.0.             |
| <b>Time and place of opening of sealed proposals</b>                                        | On 01 <sup>st</sup> of October, 2026 by 11.00 Hrs. at PMD Headquarters, H-8/2 Islamabad. |

### **TERMS & CONDITIONS:**

- For pre-qualification, parties having experience, capability and resources as per enclosed documents may apply alongwith following information and documents.
  - Name of Firm alongwith postal address, phone and fax number.
  - Experience Record.
  - Current works in progress.
  - Financial position/ capabilities: -
    - Bank Statement of last two years
    - No. and amount of bank guarantees already given.
    - Credit/ loan limit with any bank
- The relevant documents may be obtained from the websites i.e. <https://weather.gov.pk>, PPRA EPADS <https://pa.epads.gov.pk> as well as <https://epms.ppra.gov.pk>.
- Bidding Process shall be conducted through **Single Stage Two Envelope Bidding Procedure**
- The bid received within stipulated date and time, will be opened by the committee on the same day (as mentioned above), in the presence of the bidders or their authorized representatives.
- The procuring agency reserves the right to accept or reject any or all proposal(s) in accordance with rule 33 of PPRA Rules 2004 (as amended time to time)

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***Note:*** All Firms are directed to quote their Bids online through PPRA E-PADS 2.0 as well as original Bids must be submitted in hard forms to I&P Section, PMD Headquarters office, Islamabad

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## **BACKGROUND AND PURPOSE**

Repair and Replacement of Parts for Glacial Lake Outburst Flood Early Warning System (GLOF EWS)

### **1. Title of Procurement**

Repair and replacement of parts for hydro-meteorological equipment installed for Glacial Lake Outburst Flood Early Warning System (GLOF EWS) in Gilgit-Baltistan (G-B) and Khyber Pakhtunkhwa (KP).

### **2. Introduction**

The United Nations Development Programme (UNDP) successfully implemented and completed the Glacial Lake Outburst Flood Risk Reduction Project (GLOF-II). A network of hydro-meteorological equipment installed to establish and support the GLOF Early Warning System in the glaciated regions of Gilgit-Baltistan (G-B) and Khyber Pakhtunkhwa (KP).

The ownership, operation, management, and maintenance responsibilities for the installed hydro-meteorological equipment were transferred to the Pakistan Meteorological Department (PMD) to ensure long-term sustainability and continued operation of EWS. The availability of compatible and technical compliant parts is essential for maintaining the operational integrity, reliability, and longevity of EWS network established in the targeted valleys of G-B and KP. Accordingly, PMD intends to repair/ replace the required parts to ensure timely maintenance and uninterrupted functionality of these installed systems, particularly during flood and monsoon season.

### **3. Scope of Work / Technical Specifications**

The successful bidder shall supply and deliver genuine, new and unused parts and equipment for the hydro-meteorological systems installed for GLOF EWS.

All supplied items shall:

- a. Be fully integrate-able with the existing installed equipment and associated data acquisition and communication systems;
- b. Be factory-tested and supplied in proper working condition;
- c. Where applicable, be calibrated in accordance with internationally recognized standards and relevant World Meteorological Organization (WMO) requirements;
- d. Meet the technical specifications, accuracy, resolution, measurement ranges, signal output configurations, communication protocols, and power supply requirements specified in this document; and
- e. Be capable of integration and configuration with the existing installed systems without compromising the functionality, reliability, or performance of the EWS.

The bidder shall be responsible for ensuring the exact specifications of the offered parts with the existing installed equipment as per specifications mentioned in the document.

# **Pre-Qualification Requirements for Technical Compatibility**

The bidder shall demonstrate, to the satisfaction of the Pakistan Meteorological Department, that the offered equipment, parts, and associated data acquisition components are fully compatible with the existing Glacial Lake Outburst Flood Early Warning System (GLOF-EWS) installed in Gilgit-Baltistan and Khyber Pakhtunkhwa. The bidders are allowed to visit the PMD HQs office, Islamabad for any queries and observation of the existing system.

Failure to successfully complete the technical compatibility demonstration may result in rejection of the bid.

## **1. Existing System Compatibility**

The bidder shall provide documentary evidence and demonstration that the offered parts are fully compatible with the existing installed hydro-meteorological stations, sensors, communication equipment, and data acquisition system currently deployed by PMD.

The bidder shall demonstrate that:

- Bidders should be the sole authorized dealer of offered parts and with authentic certificate of OEM products for at-least next three years from the date of award of tender.
- Fully compatible with the existing hydro-meteorological EWS systems.
- Sensor communication interfaces completely identical IO architecture with the existing Compact/Compact+ C.A.E dataloggers, and mounting arrangements are fully compatible with the existing equipment.
- Existing sensor wiring, power supply arrangements, communication protocols, and station configuration shall remain unchanged.

## **2. Data Logger Compatibility Demonstration**

Where an alternate/ equivalent data logger is offered, the bidder shall demonstrate that the logger is fully compatible with the existing GLOF-EWS infrastructure.

The demonstration shall include, but not be limited to:

- Successful integration with the existing satellite communication modem HUGHES-9502.
- Compatibility with GSM modem TRM-240.
- Compatibility and integration with all existing sensors installed at PMD hydro-meteorological EWS systems.
- Compatibility with all communication protocols currently used in the hydro-meteorological EWS systems.
- Successful communication with the existing Database server/system.
- The bidder shall demonstrate the supplied logger configuration in accordance with PMD's required data formats, intervals, and communication protocols.

## **3. Communication Demonstration**

The bidder shall demonstrate successful communication between the supplied logger and the existing satellite modem hughes-9502 and GSM modem TRM-240. The demonstration shall verify:

- Successful establishment of communication.
- Correct transmission intervals.

- Successful data packet generation.
- Data integrity.
- Error-free communication.
- Automatic recovery following communication interruption.

#### **4. FTP Communication Demonstration**

The bidder shall demonstrate successful FTP communication with the existing PMD server.

The demonstration shall include verification of:

- Automatic connection.
- Authentication.
- File creation.
- Correct file naming convention.
- Successful upload with acknowledgement.
- Automatic retry mechanism.
- Successful transfer after communication interruption.

#### **5. Date and Time Synchronization**

The bidder shall demonstrate that:

- Logger date and time are synchronized correctly with NTP.
- Time zone settings comply with PMD requirements.
- Time stamps are generated correctly.
- Time stamps are identical to PMD data format.
- Time synchronization is maintained after restart.
- No time drift occurs during continuous operation.

#### **6. Functional Testing Under Different Scenarios**

The logger shall be tested under various operational conditions, including:

- Power interruption and automatic recovery.
- Sensor disconnection.
- Sensor failure.
- Communication failure.
- Satellite link interruption.
- GSM network loss.
- FTP server unavailability.
- Memory overflow.
- Data buffering during communication outage.
- Automatic transmission of buffered data after communication restoration.
- Restart after power restoration.
- Clock synchronization after restart.
- Simultaneous operation of multiple sensors.
- Continuous operation for a minimum of 24 hours without malfunction.

#### **7. TECHNICAL EQUIVALENCE, COMPATIBILITY AND INTEGRATION REQUIREMENTS**

- Where the bidder offers an item, component, sensor, data logger, communication device, or other equipment that is different in make, model, design, or technical configuration from the existing installed equipment, it may be considered only if the bidder demonstrates that the offered item is functionally, electrically, mechanically, and communicational compatible with the existing GLOF-EWS infrastructure.
- Merely meeting or exceeding individual specifications such as measurement range, accuracy, resolution, memory, processor speed, or communication interface shall not, by itself, constitute technical equivalence.
- The bidder shall provide sufficient documentary evidence and, where required, conduct a practical demonstration to establish that the proposed alternative can be integrated with the existing system without requiring replacement or modification of other installed components, unless such modifications are explicitly approved by PMD.
- Where an alternative/equivalent data logger is proposed in place of the existing Compact/Compact+ data logger, the bidder shall demonstrate that:
  - The proposed data logger can be connected to and operate with the **existing installed sensors without replacement of the sensors**.
  - Existing sensor wiring, connectors, power arrangements, and mounting arrangements can be retained, wherever applicable.
  - The proposed logger accepts the **same sensor input types and signal characteristics** used by the existing system, including applicable analogue, digital, RS-485, SDI-12, pulse/frequency, PT100, and other installed sensor interfaces.
  - The proposed logger generates sensor data in a format and structure that is **fully compatible with the existing PMD data processing and database system**.
  - Existing data fields, parameter identification, units, timestamps, sampling intervals, recording intervals, and transmission intervals are maintained, or any proposed change is demonstrated to be fully compatible with the existing PMD system and approved by PMD.
  - The existing communication arrangements, including the HUGHES-9502 satellite modem and TRM-240/GSM communication system, can be retained and operated without loss of functionality.
  - The replacement of the logger does not require replacement of the existing sensors, communication modem, server/database interface, or other station equipment solely to make the proposed logger operational. Historical and real-time data generated by the proposed logger can be processed by the existing PMD system without alteration to the established data interpretation and monitoring arrangements.
- Where an alternative/equivalent sensor is proposed in place of an existing sensor, the bidder shall demonstrate that the proposed sensor:
  - Performs the **same measurement function** as the existing sensor.
  - Same measurement range, accuracy, resolution, response characteristics, and environmental suitability equal to or better than the specified requirements.
  - Provides an **input/output signal compatible with the existing data logger**, without requiring replacement of the data logger.
  - Uses a compatible communication protocol and addressing/configuration arrangement, where applicable.
  - Can be connected to the **existing sensor wiring and input channel** without modification, wherever the existing interface is required to be retained.
  - Produces measurement values in the same required units and with the same data interpretation as the existing sensor.

- Can be configured so that the existing PMD data acquisition, logging, transmission, and database systems receive and interpret the data correctly.
- Does not require changes to the existing data file structure, parameter identification, or data-processing logic, unless such changes are demonstrated and approved by PMD.
- For replacement of any logger or sensor, the bidder shall demonstrate that the replacement equipment can generate and/or transmit data using the **same established data structure, file format, parameter sequence, parameter identification, units, timestamp format, and transmission protocol** currently used by the existing GLOF-EWS.
- The bidder shall demonstrate, at its own responsibility and cost, that the data can be converted or configured so that the **existing PMD server/database and monitoring system receive and process the data without disruption**.
- A proposed item shall not be considered technically equivalent merely because its output can be converted through an additional device or software layer; such an arrangement shall require prior technical approval by PMD.

The bidder shall demonstrate that the proposed replacement item has compatible:

- Electrical input/output characteristics;
- Signal type and signal range;
- Communication interface;
- Communication protocol;
- Data structure;
- Sampling and recording configuration;
- Power supply requirements;
- Connector/wiring arrangement; and
- Mechanical installation/interface requirements.
- Where the bidder claims that an offered item is a direct replacement / drop-in replacement for an existing component, the bidder shall demonstrate that the existing component can be removed and the proposed item installed in its place with no modification to the remaining EWS system. The demonstration shall verify, as applicable:
  - **Existing Sensor → Proposed Logger → Existing Communication System → Existing PMD Server/Database**
  - or
  - **Existing Logger → Proposed Sensor → Existing PMD Server/Database.**
- The complete chain shall operate successfully and produce valid, correctly identified and correctly interpreted data at the PMD central system.
- The bidder shall demonstrate:
  - Physical connection and installation;
  - Sensor recognition and data acquisition;
  - Correct measurement values;
  - Correct units and parameter identification;
  - Correct timestamp;
  - Correct recording interval;
  - Correct data-file generation;
  - Correct data transmission;
  - Successful communication through the existing modem;
  - Successful receipt by the existing PMD server/database;
  - Correct display/interpretation of data at the central system; and
  - Continued operation following power and communication interruption.

- The bidder shall clearly identify any additional hardware, software, converter, interface, gateway, adapter, license, subscription, or modification required to integrate the proposed alternative item with the existing EWS.
- PMD shall not be required to procure additional components or undertake modifications merely to make an offered “equivalent” item compatible with the existing system, unless such requirements are explicitly identified by the bidder and accepted by PMD before technical evaluation.
- The burden of proof of technical equivalence and compatibility shall rest entirely with the bidder.
- PMD shall have the right to reject any proposed alternative item where the bidder fails to provide adequate documentary evidence or fails to satisfactorily demonstrate compatibility with the existing GLOF-EWS infrastructure.
- The final determination of technical equivalence and compatibility shall rest with the Pakistan Meteorological Department, based on the submitted documentation, technical evaluation, and/or practical demonstration.
- For the purpose of pre-qualification, compatibility shall be assessed on a **complete system basis** and not solely on individual component specifications.
- An item shall be considered technically acceptable only where its integration does not adversely affect the existing EWS's chain:  
**measurement → data acquisition → data logging → data formatting → communication → transmission → server/database → monitoring/alerting.**

## 8. Evaluation Criteria

| Sr. No.                     | Criteria                                                                                                                                                                                                                                                                                                                                                                                                                    | Evaluation                                                                                          |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Technical Evaluation</b> |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                     |
| i.                          | <p>It is validly incorporated under the laws of Pakistan (to the extent applicable), registered with relevant government agencies, active tax payer and OEM sole certificate.</p> <p>The bidder shall demonstrate the claimed equivalence and compatibility through verifiable technical documentation and/or practical demonstration to the satisfaction of PMD.</p>                                                       | Mandatory                                                                                           |
| ii.                         | Demonstration.                                                                                                                                                                                                                                                                                                                                                                                                              | 30 Marks                                                                                            |
|                             | <p>a. Practical demonstration</p> <p>Practical demonstration with 100% compliance</p> <p>Practical demonstration with 75% compliance</p> <p>Practical demonstration with 50% compliance</p> <p>Practical demonstration with &lt; 50% compliance</p> <p>b. Online demonstration</p> <p>100% compliance</p> <p>75% compliance</p> <p>50% compliance</p> <p>&lt;50% compliance</p> <p>c. Documented demonstration/ Written</p> | <p>30/30</p> <p>15/30</p> <p>5/30</p> <p>0/30</p> <p>20/30</p> <p>10/30</p> <p>5/30</p> <p>0/30</p> |

|       |                                                                   |           |
|-------|-------------------------------------------------------------------|-----------|
|       | 100% compliance                                                   | 10/30     |
|       | 75% compliance                                                    | 5/30      |
|       | <75% compliance                                                   | 0/30      |
| iii.  | Presence in Pakistan (Regional / Area Office)                     | 10 Marks  |
|       | a. $\geq 10$ years                                                | 10/10     |
|       | b. $\geq 5$ years                                                 | 5/10      |
|       | c. $< 5$ years                                                    | 0/10      |
| iv.   | Experience in providing similar systems                           | 10 Marks  |
|       | a. $\geq 10$ years                                                | 10/10     |
|       | b. $\geq 5$ years                                                 | 5/10      |
|       | c. $< 5$ years                                                    | 0/10      |
| v.    | After sales services with proven availability (in terms of years) | 10 Marks  |
|       | a. $\geq 10$ years                                                | 10/10     |
|       | b. $\geq 5$ years                                                 | 5/10      |
|       | c. $< 5$ years                                                    | 0/10      |
| vi.   | Technical team (provide complete details / CV)                    | 10 Marks  |
|       | a. $\geq 10$ team of technical person                             | 10/10     |
|       | b. $\geq 5$ team of technical person                              | 5/10      |
|       | c. $< 5$ team members                                             | 0/10      |
| vii.  | Customer Feedback                                                 | 10 Marks  |
|       | a. Qty of systems delivered with customer feedback $\geq 10$      | 10/10     |
|       | b. Qty of systems delivered with customer feedback $\geq 5$       | 5/10      |
|       | c. Qty of systems delivered with customer feedback $< 5$          | 0/10      |
| viii. | WMO Traceable Calibration certificates (equipment / sensors)      | 20 Marks  |
|       | a. 100 % sensor traceable certificate                             | 20/20     |
|       | b. 90 % sensor traceable certificate                              | 10/20     |
|       | c. Below 90 % sensor traceable certificate                        | 0/20      |
|       | Total                                                             | 100 Marks |

**Passing Marks: - 65/100**

## 9. Technical Specifications (LOT-1)

| Item | Parameter / Sensor Model            | Measurement Range                                                                                                               | Accuracy / Resolution                                                                                                                                                                                                                        | Output Options                                                        | Power Supply                      |
|------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------|
| 1    | Barometric Pressure (BARO sense-M)  | 300 – 1100 hPa<br>(Configurable analog output default: 600–1100 hPa)                                                            | <ul style="list-style-type: none"> <li>• Accuracy: <math>\pm 0.3</math> hPa (700...1100 hPa) @ 20°C; <math>\pm 1</math> hPa (500...1100 hPa); <math>\pm 0.3</math> hPa (300–500 hPa @ T=0...60°C)</li> <li>• Resolution: 0.01 hPa</li> </ul> | RS485 (Modbus-RTU/ASCII); Optional Analog (0/4–20 mA, 0–1/5/10V)      | 7 – 30 Vdc                        |
| 2    | Rainfall/ Rain Gauge (HD2013SR-1)   | Max rate: 600 – 1000 mm/h                                                                                                       | <ul style="list-style-type: none"> <li>• Accuracy: <math>&lt; 1\%</math> up to 30 mm/h</li> <li>• Resolution: 0.1, 0.2, or 0.5 mm/tip</li> </ul>                                                                                             | NC Contact; Optional Analog (4–20 mA, 0–10V) or SDI-12                | 7 – 30 Vdc (for optional outputs) |
| 3    | Global Solar Irradiance (LPPYRA02)  | 0 – 2000 W/m <sup>2</sup>                                                                                                       | <ul style="list-style-type: none"> <li>• Classification: Spectrally Flat Class B</li> <li>• Sensitivity: 6 – 12 <math>\mu\text{V/W/m}^2</math></li> </ul>                                                                                    | Passive mV; Analog (4–20 mA, 0–1/5/10V); Digital (Modbus-RTU, SDI-12) | 5 – 30 Vdc (active versions)      |
| 4    | Water Level & Flow Velocity (RVM20) | <ul style="list-style-type: none"> <li>• Level: 0 – 30 m</li> <li>• Velocity: 0.15 – 15 m/s</li> </ul>                          | <ul style="list-style-type: none"> <li>• Level Accuracy: <math>\pm 3</math> mm</li> <li>• Velocity Accuracy: <math>\pm 0.01</math> m/s (<math>\pm 1\%</math>)</li> </ul>                                                                     | RS485 (Modbus/SDI-12); Analog (4–20 mA)                               | 8 – 16 Vdc                        |
| 5    | 4-Component Net Radiation (NR01)    | <ul style="list-style-type: none"> <li>• Solar: 285 – 3000 nm</li> <li>• Longwave: 4.5 – 40 <math>\mu\text{m}</math></li> </ul> | <ul style="list-style-type: none"> <li>• ISO Second Class (Pyranometer)</li> <li>• Sensitivity: <math>\sim 15</math> <math>\mu\text{V/W/m}^2</math></li> </ul>                                                                               | Passive (4 differential channels); Pt100 for body temp                | Passive (Sensor); 12 Vdc (Heater) |
| 6    | Snow / Water Level (ULM30)          | 0.5 – 15 m                                                                                                                      | <ul style="list-style-type: none"> <li>• Precision: <math>\pm 0.01</math> m</li> <li>• Resolution: 0.01 m</li> </ul>                                                                                                                         | SDI-12; Analog (0/4–20 mA, 0–5/10V)                                   | 10 – 15 Vdc                       |

|    |                                 |                                                                                                                   |                                                                                                                                         |                                                                                 |                           |
|----|---------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------|
| 7  | Temp. & Relative Humidity (THS) | Not specified                                                                                                     | PT100 (Temp);<br>0–1 V (Humidity)                                                                                                       | Analog (Temp/Humidity);<br>Digital<br>UART                                      | 10 – 16 Vdc<br>(standard) |
| 8  | Wind Speed (VV20)               | 0 – 100 m/s                                                                                                       | <ul style="list-style-type: none"> <li>• Accuracy: <math>\pm 0.07</math> m/s</li> <li>• Resolution: 0.06 m/s</li> </ul>                 | 10 Vp Square Wave<br>(frequency proportional to speed)                          | 12 Vdc                    |
| 9  | Wind Direction (DV20)           | 0 – 360°                                                                                                          | <ul style="list-style-type: none"> <li>• Accuracy: <math>\pm 2.8^\circ</math></li> <li>• Resolution: <math>0.35^\circ</math></li> </ul> | Analog (0.5 V – 4.5 V)                                                          | 5 Vdc<br>(Excitation)     |
| 10 | Hydrostatic Level (PR-26Y)      | 0 – 10 m H <sub>2</sub> O                                                                                         |                                                                                                                                         | 4 – 20 mA                                                                       | 8 – 32 Vdc                |
| 11 | Data Logger (Compact)           | Processor: 528 MHz ARM Cortex A7<br>MPCore<br>RAM: 512MB of SDRAM<br>DDR3<br>NAND flash: 2 GB<br>NOR flash: 16 MB | Network Interface:<br>Ethernet, Wifi, Bluetooth<br>Accuracy: 0.012 % of the measure<br>Resolution: 24 bit                               |                                                                                 | 10—16V                    |
| 12 | Data Logger (Compact Plus)      | Processor: 168 MHz ARM Cortex M4<br>A/D converter: 24 bit<br>Total Flash memory: 5 MB<br>Total RAM: 704 KB        | Network Interface:<br>Ethernet, Wifi, Bluetooth<br>Accuracy: 0.012 % of the measure<br>Resolution: 24 bit                               | Number of available inputs: 9<br>Single-Ended / 4 differential + 1 Single-Ended | 10—16V                    |
| 13 | Charge Controller MPPTWRM20     | 12V/24V<br>20A                                                                                                    |                                                                                                                                         |                                                                                 |                           |
| 14 | RAM for Compact Data Logger     | 512MB of SDRAM<br>DDR3                                                                                            | Compatible with 528MHz ARM Cortex A7 Mpcore Processor                                                                                   |                                                                                 |                           |

|    |                                         |                                                                                                                                     |  |                                   |                                 |
|----|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|---------------------------------|
| 15 | Huges Satellite Modem 9502 with Antenna | Transmission frequency<br>1626.5 – 1675MHz<br>Receiving Frequency<br>1518 – 1559 MHz<br>Antenna Dimensions(385 mm x 385 mm x 33 mm) |  | RJ45 connector (Ethernet 10BaseT) | +12VDC / +24VDC<br>1.5A / 0.75A |
| 16 | Solar Panel (Monocrystalline, Grade- A) | 100-180W, 12V DC, Pole-mounted with adjustable brackets and accessories                                                             |  |                                   |                                 |
| 17 | Battery                                 | 80A, 12V, AGM Gel battery                                                                                                           |  |                                   |                                 |
| 18 | GSM Modem (Industrial Grade)            | 4G/LTE/5G, Wifi Cellular router, 5V powered via microUSB and compatible with the Compact Series Data Logger, PTA approved           |  |                                   |                                 |
| 19 | Warning Sirens                          | 24V DC, Max Sound level 122*dB or more , Vol control -9dB, Flash energy 10J, 1HZ                                                    |  |                                   |                                 |

|     |                                           |                                                                                                                                               |                                                                                                    |  |  |
|-----|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--|--|
| 20. | Enclosure for Data Logger and Battery Box | Outdoor industrial enclosure, Lockable, IP66 rating, Pole mounted with nuts, bolts, clamps and other accessories. UV-resistant powder coating | Dimensions:-<br>L x W x Depth<br>25.5 x 16 x 8 inches<br>in accordance with the drawing (attached) |  |  |
|-----|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--|--|

**Note:** The quantities of individual items shall be as specified in the approved Bill of Quantities (BoQ) / Financial Schedule. The Procuring Agency reserves the right to procure all or part of the listed items, subject to applicable procurement rules and the approved procurement requirements.

#### 10. Technical Specifications (LOT-2)

| Item | Parameter / Sensor Model | Measurement Range                                                    | Accuracy / Resolution                                                                                                                                                                                                                        | Output Options                                                              | Power Supply                      |
|------|--------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------|
| 1    | Barometric Pressure      | 300 – 1100 hPa<br>(Configurable analog output default: 600–1100 hPa) | <ul style="list-style-type: none"> <li>• Accuracy: <math>\pm 0.3</math> hPa (700...1100 hPa) @ 20°C; <math>\pm 1</math> hPa (500...1100 hPa); <math>\pm 0.3</math> hPa (300–500 hPa @ T=0...60°C)</li> <li>• Resolution: 0.01 hPa</li> </ul> | RS485 (Modbus-RTU/ASCII);<br>Optional Analog (0/4–20 mA, 0–1/5/10V)         | 7 – 30 Vdc                        |
| 2    | Rainfall/ Rain Gauge     | Max rate: 600 – 1000 mm/h                                            | <ul style="list-style-type: none"> <li>• Accuracy: &lt; 1% up to 30 mm/h</li> <li>• Resolution: 0.1, 0.2, or 0.5 mm/tip</li> </ul>                                                                                                           | NC Contact;<br>Optional Analog (4–20 mA, 0–10V) or SDI-12                   | 7 – 30 Vdc (for optional outputs) |
| 3    | Global Solar Irradiance  | 0 – 2000 W/m <sup>2</sup>                                            | <ul style="list-style-type: none"> <li>• Classification: Spectrally Flat Class B</li> <li>• Sensitivity: 6 – 12 <math>\mu\text{V/W/m}^2</math></li> </ul>                                                                                    | Passive mV;<br>Analog (4–20 mA, 0–1/5/10V);<br>Digital (Modbus-RTU, SDI-12) | 5 – 30 Vdc (active versions)      |

|     |                                              |                                                                                                                                                                                                                                                                                     |                                                                                                                                                                          |                                                        |                                   |
|-----|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------|
| 4   | Water Level & Flow Velocity                  | <ul style="list-style-type: none"> <li>• Level: 0 – 30 m</li> <li>• Velocity: 0.15 – 15 m/s</li> </ul>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Level Accuracy: <math>\pm 3</math> mm</li> <li>• Velocity Accuracy: <math>\pm 0.01</math> m/s (<math>\pm 1\%</math>)</li> </ul> | RS485 (Modbus/SDI-12); Analog (4–20 mA)                | 8 – 16 Vdc                        |
| 5   | 4-Component Net Radiation                    | <ul style="list-style-type: none"> <li>• Solar: 285 – 3000 nm</li> <li>• Longwave: 4.5 – 40 <math>\mu\text{m}</math></li> </ul>                                                                                                                                                     | <ul style="list-style-type: none"> <li>• ISO Second Class (Pyranometer)</li> <li>• Sensitivity: <math>\sim 15</math> <math>\mu\text{V/W/m}^2</math></li> </ul>           | Passive (4 differential channels); Pt100 for body temp | Passive (Sensor); 12 Vdc (Heater) |
| 6   | Snow / Water Level                           | 0.5 – 15 m                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Precision: <math>\pm 0.01</math> m</li> <li>• Resolution: 0.01 m</li> </ul>                                                     | SDI-12; Analog (0/4–20 mA, 0–5/10V)                    | 10 – 15 Vdc                       |
| 7   | Combine Temp. & Relative Humidity (THS)      | Not specified                                                                                                                                                                                                                                                                       | PT100 (Temp); 0–1V (Humidity)                                                                                                                                            | Analog (Temp/Humidity); Digital UART                   | 10 – 16 Vdc (standard)            |
| 8   | Wind Speed                                   | 0 – 100 m/s                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Accuracy: <math>\pm 0.07</math> m/s</li> <li>• Resolution: 0.06 m/s</li> </ul>                                                  | 10 Vp Square Wave (frequency proportional to speed)    | 12 Vdc                            |
| 9   | Wind Direction                               | 0 – 360°                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Accuracy: <math>\pm 2.8^\circ</math></li> <li>• Resolution: <math>0.35^\circ</math></li> </ul>                                  | Analog (0.5 V – 4.5 V)                                 | 5 Vdc (Excitation)                |
| 10  | Hydrostatic Level                            | 0 – 10 m H <sub>2</sub> O                                                                                                                                                                                                                                                           |                                                                                                                                                                          | 4 – 20 mA                                              | 8 – 32 Vdc                        |
| 11. | DJI Phantom 4 Pro Intelligent Flight Battery | Compatible with DJI Phantom 4 Pro/Phantom 4 Pro V2.0 aircraft. Intelligent LiPo battery with built-in battery management system (BMS). Battery Capacity: <b>5870 mAh or higher</b> . Voltage: <b>15.2 V</b> (4S). Flight Time: <b>Up to 30 minutes</b> . OEM or equivalent quality. |                                                                                                                                                                          |                                                        |                                   |
| 12. | DJI Phantom 4 Pro Remote Controller Battery  | Compatible with DJI Phantom 4 Pro/Phantom 4 Pro V2.0 Remote Controller. Rechargeable <b>Lithium-ion (Li-ion)</b> battery. Battery Capacity: <b>6000 mAh or higher</b> . Voltage: <b>7.2 V</b> . OEM or equivalent quality.                                                          |                                                                                                                                                                          |                                                        |                                   |

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| 13 | Data Logger | <p>The data should be recorded and saved in the internal non-volatile memory for at least 72 hours with an option of archiving to external memory.</p> <p>Recording/ measurement type: Instantaneous, average, min, max</p> <p>Recording Cycle: 1 min, 10 mins, 60 mins, 24 hrs or user defined.</p> <ul style="list-style-type: none"> <li>• Capable of transferring data using GSM, Satellite, Wi-Fi.</li> <li>• Direct data logger access through wireless and wired mode.</li> <li>• Complete end-to-end system, to transmit data from remote loggers to the Central data processor unit at pre-programmed intervals, or alternately respond to Polls from Central data processing unit.</li> <li>• The logger must support connection through different protocols such as RS-232, RS-485, Ethernet TCP/IP, USB, SDI etc.</li> <li>• The logger must be compatible to support data input from third party sensors using any of the above mentioned protocols.</li> <li>• Simultaneous communication on all ports automatically or could be defined by the user.</li> <li>• Sufficient number of channels to connect digital and analogue sensors with an option for extension.</li> <li>• Flash Card Memory 8GB included</li> <li>• LCD panel to display data and configure the logger</li> <li>• Operating temperature range -40°C to +60°C and humidity Range 0-100%.</li> <li>• Automatic system reset upon microprocessor failure</li> <li>• All exposed connectors must be rugged industrial grade material for corrosion and climate/environment proofing.</li> </ul> <p><b>Software for Connectivity with Data Logger:</b></p> <ul style="list-style-type: none"> <li>• Easily configure and connect with the logger for set-up and data downloading.</li> <li>• Should provide easy tools for displaying instantaneous and stored historical data in graphical and tabular/text format.</li> </ul> <p><b>Cabinet for logger :</b></p> <p>The AWS/Smart Sensor and the electronic equipment required for the AWS/Smart Sensor, should be installed in an outdoor cabinet with a protection category of IP65, IP66 or IP 67 (IEC 60 529). The material of the cabinet should be chosen so that the cabinet can survive at least 10 years in the environment of the installation without physical damage.</p> <p>The outer layer of the cabinet should be UV resistant, and not show external or internal corrosion in case it is made of metal.</p> <p>The cabinet should have at least one lock and should open/close with a key.</p> <p>At the bottom of the cabinet glands should be built in for incoming and outgoing cables.</p> <p>The cabinet should be supplied with all necessary pole mounting brackets or wall mounting brackets, as required.</p> <p><b>Charge Regulator (MPPT):</b></p> <ul style="list-style-type: none"> <li>• Smart Charge regulator to charge 12Volt, 100AH battery or better from power supplied by solar panel with intelligent charge control.</li> </ul> |
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| 14 | Standalone 4G Remote Monitoring Camera with external battery, solar panel and battery enclosure | <p>Suitable for remote and harsh weather conditions in both day and night operations.</p> <p>Support Local SIM cards (PTA approved equipment)</p> <p>4 MP image resolution.</p> <p>Color: 0 Lux with white light ON IP67</p> <p>Operating temperature: -20°C to +60°C.</p> <p>Automatic time-based (periodic) image capture and transmission to remote server. User-configurable capture interval from 1 minute to 24 hours.</p> <p>Date and time stamp embedded on each image. Support for image upload via FTP, SFTP, HTTP/HTTPS, or equivalent.</p> <p>Internal storage and/or microSD card (minimum 64 GB).</p> | <p><b>Battery Capacity:</b> Sufficient capacity to provide a minimum of 2 days of autonomous backup operation under normal system load during periods of no sunlight.</p> <p><b>Battery Type:</b> 12 V maintenance-free, sealed deep-cycle AGM battery or equivalent</p> <p><b>Battery Enclosure:</b> The battery shall be installed inside a minimum IP67-rated weatherproof enclosure suitable for outdoor installation. The enclosure shall include appropriate cable entry glands/openings for solar panel, camera, and power connections, and shall be supplied with all necessary pole-mounting brackets, fixing hardware, and installation accessories.</p> <p><b>Solar Charge Controller:</b> The system shall include a suitable solar charge controller. The controller shall be compatible with the selected battery type and solar panel capacity.</p> | <p>The system shall include a high-efficiency monocrystalline solar panel with a capacity of 100 W to 180 W</p> <p>The solar panel shall be supplied with a corrosion-resistant mounting frame/bracket suitable for pole mounting, including all required clamps, and accessories.</p> | <p>Average power consumption: ≤5 W.</p> <p>The camera system shall include all necessary pole-mounted accessories for installation</p> |
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**Note:** The quantities of individual items shall be as specified in the approved Bill of Quantities (BoQ) / Financial Schedule. The Procuring Agency reserves the right to procure all or part of the listed items, subject to applicable procurement rules and the approved procurement requirements.

## 11. Service Requirements

The bidder shall comply with the following requirements:

### a. Item-by-Item Statement

The bidder shall submit a detailed, item-by-item statement against all technical specifications provided in this document. The statement shall clearly indicate whether the offered item **complies with, exceeds, or deviates from** each specified requirement.

Any deviation, exception, or alternative specification shall be clearly identified and fully explained.

### b. Calibration Certificates

All applicable sensors and measuring instruments shall be supplied with valid factory calibration certificates traceable to internationally recognized standards (calibration certificate before January 2026 is not acceptable). Where applicable, calibration shall be traceable to relevant **ISO / WMO** standard.

### c. Technical Documentation

The technical bid shall include complete and authentic technical documentation for each offered item, including, where applicable:

- Manufacturer's technical datasheet;
- Operation and maintenance manual;
- Installation and configuration manual;
- Wiring and pinout diagrams;
- Communication protocol details;
- Power supply requirements; and
- Any other documentation necessary for integration with the existing EWS infrastructure.

### d. Warranty

All supplied items shall carry a minimum comprehensive warranty of **twelve (12) months from the date of installation, commissioning, or acceptance, whichever is later**, against manufacturing defects, material defects, workmanship defects, and abnormal measurement deviations attributable to the supplied equipment.

The supplier shall repair or replace defective items, at no additional cost to PMD, during the warranty period.

## 12. Delivery

- a. All equipment and parts shall undergo appropriate factory testing and quality checks prior to dispatch (the produced calibration certificate will not be accepted if it dates back before January 2026).
- b. The supplier shall provide evidence of factory testing and inspection, where applicable, along with the shipment.
- c. Upon delivery, the supplied items shall be subject to inspection and verification by PMD.
- d. Post-delivery inspection and functional testing may be conducted at designated PMD facilities or station locations to verify compliance with the approved technical specifications.

- e. Any item found defective, damaged, non-genuine shall be replaced by the supplier at no additional cost to PMD.
- f. The supplier shall ensure that all equipment is suitably packed and protected against damage during transportation, handling, and storage.

### **13. Validity of Offer**

All supplied equipment and parts shall be **new, genuine, unused, and sourced from the Original Equipment Manufacturer (OEM).**

The bidder shall be solely responsible for ensuring the accuracy, completeness, authenticity, and technical compliance of the information submitted in its technical bid.

Failure to comply with the mandatory technical requirements may result in the rejection of the bid in accordance with the applicable procurement rules and tender conditions.