

## ***Summary of AWS Technical Specifications.***

*The Goods and Related Services shall comply with following Technical Specifications and Standards*

<b><i>Item No</i></b>	<b><i>Name of Goods or Related Service</i></b>	<b><i>Technical Specifications and Standards</i></b>
1	<b>Combined Wind speed and wind Ultrasonic)</b>	<ul style="list-style-type: none"> <li>• Operating Temperature Range: -40 to +60°C and Humidity 0 to 100%</li> <li>• Sustain a Wind Gust of at least 100 m/s</li> <li>• Installation height 30 ft.</li> <li>• The sensor should be heated if required</li> <li>• Mounting system for the pole</li> <li>• Cable length, tailored to the system configuration</li> </ul> <p><b>Wind Speed Ranges</b></p> <ul style="list-style-type: none"> <li>• Measuring range: 0 to 80m/s or better</li> <li>• Resolution: &lt; 0.5 m/s or better</li> <li>• Threshold: maximum 0.1 m/s</li> <li>• Accuracy: ± 0.3 m/s or 3% from reading</li> </ul> <p><b>Wind Direction Ranges</b></p> <ul style="list-style-type: none"> <li>• Measuring range: 0 to 359.9°</li> <li>• Resolution: 0.1° or better</li> </ul> <p>Accuracy: &lt; 3°</p>
2	<b>Combined Humidity &amp; Temperature Sensor</b>	<p><b>The radiation shield should be preferably naturally ventilated.</b></p> <p><b>The presence of a radiation shield shall not affect measurements in anyway.</b></p> <p><b>The radiation shield must be made of UV stabilized material. non-metal material and have a stacked plate structure.</b></p> <p><b>The outer surfaces of the shield must be white to reflect radiation.</b></p> <p><b>The sensor will be installed on side arm, attached to the pole, at 2 m height.</b></p> <p><b>Temperature:</b></p> <p><b>Sensor type PT-100 IEC 60751 or PT 1000 DIN A or other equivalent standard</b></p> <ul style="list-style-type: none"> <li>• Measurement range: -40 to +60 °C</li> <li>• Resolution: maximum 0.1 °C</li> <li>• Accuracy:±0.1°C.</li> <li>• long-term stability/year: ±0.1°C or better</li> <li>• Current consumption: max 5mA</li> </ul>

		<p>(without heating)</p> <ul style="list-style-type: none"> <li>• Output signal (linear) resistance or 0...1 VDC</li> </ul> <p><b>Humidity:</b> Relative humidity must be measured using a heated capacitive or comparable sensor to avoid the measurement errors caused by dew formation. The sensor must be protected from pollution by an appropriate, exchangeable filter</p> <ul style="list-style-type: none"> <li>• Range: 0 – 100%</li> <li>• Resolution &gt; maximum 1% RH</li> <li>• Accuracy: ± 1% RH</li> <li>• Operating Temp. range: - 40 to +60°C</li> <li>• Long-term stability/year: ±1 % or better</li> </ul> <p>Current consumption: max 5mA (without heating)</p>
3	<b>Solar Radiation Sensor (PAR)</b>	<p>Type can be Photosynthetically active radiation or ISO 9060 spectrally flat Class B</p> <ul style="list-style-type: none"> <li>• Measurement Range: 0 – 2000 W/m<sup>2</sup>.</li> <li>• Operating Temperature Range: -40° to +60°C</li> <li>• Accuracy: ± 5%</li> <li>• Response time: &lt; 15s</li> </ul> <p>Provides measurements in direct sunlight, when the sky is cloudy, and in artificial light</p>
4	<b>Pressure sensor</b>	<ul style="list-style-type: none"> <li>• Range: 600-1100hPa or better</li> <li>• Calculate both station and mean sea level pressure</li> <li>• Operating temperature range -40- +60°C</li> <li>• Resolution: 0.1hPa or better</li> <li>• Response time: 10 seconds or better</li> <li>• Accuracy: 0.3hPa (-40- +60°C) or better</li> <li>• Dust filter</li> <li>• Long term stability: ± 0.2 hPa / year</li> </ul> <p>Output signal (linear) 0...1 VDC or 0...5VDC or 0...10VDC</p>
5	<b>Rain Gauge (Tipping or Weighing Type)</b>	<p>Tipping bucket type</p> <ul style="list-style-type: none"> <li>○ Sensor Type: Reed switch</li> <li>○ Orifice Diameter: 20.0 cm</li> <li>○ Rainfall per Tip: 0.2 mm</li> </ul>

		<p>Weighing type</p> <ul style="list-style-type: none"> <li>○ Collecting area: 200/400 cm<sup>2</sup>- circular area</li> <li>○ Range: 0-200 mm</li> </ul> <p>The sensor should have the capability to output, minimum, the following measurements:</p> <ul style="list-style-type: none"> <li>- Intensity (Real Time)</li> <li>- Amount (Real Time / Non Real Time)</li> <li>- Amount Total (Non Real Time)</li> <li>- Bucket Content (Real Time and Non Real Time)</li> <li>- Temperature of load cell - weighing type</li> <li>- Sensor Status</li> <li>- Heating status</li> </ul> <p>Technical specification for weighing type</p> <ul style="list-style-type: none"> <li>● Resolution: max 0,01mm, 0.01 mm/min or mm/h – on SDI-12 and RS-485 interface</li> <li>● Uncertainty : ± 0,1 mm or ± 1% from reading</li> <li>● Operating temperature: - 40 ÷ + 60° C</li> <li>● Humidity : 0 ... 100% ( non condensing)</li> <li>● Protection: min. IP 65</li> <li>● Accuracy (at -25 ... +45 °C)</li> </ul> <ul style="list-style-type: none"> <li>- Amount: ±0.1 mm or ±1 % of measured value</li> <li>- Intensity: ±0.1 mm/min, ±6 mm/h or ±1 % of measured value</li> </ul> <p>Technical specification for weighing type</p> <ul style="list-style-type: none"> <li>● Resolution: 0.1 mm</li> <li>● Accuracy : ± 2%</li> <li>● The sensor must come with cable connexion, set up with proper length.</li> <li>● Base plate should be made from aluminum and the bucket from polyethylene. The pipe housing should be ASA, UV-resistant</li> </ul>
6	<b>Ultrasonic Snow level sensor</b>	<ul style="list-style-type: none"> <li>● Range 0 to 10m</li> <li>● Resolution: 1mm</li> <li>● Accuracy: ± 0.3%</li> <li>● Operating temperature range -40-+60°C</li> </ul> <p>The instrument shall be equipped with sufficient heating as appropriate for the local conditions. The heating shall be controlled by a thermostat and it shall be switched on below an ambient temperature of 1 °C. The heating shall avoid snow and ice building up on the</p>

		instrument.
7	<b>Soil Moisture and Temperature Sensor at separate depths (5cm, 10cm, 20cm, 30cm, 50cm, 100cm)</b>	<ul style="list-style-type: none"> <li>• Can measure Volumetric water content and soil temperature</li> <li>• Salinity ranges from <b>50 to 500 mS.m<sup>-1</sup></b></li> <li>• Temperature range -40- +60°C or better</li> <li>• <b>Resolution: 0.1° C</b></li> <li>• <b>Accuracy: ± 0.3° C</b></li> <li>• A separate sensor is required for each depth</li> </ul> <p>An appropriate mounting bracket and cover must be provided to maintain the probe above the ground and to ensure its protection</p>
8	<b>Evaporation Pan with Gauge</b>	<p><b>Evaporation Pan (as per WMO standard)</b></p> <ul style="list-style-type: none"> <li>• Material: Low carbon stainless steel, 18 gauge</li> <li>• Construction Heliarc welded, 1/2-in. drain plug NPT female coupling</li> <li>• Volume~291 L (~77 gal)</li> <li>• Mesh protection from birds</li> </ul> <p><b>Evaporation Gauge</b></p> <ul style="list-style-type: none"> <li>• Consists of a float, pulley, and counterweight attached to a precision 1000-ohm potentiometer mounted through a gear assembly in a weatherproof housing</li> <li>• Potentiometer Accuracy 0.25%</li> <li>• Made of Stainless steel</li> <li>• Resolution 0.76mm or better</li> </ul> <p>Operating temperature range -40- +60°C</p>
9	<b>Ceilometer</b>	<ul style="list-style-type: none"> <li>• <b>Measuring principle: LIDAR</b></li> <li>• Low weight State-of-the-art weather proof Ceilometer that can differentiate liquid and solid clouds and precipitating particles.</li> <li>• The Reporting Range is from 0 to 8 km or better.</li> <li>• Can report Sky Condition Up to five layers with cover in oktas according to WMO requirements for SYNOP and METAR codes as per standard.</li> <li>• Resolution: maximum 5 m</li> <li>• Accuracy: ± 5 m</li> <li>• <b>Output data format: NetCDF or ASCII CSV</b></li> <li>• <b>Internal battery with measuring range of 1 h</b></li> <li>• <b>External battery and solar system than</b></li> </ul>

		<p><b>should offer an measuring autonomus of 48 hours</b></p> <ul style="list-style-type: none"> <li>• <b>Laser protection class: 1M,IEC 60825-1</b></li> <li>• <b>Light source: laser diode</b></li> <li>• <b>Wind resistance: min 55m/s</b></li> <li>• Operating temperature range : <ul style="list-style-type: none"> <li>○ Without battery -40- +60°C</li> <li>○ With battery -25- +50°C</li> </ul> </li> <li>• Communication interface: RS2,32 / RS485, LAN or other methods in order to assure data transmission.</li> </ul>
10	<b>Visibility Sensor</b>	<ul style="list-style-type: none"> <li>• Maximum Measurement Range: 5 to 30 Km or better</li> <li>• Operating Temperature Range: -40°C to 60°C</li> <li>• Non-condensing</li> <li>• Accuracy: <ul style="list-style-type: none"> <li>○ <b>± 10% - up to 10000 m</b></li> <li>○ <b>± 15% - up to 15000 m</b></li> </ul> </li> <li>• Resolution: maximum 1 m</li> </ul> <p>Wind resistance: up to 55 m/s</p>
11	<b>Lysimeter (Weighing Type)</b>	<ul style="list-style-type: none"> <li>• Measured Parameter: Rain, Evaporation</li> <li>• Measuring Principle: Weighing</li> <li>• Measuring Accuracy: 0.1mm evaporation/rain</li> <li>• Sample Type: Undisturbed</li> <li>• Sample Diameter: 50cm</li> <li>• Sample Depth: 50cm</li> <li>• Sample Volume: 98 L</li> </ul>
12	<b>Data logger</b>	<p>A fast, reliable and all-in-one data logger, which should be able to perform all necessary operations (instant-read each sensor and battery data, record and show the output on the main screen of the data logger as well as to the main control computer through a communication interface).</p> <p>The data should be recorded and saved in the internal non-volatile memory for at least one month 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/GPRS, Satellite, Wi-Fi, Radio communication, LoRaWAN or any other protocol.</li> <li>• The communication modem can be integrated in the datalogger, but the datalogger must have a dedicate port, in case a separate modem must be installed. This (modem) should be easily replaceable without the need to replace other components in AWS</li> <li>• In both case (integrated modem or separate modem), the equipment should be attached to an omnidirectional antenna, that will provide enough signal for data transmission.</li> <li>• Direct data logger access through wireless and wired mode.</li> <li>• GSM/Satellite-based Pakistan Telecommunication Authority (PTA) approved communication modem system; using any of the Pakistani GSM networks (that may have service in the area of installation) using SMS and GPRS service.</li> <li>• The 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 the 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</li> </ul>
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		<p>connect digital and analogue sensors that will be provide and option for extension with at least 2 analog channels and 2 digital channels</p> <ul style="list-style-type: none"> <li>• The number of analog/digital/serial channels in the data logger must be compatible to the sensors being supplied</li> <li>• The data logger must support remote configuration through MIPS.</li> <li>• Flash Card Memory 8GB included</li> <li>• Datalogger must have a integrate LCD panel to display data and configure the logger, or equivalent equipment.</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> <li>• The expansion with new sensor should be done easily by the client, without any need for intervention by the manufacture/vendor (based on the training lessons). In case of manufacture necessity for expansion, this should be provided, free of charge, for a period of 10 year.</li> <li>• It should have at least the following communication protocols: <ul style="list-style-type: none"> <li>○ TCP/IP</li> <li>○ Hypertext Transfer Protocol, HTTP;</li> <li>○ File Transfer Protocol, FTP;</li> <li>○ Simple Mail Transfer Protocol, SMTP;</li> <li>○ Network Time Protocol, NTP;</li> </ul> </li> <li>• Time synchronization: <ul style="list-style-type: none"> <li>○ Real Time clock accuracy for the datalogger of +/-3 minute per year.</li> <li>○ NTP (network time protocol)</li> <li>○ GPS</li> </ul> </li> </ul> <p><b>Software for Connectivity with Data</b></p>
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		<p><b>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> <li>• Should be able to configure, remotely the sensor that are connected</li> <li>• Firmware should be available, and free of charge for all the warranty period</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 white cabinet with a protection category of IP65, IP66 or IP67 (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>If powder-coated or painted, the coating may have changed colour, but it should not be cracked or damaged in any other way.</p> <p>If glass fiber or other synthetic material, it should not be cracked or damaged in any other way.</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, and possibility to add new ones in case of expansion.</p> <p>All wiring inside the enclosure shall be bundled so that no loose wires or cables exist inside the enclosure</p> <p>The cabinet should be supplied with all necessary pole mounting brackets or wall mounting brackets, as required.</p> <ul style="list-style-type: none"> <li>• Operational temperature limits -40° ... +60°C</li> </ul>
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		<ul style="list-style-type: none"> <li>• Operational relative humidity limits 0 ... 100 % RH</li> <li>• Tolerant to wind speed up to 60 m/s</li> </ul> <p><b>Power Option:</b></p> <ul style="list-style-type: none"> <li>• The data logger should operate both on AC and DC power supply.</li> <li>• Two AC sockets for external usage.</li> </ul> <p><b>Solar Panel (Monocrystalline):</b></p> <ul style="list-style-type: none"> <li>• Photovoltaic solar panel to charge batteries from solar energy, 12V 60-Watts output, 8-meter stranded UV-protected copper cables RED+BLACK</li> </ul> <p><b>Charge Regulator (10 AMP MPPT):</b></p> <ul style="list-style-type: none"> <li>• Smart Charge regulator to charge 12Volt, 50AH battery or better from power supplied by solar panel with intelligent charge control.</li> </ul> <p><b>Battery:</b></p> <ul style="list-style-type: none"> <li>• Sealed maintenance-free battery; 12Volt, 50Ah or better with high-quality instrumentation class terminals and # 16-gauge standard copper connection cable RED+BLACK.</li> </ul> <p><b>Battery Enclosure (If required):</b></p> <ul style="list-style-type: none"> <li>• The battery should be installed in an outdoor cabinet with a protection category of IP65, IP66 or IP67 (IEC 60 529).</li> <li>• The battery must be housed in a weatherproof vented outdoor housing.</li> <li>• The outer layer of the cabinet should be UV resistant, and not show external or internal corrosion in case it is made of metal.</li> <li>• This housing should be connected to the logger housing, if different using environment-proof connectors.</li> </ul> <p><i>The solar power system should be tailored, in order to have an autonomous of 7 days without solar light.</i></p>
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13	Air Quality Sensor	<ul style="list-style-type: none"> <li>• Measures important urban pollutant gases such as NO<sub>2</sub>, NO, O<sub>3</sub>, and CO and particles PM<sub>10</sub>, PM<sub>2.5</sub>, PM<sub>1</sub></li> <li>• Gases: <ul style="list-style-type: none"> <li>○ Detection limits: <ul style="list-style-type: none"> <li>▪ NO<sub>2</sub> – 20ppm</li> <li>▪ NO- 250ppm</li> <li>▪ O<sub>3</sub>-10ppm</li> <li>▪ CO-300ppm</li> </ul> </li> <li>○ Accuracy <ul style="list-style-type: none"> <li>▪ NO<sub>2</sub> ± 5ppm</li> <li>▪ NO ± 8ppm</li> <li>▪ O<sub>3</sub> ± 6ppm</li> <li>▪ CO ± 190ppm</li> </ul> </li> </ul> </li> <li>• Particles <ul style="list-style-type: none"> <li>○ Detection limits: <ul style="list-style-type: none"> <li>▪ PM<sub>1</sub>- 0..1000 µg/m<sup>3</sup></li> <li>▪ PM<sub>2.5</sub>- 0--1000 µg/m<sup>3</sup></li> <li>▪ PM<sub>10</sub>- 0..1000 µg/m<sup>3</sup></li> </ul> </li> <li>○ Accuracy <ul style="list-style-type: none"> <li>▪ PM<sub>1</sub> ± 5%</li> <li>▪ PM<sub>2.5</sub> ± 5%</li> <li>▪ PM<sub>10</sub> ± 5%</li> </ul> </li> </ul> </li> <li>• Operating temperature range -10-+30°C</li> <li>• Data output: ASCII, CSV or other format that is compatible with the datalogger</li> </ul>
14	Self-recording Automatic Rain Guage with data logger complete communication (built in GPRS)	<p>Tipping bucket type</p> <ul style="list-style-type: none"> <li>○ Sensor Type: Reed switch</li> <li>○ Orifice Diameter: 20.0 cm</li> <li>○ Rainfall per Tip: 0.2 mm</li> </ul> <p>Weighing type</p> <ul style="list-style-type: none"> <li>○ Collecting area: 200/400 cm<sup>2</sup>-circular area</li> <li>○ Range: 0-200 mm</li> </ul> <ul style="list-style-type: none"> <li>• The sensor should have the capability to output, minimum, the following measurements: <ul style="list-style-type: none"> <li>- Intensity (Real Time)</li> <li>- Amount (Real Time / Non Real Time)</li> <li>- Amount Total (Non Real Time)</li> <li>- Bucket Content (Real Time and Non Real</li> </ul> </li> </ul>

		<p>Time)</p> <ul style="list-style-type: none"> <li>- Temperature of load cell - weighing type</li> <li>- Sensor Status</li> <li>- Heating status</li> </ul> <ul style="list-style-type: none"> <li>• Technical specification for weighing type</li> <li>• Resolution: max 0,01mm, 0.01 mm/min or mm/h – on SDI-12 and RS-485 interface</li> <li>• Uncertainty : <math>\pm 0.1</math> mm or <math>\pm 1\%</math> from reading</li> <li>• Operating temperature: - 40 - + 60° C</li> <li>• Humidity : 0 ... 100% ( non condensing)</li> <li>• Protection: min. IP 65</li> <li>• Accuracy (at -25 ... +45 °C)</li> </ul> <p>- Amount: <math>\pm 0.1</math> mm or <math>\pm 1\%</math> of measured value</p> <p>- Intensity: <math>\pm 0.1</math> mm/min, <math>\pm 6</math> mm/h or <math>\pm 1\%</math> of measured value</p> <ul style="list-style-type: none"> <li>• Technical specification for weighing type along with data logger</li> <li>• Resolution: 0.1 mm</li> <li>• Accuracy: <math>\pm 2\%</math></li> <li>• The sensor must come with cable connexion, set up with proper length.</li> <li>• Base plate should be made from aluminum and the bucket from polyethylene. The pipe housing should be ASA, UV-resistant</li> <li>• The data logger must support remote configuration through MIPS.</li> <li>• Flash Card Memory 8GB included</li> <li>• Datalogger must have a integrate LCD panel to display data and configure the logger, or equivalent equipment.</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>• The data logger should operate both on AC and DC power supply.</li> <li>• Data retrieval and transmission Through SD Card and GPRS telemetry OR RS 485 communication</li> <li>• Two AC sockets for external usage.</li> <li>• 5V lithium battery with inbuild</li> </ul>
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		<p>charges battery pack; 1 year warranty</p> <ul style="list-style-type: none"> <li>• Battery backup; 10 days suitable for extreme weather conditions</li> <li>• Real time clock: stability long-term <math>\pm 1</math> ppm/year; Stability (temperature): <math>\pm 3.5</math> ppm or better from <math>-40^{\circ}</math> to <math>60^{\circ}\text{C}</math></li> <li>• Environmental rating for logger used outside of rain Gauge: suitable for deployment of outdoor with some international certification</li> <li>• Provide to the Principal the software, instructions and any connection hardware to connect to and download from the rainfall datalogger.</li> <li>• Monitor battery voltage and change battery according to the rainfall datalogger manufacturer's specifications.</li> <li>• Solar panel and solar charge with battery pack: 6 volts solar panel with inbuilt charges battery pack</li> <li>• Installation: on Mast-on the ground with relevant accessory</li> </ul>
15	<p style="text-align: center;"><b>Mounting pole</b></p>	<ul style="list-style-type: none"> <li>• The mast/tower will be tiltable mast of 30 ft height above ground (three sections of 10 ft) with 3 guy-wires. Separate pole of 4 ft height for rain gauge.</li> <li>• Lifting up and bending should be done with no more than 4 operators</li> <li>• Accessories for lifting and bending should be delivered with each pole.</li> <li>• It shall include isolated lightning protection which is grounded separately from the electronics.</li> <li>• The mast/tower must withstand wind speeds up to 60 m/s.</li> <li>• All the used materials should be highly corrosion resistant or non-corrosive. The mast should be painted white.</li> </ul> <p>The mast/tower will be used to support sensors, electronics, the data logger and data processing unit, solar panels, lightning rod etc. The mast/tower tubes should be made of aluminum or stainless-steel material. The remaining parts of the main assembly are</p>

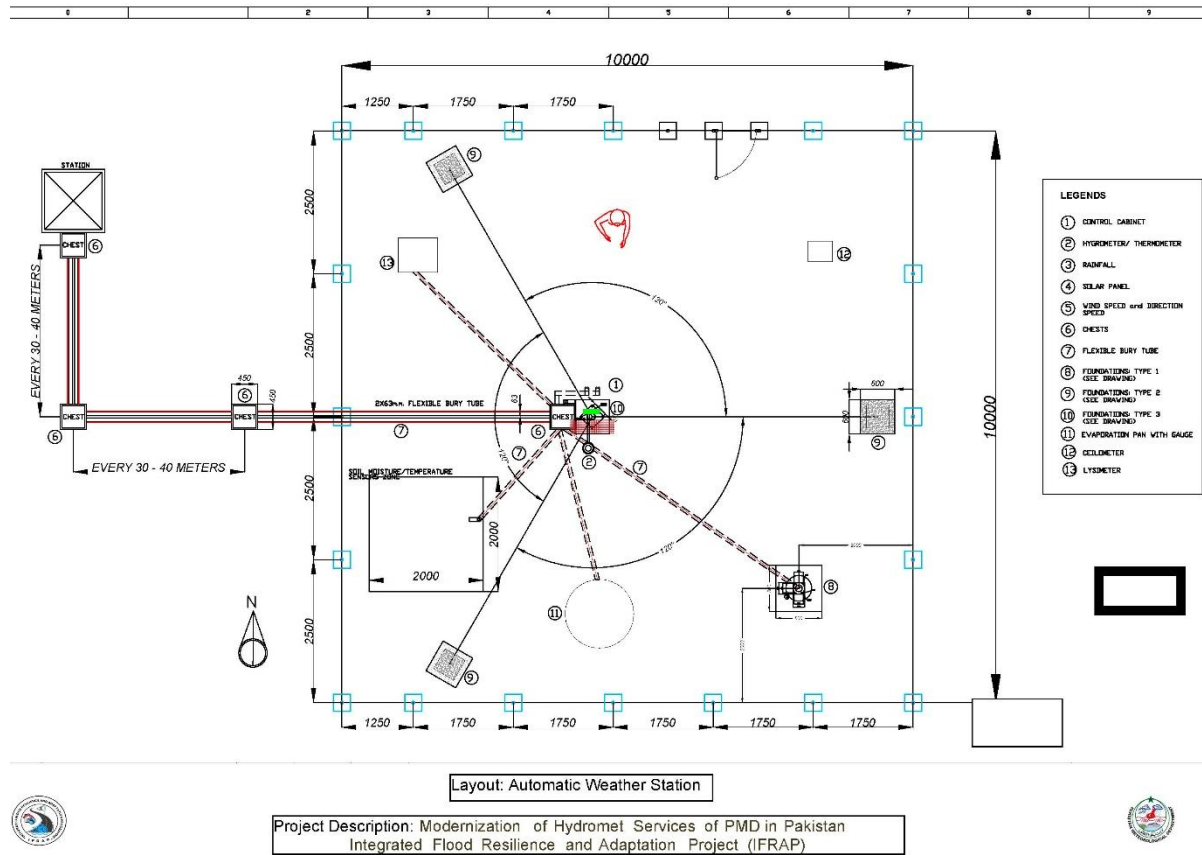
		made of stainless steel to resist weathering.
16	<b>Accessories/ Fittings</b>	<ul style="list-style-type: none"> <li>Anodized aluminum or stainless-steel sensor arms.</li> </ul> Anodized aluminum or Stainless-steel mountings for each sensor, data logger, battery box Solar panel etc.
<b>CIVIL WORKS (see drawings)</b>		
1	<b>Foundation</b>	<p>The mast/pole of AWS will be placed on a foundation with the following specification:</p> <ul style="list-style-type: none"> <li>- 60x60x80 ( Lxhx) cm</li> <li>- Reinforced concreat</li> <li>- Housing for the mast/pole,</li> </ul> <p>Anchoring foundation:</p> <ul style="list-style-type: none"> <li>- 40x40x80 ( Lxhx) cm</li> <li>- Reinforced concrete</li> </ul> <p>Rain Gauge and Ceilometer foundation</p> <ul style="list-style-type: none"> <li>- 80x80x80 ( Lxhx) cm</li> <li>- Reinforced concrete</li> </ul>
2	<b>Fence</b>	<ul style="list-style-type: none"> <li>All meteorological platforms will be fenced.</li> </ul> <p>The entrance on the platform will always be on the North side</p>
3	<b>Connection</b>	<p>All the cables that are connecting the sensors (which are not mounted on the AWS pole), should be underground, in flexible bury tube. The burial depth is 70 cm blow the ground level.</p>
4	<b>Grounding</b>	<p>All meteorological platform must have grounding, to which will be connected all the AWS equipment. This grounding will be separate than the one for the pole.</p>
<b>Services</b>		
1	<b>Meteorological Information and Processing System (MIPS)</b>	<p>The software system must be user-friendly with the following capabilities:</p> <ul style="list-style-type: none"> <li>The primary MIPS system (as per WMO guidelines) for the PMD is to be deployed on the central database server in Islamabad and secondary servers will be deployed in regional meteorological centres (Karachi, Lahore, Peshawar, Quetta).</li> <li>The bidder shall include complete hardware specifications of the servers along with the bid.</li> <li>Data communication methodology</li> </ul>

		<p>(Ethernet, TCP/IP and other protocols, GPRS, satellite, landline), bi-directional between the MIPS and AWS.</p> <ul style="list-style-type: none"> <li>• The data files or databases should be managed automatically by the system without human intervention. For example, the system should automatically repair damaged data files or databases, automatic correction activities should be implemented, automatic purging of data files or databases for the configured storage periods, automatic database replication (if applicable), etc.</li> <li>• The MIPS shall collect statistics on all acquisition processes. The MIPS shall have facilities to display these statistics graphically (on a GUI display) as a function of time for all individual systems that supply data, but also for groups of data-supplying systems (e.g., to display acquisition processes from all AWS stations)</li> <li>• The MIPS shall have GUIs to display all the data in the system, meteorological data, log files, status information, errors, reports, etc. Such displays shall contain as many screens as needed to display the data in a structured manner. These screens and displays shall be configurable by the user (system administrator).</li> <li>• The MIPS shall have a graphical user interface for maintenance, configuration and support tasks. It shall work with Windows to show information in a structured and configurable manner. MIPS displays can be shown in web browsers or dedicated client applications.</li> <li>• The MIPS shall be able to access system components to perform system management (such as starting and stopping processes, file management, etc.).</li> </ul>
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		<ul style="list-style-type: none"> <li>• All aspects of the MIPS server should be redundant and installed at PMD headquarters, in Islamabad. The redundant systems should have a hot standby relationship. The operation should be taken over within 1 minute.</li> <li>• The system should provide facilities for the installation, for making new versions of the software and configuration operational from a central point, through the MIPS.</li> <li>• Able to generate SYNOPS and METAR as per WMO standards.</li> </ul> <p>Should have the functionality to Quality Check/Control data.</p>
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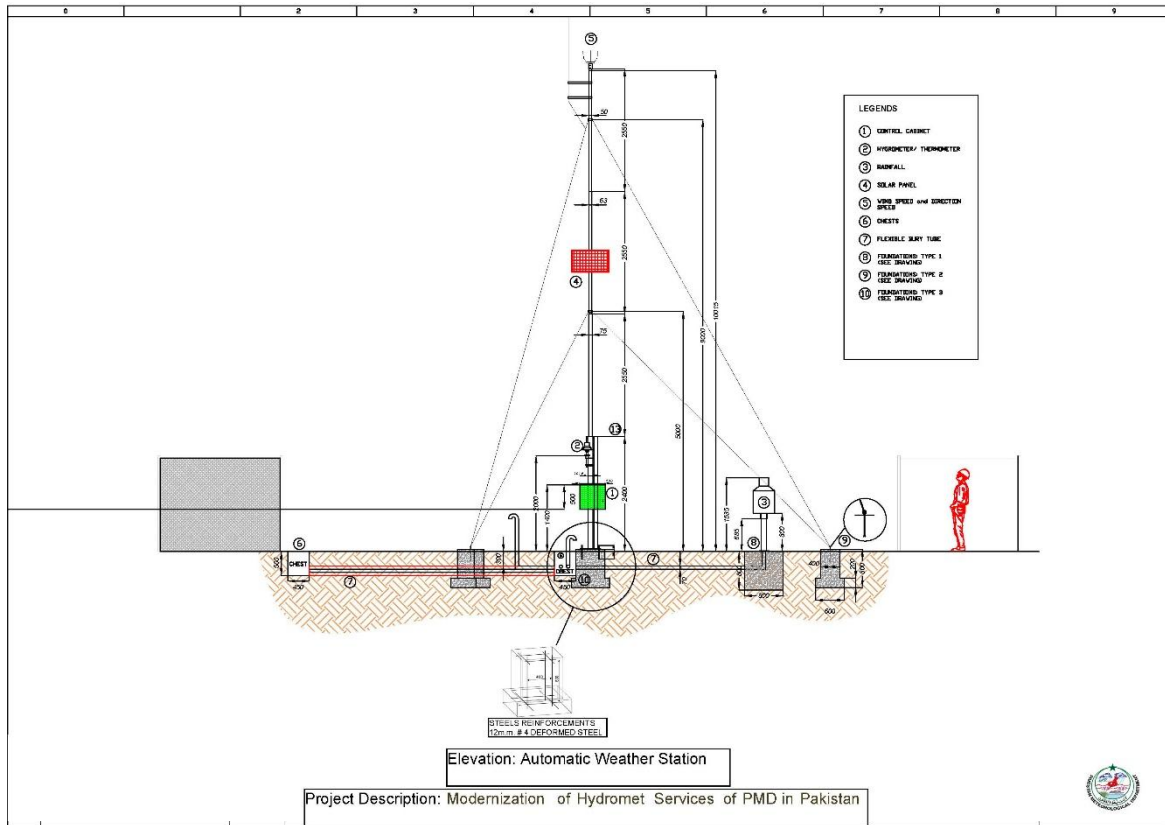
<b>List of Drawings</b>		
<b>Drawing Nr.</b>	<b>Drawing Name</b>	<b>Purpose</b>
1	Automatic weather stations Observatory	The structure of AWS observatory and its premises where the sensors will be installed.
2	Mounting Pole	The sensors of windspeed and wind direction, temperature humidity sensors etc. along with the data logger will be mounted
3	Foundation Type-1	The foundation of Rain Guage and steel tower/pole
4	Foundation Type-2	-do-
5	Foundation Type-3	-do-

## Drawing-1: Automatic weather stations Observatory

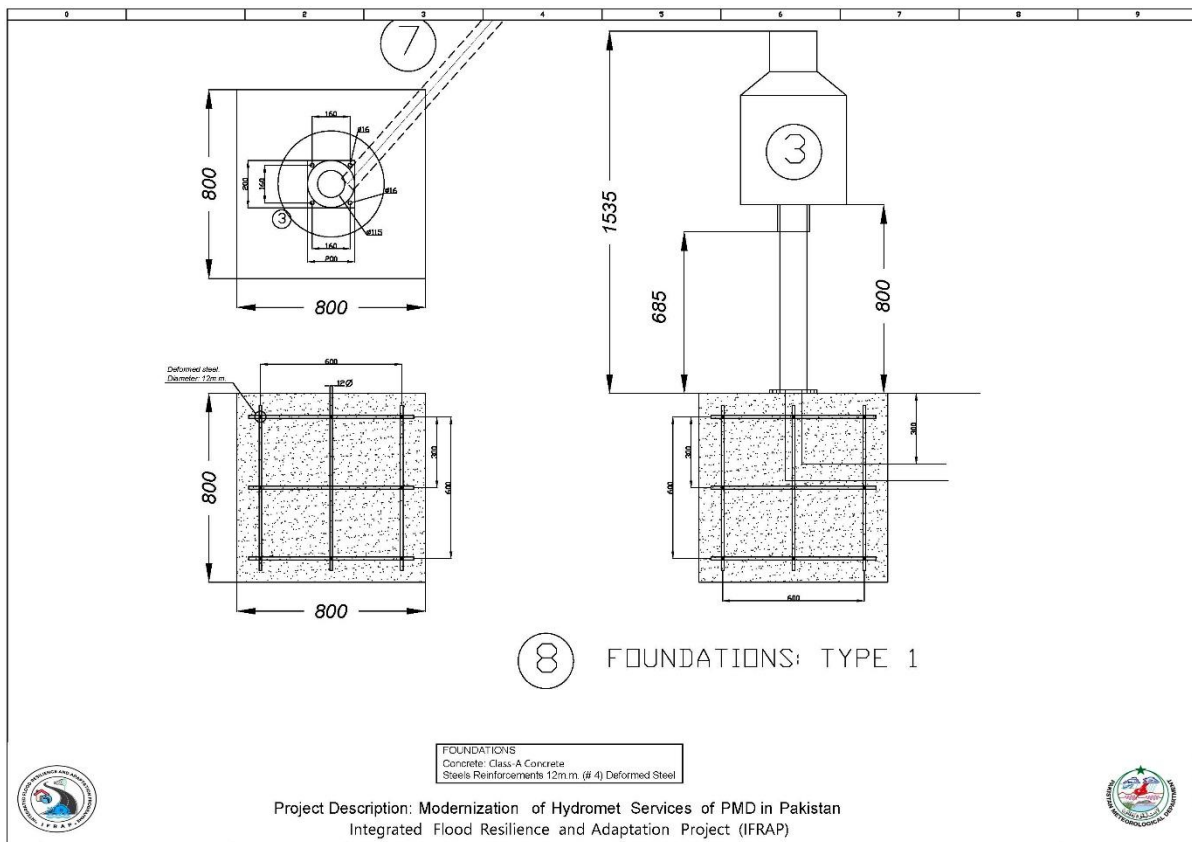


## Drawing-2: Mounting Pole

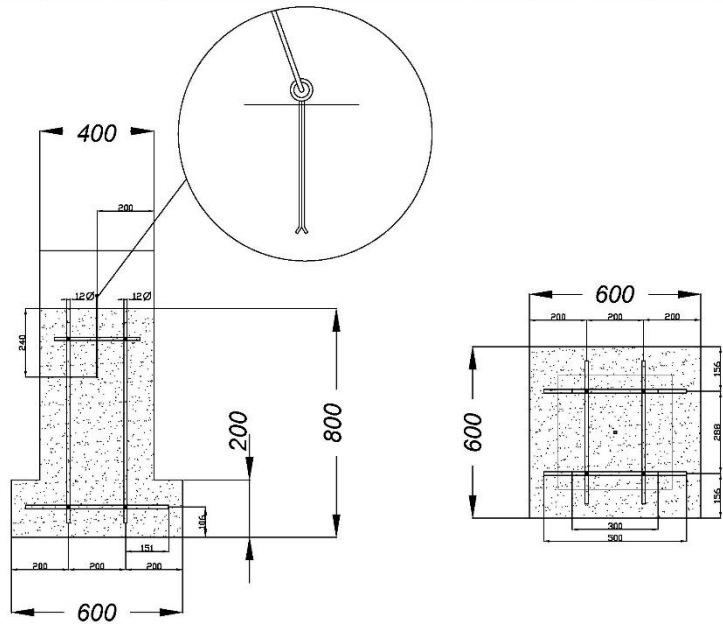




**Drawing-3: Foundation Type-1**



**Drawing-4 Foundation Type-2**



9 FOUNDATIONS: TYPE 2

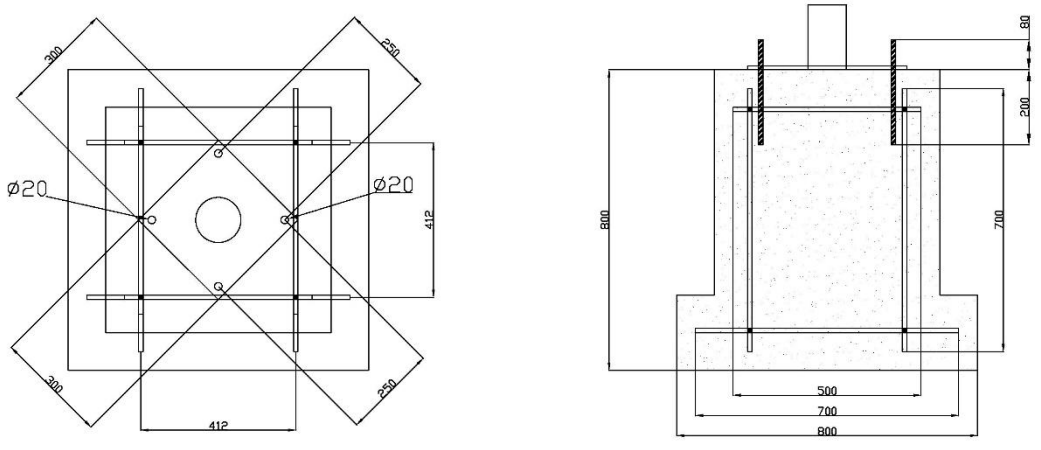
FOUNDATIONS  
 Concrete: Class-A Concrete  
 Steels Reinforcements 12m.m. (# 4) Deformed Steel

Project Description: Modernization of Hydromet Services of PMD in Pakistan  
 Integrated Flood Resilience and Adaptation Project (IFRAP)



**Drawing-5: Foundation Type-3**

10 FOUNDATIONS: TYPE 3



FOUNDATIONS  
 Concrete: Class-A Concrete  
 Steels Reinforcements 12m.m. (# 4) Deformed Steel

Project Description: Modernization of Hydromet Services of PMD in Pakistan  
 Integrated Flood Resilience and Adaptation Project (IFRAP)



**MESH FENCING**



**List of Related Services**

Service	Description of Service	Quantity <sup>1</sup>	Physical Unit	Place where Services shall be performed
1	<b>Foundation (Shown in diagram)</b>	300	<p>The mast/pole of AWS will be placed on a foundation with the following specification:</p> <ul style="list-style-type: none"> <li>- 60x60x80 (Lxlxh) cm</li> <li>- Reinforced concrete</li> <li>- Housing for the mast/pole, Anchoring foundation:               <ul style="list-style-type: none"> <li>• 40x40x80 (Lxlxh) cm</li> <li>• Reinforced concrete</li> </ul> </li> </ul> <p>Rain Gauge and Ceilometer foundation</p> <ul style="list-style-type: none"> <li>- 80x80x80 (Lxlxh) cm</li> </ul> <p>Reinforced concrete</p>	<p><i>Balochistan: 105; Khyber Pakhtunkhwa: 75, Punjab: 75; Sindh: 45</i></p> <p><i>(Map along with list of sites is attached)</i></p>
	<b>Fence with mesh wire (7feet) height</b>	300	<ul style="list-style-type: none"> <li>• All meteorological platforms will be fenced with galvanized iron (GI) fence supported by GI angles erected using required cement concrete. The structure specification to be followed by the tenderer like mesh size and thickness should be explicitly declared in the bid for ascertaining the strength of the fence</li> <li>• A lightning arrester also need to be provided for all AWS Units. Earthing pit shall be laid out as per standards.</li> <li>• Fencing and mast should be painted with good quality white paint.</li> <li>• The lay out and drawing related to the installation and all civil work should be appended along with technical bid.</li> </ul> <p>The entrance on the platform will always be on the North side</p>	
	<b>Connection</b>	300	<p>All the cables that are connecting the sensors (which are not mounted on the AWS pole), should be underground, in flexible bury tube. The burial depth is 70 cm below the ground level.</p>	
	<b>Grounding</b>	300	<p>All meteorological platform must have grounding, to which will be connected all the AWS equipment. This grounding will be separate than the one for the pole.</p>	

