

## TECHNICAL SPECIFICATIONS

### PREVENTIVE MAINTENANCE AT TMO-MASINLOC, ZAMBALES SUCH WATERPROOFING WORKS, REPAIR OF ROOF FLASHING AND ROOF RIDGE ROLL, AND REPAIR OF PLUMBING SYSTEM

*Project Title*

#### **ITEM I : GENERAL EXPENSES**

##### **PROJECT BILLBOARD**

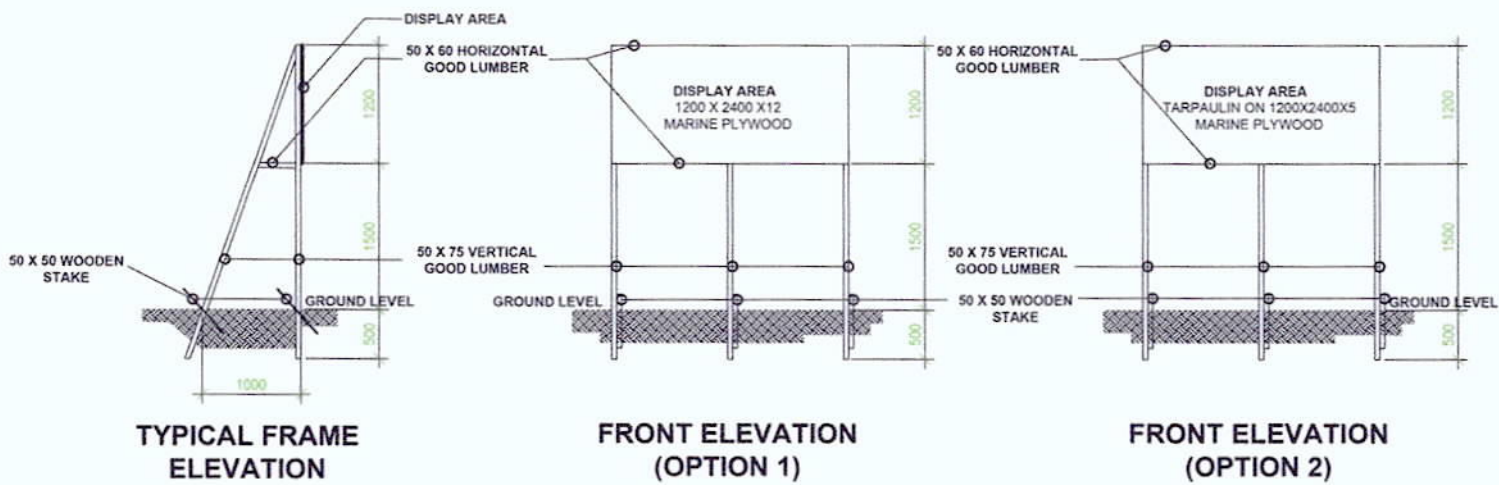
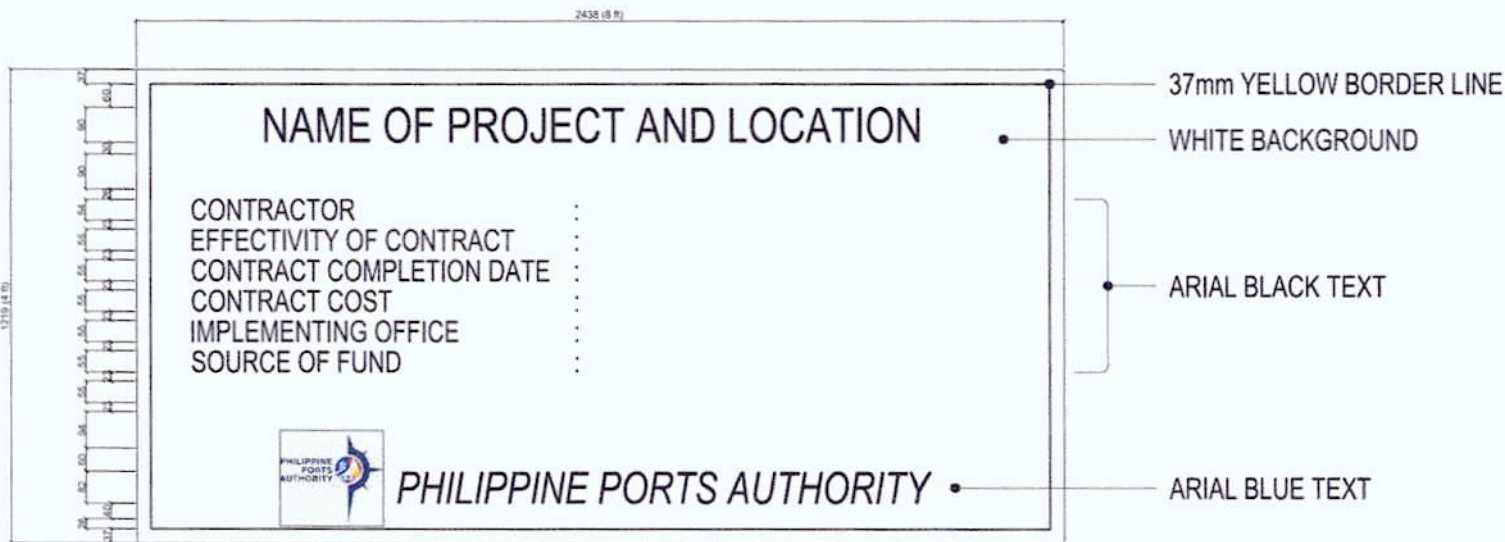
##### **SPECIFICATION**

The Project Billboard shall be installed at location(s) designated by the Engineer.

The size and specifications of materials for the standard billboard shall be 4ft. x 8ft. (1,200mm x 2,400mm) using ½ inch (12mm) marine plywood or tarpaulin poster on 3/16 inch (5mm) marine plywood.

Project billboards shall not contain Name(s) and/or picture(s) of any personages.

See attached drawings for further details of the standard billboard.



## BILLBOARD FRAME

## **ITEM II : CONCRETE WATERPROOFING**

### **GENERAL**

General Requirements contain provisions and requirements essential to these specifications and apply to this Section, whether or not referred to herein.

### **SCOPE OF WORK**

The work shall cover the waterproofing requirements for building as shown on the drawings.

The work shall consist of furnishing all labor, materials, equipment and other incidentals necessary for the integral waterproofing works where required as shown on the drawings and in accordance with the requirements of these specifications as directed by the Engineer.

### **SUBMITTAL**

1. The Contractor shall submit for approval of the Engineer the name of the manufacturer nominated for the supply of materials.
2. The Contractor shall submit the procedure of waterproofing application for approval of the Engineer.
3. Waterproofing materials shall be applied only by an experienced applicator and shall be applied in accordance with the approved manufacturer's application procedures or methods, approved by the Engineer.

### **PRODUCT HANDLING**

Materials shall be delivered and dosed to the batching plant/s in the sealed drums and packages bearing the manufacturer's name.

### **ALTERNATIVE**

No substitution of materials shall be made unless authorized in writing by the Engineer prior to starting the work of waterproofing.

### **MATERIAL REQUIREMENTS (Roof deck and Canopy)**

Areas such as Roof Deck and Canopy shall be waterproofed by the addition of fibre-reinforced and specially modified high-grade acrylic polymer named Bostik Powermix or approved equivalent of the minimum requirement stipulated below and approved by the Engineer. The manufacturer's recommended mixing ratio of cementitious waterproofing shall be at the rate of 1 gallon Powermix per of 4.5 kgs or 3.5 liters of Portland cement.

Furthermore, concrete containing Powermix shall comply strictly with the following minimum requirements:

1. The concrete cement content shall not be less than 350 kg per cubic meter or minimum of 300 kg per cubic meter of Ordinary Portland Cement (OPC) and Concrete Compressive Strength shall be at least 30 MPa.
2. The water content shall be reduced to adjust and maintain the required workability; however the water/cement ratio must not exceed 0.45
4. Other details of Powermix shall be conforming to current recommendations and requirements.
5. A trial mix must be conducted prior to construction and the cement content is to be stated on the premix concrete dockets.



7. The product to be used must be proven by an independent authority to have had no reduction in performance after field exposure.

9. The Engineer reserves the right to require the concrete as placed and cured in the actual structure to comply with the water absorption limit within 7 days of placement. The Contractor shall provide costing for water absorption testing by an independent laboratory, and if so required, samples shall be taken during construction as directed by the Engineer. These samples shall be tested according to BS 1881: Part 122:1983 and shall conform with the water absorption requirement. The Engineer further reserves the right to take cores from the structure to confirm compliance.

## **FLOODTESTING**

Floodtest for duration of 48 hours shall be undertaken upon completion of waterproofing installation to determine any leakage or defect on the materials and/or workmanship.

## **WATERPROOFING ON FIREWALL**

### **SUBMITTAL**

The Contractor, before placing order for the painting materials, shall submit to the Engineer for approval samples of materials. No placing of orders for material shall be made without his approval.

### **STORAGE AND DELIVERY**

1. The Contractor shall deliver all material to the site in the original labeled sealed cans and containers, with labels intact and seal unbroken.
  - a. Seals shall remain unbroken until after inspection and acceptance of material by the Engineer.
  - b. The Contractor shall deliver materials in ample quantities sufficiently in advance of the need to avoid any delay or interruptions in the works.
2. Paint in thinner shall be stored in accordance with the approved manufacturer's instructions.
  - a. All regulations required for storage of paint shall be observed and all necessary safety signs required by governing codes shall be posted.
  - b. Any damage caused by failure to exercise proper precautions in paint storage shall be repaired.

## **MATERIAL REQUIREMENTS**

Firewalls shall be waterproofed with Elastomeric Paint or approved equivalent of the minimum requirement and approved by the Engineer. This paint is resistant to sunlight, heat, cold and wind driven rain. Exterior flaws such as hairline cracks shall be eliminated by applying Elastomeric Putty and coated with Concrete Primer.

### **PAINT**

Paints for the protective coating system shall be the product of a manufacturer approved by the Engineer.

Paints for exterior finish must be with tile like durability and elegance, fast drying, solvent based acrylic, highly suitable for coastal or polluted areas with excellent anti-fungus properties and alkali resistance.

### **SCHEDULE OF PAINTING**



Architectural Items	
a. Exterior Finishes	
1. On Concrete Walls	
Three Coats, Concrete Masonry Paint	Elastomeric Paint or approved equal
2. Unprimed Ferrous Metal	
First Coat	Red Oxide Primer, #310 or approved equal
Second & Third Coat	Quick Dry Enamel or approved equal
3. On Concrete Block Wall	
Masonry Neutralizer	Masonry Neutralizer #44 or approved equal
Three Coats Concrete Masonry Paint	Elastomeric Paint or approved equal
4. On Wood	
First Coat Exterior Wood Primer	Flatwall Enamel or approved equal
Second & Third Coat Exterior enamel	Quick Drying Enamel or approved equal

#### SURFACE PREPARATION FOR CEMENT SURFACES

Shall be dry and clean prior to application of the specified first-coat material. Oil, grease, or rust stains shall be carefully removed by the use of suitable solvent. Wire brushing will not be permitted. After the first coat has become dry and prior to application of finish coats, touch-up coats shall be applied to suction spots.

#### Handling

Coated items should be cooled to no less than 40° Centigrade before handling. Precautions should be taken to avoid damages on the finished coating during stacking, storing and transportation.

#### Storage and Delivery

Inspect materials delivered to the site for damage. Unload and store with minimum handling. Provide storage space in dry location with adequate ventilation, free from dust or water and easily accessible for inspection and handling. Store materials neatly on the floor, properly stacked on non-absorptive strips or wood platforms. Protect finished surfaces during shipping and handling using manufacturer's standard method.

#### WEATHER CONDITION

The paint shall not be applied when the relative humidity is above 85 percent. The paint shall not be applied in rain, wind, fog, dust or mist.

#### APPLICATION

Workmanship shall be first class in every respect. All work shall be done in a workmanship manner so that the finished surfaces shall be free from runs, chop, ridges, waves, laps and unnecessary brush marks. All coats shall be applied in such manner as to produce an even film of uniform thickness. Edges, corners, crevices, welds and rivets shall receive special attention to ensure that they receive an adequate thickness of paint.



All painting shall be done by thoroughly experienced workmen.

Safety regulations shall be adhered to at all times, including the wearing of respirators by persons engaged on assisting in spray painting. Adjacent areas and installation shall be protected by the use of cloths or other approved precautionary measures.

Sanding and dusting as required shall be performed between coats in varnishing work. Finish coat shall be smooth and free from runs, sags, and other defects. Exterior paint shall not be applied during rainy days.

All paint when applied shall provide a satisfactory film and smooth, even surface. Paint shall be thoroughly stirred and kept at a uniform consistency during application. The remainder of the base paint shall then be thoroughly stirred in.

Where necessary to suit conditions of surface temperature, weather and method of application, the package paint may be thinned immediately prior to application in accordance with the approved manufacturer's directions, but not in excess of 125 cc of suitable thinner per liter (one pint per gallon). Before using, the paint shall be mixed to a uniform consistency and shall be stirred frequently during application.

Paints other than water-thinned paints shall be applied only to surfaces which are completely free of moisture as determined by sight or touch and only such combinations of humidity to be painted as will cause evaporation rather than condensation.

Surfaces which have been cleaned, pretreated and/or otherwise been prepared for painting shall be primed or painted with one coat of finish paint as soon as practicable after such preparation has been completed, but in any event prior to any deterioration of the prepared surfaces.

The first coat of paint on all exterior surfaces shall be applied by brush. Interior prime coats and all other subsequent coats on either exterior or interior surfaces may be applied by brush or spray. Whenever spraying is permitted all areas inaccessible to spray painting shall be coated by brushing or other suitable means. Brushes to be used for application of water-emulsions shall be soaked in water for a period of 2 hours prior to use.

All cloths and cotton waste which might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each day.

Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site or destroyed in a manner approved by the Engineer. Paint spots, or stains upon adjacent surfaces shall be removed and the entire job left clean and acceptable to the Engineer.

No smoking shall be permitted in the vicinity where painting is going on.

#### **PAINTING SYSTEM:**

- a. Prepare the areas to be painted by scraping and removing all the loose paint and sand down rough ridges where the paint has broken off.
- b. Surface imperfections such as cracks, dents, and rough edged, apply Elastomeric Putty using putty knife. Let dry, sand and dust off.
- c. Spot prime all the puttied areas with concrete primer & sealer. Let dry for two (2) hours as recommended by manufacturer.
- d. Finish with two coats of desired color of Elastomeric Paint by brush or roller. Allow recommended hours drying in between coats.



#### TOUCH-UP PAINTING

Touch-up painting shall be done with the same paint as used for the original coat. The resulting minimum dry film shall be the same as for the original coat.

Touch-up painting shall include cleaning and painting of field connections, welds and all damaged or defective paint and rusted areas.

During touch-up painting, only loose, cracked, brittle or non-adherent paint shall be removed during cleaning. All exposed edges shall be feathered. Touch-up painting shall be performed in a manner which will minimize damage to sound paint. Rust spots shall be thoroughly cleaned and edges of the existing paint shall be scraped back to sound material.

#### DRYING

1. No primer or paint shall be forced to be dried under conditions which will cause cracking, wrinkling, blistering, formation of pores which would detrimentally affect the condition of the paint.
2. No drier shall be added to the paint unless specified in the approved manufacturer's instructions.
3. Painted surfaces shall be protected from dust, dirt, and the elements of the weather until dry to the fullest extent practicable.
4. After drying, any areas of paint damaged from any cause shall be removed, the surface again prepared and then touched-up with the same paint and to the same thickness as the undamaged areas.

#### HANDLING

1. Precautions shall be taken to minimize damage to paint films resulting from stacking for drying.
2. Paint which is damaged in handling shall be scraped off and touched-up with the same paint and in the same thickness as was previously applied to the damaged area at Contractor's expense.

#### INSPECTION

1. All works and materials supplied under this Specification shall be subject to inspection by the Engineer.
2. The Contractor shall correct such works or replace such materials found defective under these Specifications at his own expense.

#### ALTERATION

Any alterations and revisions from the Plans/Drawings and Specifications done without the knowledge of the Engineer, that may impair the strength and/or the aesthetic of the project, shall be borne by the General Contractor instead.

## **ITEM III : REPAIR OF ROOF FLASHING AND ROOF RIDGE**

### **GENERAL**

General Requirements contain provisions and requirements essential to these Specifications; and apply to this section, whether or not referred to herein.

### **SCOPE OF WORK**

The work shall included all labor, materials and equipment, plant and other facilities required to complete all miscellaneous work as shown on the drawing and has specified herein.

### **GALVANIZED FLASHING AND RIDGE ROLL**

- A. Material: Provide Ga.24 galvanized aluminum sheets complete with accessories and necessary fasteners. Provide compatible ridge cap, and flashing, as and where needed. Color shall be selected from manufacturer's standard procedure.
- B. Provide other materials, not specifically described but required for a complete and proper installation such as wire ties or wind clips, as shown in the detail drawings.
- C. Fasteners and Fixations: Use appropriate connectors as recommended by the Manufacturer and approved by the Engineer. Apply fastener in a neat, consistent, even and standard manner. Apply strip of butyl rubber based caulking compound/silicone sealant along end lap joints and passing over pre-drilled fixation holes.

## **REALIGNMENT OF WATERLINE**

### **SCOPE OF WORK**

The work covered for this section shall consist of furnishing all labor, tools, equipment, materials and incidentals necessary for the complete installation, testing and operation of the plumbing and sanitary system within the buildings and premises in accordance with these Specifications and as shown on the drawings or as directed by the Engineer. The septic tank and their effluent and discharge pipelines shall be part of other section of these specifications.

### **MATERIAL REQUIREMENTS**

#### **SUBMITTAL**

1. Shop drawings shall be dated and shall contain the name of the project and location of the subject item in the shop drawing which is to be installed.  
  
The Engineer will review and approve or return for correction all shop drawings with reasonable promptness. The Contractor shall make any corrections required and file with the Engineer three (3) corrected copies of the shop drawings.
2. The Contractor shall be responsible for the proper fitting of materials, equipment and accessories without substantial alteration and at no cost to the Employer.
3. The Contractor shall be responsible for the proper coordination of the work and shall provide all necessary clearance where necessary.

### **STANDARDS**

Use of materials shall further be governed by other requirement imposed on other sections of



these Specifications. Materials shall be subject to tests necessary to ascertain their fitness if the Engineer so requires. All works shall comply with the pertinent provisions of the Plumbing Code of the concerned city or town, the Code on Sanitation of the Philippines, and/or the National Plumbing Code of the Philippines.

## **MATERIALS**

### **1. Identification of Materials**

Each length of pipe, fittings, traps, fixtures and devices used in the plumbing work shall have cast, stamped or indelibly marked on it, the approved manufacturer's trademark or name, the weight, type and class of product when so required by the standards mentioned above.

### **2. Alternative Materials**

Use of any material not specified in this Specification may be allowed provided such alternate has been approved by the Engineer and provided further that a test, if required, shall be done by an approved agency in accordance with generally accepted standards.

### **3. Jointing Material**

The joint material for uPVC pipes shall be PVC solvent cement as recommended by the approved pipe manufacturer.

### **4. Water Supply Pipes**

Water supply pipes shall be uPVC pipes, schedule 40.

### **5. Valves**

Valves shall be cast bronze or brass body. Chrome plated finish for all fixture taps and faucets and natural finish for all others, like hose bibbs, gate valves and which are not tapped directly to a plumbing fixture.

## **EXECUTION**

All installation works shall be in conformity with the National Plumbing Code of the Philippines (NPCP).

## **INSTALLATION OF WATER PIPES, FITTINGS AND CONNECTIONS**

### **1. Gate Valves and Outlets**

Gate valves shall be installed close to the point of connection to the existing service line outside the building. The piping shall be extended to all fixture outlets and equipment from the gate valves. Outlets where indicated shall be capped or plugged and left ready for future connections.

### **2. Joints**

Joints and connections in the plumbing system shall be gas-tight and watertight for the pressures required by test.

After cutting and before threading all pipes shall be reamed and shall have burrs removed. All screwed joints shall be applied with an approved graphite compound or TEFLON tape to facilitate connections. Threads shall be full cut and not more than three threads on the pipe shall remain exposed.

3. Unions

Where required unions shall not be concealed in walls, ceilings or partitions.

4. Tests

The following tests shall be conducted by the Contractor at his expense under the supervision of the Engineer.

b. Sterilization

The entire water supply piping system shall be sterilized with a solution containing not less than fifty (50) parts per million of available chlorine, either liquid chlorine or a solution of sodium hypochlorite. The sterilizing solution shall remain in the system for a period of not less than 8 hours during which time all valves and faucets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until the residual chloride content is not more than 0.2 parts per million.

c. Pressure Test for Water Lines

1. After the pipe have been installed, the joints completed and with joints exposed for examination, all newly installed pipe or any valve section, thereof, shall be subjected to hydrostatic pressure one and one half ( $1\frac{1}{2}$ ) the designed working pressure of the system or as specified by the Engineer.
2. The duration of each pressure test shall be at least 20 minutes unless otherwise specified by the Engineer.
3. Each section of pipeline shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. During the filling of the pipe and before applying the test pressure, all air shall be expelled from the pipeline. To accomplish this, tap shall be made if necessary, at the highest point of the pipe under test and after completion of the test, the taps shall be tightly plugged unless otherwise specified. During the test, all exposed pipes, fittings, valves, joint and couplings will be carefully examined. If found to be cracked or defective, they shall be removed and replaced by the Contractor with sound materials at his expense. The test shall then be repeated until satisfactory results are obtained.

d. Leakage Test for Water Lines

1. Leakage test shall be conducted after satisfactory completion of the pressure test and shall consist of an examination of all exposed joints for leakage as well as an overall leakage test of the completed pipeline.
2. The pressure to be maintained during the test shall be the designed working pressure of the system.
3. Leakage test shall be made only after a minimum of 24 hours after the pipe to be tested has been filled with water.
4. The duration of each leakage test shall be two hours unless otherwise specified by the Engineer.
5. Each section of pipeline shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation shall be applied by means of a positive displacement type pump and reservoir connected



to the pipe in a manner satisfactory to the Engineer.

6. Before starting the leakage test, all air shall be expelled from the pipe. All exposed pipes, fittings, valves and joints shall be examined for leakage during the test.

e. Defective Work

1. If the inspection or test shows any defect, such defective work or material shall be replaced and the test shall be repeated until satisfactory to the Engineer.
2. All repairs to piping shall be made with new materials at the expense of the Contractor.
3. No caulking of screwed joints or holes will be accepted.

**GUARANTEE**

Upon completion and before final acceptance of the equipment installation, the Contractor shall furnish the Engineer a written guarantee stating that all equipment installed under this Section free from defects. The guarantee shall be for a period of one (1) year from the date of final acceptance of the work. Any part of the equipment that becomes defective during the term of the guarantee shall be replaced, renewed and/or made good by the Contractor, at his own expense and in a manner satisfactory to the Engineer.

Guarantees made by the approved manufacturers or suppliers beyond one year, shall be transferred to PPA without any expense on his part.

**CLEANING UP**

Upon completion of the work, all parts of the installation shall be thoroughly cleaned of grease, metal cuttings and sludge which may have accumulated during the testing operation.