



CALAMBA WATER DISTRICT
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SCOPE OF WORKS AND SPECIFICATIONS

PROJECT : PROPOSED RENOVATION OF PUMPING STATION
LOCATION : Villa De Calamba, Calamba City
DATE : November 22, 2021

I. SCOPE OF WORKS

The Scope of Work includes the furnishing of all labors, materials, equipment, and tools including Supervision necessary to complete the Construction of Pump House, Pump House Perimeter Fence, Water Tank Perimeter Fence, UV Enclosure and Electrical Works, as specified in the drawings.

A. EARTHWORKS

EXCAVATION

The Contractor shall make all necessary excavation to establish grades indicated on drawings including all other excavations required and necessary for the proper execution of the project. Trim the excavation to the required depth, lines and grades and other incidental excavations to level up the footing. The materials to be excavated shall include any rock, earth and other materials of any nature and description encountered in obtaining the indicated lines and grades. Structural excavation shall be done to the required depth or as per plan and specification. Provide sufficient distance from wall and footings. No footing shall rest on fill. Footings or foundations which may be affected by the excavation shall be underpinned adequately, or otherwise protected against settlement or lateral movement. For areas to be excavated with trees, except as shown on the drawing to be removed, trees shall be free from injury and shall be supported during excavation. No tree is to be removed without the written permission from the Engineer/Project In-Charge.

BACKFILL/RESTORATION

All excavation shall be back-filled immediately as work permits after footings/ concrete walls have attained full design strength. After the forms have been removed from the footings/ concrete walls, the material taken from the excavations (free from waste and other unnecessary materials) shall be used for backfilling around them. The filling material shall be made in layers not to exceed 15 centimeters and thoroughly compacted before the next fill is placed. Excess excavated materials shall be placed and spread on the immediate premises as directed, provided however, that the Contractor shall not be

required to remove such materials within the area. Otherwise, remove/dispose all excess excavated material in manner approved by the Engineer/Project In-Charge.

B. FORMWORKS

Forms for exposed concrete structure shall be of steel or new plywood panels. All other forms shall be of steel panels, plywood or surfaced lumber. Exposed vertical corners of all concrete structures shall be given a 19mm (3/4in) chamfer. Forms shall not be removed until permission to do so has been received from the Engineer/Project In-Charge or until the concrete has obtained eighty percent (80%) of its 28-day strength.

C. CONCRETING WORKS

PREPARATION OF EQUIPMENT

All the equipment for mixing and transporting concrete shall be clean. Debris shall be removed from spaces to be occupied by concrete. Forms shall be properly coated. Masonry filler units that will be in contact with concrete shall be well drenched. Reinforcement shall be thoroughly clean of deleterious coatings. All laitance and other unsound material shall be removed before additional concrete is placed against hardened concrete.

PLACEMENT OF CONCRETE

As concrete is placed in forms or in excavations, it shall be thoroughly settled and compacted throughout the entire depth of the layer which is being consolidated, into a dense homogeneous mass. Except in special case where their use is deemed impractical by the Engineer/Project In-Charge, the Contractor shall use high-speed internal vibrators of an approved immersion type.

FINISH OF CONCRETE SURFACES

All finished or formed surfaces shall conform accurately to the shape, alignment, grades and sections as shown on the plans or as prescribed by the Engineer/Project In-Charge. Surfaces shall be free of fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous, hard surface.

Except as otherwise provided herein, unformed top surfaces of concrete shall be brought to uniform surfaces and worked with suitable tools to a reasonably smooth wood-float finish. Excessive floating or surfaces while the concrete is plastic will not be permitted. Dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted. Floor slabs and exposed tops of walls and curbs shall be given a steel trowel finish. At the Contractor's option, the above-mentioned floor slabs may be finished with a power float after screeding. Subsequent to the aforementioned finish, all sloping surfaces of floor slabs shall be lightly broomed to provide a skid resistant surface. Unless otherwise shown, the edges of all exposed horizontal surfaces shall be finished with an edging tool to a radius of 13 mm (1/2-in).

CURING

All structural concrete shall be cured by being kept moist for fourteen (14) days after placing, or at the option of the Contractor, may be cured by use of a curing compound approved by the Engineer/Project In-Charge. Encasement concrete and thrust blocks shall be covered with earth not prior to four (4) hours but not later than twenty-four (24) hours after placing.

REBAR WORKS

PLACING REINFORCEMENT

All reinforcement shall be placed in accordance with the plans furnished by the Engineer/Project In-Charge. In case of any doubt or ambiguity in placing of steel, the Contractor shall consult with the Engineer/ Project In-Charge whose decision shall be final in such cases. All loose rust or scale, all adhering materials, and all oil or other materials which tend to destroy bond between the concrete and the reinforcement shall be removed before placing the steel and before concreting begins. Metal reinforcement shall be accurately placed and adequately secured by using annealed iron wire ties or suitable clips at intersections and shall be supported by concrete or metal supports, spacers or metal hangers. All bars shall be bent cold. Reinforcement steel shall not be straightened or re-bent in a manner that will injure the material. Bars with kinks or bends not shown on the drawings shall not be used. Heating of the reinforcement will be permitted only when approved by the Engineer/Project In-charge.

OFFSETS AND SPLICES IN REINFORCEMENT

In slabs, beams, and girders, splices of reinforcement at points of maximum stress shall be generally avoided, and may be allowed only upon written approval of splice details by the Engineer/Project In-Charge. Splices shall provide sufficient lap to transfer stress between bars by bonding shear or by the butt welding to develop in tension at least 125 percent of the specified yield strength of the reinforcing bar. Splices in adjacent bars shall be generally staggered. Where changes in the cross-section of a column occur, the longitudinal bars shall be offset in a region where lateral support is afforded. Where offset, the slope of the inclined portion of the bar with the axis of the column shall not be more than one in six and in the case of tied columns, the ties shall be spaced not over 75 mm (3-in) on centers for a distance of one foot below the actual point offset unless otherwise shown on the drawings.

D. MASONRY WORKS

LAYING CONCRETE HOLLOW BLOCKS

Erect Concrete Hollow Block units to plumb and true to alignment with acceptable tolerance. Concrete Hollow Blocks inside surfaces shall be filled with grout/mortar and shall encase fully the reinforcing steel. Mix proportion for grouting and setting bed shall be 1:4 (cement:sand), maximum proportion. The vertical reinforcement shall be limited to maximum spacing of 800mm on center while horizontal reinforcement is every 3 layers of CHB height. Damaged unit masonry shall not be used.

CEMENT PLASTERING

Surfaces to receive plaster shall be clean and free from defects. Plaster shall be straight and plumb in horizontal and vertical direction if needed. Corners and interior angles shall be square which arises slightly rounded. Thickness of plaster, based to the finished plaster surfaces, shall not be less than 20mm.

E. PAINTING WORKS

All painting activities shall be in accordance to standards. Colors shall be coordinated to owner prior to ordering and application. Paints shall be latex paints for concrete, quick dry enamel for wood and epoxy paint for steel. Apply patching compound and glazing putty to all uneven surfaces of concrete and wood respectively. Surfaces to be applied shall be approved by the Engineer/Project In-charge prior to application of first coating and final coating. Provide barricades or signage to protect wet paints. Follow manufacturer's specifications.

All painting and finishing shall be performed by skilled craftsmen. Each coat of paint shall be applied at proper consistency, evenly, and free of laps, sags, and runs and cut sharply to required lines. Except as otherwise specified or required, paint shall be applied only under dry and dust-free conditions that will ensure properly finished surfaces, free of defects and blemishes. Paint shall not be applied when temperature is likely to be above 32°C (90°F). Sufficient time shall be allowed between coats to ensure proper drying. All primer and intermediate coats shall be unscarred and completely integral at time of application of each succeeding coat. The Engineer/Project In-charge shall be notified when each coat has been applied and is ready for inspection. Until each coat is inspected and approved by Engineer/Project In-charge, no succeeding coats shall be done.

MATERIAL SPECIFICATIONS

Concrete Hollow Blocks. Size of concrete hollow blocks shall be 12.5cm (5") x 20cm x 40cm for Perimeter Fence and 10.0cm (4") x 20cm x 40cm for Pump house, no deforms and dried as delivered.

Portland Cement. Cement shall conform to the Standard Specifications for Ready Mixed Concrete, ASTM C-94 or on the Specification for Portland Cement, ASTM C 150 or PNS 07. An air-entraining admixture, conforming to ASTM C-260 shall be added to Type I, Type II or Type III Portland cement. Mixture shall be 1:3:6 or as suggested by the Engineer depending on type of cement. Use 40kg bag of cement.

Aggregates. All aggregates used for concreting shall conform to ASTM C 33 or PNS 18 and shall be checked daily for any variances in moisture current. Said variances shall be corrected and/or taken into consideration for each batch.

Coarse Aggregates. Shall be uniformly and evenly graded for each application in accordance to A.C.I. standard 318. Unless otherwise approved, aggregate shall be sound, crushed, angular granitic stone. Smooth or rounded stone (river rock) shall not be acceptable.

Fine Aggregates. Shall consist of natural sand, manufactured sand or a combination thereof.

Metal Reinforcement. Reinforcing bars may be galvanized or epoxy coated in accordance with Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement, ASTM A 767 or Specification for Epoxy-Coated Reinforcing Steel Bars ASTM A 775. Use minimum $f_y = 227$ MPA (grade 33).

Formworks. Use ordinary plywood with dimension 4' x 8' x 1/2", dried as delivered. Use coco lumber size 2" x 2" x 12' and 2" x 4" x 12' free from deformation and pests that could destroy its quality.

Painting Works.

Concrete: Latex paint for concrete wall.

Wood: Flat wall enamel

Steel: Epoxy primer with epoxy paint gray top coat

F. ELECTRICAL WORKS

The work consist of furnishing all materials, equipment, tools, labor and all other services necessary to complete and make ready for operation the Electrical Power described below and or indicated in the electrical plan and specifications in accordance with the latest edition of the Philippine Electrical Code with the rules and regulation of the local enforcing authority and the requirements of the local power company.

The low voltage cables are THHN insulated, stranded and copper conductor. All ground wire shall be insulated grounds.

Cables sizes are selected by applying appropriate de-rating factors for ambient conditions of installation as per PEC.

Size of grounding wire will be based on PEC table 3.10.1.16.

All materials to be used shall be brand new and approved types for purpose and location.

Mounting height shall be as follows:

- Convenience outlet shall be 300mm from the finish floor line to the center of the device
- Wall switches shall be 1200mm from the finish floor line to the center of the device
- Panel board – centrally located between the ceiling line and floor finish line

Wiring methods shall be as follows:

- Poly vinyl chloride (PVC) or unplasticised poly vinyl chloride (uPVC) – used when embedded in concrete wall or masonry and can be laid underground within 500mm deep from earth grade.

- Rigid Steel Conduit (RSC) – used in exposed/wet location and can be laid underground within 20mm deep from earth grade.

PVC and metal conduit shall be joined boxes or pull box to make a rigid and waterproof connection. If metal conduit is used an insulated bushing shall be provided at the end of the metal conduit on the inside of the junction box or pull box to prevent scuffing of the cable insulation.

All works herein shall be done under the strict supervision of a duly Licensed Electrical Engineer.