

Section VI. Specifications

This set of specifications shall govern the methods of construction and the kinds of materials to be used for the **Proposed Construction of Sta. Lucia II Pumping Station** shown in the plans and detail drawings.

The plans, detail drawings and these specifications shall be considered as complementing each other. So that what is mentioned or shown in one, although not mentioned or shown in the other, shall be considered as appearing on both. In case of conflict between the two, the same should be referred to the Designing Engineer for resolution.

GENERAL CONDITIONS

All parts of the construction shall be furnished with first class workmanship to the fullest talent and meaning of the plans and these specifications, and to the entire satisfaction of the Engineer-in-charge and the Owner.

The construction shall conform to all the requirements of the National Building Code as well as the local rules and regulations of the Municipality of Magarao, Camarines Sur, Philippines.

All materials to be used herein shall be of high quality and premium brands, and shall be inspected and approved by the in-charge Engineer before using and installation.

SECTION 1: EARTHWORK

1.1 Scope of Work

The work shall include the furnishing of all labor, tools, materials and other facilities for the satisfactory performance to complete all earthworks as shown on the drawing or as specified herein.

1.2 Clearing the Site

The building shall be leveled according to the plans and cleared of rubbish, roots and other perishable and objectionable matters to a suitable sub grade.

All such unsuitable materials shall be removed from the building site and spread uniformly over the areas adjacent to the proposed building, or otherwise disposed of as may be directed by the Engineer-in-charge of the construction.

1.3 Staking out the Building Lines

The building lines shall be staked out, and all lines and grades shown in the drawings established before any excavation is started. Batter boards and reference mark shall be erected such places where they will not be disturbed during the excavation of the building.



1.4 Excavation

1.4.1 All excavations shall be made to grade indicated in the drawings. Where the building site is covered with any kind of fill, the excavation for footing should be made deeper until the stratum for safe bearing capacity of the soil is reached.

Whenever water is encountered in the excavation process, it shall be removed by bailing or pumping, care being taken that the surrounding soil particles are not disturbed or removed.

1.4.2 The materials to be excavated include any rocks, earths and other materials of every nature and description, encountered in obtaining lines and grades, which, in the Engineers opinion, can be loosened, removed by hand with tools or with power shovels. Assume that all excavations to indicated lines and grades be done by the aforementioned means.

1.4.3 Footings shall not be placed on fill.

1.4.4 Shoring, bracing and sheeting as required for safety, or necessary to support adjoining wall, soil, streets, building fences, etc. shall be provided.

1.4.5 No pouring of concrete shall be done unless bearing surface has been approved by the Engineer-in-charge to proceed.

1.5 Filling and Grading

After concrete for foundation is hard enough to withstand pressure resulting from fills, the materials removed from excavation shall be used for backfill around them. When backfill material is not enough, it shall be sourced from outside but of good quality.

SECTION 2: CONCRETE AND MASONRY WORKS

2.1 Scope of Work

Furnish all materials, tools and perform all works necessary to complete all plans, drawings and as specified herein.

All concrete works shall be mixed thoroughly until there is uniform distribution of the cement and aggregates, and should be deposited as nearly as practicable in its final position, care being taken to avoid segregation of the aggregates.

Water to be used for mixing shall be clean and free from injurious amount of oil, alkalis, salt and other organic materials.

Prior notice to the in-charge Engineer shall be given before any concreting works shall be done for approval.



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2.2 Concrete Materials

2.2.1 Pozzolan Cement

Shall conform to the requirements of the standard specifications and test for pozzolan cement of the American Society for testing materials.

2.2.2 Portland Cement

ASTM 150 type 1 for Normal Portland Cement, unless the Engineer approves as change.

2.2.3 Fine Aggregate

Fine aggregate to be used in the composition of concrete, mortar, plaster shall consist of sand, stone screenings or other inert materials with similar characteristics or a combination thereof having clean, hard, strong, durable, uncoated grains, and free from injurious amount of dust, lumps, soft, or flaky particles, shale, alkali, organic matter, ham or clay.

2.2.4 Coarse Aggregate

Coarse aggregate shall consist of crushed stones, gravel or other approved inert materials with similar characteristics as the fine aggregate.

Coarse aggregate shall well graded as to maximum size of 19mm in diameter.

2.2.5 Metal Reinforcements

Steel bars for concrete reinforcements shall conform to the standard specifications.

2.3 Concrete Proportions

2.3.1 Class "A" concrete shall consist of one (1) part cement to a total of six (6) parts of fine and coarse aggregates measured separately. Class "A" shall be used for all columns, beams, slabs, girders, foundations, concrete pavement and footwalk.

2.3.2 Class "B" concrete shall consist of one (1) part cement to a total of seven (7) parts of fine and coarse aggregates measured separately. Class "B" concrete shall be used for all fillers and flooring resting on fill.

2.4 Depositing Concrete

2.4.1 Before pouring of concrete, debris shall be removed from space to be occupied by the concrete and forms shall be thoroughly wet.

2.4.2 Concrete shall be deposited continuously and as rapid as possible until the whole operation is completed.



2.4.3 During concrete pouring, it shall be thoroughly spaded and compacted by means of a rod. For those columns and inaccessible height where spading or compacting is not practical, the concrete shall be assisted into place by means of a vibrator or by hammering/shaking of forms outside the newly poured concrete. However, care should be taken so as not to misalign the vertical and horizontal position of forms.

2.4.4 Water shall be removed from excavated portion before concrete is poured. Any continuous flow of water into the excavated portion shall be directed to side drains and pumped/removed out from where the concrete shall be poured.

2.5 Forms

2.5.1 All of the forms for concrete shall be properly braced or tied together so as to maintain the correct position and shape of the concrete members. Form shall be constructed sufficiently tight to prevent bulging and seepage of water.

2.5.2 Forms shall conform to the shape, lines and dimensions of the finished concrete as called for on the plans.

2.5.3 Provide temporary opening where necessary to facilitate cleaning and inspection immediately before depositing of concrete.

2.5.4 All form materials are subject to approval before construction.

2.5.5 Side forms of footings may be omitted and concrete placed against the next excavation only when approved by the Engineer and when appropriate credit is allowed.

2.5.6 Do not remove shoring without approval and under no circumstances, until the member's required sufficient strength to support their weight and the load thereon. Form shall remain in place for a minimum time as follows:

Columns after 3 days
Beams and Slabs..... side forms after 3 days
bottom forms after 28 days

2.6 Concrete Slab Floors on Fill

2.6.1 Concrete slabs on fill shall be poured on a bed of gravel not less than 100mm thick. Each concrete slab course to be poured shall not more than 1.00m wide and each course shall be poured alternately to the indicated floor finish.

2.7 Concrete Hollow Blocks

2.7.1 Exterior Walls and Firewalls

All exterior walls and firewalls shall be 150mm thick concrete hollow blocks with plain cement plaster finish smooth from footing tie beam to roof line level.

2.7.2 Interior Walls

All interior walls shall be 100mm thick concrete hollow blocks with plain cement plaster finish smooth.

2.7.3 CHB Reinforcements

For 150mm thick CHB it shall be 12mm diameter RSB and for 100mm thick CHB it shall be 10mm diameter RSB. Vertical and horizontal bars spaced at every 0.60m o. c. and at every three (3) layers of CHB, respectively.

2.7.4 Visual Inspection

All walls shall be sound and free from cracks or other defects and imperfections.

2.8 Wall Furnishing

All shall be plain cement plaster finished smoothed, unless otherwise indicated.

2.9 Curing and Protection

General:

Protect all concrete works from drying out after the removal of forms. Wet concrete as often as required throughout each day for a period of at least seven (7) days where normal portland cement type I is used.

2.11.1 When the footing level is below water table, a standby water pump must be provided for dewatering.

2.11.2 Coordination

The concrete work shall be coordinated with the works of other trades to allow reasonable time to set sleeves, inserts and other accessories which must be in position.

SECTION 3: STEEL REINFORCING BARS

3.1 All steel reinforcing bars to be used in the Construction shall consist of round deformed bars with lugs or projections on their sides to provide a greater bond



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between the concrete and the steel. All steel reinforcing bars to be used shall be approved quality, $f_y - 276\text{mpa}$.

- 3.2 All steel reinforcing bars shall be accurately placed and secured against displacement by tying them together at each bar intersection with gauge no. 16 G. I. wire.
- 3.3 No steel reinforcement shall be installed in place unless it is free from rust, scale or any other coating that will destroy or reduce the bond with concrete, reinforcement shall be re-inspected and cleansed.
- 3.4 Reinforcement shall be carefully formed to the dimensions in the plan or called for by the plan.
- 3.5 Splices of tensile reinforcements at joints of maximum stresses will be allowed only when expressly authorized by the Engineer-in-charge. Splices where permitted shall provide sufficient overlap of not less than 40 times the diameter for the deformed bars.

SECTION 4: ROOFING AND ROOFING ACCESSORIES

- 4.1 0.50mm.THK Pre-Painted Long Span G.I. Roofing Complete, and G. I. Flashings.
- 4.2 All rivets and tekscrews shall be placed on the top of corrugation to prevent the water gather around the rivets or tekscrews.
- 4.3 Provide 10mm thick Roof Insulation (Double Sided) on 12 mm \emptyset welded wire mesh.
- 4.4 Downspouts shall be 75mm diameter Sanimold uPVC Pipe with elbows.

SECTION 5: ALUMINUM FIXED AND AWNING TYPE WINDOW

Aluminum fixed and awning type window to be used in this project shall conform to the size and designs shown in the detail drawings or schedule of steel windows.

5.1 Work Included

The work executed under this item shall include fabricating, furnishing and delivery of all materials and other facilities necessary to complete all aluminum sliding type windows as shown in the plans and as specific hereunder.

5.2 Construction

Frame and corners shall be mitered to ensure correct alignment electrically welded and forged with exposed surface ground smooth.

5.3 Adjustment

After setting and before glazing, all vents shall be carefully adjusted to insure proper alignment and continuous weathering contacts.



5.4 Glass

All windows shall be provided with 1/4"thk. clear glass with Aluminum glass clip.

SECTION 6: DOORS AND FRAMES

Doors and door frames shall conform to the thickness, sizes and designs and kind of materials shown in the details of doors and schedule of doors.

SECTION 7: ELECTRICAL WORKS

7.1 Scope of Work

The contractor shall furnish all labor, tools and materials for construction and installation at the work site of all electrical conduit, wiring, lighting and appurtenances as shown and specified.

7.2 Codes and Standards

7.2.1 All materials shall conform to the latest revision of the following:

7.2.1.1 Philippine Electrical Code

7.2.1.2 National Electrical Manufacturer's Association (NEMA)

7.2.1.3 Underwriter's Laboratory (UL)

7.2.2 In addition, all electrical materials, design construction and installation thereof, shall comply with all applicable provisions of local codes and regulations.

7.2.3 Where the drawings or those specifications require higher degree of workmanship or better quality of material than implied by the above codes and standard, and then these drawings and specifications shall prevail.

SECTION 8: CEILING

8.1 Scope of Work

The contractor shall provide all materials, tools and labor necessary for the completion of ceiling works its exterior eaves and fascia boards.

8.2 Materials

a. Interior Ceiling - Ceiling joists shall be 0.40mm Thk. Double Furring on 0.80mm Thk. Carry channel spaced at 0.60ft. and 1.2ft. respectively, and with 12mm thick Gypsum board as ceiling boards. Provide compression post and wire as hangers and 1/4 thk Fascia Board at the side of drop ceiling as light stopper.



SECTION 9: PAINTING

9.1 Scope of Work

The work shall include furnishing of labor, tools and materials necessary for painting of the following:

10.1.1 Exterior Wall, Interior Wall, Ceiling, Flooring and Roofing

9.2 Preparation of Surfaces and Application

Before application, all surfaces shall be of cleaned off dust, oil, grease and other foreign materials and allowed to dry. For new concrete, neutralizer should be applied first. No coat or paint shall be applied on either wet or damp surfaces and no second coat applied unless preceding coat is hard and dry. All paint shall be thoroughly spread out.

9.3 Materials

The materials to be used shall be of high quality and premium brands. All materials shall be delivered to the worksite in their original containers. All painting materials shall be inspected and be approved by the Engineer-in-charge before application.

9.3.1 Cement - Flat latex - first coat
 - Gloss latex - second and final coat

9.3.2 Steel - Primer - first coat
 - QDE, Aluminum - second and final coat

SECTION 10: CONSTRUCTION SAFETY AND HEALTH PROGRAM

10.1: PERSONAL PROTECTIVE EQUIPMENT AND DEVICES

General Provision:
Every contractor as defined:

a. Shall at his own expense furnish his workers with protective equipment for the eyes, face, hands, head and feet, protective shields and barriers whenever necessary by reason of the hazardous nature of the process or environment, chemical or radiological or other mechanical irritants or hazards capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

10.2: All personal protective equipment shall be of the approved design and construction appropriate for the exposure and the work to be performed.

10.3: The contractor shall be responsible for the adequacy and proper maintenance of personal protective equipment used in his workplace.

10.4: No person shall be subjected or exposed to a hazardous environmental condition without protection.

SECTION 11: AS-BUILT PLAN & CONSTRUCTION LOGBOOK

11.1 "As-built" Plan shall be entirely a new set of drawings (A3 size) accurately showing every part of the structures as actually built to be prepared by the contractor and submitted to implementing office. All notes, dimensions, and other pertinent construction details shall correspond to the actual completed works. It shall be reviewed and signed by the Project Engineer and Division Head and approved by the General Manager.




11.2 "As-built" Plan shall be submitted by the contractor within 10 days upon completion of the project.

11.3 The contractor shall submit three (3) sets of "As-built" plan, electronic file of the "As-built" plan and duly filled-up construction logbook.

11.4 No Certificate of Completion and Final Acceptance shall be issued to the contractor unless the "As-Built" plan has been approved.

Conforme: _____

Date: _____

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