



Republic of the Philippines

**DEPARTMENT OF SCIENCE AND TECHNOLOGY**

**Philippine Atmospheric, Geophysical and Astronomical Services  
Administration (PAGASA)**

**Project Title: CONSTRUCTION OF SYNOPTIC BUILDING, OBSERVER'S  
QUARTER, POWER HOUSE, FENCE GATE AND SIGNAGE**

**Project Location: Visayas State University, Inopacan Rd. Baybay City, Leyte**

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**SCOPE OF WORKS AND SPECIFICATIONS**

**General Requirements**

- The Contractor shall provide all materials, equipment, tools, labor, and supervision required for the complete construction of the project.
- To ensure proper phasing or scheduling of work, the Contractor must coordinate all work with all parties.
- Contractor must provide end-user with complete specifications and a product sample for evaluation. Inspection of the Project-in-Charge shall be required prior to installation of any item/material during the construction.
- The Contractor shall promptly remove from the premises all trash, debris, and such weekly and after the completion of all works. Restore all areas that were damaged as affected by the construction works and leave the site clean to the satisfaction of the Project Inspector or his representative and the End-user.
- All materials removed from the unit shall be properly documented prior to turn-over to the End-user for proper safekeeping.
- Provision of Temporary Facility for workers shall be coordinated with the Project-in-Charge in order to provide a proper location and establish rules and regulations as the site consists of equipment and is on the premises of a workplace.
- To protect the building, create a temporary enclosure in each location. All of the building facilities must be adequately covered by such covers throughout the duration of the project.
- To ensure proper installation of all framing systems and protection of the area, the Contractor should provide, at its own expense, the necessary scaffoldings, board-ups, safety nets, and similar items.
- Construction requirements of each pay item must be in accordance with the DPWH "Standard Specifications for Public Works Structures Volume II"



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- Given that the site is situated within the premises of Visayas State University, the contractor is obligated to adhere to the rules and regulations set forth by Visayas State University.

### **Utility Services**

- For the Utility Services/Consumption such as water and electric power, provision of electric and water meter shall be provided by the Contractor. All utility consumption shall be provided with meters to limit the usage of such during the construction period. Payments of the bill shall be at the expense of the Contractor.

### **Site Monitoring**

- Site Monitoring shall be a must for the Contractor for the effective implementation of the Project. Any discrepancies in plans and on the actual site shall be properly coordinated with the Project Monitoring Engineer for verification.
- Regular coordination meetings shall be done between the Contractor or its representative and the Project Monitoring Engineer.
- Progress Photographs shall be documented by the Contractor
- A logbook shall be available at the site. It shall contain the daily activities on the site, including weather conditions, delivery, manpower, and other matter pertaining to the situation of the project. It will also serve as data for the Contractor and Project Monitoring Engineer.
- Existing conditions of the work site shall be documented by the contractor and photos shall be taken before the commencement of work to ensure such status. Any damage on the areas due to the contractor's ongoing works shall be refurbished at his expense.

### **Part B – Other General Requirements**

#### **1. Project Billboard / Safety Signage**

- The Contractor shall install two (2) Project Information Signs at/or near the beginning and the end of the project or upon the discretion of the Engineer. The new billboard layout, dimensions are as follows:
  - Tarpaulin Dimensions: 1.22m x 2.44 m
  - Thickness of Marine Plywood: 5mm
  - Background: WhiteThe billboard shall consist the following data:
  - Title of the Project



- Contractor
- Location
- Implementing Agency
- Brief Description of Project
- Approved Budget of the Contract
- Project Details

## **2. Occupational Safety and Health Program**

- This Item covers the implementation of the construction safety in all stages of project procurement, requirements, provisions, and instructions for the guidance of the Engineer.
- The Contractor shall furnish his workers with protective equipment for eyes, face, hands and feet, lifeline, safety belt/harness, protective shields and barriers whenever necessary by the reason of the hazardous work process or environment.
- For General Construction Work, the required basic PPEs for all workers shall be Safety Helmet, Safety Gloves, and Safety Shoes. Workers within the construction project site shall be required to wear the necessary PPE at all times. Moreover, all other persons who are either authorized or allowed to be at a construction site shall also wear appropriate PPEs.
- All Personal Protective Equipment (PPE) are subject for the approval of Project Monitoring Engineer and should meet the specified standard requirements:
  - The Safety Helmets/Hard hat shall meet the specifications contained in the technical guidelines issued by the Specialize department in accordance to international standards- OSHA or ANSI z89. Safety Helmets should be inspected by the safety officer to ensure that it is safe and reliable to use. It should be free from cracks and proper shock-absorbing lining of the helmet and should be in good condition.
  - Safety Shoes must meet the minimum requirements according to PNS ATM F2412:2016 and PNS ASTM F2413:2016 for the impact resistance and compression resistance at the toe area of the footwear
    - Impact Resistance – 75 ft-lbs (101.7 J)
    - Compression Resistance – 2500 lbs (11,121 N)

## **3. Mobilization / Demobilization**

- This Item includes the mobilization process, relocation/transfer of existing office furniture and equipment to the designated temporary location.
- Demobilization process shall include clearing of the affected areas from all rubbish, debris, and all unnecessary building materials and restore all the areas that were damaged as affected by the works and leave the site clean to the satisfaction of the Project Monitoring Engineer and/or the End-user.



## **Part C – EARTHWORKS**

- The Contractor shall supply all labor, materials, equipment, and other facilities required to complete all earthworks in an acceptable manner as shown in the drawings and as specified herein. This work shall include, clearing, staking, excavation, sub-base preparation, backfilling, compaction, and trimming for final grades.

### **Item 803(1)a – Structure Excavation**

- This Item shall consist of the necessary excavation for the foundation of the building.
- This Item shall include the removal of all materials of whatever nature encountered including all obstructions of any nature that would interfere with the proper execution and completion of the work.
- The excavation of the following shall be in accordance to the measurements provided at the plan;
  - Column Footing
  - Wall Footing
  - Line Canal
  - Septic Tank

### **Item 804(1)a – Embankment from Structure Excavation (Common Soil)**

- This Item shall consist of the construction of an embankment using suitable materials of various compositions and compacted in accordance with this Specification and in conformity with the lines, grades, and dimensions shown on the Plans or established by the Project Monitoring Engineer.
- Excavated materials will be used for backfill materials, all backfilling materials shall be free of debris, roots, or other similar materials.

### **Item 804(7) – Gravel Bedding**

- Gravel Fill shall be constructed below the original ground elevation. The compacted thickness for each beddings are as follows:
  - Column Footing – 100mm thick
  - Wall Footing – 100mm thick
  - Footing Tie Beam – 100mm thick
  - Slab on Grade – 100mm thick
  - Path walk – 100mm thick
  - Driveway-100mm thick
- All subsequent layers shall be spread and compacted in a similar manner. Gravel fill shall be in accordance with the approved Plan and conform to the applicable requirements of earth embankment.



## **Part D – REINFORCED CONCRETE**

- This Item shall consist of furnishing, placing, and finishing concrete in buildings and related structures in accordance with this Specification and conforming to the dimension shown on the Plans.

### **Item 900 – Structural Concrete**

- The work to which this refers includes all operations necessary for the supply and delivery of all materials, labor, equipment, and all associated activities. This shall conform in the recommendations of the “National Structural Code for Buildings” published by the Association of Structural Engineers of the Philippines.
- Material Requirements:
  - Cement to be used shall be Type I conforming to the ASTM C-150
  - Fine and coarse aggregates shall be obtained from the approved source as determined by DPWH and shall conform to ASTM C-33
  - Water shall be potable and free from deleterious amounts of acids, alkalis, oils or organic matters.
  - The quality of concrete shall comply with Section 5.04 of the National Structural Code of the Buildings.
  - Testing of samples from concrete pours shall be as required by Section 5.05 of the National Structural Code of Buildings.
  - Should further testing of the finished concrete be necessary due to non-compliance of test specimens, as required by the Engineer. It shall be carried out in accordance with the approved procedure laid down in National Structural Code of Buildings, Section 5.04 clause(e).
  - Hardened concrete that is deemed not to comply with the specifications above, but which the Engineer permits to be further tested, shall be tested for compressive strength.
  - Any concrete will be rejected under the specifications above if the results fail to meet the requirements Section 5.03 of National Structural Code of Buildings.
  - Hardened concrete may also be rejected for any one of the following conditions:
    - It is porous, segregated or honeycombed.
    - Its placing has been so interrupted that there is a construction or similar joint not in accordance with Section 5.03 clause (d) of the National Structural Code of Buildings.
    - The reinforcing steel it incorporates has been displaced.
    - Construction tolerances have not been met.
    - The required surface finish has not been met.
    - The concrete can be shown to be otherwise defective.



- When the above condition happened, the Engineer has the option to let the Contractor to demolish the rejected portion.
- The following proportion shall be as follows for each member:
  - o **Class A Mixture (1:2:4):** for structural members such as Column, Beam, Column Footing, Wall Footing, Footing Tie Beam, Suspended Slab, Concrete Gutter and Slab on Grade.

### **Item 902 – Reinforcing Steel**

- This item shall consist of furnishing, cutting, bending, fabricating, welding, and placing of steel reinforcement with or without an epoxy coating of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans.
- All steel bars to be used during construction should be in accordance with the guidelines of the National Structural Code of Buildings.
- The support and tolerance in placing of reinforcement shall comply with section 5.07 of the National Structural Code of Buildings.
- Lap Splicing and/or welding of reinforcement shall comply with section 5.07 of the National Structural Code of Buildings.
- Welding of reinforcement shall not be carried out unless shown on the drawings, specified, or otherwise approved by the Project Monitoring Engineer.
- All reinforcing bars shall be high tensile strength (Grade 60) except for the lateral ties, stirrups, and any reinforcing bars with 12mm Ø and below which shall be a structural grade (Grade 40).

### **Item 903 – Formworks and False works**

- This Item covers the furnishing, fabrication, installation, erection, and removal of forms and false works.
- The contractor shall be responsible for the design, erection, and adjustment of all formworks and false work in accordance with Section 5.06 of the National Structural Code for Buildings.
- All materials used in construction and support of formwork shall be of timber. Alternative materials shall only be used with Project Monitoring Engineer's approval.
- It shall be the Contractor's responsibility to ensure that the forms are in placed to the shape, lines, and dimensions as indicated on the drawings, and they shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete. The Contractor shall ensure that the forms are maintained rigidly in position and be sufficiently tight to prevent excessive leakage of mortar.
- All debris particularly chipping, shavings, and sawdust, shall be removed from the interior of the forms before the concrete is placed. All form surfaces shall be cleaned and thoroughly wetted before pouring of concrete.



- Before the placement of any concrete, the Project Monitoring Engineer shall inspect the formwork and may, at his discretion, reject any materials or forms that do not conform to this specification.
- The deflection of forms between joints and/or studs shall not exceed one five-hundredth (1/500) of the joints or stud spacing.
- The recommendations minimum stripping for horizontal slabs be twenty-four (24) hours after the approval of the Project Monitoring Engineer.

## **Part E – FINISHING AND OTHER CIVIL WORKS**

### **Item 1000– Termite Control Work**

- This Item shall consist of furnishing and applying termite control chemicals, including the use of equipment and tools performing such operations in accordance with this Specification.

#### **Material Specifications:**

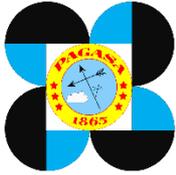
- Proven effective against termites by providing a barrier
- Longer lasting protection
- Higher dilution rate
- Wider area coverage
- Less hazardous
- Assurance of high quality and proven efficacy

### **Item 1001– Storm Drainage and Sewerage System**

- This item shall consist of furnishing all materials, equipment and labor for the complete installation of storm drainage system which include all pipings, gutters, canals, catch basins, junction boxes, handholes, manholes and other appurtenant structures, and sewerage system which include all sanitary sewer piping and septic vault/tank where no public sewer exist, from the building to the point of discharge.

#### **Scope of Work**

- Sanitary drainage including soil drainage, waste drainage, and vent system, within the building.
- Building storm drainage system including aircon drainage, and gutter drains, canopy drains, plant boxes drains, and building area drains.
- Pipe laying of Sewer and vent lines. Pipes and fittings for sanitary lines shall conform to PNS 195.
- Sewer and vent lines shall be polyvinyl chloride (PVC) pipes and fittings conforming to ASTM D2729, Series 600
- Sewer line below natural grade line shall be polyvinyl chloride (PVC) pipes and fittings conforming to ASTM D2729, Series 1000



- The pipes shall be laid in accordance with grades and alignment indicate or shown in the plans.
- Sewer/Storm drainage should be tap properly to the line canal.
- Construction of concrete Septic Tank measuring 1.20meter x 2.30 meter with a depth of 1.50meter below natural grade line as show in the Plan.
- All piping above the ground shall be run parallel with lines of the building unless otherwise indicated on the plans.

### **Item 1002– Plumbing**

- This item shall consist of furnishing all materials, tools, equipment and fixtures required as shown on the plans for satisfactory performance of the entire plumbing and fire protection system including installation in accordance with the latest edition of the Revised National Plumbing Code, Uniform Plumbing Code of the Philippines, The Fire Code of the Philippines, The National Building Code, and this Specification.

#### Scope of Works

- Installation of plumbing fixtures and fittings.
  - Water closet shall be vitreous china, free standing toilet combination, elongated front bottom outlet siphonic washdown bowl with push button, double flushing, trapway; concealed, 4/6 liters per flush, measuring 705 x 400 x 775 mm with cover complete with fittings and mounting accessories. Sample models and color shall be submitted for approval prior to delivery at jobsite by the Monitoring Engineer/End-user or unless otherwise specified on the plans. **(3 sets)**
  - Corner Lavatory shall be white ceramic with single hole with complete fittings. Faucets shall be made of stainless steel. **(2 sets)**
  - Kitchen Sink shall be stainless with single hole with complete fittings. Gooseneck faucet shall be made of stainless steel. **(1 set)**
- Installation of Bathroom/Toilet Accessories;
  - Shower head and fitting shall be movable, round hand shower and rain shower measuring 8 inches diameter with escutcheon arm complete with stainless steel shower valve and control lever, all exposed surface to be chromium finish. Faucets shall be made of stainless steel for interior use. **(1 set)**



- Floor drains shall be made of stainless steel beehive type, measuring 4in x 4in, and provided with detachable stainless strainer, expanded metal lath type. **(4 sets)**
- Bidet spray shall be 304 stainless steel with 2-way angle valve with complete fittings. **(3 sets)**
- Facial Wall Mirror shall be mounted on the wall measuring 500x700mm **(1 set)**
- Roll Tissue Dispenser shall be plastic and wall mounted, measuring 250 x 130 x 280 mm, with 9" paper roll with 2 1/2" core. **(2 pcs)**
- Steel Grab Bar shall be 304 stainless steel and wall mounted, measuring 1" dia. x 600mm with pipe flange cover. **(3 pcs)**
- Pipes laying for water lines. Pipes and fittings for water lines shall conform to PNS 65:1993 – Unplasticized Polyvinyl Chloride (uPVC) Pipes for Potable Water Supply.
- Tapping from an existing public water main of the site distribution to include supply & installation of main water meter and sub-water meters.
- All pipes shall be cut accurately to measurements and shall be worked into place without springing or forcing. Care shall be taken so as not to weaken the structural portions of the building.

#### **Item 1003– Carpentry and Joinery**

- The work under this Item shall consist of furnishing all required materials, fabricated woodwork, tools, equipment, and labor and performing all operations necessary for the satisfactory completion of all carpentry and joinery works in accordance with the Plans and this Specifications.
  - **Ceiling 4.5mm thk Fiber Cement Board on Metal Furring, painted finish**
    - On Metal Furring, puttied, sanded and ready to receive paint primer coating
    - Surface preparation for 4.50mm thk Fiber Cement Board Ceiling Panel on Metal Furring.
    - Painting of new ceiling in latex paint
    - Frame: 19mm x 50mm x 0.40mm thk. Double Metal Furring spaced at 0.40m O.C.  
12mm x 38mm x 0.8mm thk. Carrying Channel spaced at 1.20m O.C



25mm x 25mm x 0.50mm Wall Angle at every sides,  
and angle of the wall

- Provide all the necessary preparation of ceiling.
- Hanger rod with adjustable clip shall be 1.00m interval both ways but provide additional hanger and support on critical areas.
- Provide all the necessary accessories and framing for proper installation.
- Ensure adequate hanger and support at all the utilities on the area

➤ **Ceiling Eaves 4.5mm thk Fiber Cement Board on Metal Furring, painted finish**

- On Metal Furring, puttied, sanded and ready to receive paint primer coating
- Surface preparation for 4.50mm thk Fiber Cement Board Ceiling Panel on Metal Furring.
- Painting of new ceiling in latex paint
- Framing: 19mm x 50mm x 0.40mm thk. Double Metal Furring spaced at 0.40m O.C.  
12mm x 38mm x 0.80mm thk. Carrying Channel spaced at 1.20m O.C  
25mm x 25mm x 0.50mm Wall Angle at every sides,  
and angle of the wall
- Provide all the necessary preparation of ceiling.
- Hanger rod with adjustable clip shall be 1.00m interval both ways but provide additional hanger and support on critical areas.
- Provide all the necessary accessories and framing for proper installation.
- Ensure adequate hanger and support at all the utilities on the area

➤ **Fascia Board, 9mm thk. x 10" Fiber Cement Board**

- On 2" x 4" x 1.2mm thk. C-Purlin, puttied, sanded and ready to receive paint primer coating
- Surface preparation for 12.00mm thk Fascia Fiber Cement Board Ceiling Panel on C-Purlin.
- Painting of new ceiling in latex paint

**Item 1004– Hardware**

- This Item shall consist of furnishing and installing all building hardware required to: (1) ensure rigidity on joint/connections of different parts of the structure; and (2) equip in a satisfactory operating condition parts of the structure such as



doors, windows, cabinets, lockers, drawers and other similar operating parts in accordance with the Plans and this Specification.

- **Lever-type Door Lockset (D1,D2,D3)**
  - ✓ Material: Brass
  - ✓ Universal 4-way latch
  - ✓ Fits standard doors
  - ✓ 2 3/8 in and 2 3/4 in backsets
  - ✓ Exterior keyed locking entry door
  - ✓ 3 keys
  - ✓ Meets ANSI Grade 3 Standards
- **Stainless Steel Ball Bearing Hinges (D1,D2,D3)**
  - ✓ Size: 4" x 4" x 3mm
  - ✓ Material: Stainless Steel 304
  - ✓ Loose Pin
  - ✓ Knuckles with 4 ball bearings
  - ✓ Suitable for DIN left and right hand
  - ✓ Suitable for Wooden Flush Door
  - ✓ Comes with stainless screws
- **Steel Ladder – Power House**
  - Framing:
    - ✓ Rectangular Tubular (1"x1"x1.5mm thk)

#### **Item 1005– Steel Windows**

- This Item shall consist of furnishing and installing steel windows (fixed, project-in, project-out, side hung-out or side hung-in) fully equipped with flying accessories and looking devices in accordance with the Plans and this Specification.
  - Material Requirements:
    - **(W1) - 1300mm(H) x 2100mm(W), (W2) – 1300mm(H) x 1400(W), (W3) – 1300mm(H) x 700mm(W), (W5) – 650mm(H) x 750mm(W),**
      - ✓ Swing Type Casement
      - ✓ Steel Frame and grills w/ 6 mm thk. glass
      - ✓ Hinges and lock set
    - **(W4) – 600mm(H) x 500mm(W)**
      - ✓ Awning Type Casement
      - ✓ Steel Frame and grills w/ 6 mm thk. glass
      - ✓ Hinges and lock set
    - **Louwer Window**
      - ✓ Size: **W6- 0.90m W x 1.00m H x 1.2mm thk & W7- 0.45m W x 1.00m H x 1.2mm thk**
      - ✓ Fixed Louwer Type
      - ✓ Framing: Rectangular Tubular 1"x2" – Blade
      - ✓ Framing: Rectangular Tubular 2"x3" - Frame
      - ✓ including louwer, tubular frame, and screen



**Item 1007 – Aluminum Glass Door**

- This Item shall consist of furnishing all materials, hardware, plant, tools, labor and services necessary for complete fabrication and installation of glass doors of the type and size in accordance with the Plans and this Specification.
  - **(D4) – 2.10m(H) x 0.90m(W)**
    - ✓ UPVC Glass Door Double Swing Type
    - ✓ ¼" thk. Clear tempered glass
    - ✓ 1mx2.15m UPVC door jamb
    - ✓ 1 set of lock lever type

**Item 1010– Wooden Doors**

- This Item shall consist of furnishing all materials, hardware, plant, tools, labor and services necessary for complete fabrication and installation of wooden doors of the type and size in accordance with the Plans and this Specification and applicable Specifications of Item 1003, Carpentry and Joinery Works.
  - - **(D1) – 2.10m(H) x 0.90m(W)**
      - ✓ Flush Door Swing Type
      - ✓ With 2" x 4" Tanguile Door Jamb
      - ✓ 3 pairs of 4" x 4" x 3mm Stainless Steel Ball bearing hinge
      - ✓ 1 set of entrance lock lever type
      - ✓ Varnish Finish
    - **(D2) – 2.10m(H) x 0.80(W)**
      - ✓ Solid Wood Panel Door Swing Type
      - ✓ With 2" x 4" Tanguile Door Jamb
      - ✓ 3 pairs of 4" x 4" x 3mm Stainless Steel Ball bearing hinge
      - ✓ 1 set of entrance lock lever type
      - ✓ Varnish Finish
    - **(D3) – 2.10m(H) x 0.70(W)**
      - ✓ Solid Wood Panel Door Swing Type
      - ✓ With 2" x 4" Tanguile Door Jamb
      - ✓ 3 pairs of 4" x 4" x 3mm Stainless Steel Ball bearing hinge
      - ✓ 1 set of entrance lock lever type
      - ✓ Varnish Finish

**Item 1006– Steel Doors and Frames**

- This item shall consist of furnishing and installing all fabricated steel doors and frames equipped with fixing accessories and locking devices in accordance with the Plans and Specification.
  - **(D5) – 2.10m(H) x 1.70m(W)**
    - ✓ Double Swing Type
    - ✓ Steel Louver Door and Frames



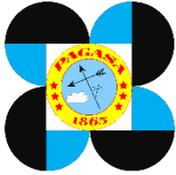
- ✓ 3 pairs of 4" x 4" x 3mm Stainless Steel Ball bearing hinge
- ✓ 1 set of entrance lock

### **Item 1013– Corrugated Roofing and Item-1047 Structural Steel**

- This Item shall consist of furnishing all equipment, tools, materials and labor required to properly install and complete the corrugated metal roofing, together with the related accessories such as ridge/hip rolls, valleys, gutters, and flashing in accordance with the Plans and this specification.
  - **Pre-painted Metal Sheets, Gauge 24 (t = 0.6mm.), Rib Type, Long span**
  - Materials Requirements:
    - ✓ Panels: Ga. # 24 (0.60mm) thick. Pre-painted Rib-type roof, Long span
    - ✓ Roof Trusses for Synoptic and Quarters Building: A36 Top and Bottom Chord (Double Angle Bar 2L) 2" x 2" x 3mm thick.
    - ✓ Plates for Synoptic and Quarters Building: A36 Gusset 4.5mm. thick and A36 Base Plate 6mm thick. x 200mm. x 200mm.
    - ✓ Web Members for Synoptic and Quarters Building: A36 1 ½" x 1 ½" x 3mm thk. (Double Angle Bar 2L)
    - ✓ Purlins for Synoptic Building: 100mm.x 50mm. x 15mm.x 2.0mm. thick LC-Purlins
    - ✓ Purlins for Quarters Building: 75mm. x 38mm. x 15mm. x 2.0mm. thick A36 LC-Purlins
    - ✓ A36 Sagrods: 10mmØ x 0.65m. w/ standard nuts and washers
    - ✓ Insulations: 10mm thick. Double Sided P.E Foam Insulation.
  - Steel Connections shall be full weld. Welding electrodes shall be E60 series of ASTM Specifications A233.
  - Provide all necessary accessories for proper installation.
  - Verify plans for necessary details.
  - All structural steel frames shall be applied with Acrylic epoxy paint.
  - All Steel sections shall be primed and painted two coat with final coating colors as to be specified by Project Monitoring Engineer and End-user

### **Item 1014– Pre-painted Metal Sheets**

- This Item shall consist of furnishing all pre-painted metal sheet materials, tools, equipment, plant including labor required in undertaking the proper installation complete in accordance with the plans and this Specifications.
  - **Fabricated Metal Roofing, Pre-painted, Ridge Roll**
    - ✓ Thickness: Gauge 24 (0.60mm)



- **Fabricated Metal Roofing, Pre-painted, Gutter**
  - ✓ Thickness: Gauge 26 (0.551mm)
  - ✓ Ordinary
- **Fabricated Metal Roofing, Pre-painted, Wall Flashing**
  - ✓ Thickness: Gauge 26 (0.551mm)

- Gutters, valleys, flashing ridge and hip rolls shall be fastened where indicated on the Plans by self-tapping screws or galvanized iron straps and rivets. Always begin flashing installation from bottom and work up, so that flashings are lapped on top of the lower flashings. This will prevent moisture from leaking under the flashings and into the structures.

### **Item 1016– Waterproofing**

- This Item shall consist of furnishing all waterproofing materials, labor, tools equipment and other facilities in undertaking the proper installation works required in accordance with this Specification.
- **Item 1016(1)a – Waterproofing, Cement-base**
  - Material Requirements for the waterproofing:
    - Superior water impermeability
    - Flexible and fiber-reinforced
    - Most compatible to concrete substrates (being cementitious)
    - High water vapor transmission
    - UV Resistant (high-grade polymer plus cement)
    - Monolithic
    - Guaranteed water protection; virtually a “waterproofed concrete skin”
    - Excellent adhesion to concrete (chemical & mechanical bonding)
    - Releases retained water vapors in concrete; prevents blistering.
    - Longer service life of waterproofing film

#### *Scope of Works:*

- Waterproofing at the Roof deck and Parapet Wall.
- Clean the area to be applied with waterproofing. All laitance, contaminants, dust, oil, and previous coatings shall be removed
- Wet the application area with water until water absorption is none to minimal with no water ponding.
- Brush on one (1) coat of waterproofing primer to the substrate to ensure all pores are sealed off.
- Once the primed surface is dry to touch, apply the waterproofing cement-base mixture. Allow the first coat to cure from 1-2 hours, then apply the second mixture over the first coat (applied on the opposite direction).



- Let dry for 24 hours before flood testing.

#### **Item 1018– Ceramic Tiles**

- This Item shall consist of furnishing and installing ceramic tiles materials including cementitious/adhesive materials, tools and equipment including labor required in the proper installation of floor, wall, and countertop as shown on the Plans and in accordance with this Specifications.
  - **Unglazed Tiles**
    - Unglazed tiles shall be hard dense tile of homogeneous composition.
    - ✓ T&B Floor Tiles: 30cm x 30cm Unglazed Tiles
  - **Glazed Tiles and Trims**
    - Glazed Tiles and trims shall have an impervious face of ceramic materials fused onto the body of tiles.
    - ✓ T&B Wall Tiles : 30cm x 30cm Glazed Tiles
    - ✓ Floor Tiles for Office and Radio Room: 40cm x 40cm Glazed Tiles

#### **Item 1046– Masonry Works**

- This Item shall consist of furnishing all necessary materials, tools, equipment, and labor necessary to complete the execution of the masonry works as shown on the Plans.
  - Material Requirements:
    - Use Portland cement which conforms to the requirements of ASTM C-150 Type for normal Portland Cement.
    - Use fine aggregates which shall be free from injurious amount of clay loam and deleterious materials and shall conform to ASTM C-33 or C-330.
    - Concrete Hollow Blocks, 4", shall be standard manufacture, machine vibrated, and shall have fine and even texture, and well defined edges. Mortar, filler and plastering shall be Class "B".
    - Deformed steel bars shall conform to ASTM A-305. It shall be clean and free from loose, rust, scales and any coatings that will reduce the bond.
    - #16 G.I tie wires shall be used for reinforcing bar connectors.
    - Provide 4" CHB Wall with 10mmØ deformed round bars at 0.60m on centers both ways. Verify actual location.
    - Concrete mixture shall be Class "B"
    - Provide the plastering at 20mm thick using Class "B" mixture.
    - Refer to plan for details.



### **Item 1021– Cement Floor Finish**

#### **Item 1021(5)– Cement Broom Finish**

- This Item shall consist of furnishing all materials, labor, tools, and equipment in undertaking cement floor finishing in accordance with the Plans and this Specification.
- Immediately after concrete has received a floated finish, give the concrete surface a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

### **Item 1026– Pebble Washout Finish**

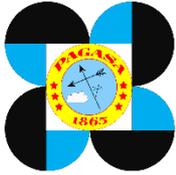
- This Item shall consist of furnishing all materials, tools, labor and equipment required in undertaking the installation of pebble washout finish as shown on the Plans and in accordance with this Specifications.
  - Materials Requirements:
    - ✓ Pebbles shall be well graded stones sized ranging from 2mm to 4.76mm rounded species like Luna Stones, Boracay, among others. Pebble shall be free from impurities and hazardous materials.
    - ✓ Area to be covered: Porch & Stairs (Front Part & Rear Part)

### **Item 1027– Cement Plaster Finish**

- This Item shall consist of furnishing all cement plaster materials, labor, tools, and equipment required in undertaking cement plaster finish accordance with the Plans and Specifications
  - Materials Requirements:
    - ✓ Mixture: Class B
    - ✓ Thickness: 20mm

### **Item 1032– Painting, Varnishing, and Other Related Works**

- This Item shall consist of furnishing all paint materials, varnish and other related products, labor, tools, equipment required and undertaking the proper application of painting, varnishing and related works in accordance with the Plans and this Specification.
- Number of coats, where specified, is minimum. The contractor shall apply as many as required to meet specifications for a solid, uniform appearance. Where film thickness in mils is specified, spot checks will be made to determine compliance with the specified thickness.



- Submit 2 samples of each and every color or finish (including all coats). Where the same color or finish is to be applied over different materials, samples of each shall be submitted.
- All works fittings, furniture, etc., are to be suitably protected during the execution of the work. Splashes on floors, walls, etc. are to be removed during the progress of work and on the whole, left clean and perfect upon completion.
- All defective or damaged work shall be restored to its initial condition.
- All voids, cracks, nicks, etc., will be repaired with proper patching material and finished flush with surrounding surfaces.
- Marred or damaged shop coats on metal shall be spot-primed with appropriate metal primer.
- Upon completion of the project, the Contractor shall remove all paint spots from all finished work, remove all empty cans and leave the entire premises free from rubbish or other debris caused by his work. They shall remove their equipment from the premises. They shall clean off all glass free from paint spots and smears and shall present the work clean and free from all types of blemishes.
- For Surface Preparation: Allow new concrete to dry for 14-28 days under normal weather conditions before painting. Surface to be painted should be clean and dry, free from oil, grease, dust, dirt, contaminants, and all loose grit and mortar.
- Painting Schedule:
  - Masonry Surfaces
    - Exterior Surfaces*
      - Smooth finish (Flat, Semi-gloss). Using a 100% acrylic water based elastomeric wall paint that is especially formulated to bridge micro/hairline cracks and crevices thus providing good waterproofing and protection from rain, carbon dioxide or other acidic gases (acid rain).
      - New Painting:
        - 1<sup>st</sup> coat: Elastomeric Wall Covering Sealer B-5800
        - Texture: Acrylic solvent-based coating, Acrytex primer w/ acrylic solvent-based putty, Acrytex Cast B-1711
        - 2<sup>nd</sup> and 3<sup>rd</sup> Coat: Elastomeric Wall Covering Basecoat B-5805
    - Interior Surfaces*
      - Smooth finish (Flat, Gloss). Treat with masonry neutralizer.
      - New Painting:
        - 1<sup>st</sup> coat: Prime bare substrate with Permacoat™ Flat Latex #701 (100% Acrylic Waterbased) w/ putty minor surface imperfections with Joint Compound #711. Let dry for one (1) hour. Spot-primed puttied portions.
        - 2<sup>nd</sup> and 3<sup>rd</sup> Coat: Finish with two (2) coats of Latex Paint with low-odor water-based coating. Let dry for one (1) hour in between coats.



- Ceiling, Fiber Cement Board
- Smooth finish (Flat, Semi-gloss).

New Painting:

1<sup>st</sup> coat: Prime bare substrate with Flat latex (100% Acrylic Water-based) w/ putty and mesh on the joint and minor surface imperfections with Joint Compound. Let dry for one (1) hour. Spot-primed puttied portions.

2<sup>nd</sup> and 3<sup>rd</sup> Coat: Finish with two (2) coats of Latex Paint with low-odor water-based coating. Let dry for one (1) hour in between coats.

- Metal Surfaces

- Gloss Finish (Epoxy type) for window frames.

Primer: Epoxy Primer Red oxide

1<sup>st</sup> and 2<sup>nd</sup> Coat: Water-based Acrylic Epoxy paint (Black)

- Varnishing, Wood, Doors and Jamb

- Gloss Finish (Gloss Lacquer)

Sand the surfaces thoroughly

All the cracks and wood imperfections shall be applied with putty and wood paste filler

Application of oil wood stain (maple)

Application of lacquer sanding sealer B-1254 sanded lightly before topcoat application

Final coat: Clear Gloss Lacquer B-1250

### **Item 1038 – Reflective Insulation**

- This Item shall consist of furnishing all thermal insulation materials of one or more low emittance surfaces bounding one or more enclosed air spaces, tools, and equipment, plant including labor required in undertaking the proper installation complete in accordance with the Plans, and this Specification.

#### Scope of Works

- Installation of Reflective Insulation at Synoptic Building and Observer's Quarter

#### Material Requirement

- ✓ P.E. foam insulation 10mm Double sided



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### Item 1047 – Metal Structures

- This work shall consist of furnishing, fabricating, hauling, erecting, welding, and painting of metal structure and accessories constructed in accordance with the Plans and Specifications.

#### Scope of Works

- Construction of Flag pole
- Construction of flagpole pedestal and concrete platform shall conform with the specifications under Item Nos. 803(1)a, 804(4), 1705, 900, 902(1), 903(2) and 1027(1).

#### Material Requirements

- Tapered Flagpole
  - ✓ Hot-dip galvanized.
  - ✓ Thickness = 3.0mm.
  - ✓ Top diameter = 3"
  - ✓ Bottom diameter = 6"
  - ✓ Height = 6.0m.
  - ✓ Base plate, anchor rods with nuts and washer, pulley holder, pulley
- Philippine Flag
  - ✓ Fabric Material: Nylon
  - ✓ 2 feet x 4 feet
  - ✓ Stars and Sun are sewn/patched
  - ✓ With non-rust eyelet ready for hanging
- Rope
  - ✓ 7mm. dia. x 10m. Vinyon rope

### Item A.1.1 (11) – Provision of Furniture for PAGASA Personnel's (Computer table and chairs)

- The field offices, laboratories and living quarters shall have at least the floor area prescribed on the Plans and shall contain the sufficient furniture/fixtures, equipment, appliances, apparatus and publications specified in the Contract. If the Contractor cannot provide or intends to supply equivalent substitute, the contractor shall secure the approval of the Engineer.

#### *Synoptic Building*

- Office Table, Executive type w/ chair – 4 sets

#### *Observer's Quarter*

- Double Deck Steel Bed Single Size (Black) – 2 sets
- Foam Urethane Mattress (Single) – 4 sets



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- Gentle Bounce Pillows – 4 sets
- Stand fan 16inch w/ thermal fuse, 65watts – 2 sets

### Part F - ELECTRICAL

#### Item 1100 – Conduits, Boxes and Fittings

- This item shall consist of furnishing and installation of the complete conduit work consisting of electrical conduits; conduit boxes; conduit fittings and other electrical materials in accordance with the Plans and this Specification.

##### Scope of Works

- All conduits, conduit boxes, conduit fittings, pull boxes and other electrical materials base on the Plans and Specification shall be installed including furnishing.
- All conduits and boxes shall be embedded in concrete unless otherwise specified on the plan.
- All Junction boxes shall install covers.
- Where a conduit enters a box, fitting, or other enclosure, a locknut and bushings shall be installed to protect the wire from abrasion unless the design of the box, fitting, or enclosure is such as to afford equivalent protection.
- Installation of pull-boxes above and below the panel boards.
- Installation of Rigid Steel Conduit in service entrance post.
- All conduits buried underground shall be at least 300mm depth and with electrical warning mesh tape.
- All lighting outlet shall have 1.5m flexible metal conduit connected to metal straight connector to metal cover.
- Installation of service entrance conduit for telecommunication cabling in radio room.
- The contractor shall laid and buried 2 – 50mm dia. PVC from Service Entrance Post to Gen. Set room and to Synoptic Building.
- The contractor shall provide 25mm dia RSC pipe with 20mm dia. weatherhead at service entrance post for Auxiliary System.
- Installation of 20mm dia. conduits for perimeter fencing and signage and trenching to MDP shall be done by the contractor, refer to the plan.
- Installation of junction boxes shall be in every post with lamp.
- Testing of all items mention above.



Specifications

- Threadless couplings and connectors shall not be used in threaded conduit ends unless listed for the purpose.
- Exposed conduit in Service Entrance Post shall be Rigid Steel Conduit (RSC).
- RSC shall be made of steel with protective coatings, aluminium, red brass or stainless steel.
- Markings in each length of RSC shall be clearly and durably marked at least every 3000mm with the letters RSC. Each length shall be marked as required in Subsection 1.10.1.21 (A) of Article 1.10, Requirements for electrical installations of PEC, Part I.
- The standard length of RSC shall be 3000mm, including an attached coupling, and each end shall be threaded.
- RSC shall be having a minimum size of metric designator 16 (trade size ½) and a maximum size of metric designator 103 (trade size 4).
- PVC Conduit shall be made of rigid (non-plasticized) polyvinyl chloride (PVC).
- PVC conduit and fittings shall be composed of suitable non-metallic material that is resistant to moisture and chemical atmosphere.
- Markings in each length of PVC conduit shall be clearly and durably marked at least every 3000mm as required in Subsection 1.10.1.21 (A) of Article 1.10, Requirements for Electrical Installations of PEC, Part I.
- The physical and mechanical properties of PVC conduit shall conform to the requirements of PNS 14:2005, Unplasticized Polyvinyl Chloride (uPVC) electrical conduit – Specification.
- PVC shall have a minimum size of metric designator 16 (trade size ½) and a maximum size of metric designator 155 (trade size 6).
- Pull boxes shall be grey coated and shall have cover.
- Service entrance conduit for telecommunication cables in radio room shall be 50mm dia. PVC and with weatherhead including conduit layout embedded in concrete. Height of the conduit shall be just below the ceiling. Inside the radio room shall have pull box with a height from finish floor line shall 300mm. Pull box shall have cover.
- All conduits that will cross the line canal shall be in concrete encasement without compromising the flow of water in line canal.

**Item 1101 – Wires, Cables and Wiring Devices**

- This item shall consist of furnishing and installation of all wires and wiring devices consisting of electric wires and cables, wall switches, convenience



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receptacles, heavy duty receptacles and other devices in accordance with the approved Plans and this Specification.

### Scope of Works

- All wires and wiring devices specified in the plan shall be installed including furnishing.
- All branch circuits and main feeder shall have grounding wire from Panel Boards to electrical devices.
- The contractor shall have labelled all electrical devices such as convenience outlets and switches with corresponding branch circuit in the Panel Board for easy troubleshooting. Refer to schedule of loads.
- The contractor shall allot 150mm minimum extension of wire for switch boxes and convenience outlet boxes.
- The contractor shall allot minimum of 1500mm extension of wire for lighting fixture junction boxes inside a flexible conduit.
- All wires shall be terminated to wiring devices and to circuit breakers according to the plan.
- All wires going in panel board shall be neat and tidy.
- Installation of power source to Intermediate Distribution Panel (IDP).
- Installation of wires in perimeter fence and signage to MDP.
- Testing all items mention above.

### Specifications

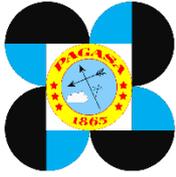
- All wires shall be Phelps Dodge Thermoplastic High Heat-Resistant Nylon-Coated (THHN) copper wires rated 600V.
- All wires shall be stranded type.
- All branch circuits and main feeder shall have grounding wire from Panel Boards to electrical devices.
- The minimum diameter size of conductors shall be 2.0mm<sup>2</sup> for copper
- Switches shall have LED indicator.
- Receptacles shall be 3-pin socket (grounding type).
- All electrical devices shall be high quality that will last for long.

### **Item 1102 – Panel Boards and Other Overcurrent Protection Devices**

- This Item shall consist of furnishing and installation of the distribution panel boards at the location shown on the approved Plans complete with circuit breakers, all accessories completely wired and ready for service.

### Scope of Works

- Installation of panel boards shall be embedded in wall concrete.



- Main and branch circuit breakers for panel boards shall have the rating, capacity and number of poles as shown on the approved Plans.
- Panel boards, main and branch circuit breakers shall be labelled accordingly to the schedule of loads.
- The contractor shall provide decorative electrical panel board cover to hide the panel board in a wall. Probably painting with wood frame.
- The body of the metal panel boards shall be properly grounded.
- The contractor shall provide grounding terminal in each panel board.
- Installation of panel boards of lighting and power outlets.
- The contractor shall submit a proposal of preliminary Test and Inspection Plan.

#### Specifications

- Panel Boards shall be NEMA 1 enclosure and shall be grey coated unless otherwise specified in the plan.
- Circuit Breakers shall be Schneider Electric.
- Main circuit breaker shall be 2-pole single phase and branch circuit breaker are 2-pole single phase according to the schedule of loads.
- Panel boards shall have busbar capacity more than the full-load current accordingly to the Plan.

#### **Item 1103 – Lighting Fixtures and Lamp**

- This Item shall consist of furnishing all lighting fixtures, accessories and fixings necessary for installation as shown on the Plans and in accordance with this Specifications. A light fixture or luminaire is an electrical device to create artificial light that serves as a tool to direct light using reflective and shielding materials.

#### **Item 1103 – Lighting Fixtures and Lamp**

- This Item shall consist of furnishing all lighting fixtures, accessories and fixings necessary for installation as shown on the Plans and in accordance with this Specifications. A light fixture or luminaire is an electrical device to create artificial light that serves as a tool to direct light using reflective and shielding materials.

#### Scope of Works

- Installation of LED panels recessed type, surface type and suspended type (accordingly to the Plan) shall be fit into ceiling, properly reinforced the mounting and properly grounded. Refer to the Plan.



- Installation of downlight fixture, surface type, recessed type. Refer to the Plan.
- Installation LED Emergency light at corresponding location. Refer to the Plan.
- Provide individual power outlet for emergency light.
- All lighting fixture body shall be properly grounded.
- LED panel in generator room shall be suspended type.
- Installation of lighting fixtures in perimeter fence and signage shall in accordance to the plan.
- Installation of LED bulbs in all lighting fixtures.
- Upon completion of installation of lighting fixtures and after circuitry has been energized, electrical energy shall be applied to demonstrate capability and compliance with requirements. When possible, malfunctioned units at the Project Site shall be rectified, then retested to demonstrate compliance; otherwise, defective items shall be removed and replaced with new units and another test shall be conducted.

#### Specifications

- LED panel light **120cm x 30cm surface type** shall be 60Watts with LED driver and color temperature shall be 6000k.
- LED panel light **120cm x 30cm suspended type** shall be 60Watts with LED driver and color temperature shall be 6000k.
- 6" vertical downlight fixture surface type and recessed type shall be aluminium material, water proof and color black. The color temperature of bulbs shall be 3000k 9watts. Refer to the Plan for location.
- LED emergency light shall be 3.6V 900mAh Ni-CD battery with overcharge and discharge protection. Injection-moulded thermoplastic ABS housing. Adjustable Headlamps. 3000k color temperature.
- Modern outdoor post lamp shall have aluminium cage, rust resistant, rectangular, E27 socket with 20W LED bulb, IP65 waterproof, black in color, atleast 150mm x 150mm x 200mm in size.
- Wall lamp shall be modern, upside down lighting, 2 bulbs, IP65 waterproof, aluminium material, black in color, E27 socket with 3watts LED bulb.
- Floodlight/Spot light shall be LED, 220V input, warmwhite in color temp., 20Watts each, outdoor waterproof, aluminium material, black in color.

#### **Item 1104 – Auxiliary System**

- This Item shall consist of furnishing and installation of all materials, components and equipment to complete the requirements for Auxiliary System in accordance with the Plans and this Specification.



Scope of Works – CATV System

- Installation of wall plate CATV outlet (See specified plan).
- Installation of conduits for Co-axial cable shall be embedded in concrete. Refer to the Plan.
- Installation of Co-axial cable and termination of cables.
- Installation of outdoor CATV box.
- Labelling of CATV outlet is a must.
- At the completion of the installation works, the entire installation shall be subject to the test before final placing in service under the full responsibility of the Contractor. Unless otherwise specified, all test shall be carried out in conformity with the requirement of Philippine Electrical/Electronics Code or with this Specification.
- After each test, the contractor shall immediately submit copies of a test report to the Engineer.
- Testing certificates shall be provided by the speciality contractor prior to final turnover.

Specification – CATV System

- CATV Outlet shall be single port, with wall plate cover unless otherwise specified on the plan.
- Co-axial cable shall be RG-6.
- Outdoor CATV panel box shall be place outside the building (See plan for location).
- Conduit, boxes and fittings shall conform to the requirements if **Item 1100**.
- Cable and wiring devices shall conform to the requirements of **Item 1101**.

Description – Network and Cabling System

- This Item shall consist of furnishing and installation of Network Cabling, equipment and associated components to form a complete coordinated system ready for operation in accordance with the Plans and Specifications.

Scope of Works – Network and Cabling System

- Installation and layout of conduits for UTP cable shall be embedded in concrete.
- Installation of UTP cable in every data outlet/port is directly from Main Distribution Frame (MDF). Splicing is strictly prohibited.
- Installation of Data outlet/port with grid and plate.
- Managed switch, patch panel and Intermediate Distribution Frame (IDF) shall install by the contractor.
- Termination of UTP and STP cables in every port and to managed switched/patch panel shall be done by the contractor.



- Configuration of the network system shall be done by the contractor.
- Installation of WIFI access point shall be done also by the contractor.
- Provide pull boxes for MDF.
- STP Outdoor Cabling shall be installed from service entrance post to MDF.
- All cables and hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. All conductors of each installed cable shall be verified useable by the Contractor prior to system acceptance.
- All UTP and fiber optic cable field testing shall be.
- and shall all result to PASS remarks channel or permanent link.
- All field tester shall be factory calibrated each calendar year by the field test equipment manufacturer.

#### Specifications – Network and Cabling System

- Conduit, boxes and fittings shall conform to the requirements of **Item 1100**.
- Cable and wiring devices shall conform to the requirements of **Item 1101**.
- UTP cable shall be CAT6.
- Data outlet shall be single port with grid and plate.
- WIFI access point shall be 300Mbps ceiling mounted.
- IDF shall be complete set (power outlets, brackets and other accessories, etc.).
- POE injector shall be 8 port for LAN and 8 port for POE.
- Manage Switch shall meet the specifications below:
  - **Power consumption:** Max Power (w/o PoE): 33W
  - **Input Voltage:** 100-127 VAC / 200-240 VAC
  - **External I/O Ports:** 24x ports 10/100/1000BASE-T ports 4x 1G SFP ports
  - **Latency:** 1 Gbps: 1.5  $\mu$ Sec
  - **Routing Capabilities:** Static
  - **Switching Capacity:** 56 Gbps
  - **Throughput:** 41.6 Mpps
  - **Memory and Processor:** Dual Core ARM Cortex A9 @ 1016 Mhz 8 GB DDR3, maximum, depending on model 16 GB eMMC
  - **PoE Capability:** non-PoE model
  - **Warranty Standard Statement:** Limited Lifetime Warranty
  - **Weight (imperial):** 5.78 lbs
  - **Weight (metric):** 2.6 kg
  - **Product Dimensions (imperial):** 1.73 x 17.4 x 7.92 in
  - **Product Dimensions (metric):** 4.4 x 44.2 x 20.1 cm



- **Operating Temperature:** 32°F to 113°F (0°C to 45°C) up to 5000 ft (1.5 km) derate -1°C for every 1000 ft (305 m) from 5000 ft (1.5 km) to 10000 ft (3.0 km)

### **Item 1109 – Grounding System**

#### **1109.1 Description**

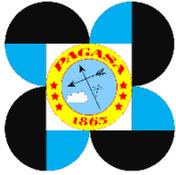
This item shall consist of furnishing all grounding system materials, labor, tools, equipment and others in undertaking the proper installation works required in accordance with the Plans and this Specification.

#### **Scope of Works**

- Trenching and excavation shall be done by the contractor.
- Installation of ground rod and conductors shall be done by the contractor.
- The contractor shall inform and ask on where to install the air terminal.
- Exothermic weld connector shall be done by the contractor.
- Base supports, air terminal braces and single spool rack shall be included at the installations.
- Chemical grounding rod, grounding enhance material, grounding busbar terminal and ground rod copper clad shall be delivered and install by the contractor.
- Sealing gum shall be use whenever it is needed.
- Terminal lugs shall be install by the contractor.
- Access well or test well of chemical ground rod shall be install by the contractor.
- Ground resistance test shall be done by the contractor and with PAGASA personnel for witness.

#### **Specifications**

- Copper clad ground rod shall be 3 meters in length and 18mm in diameter, and must be UL listed.
- Conventional lightning arrester shall have its base, shall be copper and UL listed.
- Chemical grounding rod shall be 1.2 meters in length and 50mm in diameter.
- Ground bus bar shall be 6mm x 50mm x 250mm in size, wall mounted with 12 terminal positions, insulator and mounting bracket.
- Down conductor from air terminal shall be 50mm<sup>2</sup> THHN copper wire.



- Bare copper wire must be 30mm<sup>2</sup> in size.
- Exothermic powder shall be #45 and #90 for WX and GET connections.
- Ground enhancement terminal shall maintain constant resistance for the life of the system once in its set form, performs in all soil conditions even during dry spells, does not require periodic charging treatments or placement, does not require the continuous presence of water to maintain its conductivity, fully sets within 3 days, fully cures within 28 days, does not dissolve, decompose, or leach out with time, non-corrosive, exceeds IEC® 62561-7 which sets the benchmark for corrosion, leaching, sulfur content, and other environmental regulations.
- Terminal lugs shall be ring type, 35-8.
- Hangers and support shall be well built and sturdy.
- Minimum requirements for ground resistance shall be less than 1ohm.

#### **Item 1111 – Miscellaneous Electrical/Civil Works**

- This item shall consist of construction of pedestal poles, manhole, concrete encasement, handhole, wire trench, furnishing and installation of cable tray, mounting bolts/ eye bolts, and spool insulator wire rack and shall conform to the alignment, grades, design, dimensions and details in accordance with Plans and Specifications.

#### Scope of Works

- Construction of service entrance post shall be in accordance with the plans and specifications.
- Trench excavation from service entrance post to generator room and to synoptic building. Refer to the plan.
- Hand hole shall be located according to the plan.
- Installation of electrical warning mesh tape above the trenching.
- Installation of 3 spool insulator spool secondary rack base on the plan.

#### Specifications

- Service entrance post shall be in accordance to the plan.
- Service entrance post, encasement and handholes shall be in accordance with the applicable requirements of Item 900, Structural Concrete.
- Handhole shall be 500mm x 500mm x 600mm.
- Other materials to be used shall be in accordance with Section 3.14.2.16, Handhole Enclosures and Section 1.10.5, Manholes and Other Electric



Enclosures Intended for Personnel Entry of the Philippine Electrical Code (PEC), Part 1.

- Trench excavation shall be minimum of 300mm in depth.
- Insulator post strut shall be rounded to ensure that the spool insulator will not be damaged while being strung. All components of secondary rack shall be hot-dip galvanized conforming to the requirements of ATSM A123, Zinc (hot-dip galvanized) coatings on iron and steel products.

### **Item 1200 – Air Conditioning and Ventilating System**

- This Item shall consist of furnishing and installation of air conditioning, refrigeration and ventilation systems, inclusive of necessary electrical connections, ductworks, grilles, pipes and condensate drains and all other necessary accessories, ready for service in accordance with the Plans and this Specification.

#### Scope of Works

- Installation and layout of conduits for window type ACU and Exhaust Fans shall be embedded in concrete. Refer to the Plan.
- Installation of exhaust fan wall mounted type. Refer to the Plan.
- Providing individual power outlet for each exhaust.
- The Contractor shall provide metal brackets, housing or casing of all ACU units.
- The Contractor shall provide power supply at the pull box installed beside ACU and shall furnish and install the main circuit breaker with suitable ratings and capacities, conduits, wirings, fittings, devices and all other equipment and electrical connections needed to complete the electrical installation of the system. Refer to schedule of loads of ACU.
- Air conditioning equipment shall be tested for 8hr per day for three (3) consecutive days or longer when so directed, under the supervisions of manufacturers qualified and authorized representative, who will make necessary adjustments and instruct designated operating personnel for each operation and maintenance of refrigerating equipment and controls.
- Test of air flow, temperature and humidity shall be made to demonstrate that each complies with the requirements as indicated in the manufacturer's specifications.



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### Specifications

- 2HP window type inverter ACU shall be with free bracket, 14.3 EER rating, 4 fan level, R410A refrigerant, auto swing, sleep mode, LCD remote, cycle function, dehumidifying feature, econo feature, turbo function, run our timer, slide out chassis, blue fin protection, energy saving plug, 8in1 air filter system, sensor error warning, hydrophilic evaporator, 24Hr On and Off timer, over temperature protection, under/over voltage protection, condenser grill protection, cool-dry-fan operation modes.
- 1/2HP window type non-inverter ACU shall be with free bracket, 12.0 EER rating, 12hr timer, energy saving plug, econo and sleep mode, multi-pore filter, **R410a** refrigerant, sleek modern design, atleast P1.94/hour power consumption.
- The Contractor shall supply, deliver, install and conduct testing of Air Conditioning Units mentioned above.
- Exhaust fan shall be 220V, 12in x 12in dimension, color white.

