



## TERMS OF REFERENCE

### ESTABLISHMENT OF NEW DOPPLER WEATHER RADAR STATION IN HINATUAN

#### I. Overview

The Hinatuan Doppler Radar is a fifteen-year-old system in Hinatuan, Surigao del Sur. It was installed in 2011 and has been in continuous operation, collecting data to improve weather forecasting and anticipate developing weather disturbances. Since becoming operational, PAGASA has benefited from its products in tracking tropical cyclones, heavy thunderstorms, and rainfall. The radar is known for its reliability and accuracy due to the real-time data it produces through non-stop operation. However, the radar was damaged by a series of earthquakes and was subsequently abandoned in November 2023. A new site has been proposed with the support of the Local Government Unit of Hinatuan, which has donated sufficient land to establish a new weather radar and synoptic station.

#### II. Approved Budget for the Contract (ABC):

The Approved Budget for the Contract is **TWO HUNDRED FORTY-FIVE MILLION PESOS (PHP245,000,000.00)** inclusive of Value Added Tax (VAT), custom duties, and other government taxes.

#### III. Terms of Payment

Pursuant to the Memorandum Order No. 15, dated 09 May 2011, series of 2011, amending No. 4.5 of Annex "D", Contract Implementation Guidelines for the Procurement of Goods, Supplies and Materials, of the IRR of the Republic Act No. 9184, advance payment not to exceed fifteen percent (15%) of the contract amount may be authorized and paid within sixty (60) calendar days from signing of the contract and upon issuance by the winning bidder of the corresponding Irrevocable Letter of Credit or Bank Guarantee in favor of PAGASA. The irrevocable letter of credit or bank guarantee shall remain valid until the good are delivered, and accompanied by a claim for the advance payment.

#### IV. Qualifications of Manufacturer and Bidder

- a. Manufacturing Experience – The manufacturer of the equipment to be supplied should have at least five (5) years of manufacturing experience of Long-Range Weather Radar (S or C Band).
- b. Bidder's Experience and Capability
- To shorten the downtime of the radar system and other meteorological equipment, bidders shall have their local team of engineers and technicians with experience in radar operation and maintenance to facilitate immediate repair during the warranty period and after-sales service. Having an existing or preceding maintenance contract with PAGASA is an advantage. The local bidder must be capable on the maintenance services for a weather radar system that includes accessories such as a diesel engine generator with an automatic transfer switch, an uninterruptible power supply, air conditioning units, and grounding system.
  - The prospective bidder shall submit the respective **bio-data and Certificate of Employment of Electrical or Electronics and Communication Engineers** who are permanently detailed in the Philippines and must be regular employees of the local duly registered office of the prospective bidder. The above technical personnel must have actual and verifiable experience of not less than one (1) year in the maintenance of Weather Radars.
  - The prospective bidder must submit a Single Largest Completed Contract (SLCC) that is similar to contracts related to weather radar. Additionally, a **Certificate of Satisfactory Performance** for delivering this contract must also be provided.
  - The prospective bidder must submit a **Letter of Commitment to deliver high-quality Doppler Weather Radar**, high-quality and safe constructions of the radar building, and other deliverables to meet the required specifications. The commitment should include assurances of timely production in the agreed-upon quantities.

## V. Proposal Assumptions

- a. All proposal assumptions shall be clearly identified in the bid.

## VI. Bid Proposal Contents - GOODS

- a. Prospective Bidders shall submit compliance statement table to all requirements and technical specifications and shall clearly indicate the specific technical specifications they offer or list exception to these

specifications and include the better technical specification that they are offering.

- b. Prospective Bidders shall include materials/brochures that contain evidence of compliance and activities he deems necessary to properly complete the project, exact brands and models shall be detailed.
- c. Prospective Bidders shall include original descriptive literatures and un-amended brochures of all equipment/material to be supplied. These details permit PAGASA to completely evaluate cost, features and tradeoffs.
- d. Price schedule shall be submitted in details in the financial bid that includes hardware and services components. Hardware includes itemization of radar main parts and modules, workstations with licensed software, and system accessories. Services include installation, transportations, FAT, SAT, and foreign and domestic training, warranties, and etc. Price schedule format shall include the following:
  - Name of item/store
  - Quantity
  - Make and model
  - Unit price
  - Radar system base price
  - Applicable taxes and duties
  - Trainings/Transportations/FAT/SAT
  - List of Accessories
  - On-site warranty
  - Building total cost
  - Total price

## VII. Project of Duration

- a. The winning bidder shall complete the Establishment of new Doppler Weather Radar Station at Barangay Sasa, Hinatuan, Surigao del Sur within 18 months from the date of issuance of Notice to Proceed. (See **Annex “B” Construction Schedule**)

## VIII. Project Components

- a. Supply, delivery, installation, training, testing and commissioning of S-Band Dual-Polarization Doppler Weather Radar including accessories.
- b. Site Development
  - Geotechnical Investigation (Boring Test)
  - Boundary Survey and Topographic Survey

- Instrument Area Garden
  - Parking Area
  - Storm Drainage System
  - Stainless Steel Station Signage
  - Perimeter Fence, gate, service steel gate, Fence Lighting and Street Lighting
  - Landscaping; inclusion of ornamental features, planting of trees and shrubs
  - Construction of Drain Field
- c. Construction of Concrete Doppler Radar Tower/Synoptic Station Building
  - d. Construction of Powerhouse
  - e. Construction of Public Comfort Rooms (PWD, Male and Female comfort rooms)
  - f. Construction of Guard House
  - g. Construction of reinforced 5.0-meter-wide, 600 meters in length, 150mm. thick concrete access road with pedestrian sidewalk on one side.
  - h. Installation of 220 V, 60 Hz single-phase power transmission line from power source to the site including payment of Bill Deposit to local Electric Cooperative.
  - i. Installation of communication link (lease-line) from Hinatuan radar site to PAGASA Central office with 1-year subscription.
  - j. Installation of Potable Water Service Connection to local water utilities.
  - k. Construction of Concrete Cistern, and Elevated Stainless-Steel Tank (4m<sup>3</sup>).
  - l. Supply, delivery, installation, and commissioning of basic meteorological instruments.

*Note: (See **Annex “C” Conceptual Plan**)*

## **IX. Radar Components Details**

- a. Supply, delivery, installation, training and commissioning of S-Band Dual-Polarization Doppler Weather Radar.
- b. Factory Acceptance and Testing (**FAT**) - 5 Inspectors
  - The FAT should be witnessed and validated within seven (7) days.
  - All related expenses, such as, round trip air fare, local transportation, lodging/accommodation, meals and a per diem amounting to the prevailing UNDP rate on the country of destination shall be shouldered by the winning bidder.
- c. Factory Training (**FT**) – 7 Trainees

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- The training should be attended by 7 engineers/technicians for seven (7) days
  - The training will primarily focus on hands-on calibration of the radar system using the maintenance software and test equipment.
  - All related expenses, such as, round trip air fare, local transportation, lodging/accommodation, meals and a per diem amounting to the prevailing UNDP rate on the country of destination shall be shouldered by the winning bidder.
- d. **Project Site Acceptance and Testing (SAT) – 6 inspectors**
- The SAT should be witnessed and validated by the inspectors within three (3) days.
- All expenses for accommodation and transportation (air/land) and a per diem of PHP 1,500.00 per day for each inspector shall be charged to the winning bidder.
- After the site acceptance test, the radar system and accessories shall be further tested for endurance by completing the 30 days continuous operation.
- e. **Engineers and Technicians Training (On-Site) – 7 Participants**
- Training for five (5) days shall cover radar software control and operation, calibration and maintenance.
  - ⊖ All expenses for accommodation and transportation (air/land) and a per diem of PHP 1,500.00 per day for each participant shall be charged to the winning bidder.
- f. **Software Training (On-Site) – 10 Participants from M-PRSD / DOST-CARAGA /PDRMO**
- Training for five (5) days shall cover radar scanning configuration, output product configuration, creation and interpretation.
  - ⊖ All expenses for accommodation and transportation (air/land) and a per diem of PHP 1,500.00 per day for each participant shall be charged to the winning bidder.
- g. **Software Training (Central Office) – 10 participants**
- Training for five (5) days shall cover radar scanning configuration, output product configuration, creation and interpretation. Expenses for meals and refreshments shall be by the contractor.

#### h. Warranty

- The warranty for parts and services shall be TWO (2) YEARS ON-SITE on the Doppler Weather Radar System. The warranty service begins after the final result of the site acceptance test (SAT)
- The warranty for all other equipment and accessories is valid for one year.
- All goods to supply should be free from all defects. They should be of the highest grade, consistent with the established and generally accepted standards for the material of the type used, and in full conformity with the specifications, drawings, or samples, and shall operate properly.
- Any custom charges for re-exporting or re-importing defective, repaired, or replaced parts back to the contractor's country for repairs will be the responsibility of the contractor.
- Transportation costs for sending defective parts for repairs, as well as returning repaired or replaced parts to the radar site, shall be covered by the contractor.

#### i. Technical Specifications (Minimum Requirements)

- The bidder must provide brochures describing the hardware's complete list of specifications and the software's lists of meteorological products and features as references to evaluate the capabilities of the offered weather radar system.

#### j. System

- Dual-Polarization, Doppler Weather Radar
- Operating Frequency: S-Band (2700 – 2900 MHz)
- Typical Operational Range:
  - Intensity/Precipitation: >400km
  - Maximum Doppler velocity: >200 m/s
- Pulse Repetition Frequency (PRF): 250 – 2000 Hz
- Pulse Selection Range: 0.5 - 3.3 us
- Phase Stability: 0.15° or better

#### k. Transmitter

- The supplier must own the design and intellectual property rights of the transmitter.
- Type: Coaxial Magnetron with Solid-State Modulator
- Peak Power: 850 kW

#### l. Receiver

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- Super heterodyne dual down conversion
  - Noise Figure (NF):  $\leq 2.0$  dB
  - Minimum Detectible Signal: -114 dBm or better
  - TR-Limiter: Non-Radioactive
  - Automatic test signal source for automatic online calibration purposes.
  - Calibration Processes and Validation: Online and Offline
- m. Digital Receiver and Signal Processor
- Multi-channel digital receiver
  - Intermediate Frequency (IF): 60 MHz
  - Minimum Processing resolution: 15.0 m or better
- n. Antenna and Pedestal
- Antenna type: Parabolic prime-focus reflector
  - Antenna size: ~ 6.0 meters
  - Polarization: Dual-Polarization
  - Drive system: Gear driven
  - Geographical Alignment: Automatic Sun Tracking
  - Positioning accuracy:  $\pm 0.05^\circ$  or better (Azimuth and Elevation)
- o. RADOME
- Type: Sandwich, Fiberglass with Foam Core / Quasi random panel cut
  - Diameter: ~9.0 meters
  - Wind Survivability (gust):  $\geq 90$  m/s
  - Hydrophobic Coating
- p. Accessories
- Lightning protection (De Ionization Technology)
    - Protection Radius: Minimum of 55 meters
    - Warranty: 5 Years
    - Maintenance: Annual mandatory by supplier.
  - Obstruction lights
- q. Safety System
- Shall comply to ISO 12100-1:2003, 12100-2:2003 and IEC 60204-1:1997
  - A least two emergency interlocks for radar cabinets and for maintenance and repair activities.
  - Safety system for safe working in the RADOME.
- r. Meteorological Measurement / Capabilities

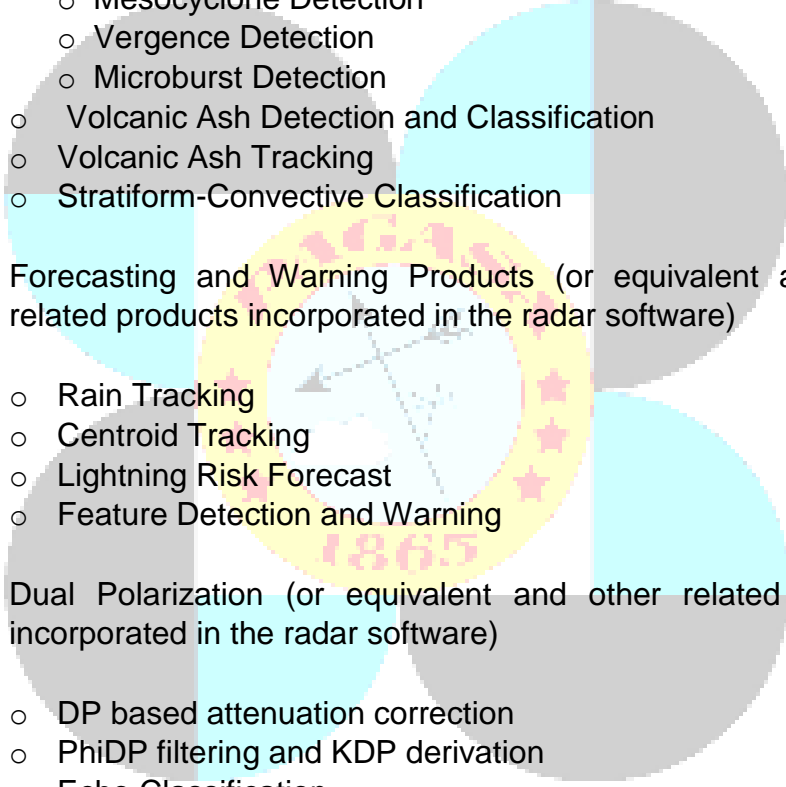


- All workstations must be configurable to generate, process, and display comprehensive meteorological, hydrological, forecasting and warning, and sensor data integration products.
- The system should be capable of detecting all significant hydrometeors and measuring precipitation rates (at minimum 0.1 mm/h up to 200 mm/h) up to a maximum range from the radar of 400 km.
- The system should be capable of monitoring the status of radar components —transmitter, receiver, RADOME, antenna, and pedestal—and report the status of radar functions to the Built-In-Test Equipment (BITE) system.
- All relevant states that could affect the performance of the radar system are continuously monitored by a control system. The maintenance software provides a detailed visualization of related information and alarms, which can be accessed remotely. In the event of severe issues, an automatic shutdown is initiated either by the radar control processor or through hardware links.
- The bidder must provide comprehensive details of the BITE, including a list of all supervised system parameters.
- The user should have the ability to configure and calibrate the different BITE signals.
- The BITE will feature a real-time display of I, Q, uncorrected Z, corrected Z, V, and W data, along with the generated dual polarization data sets.
- The Built-In Test Equipment (BITE) must feature an automatic calibration routine for the receiver. This calibration can be performed either offline at the user's request or online during operation at user-selectable time intervals. The results of the calibration must be included in the corresponding BITE reports.
- The BITE system must be flexible enough to accommodate future extensions with minimal additional effort, ideally without requiring intervention from suppliers or any re-compilation of software programs. It should be capable of integrating additional input sensors, whether analog or digital. The basic layout should be outlined in detail in the bid.
- The system shall automatically calibrate geographical alignment using a sun tracking utility.



s. Meteorological Products – Minimum Requirements

- Standard Meteorological Products (or equivalent and other related products incorporated in the radar software)
  - PPI - Plan Position Indicator
  - RHI - Range Height Indicator
  - CAPPI - Constant Altitude PPI
  - MAX - Maximum Display
  - CMAX - Column Maximum
  - Cross-section
  - EHT - Echo Height
    - Echo Top
    - Echo Base
    - Maximum
    - Thickness
- Extended Meteorological Products (or equivalent and other related products incorporated in the radar software)
  - BASEZ - Base Reflectivity
  - VAD - Velocity Azimuth Display
  - VVP - Volume Velocity Processing
  - UWT - Uniform Wind Technique
  - LMR - Layer Mean Reflectivity
  - VPR - Vertical Profile of Reflectivity
  - SWAD - Severe Weather Analysis Display
  - SMV - Spectrum at Maximum Velocity
  - SRV - Storm Relative Velocity
  - Point Visibility Analysis
  - Significant Intensity Radial VCUT
  - CONTOUR - Contour Lines
- Hydrological Products (or equivalent and other related products incorporated in the radar software)
  - SRI - Surface Rainfall Intensity
  - VIL - Vertically Integrated Liquid
  - PAC - Precipitation Accumulation
  - RIH - Rainfall Intensity Histogram
  - River Sub Catchment Accumulation
  - Point Rainfall Total
  - Rain Gauge Radar Total
- Meteorological Phenomena Detection/Analysis (or equivalent and other related products incorporated in the radar software)

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- Hydrometeors Detection
  - Gust Front Detection
  - Storm Structure Analysis
  - Vergence Product
  - SWI - Severe Weather Indicator
    - Storm Structure Analysis
    - Mesocyclone Detection
    - Vergence Detection
    - Microburst Detection
  - Volcanic Ash Detection and Classification
  - Volcanic Ash Tracking
  - Stratiform-Convective Classification
  - Forecasting and Warning Products (or equivalent and other related products incorporated in the radar software)
    - Rain Tracking
    - Centroid Tracking
    - Lightning Risk Forecast
    - Feature Detection and Warning
  - Dual Polarization (or equivalent and other related products incorporated in the radar software)
    - DP based attenuation correction
    - PhiDP filtering and KDP derivation
    - Echo Classification
    - DP Surface Rainfall Intensity
    - DP Freezing Level Analysis
    - Sea Clutter Detection and Correction
    - Hail Size Estimation
  - Radar Composite (or equivalent and other related products incorporated in the radar software)
    - COMP - Radar Composite Products
  - Radar Workstation / Radar Application Software with Permanent License
    - Radar control, monitoring, observation, and scheduling of volume scan.
    - Utilities must be included for system configuration and maintenance, featuring ASCOPE visualization and real-time automated radar calibration.

- Customizable geographic display maps and text annotation.
- The visualization must feature a global mapping display. Additionally, it should support GIS mapping layers that include oceans, seas, rivers, roads, city and place names, as well as political boundaries.
- Automatic conversion to UF, BUFR, HDF5, XML, ASCII, and NetCDF formats, along with automatic export to another system over the network.
- Automatically convert images to standard formats and export them over the network to another system for display.
- Capable of automatically archiving RAW data and selected or converted products to network-attached storage (NAS) or other networked storage and computers.
- Capability to export radar data for display in Google Earth map interface for automatic rendering of radar images.
- All graphical user interfaces can be used in mixed operating system environments and are platform-independent.
- The Contractor shall provide updates to the radar data processing software released during the warranty period at no additional cost. However, this does not include updates for the operating system or any other commercial software that operates on the LINUX/Windows workstations.
- A proposal for continued support and maintenance of the radar data processing software after the warranty period should be included in the bid.
- Workstation Specifications–Suitable for 24x7 mode of operation.
  - All off-the-shelf computer hardware and supporting software must be delivered in their latest versions. The proposed versions of both the hardware and software should be included in the offer. The delivered equipment and software must meet or exceed the performance outlined in the offer, without incurring any additional costs or requiring extra efforts from PAGASA.

- Three (3) Sets of Workstations each for Hinatuan Radar Station, Weather Forecasting, and Mindanao PRSD
  - Processor: Intel – Server Grade
  - Motherboard: Compatible motherboard
  - Main Memory: 32 GB
  - Internal Drive (SSD): 2 x 2TB
  - Graphics: High-Performance Data Analytics
  - Network Cards: Two (2) Gigabit Ethernet ports
  - Displays: Two 22" LED monitor
  - Operating System: Linux
  - Radar Software: Full Features
- Accessories for Hinatuan Radar Station's Workstations
  - Color Laser printer with scanner
  - 32 TB (usable storage) network attached storage (NAS) in RAID-6 configuration.
- Accessories for each FCST and M-PRSD Workstations
  - 1-kVA UPS
  - 1-kVA Automatic Voltage Regulator
  - 32 TB (usable storage) network attached storage (NAS) in RAID-6 configuration.
- Radar Power Supply Requirement
  - Power source - Single-Phase / 220 VAC / 60 Hz
  - Radar System's Accessories (Minimum Requirements)
    - Two (2) sets 20 kVA UPS in parallel with 5 minutes battery backup intended to accommodate the radar system including workstations, communications, and network devices.
    - Enclosed Circuit Breaker (ECB) and TVSS feeding the input of the 20 kVA UPS.
    - One (1) unit 20 kVA servo type Automatic Voltage Regulator (AVR), rated input 220 VAC, fluctuation  $\pm 15\%$  or better, rated output 220 VAC  $\pm 1\%$  or better.
    - Customized workstation table with 6 racks (1U) (for communication equipment) and 8 integrated 2-gang electrical outlets, intended to accommodate three (3) workstations, six (6) monitors, and six (6) network

devices. Table size and configuration is to be determined.

- Two (2) storage cabinet for radar parts and test equipment.
  - Materials: Steel, powdered coated, Gray
  - Dimensions: 92 x 46 x 72 inches (W x D x H)
  - Duty Rating: Heavy Duty
- Radar System Documentations
  - (2) copies (with e-copy) of manuals for installation, operation and maintenance, software, and parts list with part number of all the equipment. Complete details of schematic diagrams, theory of operation, and calibration and maintenance procedure.
  - Two (2) copies (with e-copy) of the model number, serial number Two, and specification of individual radar system parts and accessories, including those manufactured by a third-party contractor.
  - One (1) storage cabinet for radar operation and maintenance manuals.
    - Materials: Steel, powdered coated, Gray
    - Dimensions: 92 x 46 x 72 inches (W x D x H)
    - Duty Rating: Heavy Duty

## X. ICT Component Details

### a. Deliverables

No.	Particulars	Qty.	Unit
1	Next gen firewall w/ sd-wan	1	Unit
2	48 port managed access switch	2	Units
3	Wireless controller	1	Unit
4	Access Point w/ poe	6	Units
5	Network cabinet 42u mdf	1	Unit
6	16 channel nvr w/ storage,monitor and mouse	1	Unit
7	CCTV camera	8	Units
8	Ups 1kva	1	Unit
9	Structured cabling system 96 nodes	1	Lot
10	Ipvpn & internet	1	Lot
11	DESKTOP COMPUTER and PRINTER	4	Units

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12	VOIP w/ LICENSE	4	UNITS
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## b. Technical Specification

### ○ Next generation firewall

- Physical Interface
  - At least 6x 10/100/1000 BASE-T Interfaces
  - At least 4x10GE Fiber SFP+ Interfaces
  - At least 2x USB Ports
  - At least 1x Serial Port
- Performance
  - Firewall Throughput – 4 Gbps
  - Concurrent TCP Connections – 1,200,000
  - New TCP Connections – 30,000
- Must support policy configuration modules for the following functions from a single appliance:
  - IPsec Virtual Private Network (IPVPN)
  - Secure Sockets Layer Virtual Private Network (SSLVPN)
  - Proprietary Virtual Private Network (VPN)
  - Software-Defined Wide Area Network (SDWAN) Capability
  - Web Application Firewall (WAF)
  - Anti-Virus/Malware (AV)
  - Intrusion Prevention System (IPS)
  - Real-time Vulnerability Scanner
- Must provide an on-premise URL signature database for URL Filtering, not only rely on cloud
- Must support anti-virus feature that scan the files up to 20MB.
- Must support anti-virus feature with compressed file detection, and support compress file with up to 16 layers.
- Must provide risk analytics module that allows to scan and identify security loopholes such as open port, system vulnerabilities, weak passwords, etc.



- Must have risk assessment that support major protocols such as HTTP, HTTPS, POP3, SMTP, RDP, SMB, Oracle, MSSQL, MySQL etc.
- Must include the local hard disk to provide log retention and report creation of at least 30 days
- Must have SD-WAN capability via VPN tunnels:
  - Can provide intelligent or dynamic path selection
  - Can choose the optimize link based on bandwidth-remaining ratio, application type or link quality (means packet loss, jitter, latency).
- Must able to support multiple ISPs for SD-WAN.
- Must support WAF feature by itself, without additional devices. The WAF protection should meet at least the following specifications:
  - Must be able to support the attack types, such as XSS, SQL, CSRF, CC attack, OS Command Injection, Web shell, scanner blocker, path transversal etc.
  - Be able to defense OWASP top 10 attacks
  - Support WAF related signature on premise no less than 4500 signatures and support customize signature.
  - Support HTTPS site protection with decryption enabled.
  - Support weak password detection for web-based applications.
  - Support CC attack protection
  - Support HTTP request Anomaly detection, SQL injection in HTTP header, POST entity overflow, HTTP header overflow, etc.
- Must provide a real-time vulnerability analysis or passive vulnerability scan:
  - Detection vulnerabilities based on traffic pass through, without any active scanning activities to the servers, minimize the extra work load and other impact
  - The vulnerabilities that can be detected includes web application vulnerability, weak password, improper configuration on web server, etc.
  - Support generate HTML format report
- Must support ACL policy optimizer, which helps:

- Identify the redundant policy, expired policy, conflict policy etc.
  - Be able to track the ACL policy life cycle, help to track every change that have been done to the ACL policies.
- Must support a dedicated ransomware protection module, which can:
  - Automatically scan and detect ransomware related vulnerabilities, port, weak password, brute-force attack etc.
  - Provide dedicated GUI page to show and respond all the ransomware related vulnerabilities
  - Can provide guidance or suggested action to admin, e.g., deploy block policy direct
- Must support a dedicated dashboard to summarize business system(server) relate security risks, the information provide via dashboard includes:
  - Business system severity level, attack events, vulnerabilities.
  - Stages of Attack to let IT admin understand the security impact
  - One-click to block attackers IP
- Must support a dedicated dashboard to summarize user relate security risks, the information provide via dashboard includes:
  - User severity level, attack types, attack events
  - Stages of Attack to let IT admin understand the security impact.
- Must support building a proprietary virtual private network (VPN) tunnel with the existing Head Office Firewall to ensure the security, interoperability, and ease of management.
- Must support implementing security policies coming from a central manager that can manage remote offices and the existing head office firewall thus ensuring compatibility and interoperability.
- To ensure the maturity of solution technology, the principal must be CMMI L5
- Certified
- The proposed ICT equipment must be in level of Magic Quadrant for Network Firewalls 2022
- To ensure the maturity of solution technology, the principal must have the following certification:

- ISO 9001:2015
- ISO/IEC 27001:2013
- ISO 14001:2015
- ISO/IEC 20000-1:2018
- Peripherals
  - 2 x 10GB SFP+ Transceiver

○ **Access switch**

- Key Features
  - 48 x 10/100/1000BASE-T RJ-45 ports.
  - 4 x 10GE SFP+ uplink ports,
  - Supports:
    - i. Rapid Spanning Tree Protocol (RSTP) and MSTP
    - ii. static routes, OSPF, RIPv1, RIPv2, RIPv6, VRRP
    - iii. DoS Protection
    - iv. port mirroring
    - v. RRPP, ERPS
- Physical Interface
  - Switch Ports:
    - i. 24 x RJ-45 10/100/1000BASE-T ports
    - ii. 4 x 10GE SFP+ ports supporting 10G or 1G

- Performance
  - 176 Gbps Switching Capacity
  - 132 Mpps Forwarding performance
  - MAC Addresses: 32K
  - RAM: 512MB
  - Flash: 512MB
  - VLAN IDs: 4K
  - Jumbo Frames
  - Must have at least 1 fan module
  - Long term operating temperature of -5 to 50C

- Peripherals
  - 8 x 10GB SFP+ Transceiver
  - 8 x 10G Fiber Cable MultiMode, 1 Meter, LC-LC

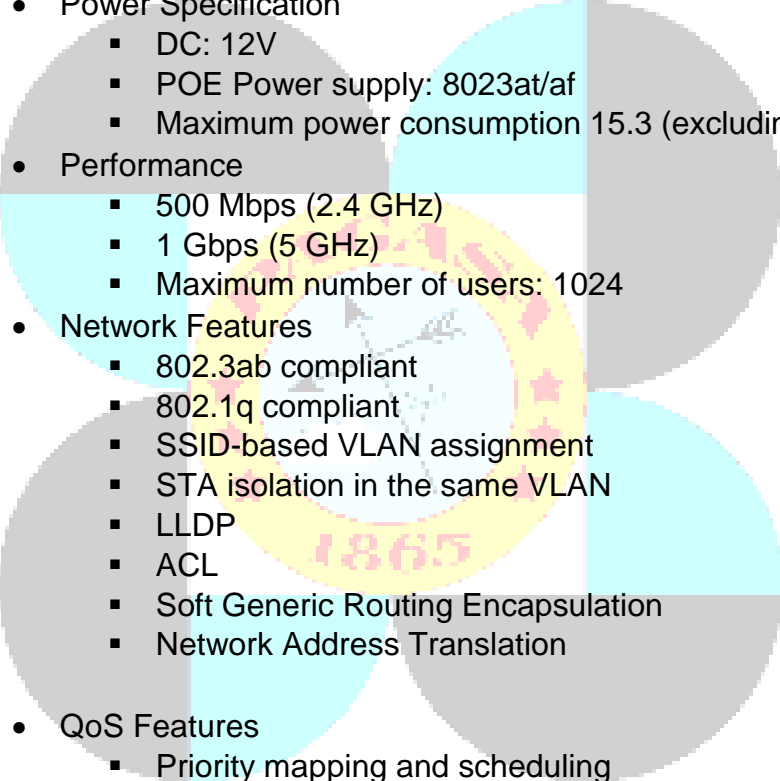
- The proposed ICT equipment must be in level of Leader Magic Quadrant for Enterprise Wired and Wireless LAN 2024

- Wireless controller

- WLAN controller should be an enterprise-class switch and scalable which will connect, controls, manage and intelligently integrates wireless Access Points (WAPs) and RF Monitors into the wired LAN.
- WLAN controller must support 802.11a/b/g/n/ac/ax
- Uplink port that supports; a. 10/100/1000Mbps (10/100/1000Base-T) copper port
- All ports automatically sense and negotiate speed, duplex, and MDI/MDX Settings
- High-speed Layer-2/Layer-3 packet forwarding
- The WLAN controller must support seamless roaming across Hinatuan Radar subnets.
- WLAN controller must perform tasks such as client authentication, policy enforcement, configuration control, fault tolerance and network expansion.
- High-performance packet processing provides value-added wireless services such as load balancing, rate limiting, self-healing, calibration, authentication, mobility, security, firewalls, encryption, intrusion detection and mitigation, centralized monitoring and configuration
- WLAN controller must work seamlessly with all the wired LAN equipment
- WLAN controller must support multiple APs per Hinatuan Radar building and offices and multiple users and sessions.
- The controller firmware can be easily upgraded, as future software releases are made available
- The controller must support 802.11e and Quality of Service (QoS) p. The controller must support redundancy
- Can be mounted in a standard 42U (19-inch) network equipment rack
- Mounting kits and railings must include.
- Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand.

- Access point

- Radio
  - 802.11 a/b/g/n/ac/ax
  - Concurrent Dual-band 2.4 / 5 GHz
  - Radio Chains: 2x2(2.4Ghz) and 2x2(5Ghz)
  - 1.7 Gbps device rate

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- Up to 16 SSIDs per radio
  - Interfaces
    - 1 x 10M/100M/1GE (RJ45)
    - 1 x USB
  - Peripherals
    - 6 x POE Injector
  - Power Specification
    - DC: 12V
    - POE Power supply: 8023at/af
    - Maximum power consumption 15.3 (excluding USB)
  - Performance
    - 500 Mbps (2.4 GHz)
    - 1 Gbps (5 GHz)
    - Maximum number of users: 1024
  - Network Features
    - 802.3ab compliant
    - 802.1q compliant
    - SSID-based VLAN assignment
    - STA isolation in the same VLAN
    - LLDP
    - ACL
    - Soft Generic Routing Encapsulation
    - Network Address Translation
  - QoS Features
    - Priority mapping and scheduling
    - Queue mapping and scheduling
    - User-based bandwidth limiting
    - Airtime scheduling
    - Air Interface HQoS scheduling
    - VLAN Features
    - Beamforming
    - DL/UL MU-MIMO
    - DL/UL OFDMA
    - 802.11 dynamic frequency selection (DFS)
    - Signal sustain technology (SST)
    - Advanced cellular Coexistence (ACC)
    - 802.11k and 802.11v smart roaming
    - 802.11r fast roaming
  - Security
    - WEP, WPA2-PSK, WPA2-802.1X, WPA3-SAE, WPA3-802.1X, WPA-WPA2
    - hybrid authentication, WPA2-WPA3 hybrid authentication

- 802.1x authentication, MAC address authentication, portal authentication
  - DHCP snooping
  - Dynamic ARP inspection
  - IP Source Guard (IPSG)
  - 802.11w Protected Management Frames (PMFs)
- Management
  - Configuration: Web User Interface (HTTP / HTTPS), SNMP v1, v2, v3
  - Network Time Protocol (NTP)
  - Telnet, Stelnet, SFTP
- The proposed ict equipment must be in level of Leader Magic Quadrant for Enterprise Wired and Wireless LAN 2024
- Network cabinet 42u
  - Rack Unit (SIZE U): 42U
  - Thread Type: CAGE NUT
  - Usable Depth(INCHES):36
  - Door Style: Perforated
  - Weight: 250lb
  - External Width(Inches):24
  - External Depth(Inches):40.67
  - External Height(Inches):80
  - Internal Width(Inches):19.00
  - Rails Adjustment: Yes
  - Locking Side Panels: Yes
  - Color: Black (Powder Coat)
  - Fans:4
  - Include: Caster, Levers
  - Horizontal Mounted 24 Gang PDU
- Network video recorder w/ storage
  - Network video recorder
    - H.265 + Video Compression/Third part camera supported
    - Up to 5 Megapixel resolution recording
    - HDMI and VGA output
    - 1x Gigabite network port, RJ45 interface
    - 2x USB 2.0
    - RCA line for audio in and video out
    - 16 Channel 4K NVR
    - Hard Drive capacity to meet the 60 days (real time) retention period, 72000RPM



- Must have the capabilities to slow forward, fast forward, loop, single frame, E-PTZ and slice playback.
  - At least 6 remote clients using web browser
  - 16 PoE ports
- Monitor
    - 32 inch branded with HDMI port
    - Must have at least Connectivity input Digital HDMI, DVI-D, Analog (RGB)
    - Must have at least Audio In/Out-USB External Control, IR Receiver.
  - Mouse
    - Optical
    - 1000dpi
    - 1.8m cable length
    - USB type
    - Black
    - 413Grams
    - Led Tracking
    - Scrolling Wheel
    - Plug and Play.
  - CCTV camera
    - Bullet Type
    - 5MP real-time video recording
    - Lens: IRI Series – 3.6mm
    - Angle View: 76' (3:6mm)
    - Housing: Weather Proof IP66 rated
    - Indoor/Outdoor
    - Distance 10m-5m
    - 1x Gigabite network port, RJ45 interface
  - UPS 1KVA
    - Input Voltage: 220VAC
    - Frequency: 50hz-60hz
    - Format: Rack 2U
    - Output Voltage: 220VAC
    - Capacity VA/Wattage: 1000VA
    - Surge Protection:>800J
    - Wave Form Type: Pure sine wave, zero transfer time
    - Efficiency (Max%): 98% ECO mode,90% online mode
    - Crest factor: 5:1

- Overload Capacity: ≤ 130% for 2 min; ≤ 200% for 10 sec; >200% for 1 sec
  - Battery Type: Sealed, maintenance-free lead acid
  - Battery quantity and size : (2) 12V 9AH
  - Typical Recharge Time (100%): < 6 hours to 90%.
- Structure cabling component
    - MDF Rack Ground Floor to Ground floor 48 Nodes
      - i. Shall supply and install 10 nodes to conference room.
      - ii. Shall supply and install 10 nodes to radar control room.
      - iii. Shall supply and install 10 nodes to power house room.
      - iv. Shall supply and install 8 nodes to quarters room.
      - v. Shall supply and install 42U MDF Cabinet
      - vi. Shall supply and install 48 ports cat6A patch panel.
      - vii. Shall provide cat6 UTP cables, ANSI/TIA/EIA-568B.2 certified
      - viii. Shall include appropriate installation and termination
      - ix. Shall include harnessing and appropriate tagging
      - x. Shall include fluke network testing with hard copy result
      - xi. Shall include conduit, hanger, bracket, cable manager and support peripherals.
      - xii. End-to-end cabling based on ISO/IEC 11801.Cable Warranty period 5 years.
    - MDF Racks Ground Floor to 2nd floor.
      - i. Shall supply and install 16 nodes to 2nd floor room
      - ii. Shall provide cat6 UTP cables, ANSI/TIA/EIA-568B.2 certified
      - iii. Shall include appropriate installation and termination
      - iv. Shall include harnessing and appropriate tagging
      - v. Shall include fluke network testing with hard copy result
      - vi. Shall include conduit, hanger, bracket, cable manager and support peripherals.
      - vii. End-to-end cabling based on ISO/IEC 11801.Cable Warranty period 5 years.

▪ MDF Racks Ground Floor to 3rd floor.

- i. Shall supply and install 16 nodes to 3rd floor room
- ii. Shall provide cat6 UTP cables, ANSI/TIA/EIA-568B.2 certified
- iii. Shall include appropriate installation and termination
- iv. Shall include harnessing and appropriate tagging
- v. Shall include fluke network testing with hard copy result
- vi. Shall include conduit, hanger, bracket, cable manager and support peripherals.
- vii. End-to-end cabling based on ISO/IEC 11801.Cable Warranty period 5 years.

▪ MDF Racks Ground Floor to 4th floor.

- i. Shall supply and install 16 nodes to 4th floor room
- ii. Shall provide cat6 UTP cables, ANSI/TIA/EIA-568B.2 certified
- iii. Shall include appropriate installation and termination
- iv. Shall include harnessing and appropriate tagging
- v. Shall include fluke network testing with hard copy result
- vi. Shall include conduit, hanger, bracket, cable manager and support peripherals.
- vii. End-to-end cabling based on ISO/IEC 11801.Cable Warranty period 5 years.

▪ RackG9round Floor to IDF Racks 9th Floor

- i. Shall supply and install 8 nodes to 9th floor room
- ii. Shall provide cat6 UTP cables, ANSI/TIA/EIA-568B.2 certified
- iii. Shall include appropriate installation and termination
- iv. Shall include harnessing and appropriate tagging
- v. Shall include fluke network testing with hard copy result
- vi. Shall include conduit, hanger, bracket, cable manager and support peripherals.
- vii. End-to-end cabling based on ISO/IEC 11801.Cable Warranty period 5 years.

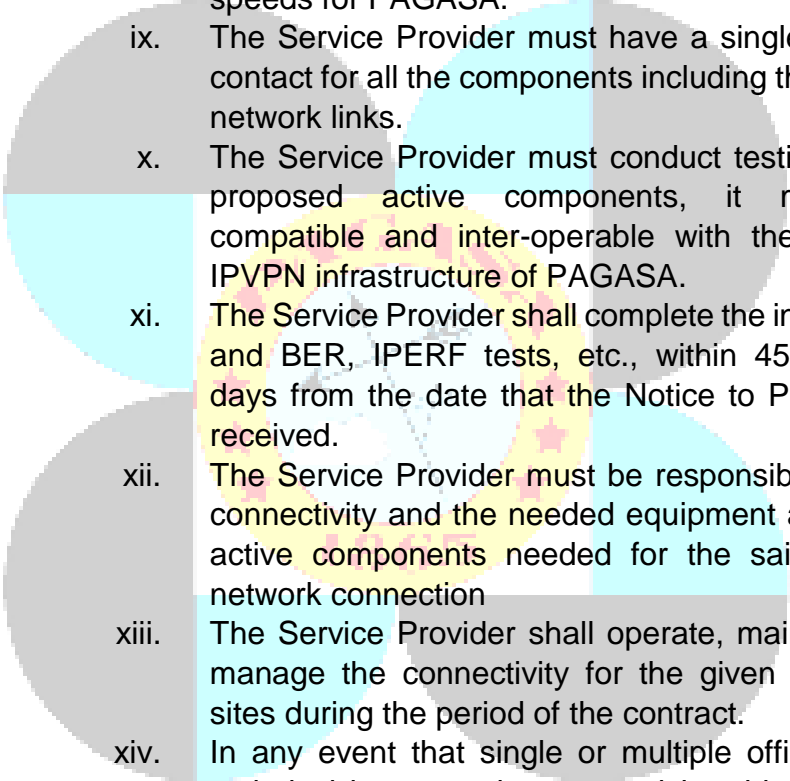
- MDF Rack Ground Floor to RADOME

- i. Shall supply and install 2 nodes to RADOME.
- ii. Shall provide cat6 UTP cables, ANSI/TIA/EIA-568B.2 certified
- iii. Shall include appropriate installation and termination
- iv. Shall include harnessing and appropriate tagging
- v. Shall include fluke network testing with hard copy result
- vi. Shall include conduit, hanger, bracket, cable manager and support peripherals.
- vii. End-to-end cabling based on ISO/IEC 11801. Cable Warranty period 5 years.

- IPVPN and I-Gate

- IPVPN -MPLS Layer 3 Platform

- i. The Service Provider shall provide a connectivity solution that is IP-based for the mentioned PAGASA clients
- ii. The Type of Access – Fixed Bandwidth CIR 10 Mbps.
- iii. The connectivity solution must be capable of handling both voice and data transmission, with adjustable quality of service capabilities for type of traffic prioritization.
- iv. The sites must have the ability to communicate with any and all other sites directly for both voice and data. The Service Provider shall be responsible for ensuring the proper routing for all communications to the proper sites.
- v. The Service Provider shall provide managed network administration services including but not limited to the following: - Status monitoring, additional VLAN activation if necessary - editing of routes - IP address allocation - traffic report generation - basic troubleshooting - stopping/starting/restarting of network equipment - password resetting if needed.
- vi. The proposed connectivity must be compatible, inter-operable with the existing network infrastructure of PAGASA with minimal configuration needed during the implementation.

- 
- vii. The Service Provider shall provide as part of their proposal a **diagram** which will show how the location sites will be connected. The diagram shall clearly reflect specific type of connectivity technology.
  - viii. The Service Provider shall follow the required line speeds for PAGASA.
  - ix. The Service Provider must have a single point of contact for all the components including the IPVPN network links.
  - x. The Service Provider must conduct testing of the proposed active components, it must be compatible and inter-operable with the existing IPVPN infrastructure of PAGASA.
  - xi. The Service Provider shall complete the installation and BER, IPERF tests, etc., within 45-calendar days from the date that the Notice to Proceed is received.
  - xii. The Service Provider must be responsible for the connectivity and the needed equipment and other active components needed for the said IPVPN network connection
  - xiii. The Service Provider shall operate, maintain and manage the connectivity for the given PAGASA sites during the period of the contract.
  - xiv. In any event that single or multiple offices have technical issue on the connectivity, this shall not affect the rest of the offices and the remaining sites shall remain connected.
  - xv. The Service Provider must be responsible for all restoration.
  - xvi. Must have a Network Operation Center (NOC) capable of providing 24 hours x 7 days a week network management and support.
  - xvii. The Service Provider must already have an established nodes and backbone near the site area.
  - xviii. The Service Provider must already be providing quality IPVPN service in the area.
  - xix. Service node must already be readily available in the Hinatuan Radar area as of the moment.

▪ Internet services

- The Internet Service Provider must provide a dedicated, high-speed, diverse, reliable and managed connectivity to the Internet and guaranteed Internet bandwidth

*"tracking the sky...helping the country"*

- The Type of Access – Fixed Bandwidth: 50 Mbps.
  - i. The Internet Service Provider must certify that the cable facility being used in the last mile connectivity is exclusively owned and operated by the Internet Service Provider.
  - ii. The Internet Service Provider must provide a certification that it uses its own domestic nationwide network and operates its own landing stations, at least 3 cable landing stations facility.
  - iii. The Internet Service Provider must provide a certification that they are connected or subscribed to Tier 1 networks.
  - iv. The Internet Service Provider has more than 10 Terabit per second (Tbps) combined International IP and Domestic Caching capacities.
  - v. The Internet Service Provider must have more than 30 peering connection to global Internet Service Providers and Content Providers through a commercial and bilateral peering arrangement.
  - vi. The Internet Service Provider must have more than 15 peering Interconnection to global and domestic Internet Exchanges.
  - vii. The Internet Service Provider must have five International Internet Points of Presence (POPs) and using more than 10 Submarine Cable Systems to connect to its international nodes.
  - viii. The Internet Service Provider must be in top 300 global ranking based on the latest (August 2020) CAIDA AS rankings. The Internet Service Provider must be peered with at least five (5) Global Internet Service Providers that are included in the top 10 of the latest CAIDA AS rankings
  - ix. The Internet Service Provider must provide a certification that its network platform is compliant to the latest MEF Carrier Ethernet (2.0) in all Ethernet Service Types.



- x. The Internet Service Provider can deliver a Dedicated Internet Access service inside a Data Center with ANSI/TIA-942 Rated 3 Facilities Certification.
- xi. The Internet Service Provider must have at least 3 Cisco Certified Internetworking Expert, 10 MEF Carrier Ethernet Certified Professional 2.0 and 3 certified Project Management Professional (PMP) technical support personnel.
- xii. The Internet Service Provider must support IPV6, or its network platform is IPV6 ready and compliant. The Service Provider must be responsible for all restoration.
- xiii. Must have a Network Operation Center (NOC) capable of providing 24 hours x 7 days a week network management and support.
- xiv. The Service Provider must already have an established nodes and backbone near the site area.
- xv. The Service Provider must already be providing quality IPVPN service in the area.
- xvi. Service node must already be readily available in Hinatuan area as of the moment.

- Desktop and printer
- Desktop
  - i. Min of 13th Gen Intel Core i5
  - ii. Min of 10 Cores
  - iii. Min of 8GB (2x4GB) RAM, DDR4
  - iv. Min of 1TB SATA HDD + 256GB PCIe NVMe M.2 SSD.
  - v. Min of Intel UHD Graphics
  - vi. Internal Speaker
  - vii. Lan Gigabit Ethernet 10/100/1000
  - viii. I/O Ports: 3xUSB 3.0, HDMI-out, HDMI-in, 3-in-1 card reader (SD, SDHC, SDXC)
  - ix. Audio/ microphone jack
  - x. Display at least 23" LED Monitor
  - xi. Operating System Windows 11 Home

- xii. Latest Licensed MS office (Word, Excel, PowerPoint, Etc.)
- xiii. Wired Keyboard and Mouse

▪ **PRINTER (All-in-One Printer)**

- i. Nozzle Configuration: 180 Nozzles Black, 59 Nozzles per Color
- ii. Minimum Droplet Size: 3 pl, With Variable-Sized Droplet Technology
- iii. Ink Technology: Dye Ink
- iv. Printing Resolution: 5,760 x 1,440 DPI
- v. Category: Home, Home Office
- vi. All-in-One Functions: Print, Scan, Copy

▪ **Print**

- i. Printing Speed ISO/IEC 24734: 10 pages/min Monochrome, 5 pages/min Colour, 69 Seconds per 10 x 15 cm photo
- ii. Printing Speed: 15 pages/min Colour (plain paper 75 g/m<sup>2</sup>), 33 pages/min Monochrome (plain paper 75 g/m<sup>2</sup>), 27 Seconds per 10 x 15 cm photo (Epson Premium Glossy Photo Paper)
- iii. Colours: Black, Cyan, Yellow, Magenta

▪ **Scan**

- i. Single-sided scan speed (A4 black): 200 DPI; 11 sec. with flatbed scan
- ii. Single-sided scan speed (A4 colour): 200 DPI; , 32 sec. with flatbed scan
- iii. Output formats: BMP, JPEG, PICT, TIFF, multi-TIFF, PDF, PNG
- iv. Scanner type: Contact image sensor (CIS)
- v. Optical Resolution: 600 DPI x 1,200 DPI (Horizontal x Vertical)

▪ **Paper / media handling**

- i. Number of paper trays: 1
- ii. Paper Formats: C6 (Envelope), B5 (17.6x25.7 cm), A6 (10.5x14.8 cm), A5 (14.8x21.0 cm), A4 (21.0x29.7 cm), Legal, User defined, 13 x 18 cm, 10 x 15 cm, Letter, No. 10 (Envelope), DL (Envelope), 16:9
- iii. Duplex: Manual

- iv. Output Tray Capacity: 30 Sheets
- v. multifunction: 100 Sheets Standard
- vi. Compatible Paper Weight: 64 g/m<sup>2</sup> - 300 g/m<sup>2</sup>
- vii. Media Handling: Borderless print (up to 10 x 15cm)

▪ General

- i. Number of paper trays: 1
- ii. Paper Formats: C6 (Envelope), B5 (17.6x25.7 cm), A6 (10.5x14.8 cm), A5 (14.8x21.0 cm), A4 (21.0x29.7 cm), Legal, User defined, 13 x 18 cm, 10 x 15 cm, Letter, No. 10 (Envelope), DL (Envelope), 16:9
- iii. Duplex: Manual
- iv. Output Tray Capacity: 30 Sheets
- v. multifunction: 100 Sheets Standard
- vi. Compatible Paper Weight: 64 g/m<sup>2</sup> - 300 g/m<sup>2</sup>
- vii. Media Handling: Borderless print (up to 10 x 15cm)
- viii. Interface: USB 2.0
- ix. Compatible Operating System: Window 10,11, Mac OS X, and Linux.

▪ Basic VOIP Phone

- i. 1000 local phonebook, caller ID, call hold, call transfer
- ii. 128x48 dot-matrix display or higher
- iii. HD audio on speakerphone and handset
- iv. Support EHS wireless headset
- v. Dual fast ports, integrated PoE
- vi. Network time synchronization
- vii. Call logs at least 500 or higher
- viii. Can save contacts at least 100 or higher and phonebook at least 500 or higher
- ix. With volume control keys for microphone such as up, down, and mute
- x. Stand with 2 adjustable angles of 45 and 50 degrees
- xi. Compatible with major platforms: Asterisk, Broadsoft, 3CX, Metaswitch, Elastix, Avaya, etc.
- xii. Supports 6-party local conference
- xiii. Dual 10/100/1000 Mbps network ports, integrated PoE

xiv. Supported Protocols: SIP2.0 over UDP/TCP/TLS, RTP/RTCP/SRTP, STUN, DHCP, LLDP, PPPoE, 802.1x, L2TP, OpenVPN, SNTP/NTP, FTP/TFTP, HTTP/HTTPS, TR-069, AES128 & AES256  
5.6.1.15. Physical

xv. Specifications: With LCD and backlight, two (2) RJ9 ports for handset and headset, two (2) RJ45 ports for network and computer, removable handset, compatible with CAT6 cable, DC power input is at least 45 5V/0.6A, power consumption: idle – less than 1.65W; peak – less than 2.95W; IP67 protection level; color is black or dark gray  
xvi. Installation: desktop stand and can be wall-mounted with free bracket

xvii. Dimension 169x187x184mm

xviii. Must be capable to register and connect in PAGASA exiting IP PBX.

xix. **With License**

- Service level agreement and warranty
- Years Warranty in All Active Components

## **XI. Design and Build of Site Development, Construction of Radar Tower/Synoptic Station Building, Powerhouse, Public C.R./Guardhouse, Perimeter Fence, and Access Road**

### **◆ Design Phase**

- Submission of Geotechnical Investigation (Soil Boring Test Report)
- Submission of Topographic and boundary Survey Report
- Submission of Health and Safety Program
- Architectural Design
  - The building should be designed with structural, electrical, mechanical, fire protection, natural or combine ventilation following parking design standards.

- The winning bidder shall prepare the preliminary and detailed Architectural Plans in accordance with the requirements of the National Building Code of the Philippines, Accessibility Law (BP 344) including all other applicable laws and local ordinances.

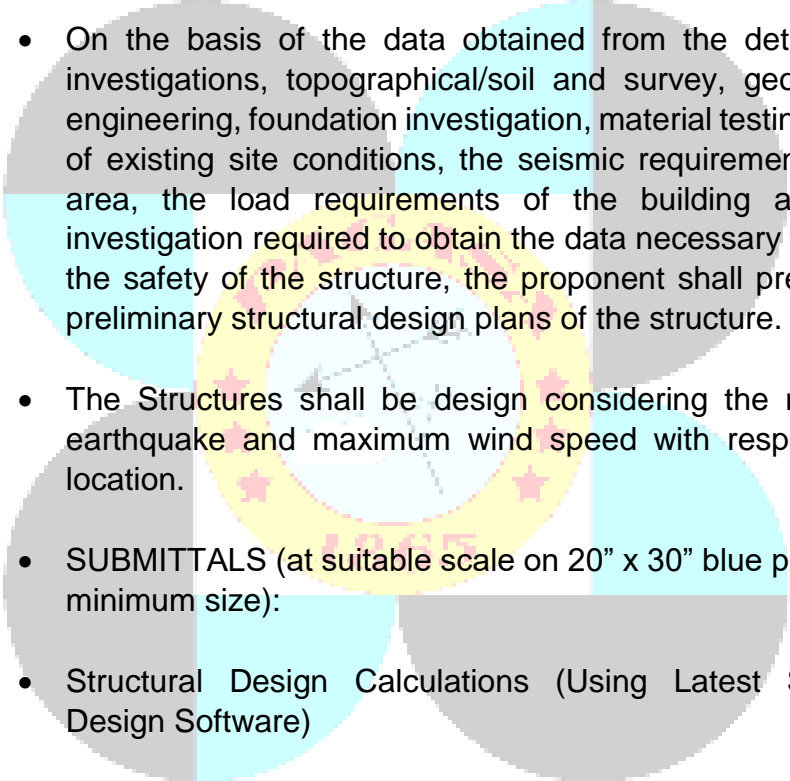
- SUBMITTALS (at suitable scale on 20" x 30" blue print paper minimum size):

- Site Development Plan.
- Embankment of sites for Radar Tower, powerhouse, Synoptic Building, Guardhouse and Public C.R.
- Stone Masonry wall for embankment protection
- Concrete Perimeter Fence (Including perimeter lighting)
- Concrete Retaining Wall for Embankment Protection
- Paver Blocks Laying
- Landscaping Works
- Concreting of access road
- Concreting of concrete pathwalk for all structures.
- i. Vicinity Map
- ii. Perspective
- iii. Floor Plans
- iv. Elevation Plans
  1. The Front Elevation
  2. Rear Elevation
  3. Right Elevation
  4. Left Elevation
- v. Longitudinal Section
- vi. Cross Section
- vii. Doors and Windows Schedule
- viii. Plans and Details of Stairs and Ramps
- ix. Reflected Ceiling Plan
- x. Schedule of Finishes for floors, walls and ceiling
- xi. AUTOCAD file of Architectural Drawings
- xii. Other necessary plans to complete the architectural plans

○ Structural Design

- The proponent shall prepare the necessary structural analysis/calculation and design of the structural members of the building component in accordance with the National Building Code of the Philippines with its referral codes such

as the latest National Structural Code of the Philippines. The design for the structure shall take into account, among other things, the seismic of (*> magnitude of 7.4*) and wind requirements of (*100 m/s.*) of the area to determine the optimum safety of the whole structure and to minimize possible earthquake and typhoon induced damage.

- 
- On the basis of the data obtained from the detailed site investigations, topographical/soil and survey, geotechnical engineering, foundation investigation, material testing, survey of existing site conditions, the seismic requirements of the area, the load requirements of the building and other investigation required to obtain the data necessary to ensure the safety of the structure, the proponent shall prepare the preliminary structural design plans of the structure.
  - The Structures shall be design considering the maximum earthquake and maximum wind speed with respect to its location.
  - SUBMITTALS (at suitable scale on 20" x 30" blue print paper minimum size):
  - Structural Design Calculations (Using Latest Structural Design Software)
    - AUTOCAD file of Structural Drawings
    - Criteria and Design Notes
    - Foundation Plans
    - Floor framing plans
    - Schedule of slab, beams and girders
    - Schedule of columns
    - Schedule of footings
    - Structural details of stairs/ramp, if applicable
    - Structural details of retaining wall, if applicable
    - Structural details of stone masonry wall, if applicable
    - Riprap, if applicable
    - Roof framing plan
    - Schedule and details of trusses if applicable
    - Perforated Stainless steel wind breaker for windows and main entrance door.
    - Structural Analysis and Design Calculations signed by a Structural Engineer member of PICE and ASEP

○ Sanitary/Plumbing Design



- General

- i. The detailed design shall conform to the general standards adopted by the Sanitary & Plumbing Code of the Philippines and other pertinent laws and ordinances.

- ii. All design considerations/assumptions shall be based on the results of the technical studies, detailed analyses, and design computations.

- iii. The technical drawings and specifications shall clearly indicate all the details required to ascertain the care and thoroughness devoted in the preparation of the drawings.

- Drainage and Sewerage

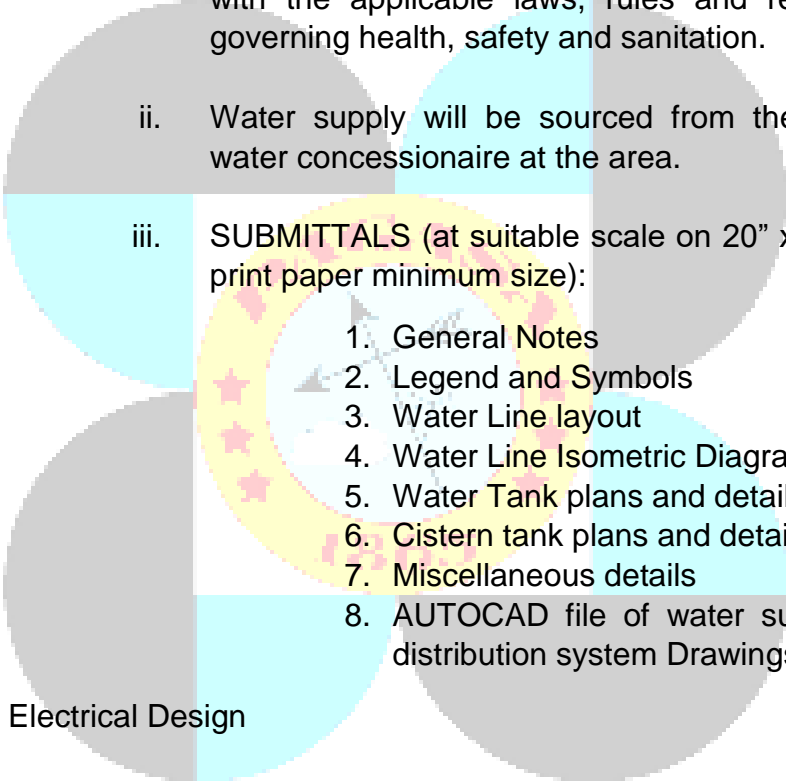
- i. Drainage and sewerage shall be underground.

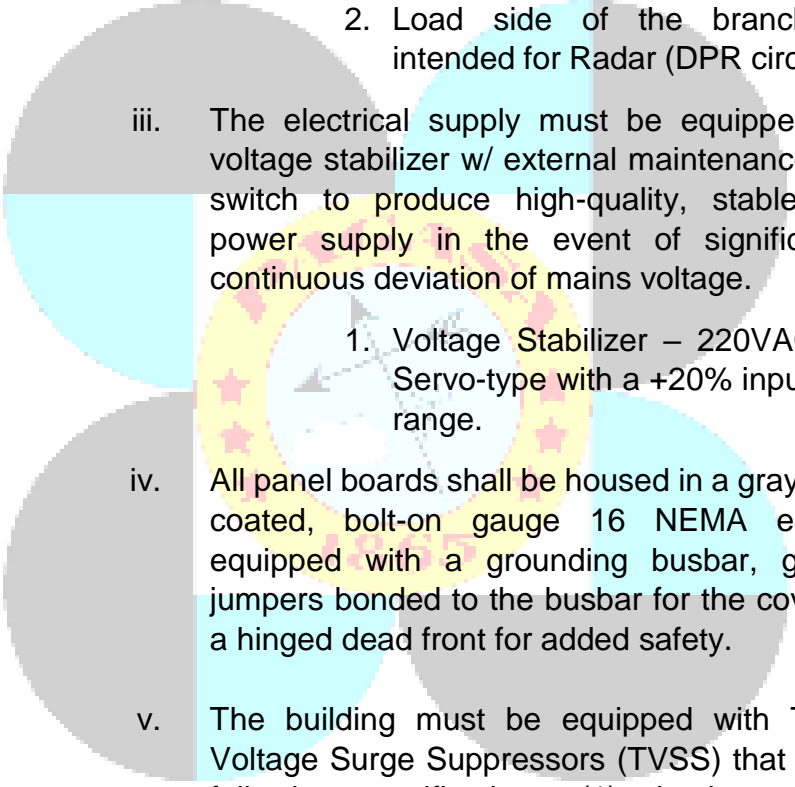
- ii. The drainage layout shall show all the required information such as direction of flow, manhole-to-manhole distances, and sizes of lines, manholes/canals, location of outfalls, etc.

- iii. SUBMITTALS (at suitable scale on 20" x 30" blue print paper minimum size):

1. General Notes
2. Legend and Symbols
3. Sewer, vent and storm drainage layout
4. Enlarge toilet plan for common and PWD toilets
5. Isometric Diagram
6. Miscellaneous details
7. Drainage System
8. Septic Tank plans and detail (three chamber)
9. Drain Field details
10. Cistern Tank
11. AUTOCAD file of Sanitary/Plumbing Drawings

- Water Supply and Distribution System

- 
- i. The winning bidder shall carry out a preliminary and detailed design for the water supply of the project. The design should be on the basis of the source and volume of water supply, water consumption (domestic & fire protection system), piping network, and conveyance in accordance with the applicable laws, rules and regulations governing health, safety and sanitation.
    - ii. Water supply will be sourced from the existing water concessionaire at the area.
    - iii. SUBMITTALS (at suitable scale on 20" x 30" blue print paper minimum size):
      - 1. General Notes
      - 2. Legend and Symbols
      - 3. Water Line layout
      - 4. Water Line Isometric Diagram
      - 5. Water Tank plans and details
      - 6. Cistern tank plans and details
      - 7. Miscellaneous details
      - 8. AUTOCAD file of water supply and distribution system Drawings
  - Electrical Design
    - The winning bidder shall prepare a preliminary and detailed design plan for the electrical and power supply system of the building in accordance with the Electrical Code of the Philippines, Fire Code of the Philippines, National Building Code of the Philippines and other relevant laws and ordinances
    - The winning bidder shall prepare a design for the electrical and power supply system and telephone system considering ease of maintenance and prevention of illegal connections.
    - i. The building's power supply shall be 220V, single-phase, 2 wires + ground, 60Hz, with the following components:
      - 1. Distribution transformer
      - 2. Metering and accessories
      - 3. Lightning Protection and Surge Arrester for transmission lines

- 
- ii. The electrical supply must be equipped with two (2) isolation transformers at the specified locations to provide surge protection and mitigate power surges.
    - 1. Load side of the indoor main Enclosed Circuit Breaker
    - 2. Load side of the branch circuit intended for Radar (DPR circuit no. 1)
  - iii. The electrical supply must be equipped with a voltage stabilizer w/ external maintenance bypass switch to produce high-quality, stable electric power supply in the event of significant and continuous deviation of mains voltage.
    - 1. Voltage Stabilizer – 220VAC, 60Hz, Servo-type with a +20% input voltage range.
  - iv. All panel boards shall be housed in a gray powder-coated, bolt-on gauge 16 NEMA enclosure, equipped with a grounding busbar, grounding jumpers bonded to the busbar for the covers, and a hinged dead front for added safety.
  - v. The building must be equipped with Transient Voltage Surge Suppressors (TVSS) that meet the following specifications: (1) sized according to IEEE STD C62.41-1991 and IEEE STD C62.45-1992, (2) UL listed and labeled under 1449-3 with a suppressed voltage rating of 1000V peak, (3) equipped with indicator lamps and Form C dry contacts for monitoring all modes, including N-E, and (4) a minimum 3-year warranty covering all parts of the unit. These TVSS units should be installed at the following locations:
    - 1. Line side of service entrance.
    - 2. Line side of the main ECB in EE room.
    - 3. Line side of the MCB in Distribution Panels (MDP, DP1, DP2, DPR & DPUPS)
    - 4. Line side of the input ECB for UPS.
  - vi. The grounding, lightning and surge protection systems must comply with the latest standards and best practices. All electrical and IT equipment, radar system, grounding busbars, steel cabinets

and similar components shall be properly connected to the building's grounding system. The grounding system must be bonded or welded underground, ensuring a resistance of less than 1 ohm.

1. All earth pits must conform to IS 3043 with latest amendments.
2. Maintain a minimum distance of 3 meters between ground electrodes.
3. Install a ground ring with earth test terminal boxes at regular intervals.
4. Provide an adequate number of earth strips with proper sized holes for extending grounding and looping earth connections in various offices, executed as required.

vii. Emergency lights must be installed throughout the building and associated areas to activate automatically during a power failure. The emergency lights should meet the following criteria:

1. Include a built-in battery and battery charging system.
2. Deliver adequate illumination with sufficient LUX levels for designated areas.
3. Use LED technology for efficient lighting.

viii. The building must be equipped with two (2) standby Diesel Electric Generator sets enough to sustain power to the building, communication equipment, and meteorological equipment therein. The design should include the following components:

1. Radiator Duct system
2. Exhaust System extensions
3. Day Tank Fuel system
4. Vibration Isolation pads

- ix. The generator system must be equipped with two (2) Automatic Transfer Switches (ATS) with ratings and protections suitable for the generator capacity. The ATS should be capable of switching automatically between Generator 1 and Generator 2.

The design should include:

1. Over and Under voltage sensors
2. Adjustable time delays
3. Auxiliary contacts
4. Manual operation handles
5. Basic indicator panel
6. Test/exercise/override buttons
7. Grounding busbar & jumpers

- x. SUBMITTALS (at suitable scale on 20" x 30" blue print paper minimum size):

1. AUTOCAD file of Electrical Drawings
2. General Notes and Specifications
3. Legend and Symbols
4. Power Riser Diagram
5. Power Layout System
6. Lighting Layout System
7. Load Schedule
8. Short Circuit Analysis
9. Voltage Drop Calculation
10. Time-current coordination (TCC) analysis
11. Lightning, Surge Protection and Grounding System
12. Fire Detection Alarm and Suppression System (FDAS)
13. Automatic fire suppression system
14. Smoke control system
15. Local Area Network System
16. CCTV System
17. Fire Exit Emergency Plan and Signages
18. Others as applicable

o Mechanical Design

- i. The winning bidder shall prepare a preliminary and detailed design plan for the mechanical equipment's, fire protection system and Air-conditioning System based on requirements of the

projects in conformity with Mechanical Code of the Philippines, Fire Code of the Philippines, National Building Code of the Philippines and other relevant Laws and Ordinances.

ii. SUBMITTALS (at suitable scale on 20" x 30" blue print paper minimum size):

1. General Notes
2. Legend and Symbols
3. Fire Protection System plans and layout
4. Air-conditioning System schedule and ventilation layout
5. Air-conditioning Unit design according to space and loading requirements with redundancy unit (Radar Control Room)
6. Other mechanical equipment's layout and details to conform with the requirement of the project
7. Technical Specifications
8. Structural Design Analysis and Computation
9. AUTOCAD file of mechanical Drawings

o Cost Estimates and Quantity Calculations

- The winning bidder shall submit the quantities of the different types of works to be carried out. In particular, the quantities of each work item shall be calculated and a bill of quantities shall be prepared to be supported with detailed cost estimates based on the scope of work as defined under this Bid Documents which shall follow DPWH standard format, to include:

i. Architectural & Engineering Design (Structural, Electrical, FDAS, Automatic fire suppression system, smoke control system, Mechanical,

Sanitary/Plumbing, ICT Design) Professional Services fees.

- ii. BOQ for the Construction of radar tower/synoptic station building, Powerhouse, Public C.R/Guardhouse, Access Road, Perimeter Fence and Flagpole, Parking, Instrument Garden landscaping and station grounds shall include:

1. General Requirements such as Temporary Facilities, Mobilization and Demobilization etc.

2. Health and Safety Requirements

3. Cost of materials (cost of sources, transport, handling, storage, miscellaneous expenses and allowances for wastage);

4. Cost of construction plant and equipment, including depreciation or rental rates, wages of operators, fuel, oil lubricants and maintenance;

5. Cost of labor, including salaries, wages, cost of living allowance and all fringe benefits.

6. All other incidental expenses necessary for the construction of the project

7. Indirect Costs

8. Overheads

9. Contingencies

10. Miscellaneous

11. Profit

12. All applicable taxes

13. Note: The preparation of Detailed Cost Estimates shall conform with the



○ Contract Documentation

- The winning bidder, hereinafter referred to as the contractor shall, upon receipt of the Notice of Award (NOA);

i. Post a contract performance security.

ii. Secure a Contractor's All Risk Insurance (CAR) covering 100% of the infrastructure cost, from the GSIS General Insurance Fund or any private bonding corporation acceptable to PAGASA and maintains such insurance coverage up to the date of the Final Acceptance of the project. Such insurance shall be submitted to PAGASA together with the Official Receipt of Payment of premium evidencing enforceability.

iii. Construction Schedule (PERT/CPM, Gantt Chart and S-Curve) including Architectural and Engineering Design Plans submission shall not exceed 60 calendar days.

iv. Other requirements that may be required.

◆ **Construction Implementation Phase**

○ Permits and Clearances

- The winning bidder shall upon authorization of the Implementing Unit, make representations with the government agencies concerned to expedite the processing of the necessary permits and certificates such as the following:

i. Building/Electrical/Sanitary Permits

ii. Tree cutting permit, if required

iii. Occupancy permit

iv. Environmental Clearance Certificate, if required

v. All other permits/clearances as may be required for the construction and application for commercial power connection.

- Temporary Structures & Facilities
  - The winning bidder shall provide and maintain the following:
    - i. Temporary office and/or quarters for the contractor's project team personnel with water, light, telephone and toilet facilities.
    - ii. Temporary office for the Implementing Unit and Construction Management project team with water, light, telephone and toilet facilities.
    - iii. Temporary bunkhouse/quarters for the contractor's workforce complete with toilet and bath facilities.
- Mobilization
  - The winning bidder shall mobilize all the required project team personnel, equipment, tools, and manpower with the required skills and in sufficient number as may be necessary for his efficient undertaking of the project.
- Material Testing
  - All material testing shall be conducted by the DPWH accredited testing laboratories.
- As-built plans
  - The contractor shall cause the preparation and submission of as-built plans duly signed and sealed by all concerned parties involved in the construction in the same sheet size and scale as the original drawings in two (2) blueprint copy, one (1) tracing paper copy and one (1) reproducible copy (Autocad File Copy).
- Workmanship
  - All the works shall be of the highest quality of the Engineering practice and in accordance with the provisions of the National Building Code and all existing code, laws and city rules and regulations. Any defects found or imperfection observed as a result of

poor workmanship shall be corrected by the Contractor without any additional cost to PAGASA.

- Health and Safety

- The winning bidder shall be responsible for obtaining the required approvals from the Bureau of Working Conditions, DOLE.
- The winning bidder shall provide sufficient number of the following items to ensure the safety and welfare of the its employees, PAGASA personnel and the public during the execution of the work.
  - i. Submission of the DOLE approved health and safety program;
  - ii. Risk assessment;
  - iii. PPE of all workers;
  - iv. Safety warning signs;
  - v. Barricades, bollards and caution tapes;
  - vi. Safety Engineer/Officer;
  - vii. Steel plates;
  - viii. Board up system;
  - ix. Warning lights (blinkers and light ropes)
  - x. Other safety equipment necessary to execute the work safely;
  - xi. Shoring for trench excavation required.
- All standard safety measures and precautions shall be exercised by the winning bidder in the course of the project for the protection of the public and its workers.
- The winning bidder shall secure their own equipment and materials on site. PAGASA shall not be liable to any losses incurred during the progress of the work.

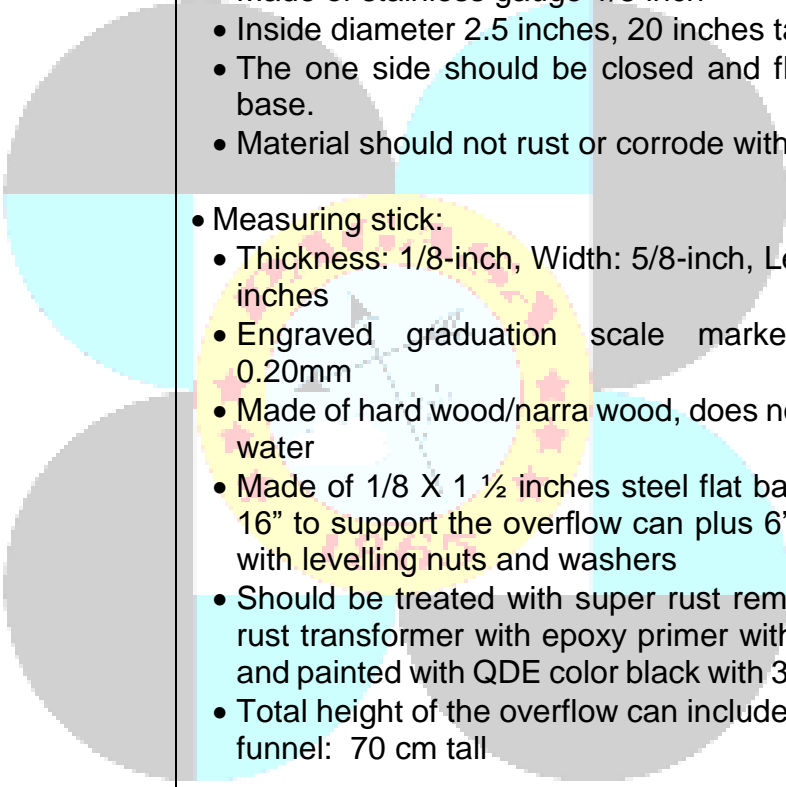
- See scope of works for other details of the project
- See conceptual plans for specifications of items.
- Specifications shall conform with DPWH Standard Specifications for Public Work Structures Volume III 2019 (minimum requirement)

## **XII. Supply, delivery, installation, testing, and commissioning of basic meteorological instruments including accessories.**

**All specifications must follow the WMO standard.**

*"tracking the sky...helping the country"*

Thermograph	<ul style="list-style-type: none"> <li>• Drum Rotation: 7-days or 1-day – exchange by gears</li> <li>• Sensor: Bi-metal</li> <li>• Measuring Range: -25°min. to 55°C max. at medium temp. <math>\pm 0.5^{\circ}\text{C}</math>, at temp. below zero and above 50°C</li> <li>• Accuracy: <math>\pm 0.2^{\circ}\text{C}</math> in medium temperature or better</li> <li>• Recording Pen: Cartridge Pen</li> </ul>
Minimum Thermometer	<ul style="list-style-type: none"> <li>• Alcohol filled thermometer</li> <li>• Range: -30°C min. to 50°C max.</li> </ul>
Aspiration Psychrometer	<ul style="list-style-type: none"> <li>• Measuring Range: 0° to 50°C or better</li> <li>• Mercury free</li> <li>• Accuracy: <math>\pm 0.2^{\circ}</math></li> </ul>
Barograph Quartz Type	<ul style="list-style-type: none"> <li>• Measuring Range: 955to 1030 hPa or better</li> <li>• Accuracy: <math>\pm 1</math> hPa or better</li> <li>• Drum Rotation: 7-days or better</li> <li>• Recording Pen: Fiber/metal pen</li> </ul>
Wind speed and direction sensor with digital indicator and alarm.	<ul style="list-style-type: none"> <li>• Range: <ul style="list-style-type: none"> <li>• Wind speed: 0, 2 to 90 m/s, <math>\pm 0.5</math> m/s or better</li> <li>• Wind direction: 0° to 359°</li> </ul> </li> <li>• Four (4) Channel Display: <ul style="list-style-type: none"> <li>• Output modes: <ul style="list-style-type: none"> <li>• Speed: Inst./2-min./10-min.</li> <li>• Direction: Inst./2-min./10-min.</li> <li>• Alarm: 3-levels or better</li> </ul> </li> </ul> </li> <li>• With 1-unit of uninterruptible power supply (UPS)</li> </ul>
Tipping bucket rain gauge with digital translator/indicator and alarm	<ul style="list-style-type: none"> <li>• Dimensions: <ul style="list-style-type: none"> <li>• 200mm Ø to 220mm Ø x 450 mm(H) or better</li> </ul> </li> <li>• Contact: Reed switch</li> <li>• Accuracy: <math>\pm 0.5\text{mm}</math> or better</li> <li>• Alarm output: <ul style="list-style-type: none"> <li>• 10 min. / 1-hour / Day / Cumulative</li> </ul> </li> <li>• With 1-unit of uninterruptible power supply (UPS)</li> </ul>
8" Standard Rain gauge	<ul style="list-style-type: none"> <li>• Overflow can/Outer tube: <ul style="list-style-type: none"> <li>• Made of G.I gauge #18</li> <li>• 8-inches inside diameter maximum capacity of the overflow can is 20 inches</li> <li>• Coated with epoxy primer with catalyst and finished by silver aluminum paint with 3 coatings by machine spray gun</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Collection funnel: slope of the funnel is sufficiently steep at 45°. <ul style="list-style-type: none"> <li>• The rim should have sharp edge</li> </ul> </li> <li>• Measuring cylinder/Inner tube: <ul style="list-style-type: none"> <li>• Made of stainless gauge 1/8 inch</li> <li>• Inside diameter 2.5 inches, 20 inches tall</li> <li>• The one side should be closed and flat at the base.</li> <li>• Material should not rust or corrode with water.</li> </ul> </li> <li>• Measuring stick: <ul style="list-style-type: none"> <li>• Thickness: 1/8-inch, Width: 5/8-inch, Length: 30 inches</li> <li>• Engraved graduation scale marked every 0.20mm</li> <li>• Made of hard wood/narra wood, does not absorb water</li> <li>• Made of 1/8 X 1 ½ inches steel flat bar, height: 16" to support the overflow can plus 6" footings with levelling nuts and washers</li> <li>• Should be treated with super rust remover and rust transformer with epoxy primer with catalyst and painted with QDE color black with 3 coatings</li> <li>• Total height of the overflow can include collector funnel: 70 cm tall</li> </ul> </li> </ul>
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See **Annex "D"** - wind mast, radio mast monopole and foundation details

### **XIII. Installation of communication link (lease-line) from Hinatuan radar site to PAGASA Central office with 1-year subscription.**

### **XIV. General Notes**

- Principal Classification Design and Building Contractor:
  - Design and build contractor shall present the following requirements:
    - General Building with minimum category of "B"
    - PCAB must be valid at the time of the proposal submission until the awarding. Should the said license expire prior or while construction is ongoing, the winning bidder must renew it accordingly and furnish documentary proof of its renewal and/or extension.

Submit proof (Valid PCAB License/Renewal extension and/or proof of payment for renewal, Mayor's permit).

- Must have on its roster of employees registered **PRC license and proof of membership on their respective Accredited Professional Organization (APO)** of the following professionals;

➤ Design Phase

Key Personnel	Years of Relevant Experience (minimum)	Type of Construction
Architect	15	General Building Construction
Civil/Structural Engineer – PICE and ASEP member	15	General Building Construction
Professional Electrical Engineer	15	General Building Construction
Professional Mechanical Engineer	15	General Building Construction
Sanitary Engineer	8	General Building Construction
Professional Electronics and Communication Engineer	8	General Building Construction
Geodetic Engineer	8	General Building Construction
Autocad Operator	5	General Building Construction
Document Controller	5	General Building Construction
Project Coordinator	5	General Building Construction

➤ Construction Implementation Phase

Key Personnel	Years of Relevant Experience	Type of Construction
Project Manager	15	General Building Construction
Assistant Project Manager	15	General Building Construction
Project Engineer	10	General Building Construction
Architect	10	General Building Construction
Site Engineer (Civil, Electrical, ECE)	10	General Building Construction
Cost and Quantity Engineer	10	General Building Construction
QA/QC Engineer	10	General Building Construction
Materials Engineer I	10	General Building Construction
Health and Safety Engineer	10	General Building Construction
Document Controller	5	General Building Construction