



**Project Title:**            **INSTALLATION OF ELECTRIC SERVICE FEEDER LINE AND ELECTRIC SERVICE ENTRANCE POST IN SL-PRSD BUILDING LEGAZPI CITY, ALBAY**

**Project Location:**    Legazpi Complex Station, Airport Site, Magayon Drive., Brgy. Cruzada, Legazpi City, Albay

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## **SCOPE OF WORKS AND SPECIFICATIONS**

### **SCOPE OF WORKS**

- **Site Preparation**
  - Clear the site of existing structures, vegetation, and debris.
  - Excavate, grade, and level the site.
  - Prepare the site for utility installation (water, electricity).
- **Foundation**
  - Excavate and prepare the foundation.
  - Install appropriate foundation systems)
  - Place and compact fill material.
  - Reinforce and pour concrete to form the foundation.
- **Structural Elements**
  - Erect concrete service entrance post.
  - Construct the two sets of concrete manhole.
- **Electrical System**
  - Install electric service entrance and main feeder line.
  - Install panel boards grounding system.
  - Cable pulling, megger testing and termination of electric cables.
- **Project Closeout**
  - Perform final inspections and address any punch list items.

### **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.

## **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 to effectively implement 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.

## **SPECIFICATIONS**

### **Part B – OTHER GENERAL REQUIREMENTS**

#### **1. 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.

## **2. Mobilization / Demobilization**

- 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.

### **1. 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.

#### Scope of Work

- Clearing and Grubbing of the area
- Excavation (Footing, concrete manhole and feederline trench)
- Compaction of soil

#### Material Requirements

- The excavation of the following shall be in accordance to the measurements provided at the plan;
  - ✓ Service Entrance Post Footing
  - ✓ Concrete Manhole
  - ✓ Excavation for Feederline Trench



*Note: Excavated material from excavation shall be used as backfill material for Service Entrance Footing and feederline trench.*

## **2. Item 804(7) – Gravel Bedding / Gravel Fill**

- This Item shall consist of the construction of embankment using gravel 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 Engineer.

### Scope of Work

- Gravel Fill shall be constructed below the original ground elevation.
- Compaction of Gravel Bedding

### Material Requirements

- The compacted thickness for each bedding are as follows:
  - ✓ Column Footing: 100mm thick
  - ✓ Manhole (see attached approved drawings)

## **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.

## **1. 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.

### Scope of Work

- Concreting works of the following:
  - ✓ Column and Footing of Service Entrance Post
  - ✓ Concrete Manhole (2 sets)

### Material Requirements

- Class “A” Mixture Concrete



- 3000 psi Compressive Strength
- 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.

## **2. Item 900 – 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.

### Scope of Work

- Reinforcement of the following
  - ✓ Column and Footing of Service Entrance Post
  - ✓ Concrete Manhole (2 sets)



### Material Requirements

- 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  $\emptyset$  and below which shall be a structural grade (Grade 40).

### **3. 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 place 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 - ELECTRICAL**

### **1. Service Entrance Post**

- This item shall consist of construction of pedestal pole, manhole, concrete encasement, wire trench, 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 and from new to existing manholes. Refer to the plan.
- Installation of electrical warning mesh tape above the trenching.
- Installation of 3 spool insulator spool secondary rack.

#### Specifications

- Service entrance post shall be in accordance to the plan.
- Trench excavation shall be minimum of 300mm in depth.
- Install a 5/8" x 6" eye bolt anchor on the service entrance post.
- 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.

## **2. Conduits 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.
- Where a conduit enters a box, fitting, or other enclosure, a locknut and bushings or an end bell 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 Rigid Steel Conduit in service entrance post.
- All conduits buried underground shall be at least 300mm depth and with electrical warning mesh tape.
- Installation of electric service entrance.
- The contractor shall laid and buried 2 – 100mm dia. PVC from Service Entrance Post to existing manhole and from existing to new manhole beside the powerhouse.



### 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.
- 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.

### **3. Wires and Cables**

- This item shall consist of furnishing and installation of all electric wires, cables and other devices in accordance with the approved Plans and this Specification.

#### Scope of Works

- All branch circuits and main feeders shall have grounding wire from Panel Boards to electrical devices.
- The contractor shall have labeled all panel boards and branch circuit breakers with corresponding panel names for easy troubleshooting. Refer to single line diagram.
- All wires shall be terminated to circuit breakers and grounding busbar according to the plan.
- All wires going in the panel board shall be neat and tidy.
- Installation of power source to PRSD BLDG DP, DP1 and DP2.
- Test all the mentioned items.

#### Specifications

- All wires shall be Philflex 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 grounding bar/system.

#### **4. 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 on surface of 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 body of the metal panel boards shall be properly grounded.
- The contractor shall provide a grounding busbar/terminal in each panel board.

##### 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 single line diagram.
- Panel boards shall have busbar capacity more than the full-load current accordingly to the Plan.

#### **5. Grounding System**

- 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, conductors and ground busbar shall be done by the contractor.
- Sealing gum shall be use whenever it is needed.
- The contractor shall install terminal lugs.



### Specifications

- Copper clad ground rod shall be 3 meters in length and 18mm in diameter, and must be UL listed.
- Ground bus bar shall be 6mm x 50mm x 250mm in size, wall mounted with 12 terminal positions, insulator and mounting bracket.
- Bare copper wire must be 30mm<sup>2</sup> in size.
- Hangers and support shall be well built and sturdy.