DESIGN STRENGTH OF CONCRETE

Concrete for structural parts or members such as beams, slabs, curtain wall, pile caps and fender/mooring blocks shall develop a minimum 28-day compressive cylinder strength of 24 MPa (3,500 psi) as indicated in the drawings. While for pre-stressed concrete piles a compressive strength of 35 MPa (5,000psi).

TRIAL BATCH FOR CONCRETE

Contractor shall submit design mixes and the corresponding test result made on sample thereof. Sampling and testing shall be in accordance with the ASTM Standard procedures for sampling and testing for the particular design strength(s) required.

The particulars of the mix such as the slump and the proportionate weights of cement, saturated surface dry aggregates and water used shall be stated.

The design mix for concrete to be used shall be submitted together with at least three (3) standard cylinder samples for approval prior to the start of each concreting schedule. Such samples shall be prepared in the presence of the Engineer.

Standard laboratory strength tests shall be taken to all concrete samples in addition to routine field tests, at cost to the Contractor. Only design mixes represented by test proving the required strength shall be allowed.

The cost of sampling, handling and transporting samples from jobsite to the laboratory and the cost of subsequent tests made until the desired mix is attained shall be for the account of the Contractor.

Slump Test shall be made in conformance with ASTM C143, and unless otherwise specified by the Engineer.

Sampling : Provide suitable facilities and labor for obtaining representative samples of concrete for the Contractor's quality control and the Engineer's quality assurance testing. All necessary platforms, tools and equipment for obtaining samples shall be furnished by the Contractor.

MIXING CONCRETE

1. GENERAL

a. Concrete shall be thoroughly mixed in a mixer of an approved size and type that will insure a uniform distribution of the materials throughout the mass.

b. All concrete shall be mixed in mechanically operated mixers. Mixing plant and equipment for transporting and placing concrete shall be arranged with an ample auxiliary installation to provide a minimum supply of concrete in case of breakdown of machinery or in case the normal supply of concrete is disrupted. The auxiliary supply of concrete shall be sufficient to complete the casting of a section up to a construction joint that will meet the approval of the Engineer.

c. Equipment having components made of aluminum or magnesium alloys, which would be in contact with plastic concrete during mixing, transporting or pumping of Portland cement concrete, shall not be used.

d. Concrete mixers shall be equipped with adequate water storage and a device for accurately measuring and automatically controlling the amount of water used.

e. Materials shall be measured by weighing. The apparatus provided for weighing the aggregates and cement shall be suitably designed and constructed for this purpose. The accuracy of all weighing devices except that for water shall be such that successive quantities can be measured to within one percent of the desired amounts. The water measuring device shall be accurate to plus or minus 0.5 percent. All measuring devices shall be subject to the approval of the Engineer. Scales and measuring devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to insure their accuracy.

f. Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the entire plant is running, the scale reading at cut-off shall not vary from the weight designated by the Engineer by more than one percent for cement, 1-½ percent for any size of aggregate, or one percent for the total aggregate in any batch.

g. Manual mixing of concrete shall not be permitted unless approved by the Engineer.

2. MIXING CONCRETE AT SITE

a. Concrete mixers may be of the revolving drum or the revolving blade type and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer.

The pick-up and throw-over blades of mixers shall be restored or replaced when any part or section is worn 20 mm or more below the original height of the manufacturer's design. Mixers and agitators which have an accumulation of hard concrete or mortar shall not be used.

b. When bulk cement is used, the scale and weigh hopper for Portland cement shall be separate and distinct from the aggregate hopper or hoppers.

The discharge mechanism of the bulk cement weigh hopper shall be interlocked against opening before the full amount of cement is in the hopper. The discharging mechanism shall be interlocked against opening when the amount of cement in the hopper is underweight by more than one percent or overweight by more than 3 percent of the amount specified.

c. When the aggregates contain more water than the quantity necessary to produce a saturated surface dry condition, representative samples shall be taken and the moisture content determined for each kind of aggregate.

d. The batch shall be so charged into the mixer that some water enter in advance of cement and aggregates. All water shall be in the drum by the end of the first quarter of the specified mixing time.

e. Cement shall be batched and charged into the mixer by such means that it will not result in loss of cement due to the effect of wind, or in accumulation of cement on surfaces of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cement in the concrete mixture.

f. Where required, synthetic fibrous reinforcement shall be added directly to the concrete mixer after placing the sufficient amount of mixing water, cement and aggregates.

g. The entire contents of a batch mixer shall be removed from the drum before materials for a succeeding batch are place therein. The materials composing a batch except water shall be deposited simultaneously into the mixer.

h. All concrete shall be mixed for a period of not less that 3 minutes after all materials, including water, are in the mixer. During the period of mixing, the mixer shall operate at the speed for which it has been designed.

i. Mixers shall be operated with an automatic timing device that can be locked by the Engineer. The time device and discharge mechanism shall be so interlocked that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.

j. The first batch of concrete materials placed in the mixer shall contain a sufficient excess of cement, sand, and water to coat the inside of the drum without reducing the required mortar content of the mix. When mixing is to cease for a period of one hour or more, the mixer shall be thoroughly cleaned.

k. In case of rubble concrete, proper mixture and placing of concrete and stones/rocks shall be in accordance to the approved plan. Methodology of work shall be approved by the Engineer.

3. MIXING CONCRETE IN TRUCKS

a. Truck mixers, unless otherwise authorized by the Engineer, shall be of the revolving drum type, watertight, and so constructed that the concrete can be mixed to insure a uniform distribution of materials throughout the mass. All solid materials for the concrete shall be accurately measured and charged into the drum at the proportioning plant. Except as subsequently provided, the truck mixer shall be equipped with a device by which the quantity of water added can be readily verified. The mixing water may be added directly to the batch, in which case a tank is not required. Truck mixers may be required to be provided with a means by which the mixing time can be readily verified by the Engineer.

b. The maximum size of batch in truck mixers shall not exceed the minimum rated capacity of the mixer as stated by the manufacture and stamped in metal on the mixer. Truck mixing shall, unless otherwise directed, be continued for not less than 100 revolutions after all ingredients, including water, are in the drum. The mixing speed shall not be less than 4 rpm, nor more than 6 rpm.

c. Mixing shall begin within 30 minutes after the cement has been added either to the water or aggregate, but when cement is charged into a mixer drum containing water or surface-wet aggregate and when the temperature is above 32 °C, this limit shall be reduced to 15 minutes. The limitation in time between the introduction of the cement to the aggregate and the beginning of the mixing may be waived when, in the judgment of the Engineer, the aggregate is sufficiently free from moisture, so that there will be no harmful effects on the cement.

d. When a truck mixer is used for transportation, the mixing time in stationary mixer may be reduced to 30 seconds and the mixing completed in a truck mixer. The mixing time in truck mixer shall be as specified for truck mixing.

JOINTS

1. No reinforcement, corner protection angles or other fixed metal items shall be run continuously through joints containing expansion-joint filler, through crack-control joints in slabs on grade and vertical surfaces.

2. Preformed Expansion Joint Filler

a. Joints with Joint Sealant

At expansion joints in concrete slabs to be exposed, and at other joints indicated to receive joint sealant, preformed expansion-joint filler strips shall be installed at the proper level below the elevation with a slightly tapered, dressed-and-oiled wood strip temporarily secured to the top thereof to form a groove. When surface dry, the groove shall be cleaned of foreign matter, loose particles, and concrete protrusions, then filled flush approximately with joint sealant so as to be slightly concave after drying.

b. Finish of concrete at joints

Edges of exposed concrete slabs along expansion joints shall be neatly finished with a slightly rounded edging tool.

c. Construction Joints

Unless otherwise specified herein, all construction joints shall be subject to approval of the Engineer. Concrete shall be placed continuously so that the unit will be monolithic in construction. Fresh concrete may be placed against adjoining units, provided the set concrete is sufficiently hard not to be injured thereby. Joints not indicated shall be made and located in a manner not to impair strength and appearance of the structure. Placement of concrete shall be at such rate that the surface of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. Lifts shall terminate at such levels as are indicated or as to conform to structural requirements as directed. If horizontal construction joints are required, a strip of 25mm square-edged lumber, beveled to facilitate removal shall be tacked to the inside of the forms at the construction joint. Concrete shall be placed to a point 25mm above the underside of the strip. The strip shall be removed one hour after the concrete has been placed. Any irregularities in the joint line shall be leveled off with a wood float, and all laitance removed. Prior to placing additional concrete, horizontal construction joints shall be prepared.
Construction Joint which is not indicated in the Drawings shall be located as to least affect the strength of the structure. Such locations will be pointed out by the Engineer.

PREPARATION FOR PLACING

Hardened concrete, debris and foreign materials shall be removed from the interior of forms and from inner surfaces of mixing and conveying equipment. Reinforcement shall be secured in position, and shall be inspected, and approved before placing concrete. Runways shall be provided for wheeled concrete-handling equipment. Such equipment shall not be wheeled over reinforcement nor shall runways be supported on reinforcement.

Notice of any concreting operations shall be served to the Engineer at least three (3) days ahead of each schedule.

PLACING CONCRETE

1. Handling Concrete

Concrete shall be handled from mixers and transported to place for final deposit in a continuous manner, as rapidly as practicable, and without segregation or loss of ingredients until the approved unit of work is completed. Placing will not be permitted when the sun, heat, wind or limitations of facilities furnished by the Contractor prevent proper finishing and curing of the concrete. Concrete shall be placed in the forms, as close as possible in final position, in uniform horizontal layers. Forms splashed with concrete and reinforcement splashed with concrete or form coating shall be cleaned in advance of placing subsequent lifts. Concrete shall not be allowed to drop freely more than 1.5m in unexposed work nor more than 1.0 m in exposed work; where greater drops are required, tremie or other approved means shall be employed.

2. Time Interval between Mixing and Placing

Concrete mixed in stationary mixers and transported by non-agitating equipment shall be placed in the forms within 30 minutes from the time ingredients are charged into the mixing drum. Concrete transported in truck mixers or truck agitators shall be delivered to the site of work, discharged in the forms within 45 minutes from the time ingredients are discharged into the mixing drum. Concrete shall be placed in the forms within 15 minutes after discharged from the mixer at the jobsite.

3. Hot Weather Requirements

The temperature of concrete during the period of mixing while in transport and/or during placing shall not be permitted to rise above 36 °C. Any batch of concrete which had reached a temperature greater than 36 °C at any time in the aforesaid period shall not be placed but shall be rejected, and shall not thereafter be used in any part of the permanent works.

a. Control Procedures

Provide water cooler facilities and procedures to control or reduce the temperature of cement, aggregates and mixing handling equipment to such temperature that, at all times during mixing, transporting, handling and placing, the temperature of the concrete shall not be greater than 36 °C.

b. Cold Joints and Shrinkage

Where cold joints tend to form or where surfaces set and dry too rapidly or plastic shrinkage cracks tend to appear, concrete shall be kept moist by fog sprays, or other approved means, applied shortly after placement, and before finishing.

c. Supplementary Precautions

When the aforementioned precautions are not sufficient to satisfy the requirements herein above, they shall be supplemented by restricting work during evening or night. Procedure shall conform to American Concrete Institute Standard ACI 305.

4. Conveying Concrete by Chute, Conveyor or Pump

Concrete may be conveyed by chute, conveyor, or pump if approved in writing. In requesting approval, the Contractor shall submit his entire plan of operation from the time of discharge of concrete from the mixer to final placement in the forms, and the steps to be taken to prevent the formation of cold joints in case the transporting of concrete by chute, conveyor or pump is disrupted. Conveyors and pumps shall be capable of expeditiously placing concrete at the rate most advantageous to good workmanship. Approval will not be given for chutes or conveyors requiring changes in the concrete materials or design mix for efficient operation.

a. Chutes and Conveyors

Chutes shall be of steel or steel lined wood, rounded in cross section rigid in construction, and protected from overflow. Conveyors shall be designed and operated and chute sections shall be set, to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients, loss of mortar, or change in slump. The discharged portion of each chute or conveyor shall be provided with a device to prevent segregation. The chute and conveyor shall be thoroughly cleaned before and after each run. Waste material and flushing water shall be discharged outside the forms.

b. Pumps shall be operated and maintained so that a continuous stream of concrete is delivered into the forms without air pockets, segregation or changes in slump. When pumping is completed, concrete remaining in the pipeline shall be ejected and wasted without contamination of concrete already placed. After each operation, equipment shall be thoroughly cleaned and the flushing water shall be splashed outside the forms.

5. Wall and Abutments

No load shall be placed upon finished walls, foundations or abutments until authorized by the Engineer. Minimum time before loading shall be 7 days.

6. Concrete Placing on Wharf

When placing concrete on wharf decks, the Contractor shall:

Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within the scheduled time; that experienced finishing machine operators and concrete finishers are provided to finish the deck; that curing equipment and finishing tools and equipment are at the site of work and in satisfactory condition for use.
Immediately prior to placing, the Contractor shall place scaffolding and wedges and make necessary adjustments. Care shall be taken to ensure that settlement and deflection due to added weight of concrete will be minimal. The Contractor shall provide suitable means to readily permit measurement of settlement deflection as it occurs.

Should any event occur which, in opinion of the Engineer, would prevent the concrete conforming to specified requirements, the Contractor shall discontinue placing of concrete until corrective measures are provided satisfactory to the Engineer. If satisfactory measures are not provided prior to initial set of concrete in affected areas, the Contractor shall discontinue placing concrete and install a bulkhead at a location determined by the Engineer. Concrete in place beyond bulkheads shall be removed. The Contractor shall limit the size of casting to that which can be finished before beginning of initial set.

COMPACTION

1. Immediately after placing, each layer of concrete shall be completed by internal concrete vibrators supplemented by hand-spading, rodding, and tamping. Tapping or other external vibration of forms will not be permitted unless specifically approved by the Engineer. Vibrators shall not be used to transport concrete inside the forms. Internal vibrators submerged in concrete shall maintain a speed of not less than 7,000 impulses per minute. The vibrating equipment shall at all times be adequate in number of units and power to properly consolidate all concrete.

2. Spare units shall be on hand as necessary to insure such adequacy. The duration of vibrating equipment shall be limited to the time necessary to produce satisfactory consolidation without causing objectionable segregation. The vibrator shall not be inserted into the lower courses that have begun to set. Vibrator shall be applied vertically at uniformly spaced points not further apart than the visible effectiveness of the machine.

EPOXY BONDING COMPOUND

Before depositing new concrete on or against concrete that has set, the surfaces of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate and be free of laitance, coatings, foreign matter and loose particles. Forms shall be re-tightened. The cleaned surfaces shall be moistened, but shall be without free water when concrete is placed. ASTM C 881. Provide Type I for bonding hardened concrete to hardened concrete; Type II for bonding freshly mixed concrete to hardened concrete; and Type III as a binder in epoxy mortar or concrete, or for use in bonding skid-resistant materials to hardened concrete.

FINISHES OF CONCRETE

Within 12 hours after the forms are removed, surface defects shall be remedied as specified herein. The Temperature of the concrete, ambient air and mortar during remedial work including curing shall be above 10 °C. Fine and loose material shall be removed. Honeycomb, aggregate pockets, voids over 13mm in diameter, and holes left by the rods or bolts shall be cut out to solid concrete, reamed, thoroughly wetted, brush-coated with neat cement grout, and filled with mortar. Mortar shall be a stiff mix of one part Portland cement to not more than 2 parts fine aggregate passing the No. 16 mesh sieve, with a minimum amount of water. The color of the mortar shall match the adjoining concrete color. Mortar shall be thoroughly compacted in place. Holes passing entirely through walls shall be completely filled from the inside face by forcing mortar through the outside face. Holes which do not pass entirely through wall shall be packed full. Patchwork shall be finished flush and in the same plane as adjacent surfaces. Exposed patchwork shall be finished to match adjoining surfaces in texture and color. Patchwork shall be damp-cured for 72 hours. Dusting of finish surfaces with dry material or adding water to concrete surfaces will not be permitted.

CONCRETE FINISHING DETAILS

1. Concrete Paving

After concrete is placed and consolidated, slabs shall be screeded or struck off. No further finish is required.

2. Smooth Finish

Required only where specified; screed concrete and float to required level with no coarse aggregate visible. After surface moisture has disappeared and laitance has been removed, the surface shall be finished by float and steel trowel. Smooth finish shall consist of thoroughly wetting and then brush coating the surfaces with cement to not more than 2 parts fine aggregate and mixed with water to the consistency of thick paint.

3. Broom Finish

Required for paving; the concrete shall be screeded and floated to required finish level with no coarse aggregate visible. After the surface moisture has disappeared and laitance has been removed, surface shall be float-finished to an even, smooth finish. The floated surfaces shall be broomed with a fiber bristle brush in a direction transverse to the direction of the main traffic.

ITEM 07 : STEEL AND METAL WORKS

GENERAL

Division 1, "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 includes the furnishing of all labor, materials, equipment and other incidentals necessary for the fabrication and installation of structural steel and miscellaneous metal works as specified in relevant items of these specifications and as indicated on the drawings.

SUBMITTAL

1. Before placing orders for materials for the steel and metal works, the Contractor shall submit to the Engineer for approval shop drawings for all steelwork. All project shop drawings shall show the dimension of all parts, method of construction, bolts, welding sectional areas and other details.

2. The detail of connections shown on the shop drawings shall be such as to minimize formation of pockets to hold condensation, water or dirt. A minimum gap between abutting angles and the like shall be provided wherever possible to eliminate any traps and facilitate maintenance painting.

3. No materials shall be ordered nor fabrication commenced until the shop drawings are approved by the Engineer.

STORAGE OF MATERIALS

Structural materials, either plain or fabricated, shall be stored above the ground upon platforms, skids, or other supports. Materials shall be kept free from dirt, grease, and other foreign matter and shall be protected from corrosion.

MATERIAL REQUIREMENTS

1. Unless specified herein all steel structures and metals shall conform with the requirements of Section 3.15, "Steel and Metal Works." Connections where details are not specified or indicated herein, shall be designed in accordance with the American Institute of Steel Construction (AISC), Manual of Steel Construction, latest edition.

2. Structural steel works consisting of channels, gusset plates and other structural steel shape shall be as indicated on the drawings and shall be structural carbon steel conforming to ASTM A 36. Shapes shall be as given in AISC, Manual of Steel Construction.

3. High strength structural bolts, shall conform to ASTM A 325, Types 1 or 2. Nuts shall conform to ASTM A 560, Grade A, heavy hex style may be provided in hex style. Washers shall conform to ANSI B 18.22.1, Type B.

4. Electrodes for arc welding shall be E70 series conforming to American Welding Society Specifications A5.1.

5. Tests are required under the ASTM Standards for steel to be used in the Works and shall be carried out in the presence of the Engineer and at least four (4) days notice must be given to him of the dates proposed for such tests. Four (4) calendar days notice on which fabricated steelwork will be ready for inspection in the Contractor's yard.

6. Standard bolt shall conform to ASTM A 307 Carbon Steel Externally Threaded Standard Fasteners.

EXECUTION

QUALIFICATION

Qualification of steel fabricators, erectors and welders shall comply with the requirements of sub-section 3.15.3.1.

FABRICATION REQUIREMENTS

1. Workmanship

Fabrication shall be performed within the permissible tolerance by the approved fabricator. All workmanship shall be of the best quality with respect to internationally recognized standards of practice.

2. Cutting

Low-carbon structural steel may be cut by machine-guided torch instead of by shears or saw. Harmful notches, burrs, irregularities, etc., shall not be developed at the cut surface.

3. Contact Faces

Contact surfaces between bases or other elements bearing directly upon bearing plates shall be ground or milled as necessary for full effective bearing. Edges for welding shall likewise be properly prepared.

4. Bolt Holes

Bolt holes shall be according to engineering practice and as specified in these specifications. Gas burning of holes will not be permitted.

5. High Strength Bolt Assembly Preparation

Surfaces of high strength bolted parts in contact with bolt heads and nuts shall not have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Where the surface of a high strength bolted part has a slope of more than 1:20, a beveled washer shall be used to compensate for lack of parallelism.

High strength bolted parts shall fit solidly together when assembled and shall not be separated by gaskets or any other interposed compressible materials. When assembled, all joint surfaces including those adjacent to washers shall be free of scale except tight mill scale, and shall be free from dirt, loose scale, burrs, and other defects that would prevent solid seating of parts. Contact surfaces of friction-type joints shall be free from oil, paint, lacquer or galvanizing.

6. Welding

All welding shall be done only by welders certified as to their ability to perform in accordance with accepted testing requirement. Welding of parts shall be in accordance with structural standards and the Standard Code for Arc and Gas Welding in Building Construction of AWS, and shall only be done where shown, specified, or permitted by the Engineer.

Damage to galvanized areas by welding shall be thoroughly cleaned with wire brushing and all traces of welding flux and loose or cracked zinc coating shall be removed prior to painting. The cleaned area shall be painted with two coats of zinc oxide-zinc dust paint. The paint shall be properly compounded with a suitable vehicle in the ratio of one part zinc oxide to four parts zinc dust by weight. As an alternative to the above, the Contractor may submit for approval the use of a galvanizing rod or galvanizing solder to repair damaged areas.

The welding machine shall be a stable welder, and have suitable functions for the dimension of materials to be welded. The auxiliary tools used for welding shall perform sufficiently and adequately.

The welding machine used for field welding shall be of readily adjustable for electric current.

7. Shop Assembly

Structural units furnished shall be assembled in the shop.

An inspection shall be made to determine that the fabrication and the matching of the component parts are correct.

Jigs shall be used for the assembly of units as much as possible to maintain appropriate position of mutual materials.

Approval of the Engineer shall be required when drilling temporary bolt holes or welding temporary support to the assembled structure.

The tolerances shall not exceed those allowed by codes and each unit assembled shall be closely checked to insure that all necessary clearances have been provided and that binding does not occur in any moving part.

In order to maintain accurate finished dimensions and shape, appropriate reverse strain or restraint shall be provided as required.

Assembly and disassembly work shall be performed in the presence of the Engineer, unless waived in writing by the Engineer any errors or defects disclosed shall be immediately remedied by the Contractor.

Before disassembly for shipment, component parts of the structures shall be match marked to facilitate erection in the field.

FABRICATION TOLERANCES

1. Dimensional Tolerances for Structural Work

Dimensions shall be measured by means of an approved calibrated steel tape at the time of inspection. Unevenness of platework shall not exceed the limitation of the standard mill practice as specified in the American Institute of Steel Construction, "Manual of Steel Construction".

2. Camber

Reverse camber in any structural steel members in excess of 1/1,000 of the span length shall cause rejection. The minimum dead load camber for any structural steel member shall be as allowed by Code, or otherwise specified.

INSPECTION AND TEST OF WELDING

1. Inspection of Welding

Inspection of welding shall be executed for the following work phases.

a. Before Welding

Scum, angle of bevel, root clearance, cleaning of surface to be welded, quality of end tab, drying of welding rod.

b. During Welding

Welding procedure, diameter of coil and wire, type of flux, welding current and voltage, welding speed, welding rod position, length of arc, melting, cleaning of slag of each level under surface chapping, supervision of welding rod.

c. After Execution of Welding

Assurance of bead surface, existence of harmful defects, treatment of crater, quality of slag removal, size of fillet, dimension of extra fill of butt welding, treatment of end tab.

2. Testing of Welding

Twenty percent (20%) of welds contributing in the overall strength of the structure and which will be inaccessible for the inspection in service shall be tested.

Welding shall be tested by ultrasonic test to the extent specified herein or as directed by the Engineer.

Where partial inspection is required, the ultrasonic test shall be located at random on the welds so as to indicate typical welding quality.

If ten percent (10%) of the random ultrasonic tested indicate unacceptable defect, the remaining eighty percent (80%) of the welding shall be tested.

Repair welding required shall be ultrasonic tested after the repairs are made.

CORRECTIONS

In lieu of the rejection of an entire piece or member containing welding which is unsatisfactory or which indicates inferior workmanship, corrective measures may be permitted by the Engineer whose specific approval shall be obtained for making each correction. Defective or unsound welds or base steel shall be corrected either by removing and replacing the entire weld, or as follows.

1. Excessive convexity or overlap shall be reduced by grinding.

2. Undercuts, lack of weld shall be repaired with necessary reinforcement of weld after removal of any foreign materials such as slag, dust, oil, etc.

3. Any defects such as slag inclusions, incomplete fusion, or inadequate joint penetration, shall be completely removed, cleaned and re-welded.

4. Cracks in welds or base steel, shall be removed to sound steel throughout their length and 5cm beyond each end of the crack, followed by welding. The extent of the crack, depth and length, shall be ascertained by the use of acid etching, magnetic particle inspection or other equally positive means.

The removal of welded steel shall be done by chipping, grinding, oxygen cutting, oxygen gouging, or air carbon arc gouging and in such a manner that the remaining welded steel or base steel is not nicked or undercut. Defective portions of the welding shall be removed without substantial removal of the base steel.

PAINTING

This work shall consist of the preparation of the metal surfaces, the application, protection and drying of the painted surfaces, and supplying of all tools, tackle, scaffolding, labor and materials necessary for the entire work. Painting shall be applied in the field or shop as approved by the Engineer.

Unless otherwise specified or approved, all painting work for structural steel shall comply with the requirements of this Section.

FIELD PAINTING

After erection, the Contractor shall thoroughly prepare and clean the entire surface of all structural steel from all dirt, grease, rust or other foreign matters. The entire surface of all members shall then be field painted.

MATERIALS

Miscellaneous Metal Work

Unless otherwise specified in other Sections of the Specifications or shown on the drawing, miscellaneous metal works such as ladders, structural steel ladder rungs, etc. shall be given two shop coats of epoxy primer and two coats of epoxy enamel.

CONSTRUCTION METHODS

1. Cleaning of Surfaces

Surfaces of metal to be painted shall be thoroughly cleaned; removing rust, loose mill scale, dirt, oil or grease, and other foreign substances. Unless cleaning is to be done by sand blasting, all weld areas, before cleaning is started, shall be neutralized with a proper chemical, after which they shall be thoroughly rinsed with water.

Three methods of cleaning are provided herein. The particular method to be used shall be as directed by the Engineer.

2. Hand Cleaning

The removal of rust, scale, and dirt shall be done by the use of metal brushes, scrapers, chisels, hammers or other effective means. Oil and grease shall be removed by the use of gasoline or benzene.

Bristle or wood fiber brushes shall be used for removing loose dirt.

3. Sandblasting

All steel shall be cleaned by sandblasting. The sandblasting shall remove all loose mill scale and other substances. Special attention shall be given to cleaning of corners and re-entrant angles. Before painting, sand adhering to the steel in corners and elsewhere shall be removed. The cleaning shall be approved by the Engineer prior to any painting which shall be done as soon as possible before rust forms.

4. Weather Conditions

a. Exterior Coatings: Coatings to surface shall not be applied during foggy or rainy weather, or under the following surface temperature conditions: below 4°C, or over 35°C, unless approved by the Engineer.

b. Interior Coatings: Coatings shall be applied when surfaces to be painted are dry and the following surface temperatures can be maintained: between 18 to 35°C during the application.

5. Application

a. Paint shall be factory tinted and mixed. All paint shall be field mixed before applying in order to keep the pigments in uniform suspension.

b. Field Painting

When the erection work is complete, including all bolting and straightening of bent metal, all adhering rust, scale, dirt, grease or other foreign materials shall be removed as specified above.

As soon as the Engineer has examined and approved each steel and metal works structures, all field bolts, all welds, and any surfaces from which the top or first coat of paint has become worn off, or has otherwise come defective shall be cleaned and thoroughly covered with one coat of paint.

Surfaces to be bolted and surfaces which shall be in contact with concrete, shall not be painted. Surfaces which shall be inaccessible after erection shall be painted with such field coats as are required. When the paint applied for retouching the shop coat has thoroughly dried, and the field cleaning has been satisfactorily completed, such field coats as are required shall be applied. In no case shall a succeeding coat be applied until the previous coat is dry throughout the full thickness of the paint film. All small cracks and cavities which were not sealed in a watertight manner by the first field coat shall be filled
with a pasty mixture of red lead and linseed oil before the second coat is applied.

The following provision shall apply to the application of both coats.To secure a maximum coating on edges of plates or shapes, bolt heads and other parts subjected to special wear and attack, the edges shall first be striped with a longitudinal motion and the bolt heads with a rotary motion of the brush, followed immediately by the general painting of the whole surface, including the edges and bolt heads.

The application of the second field coat shall be deferred until adjoining concrete work has been placed and finished. If concreting operations have damaged the paint, the surface shall be re-cleaned and repainted.

c. General Manners

Painting shall be done in a neat and workmanlike manner. Paint may be applied with hand brushes or be spraying, except aluminum paint which preferably shall be applied by spraying. By either method the coating of paint applied shall be smoothly and uniformly spread so that no excess paint shall collect at any point. If the work done by spraying is not satisfactory to the Engineer hand brushing shall be required.

d. Brushing

When brushes are used, the paint shall be so manipulated under the brush as to produce a smooth, uniform, even coating in close contact with the metal or with previously applied paint, and shall be worked into all corners and crevices.

e. Spraying

Power spraying equipment shall be used to apply the paint in a fine spray. Without the addition of any paint, the sprayed area shall be immediately followed by brushing, when necessary, to secure uniform coverage and to eliminate wrinkling, blistering and air holes.

f. Removal of Paint

If the painting is unsatisfactory to the Engineer the paint shall be removed and the metal thoroughly cleaned and repainted.

ITEM 08 : FINISHES

FINISHES

GENERAL

Division 1, "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 covered by this section consist of furnishing all labor, materials, equipment, tools and incidentals necessary to undertake, complete al finishing works and painting for the buildings as indicated on the drawings and as specified herein.

Wall, floor, ceiling and other finishing works shall include but are not limited to the following:

1. Plain cement plaster (steel trowel) finish painted with acrylic latex paint for exterior and interior CHB (Concrete Hollow Blocks) wall;

2. Glazed tile wainscoting for toilet;

3. Vinyl tile finish;

4. Vitrified ceramic tiles for toilet floor;

5. Pebble wash-out finish;

6. Non-skid Ceramic Tiles

7. Plain cement steel trowel floor finish with non-metallic floor hardener;

8. Rubbed concrete finish, painted with acrylic latex paint for exposed R.C. Ceiling (bottom of roof slab and beams)

9. Fiber Cement Board for Ceiling

SUBMITTAL

1. Shop drawings for all finishing and painting works for the building shall be submitted in advance to allow twenty eight days for review and approval. Shop drawings shall indicate materials and details of finishing works. The Contractor shall be responsible for all errors of detailing and fabrication, and for the correct finishing work items shown on the shop drawings.

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

3. Samples of all walls finishes, shall be submitted to the Engineer for approval as to its finish texture and workmanship.

MATERIAL REQUIREMENTS

WALL FINISHES AND COUNTERTOPS

1. Plain Cement Plaster Finish

   a. Sand shall be clean and hard material. Sand shall be free from deleterious substances and conforming with the requirements of ASTM C 33.
   b. Cement shall be Portland cement conforming with the requirements of ASTM Designation C 150.
   c. Water shall be clean and potable.
   d. Bonding compound shall conform to ASTM C 631.
   e. Hydrate lime shall conform to ASTM C 206.
   f. Synthetic fibrous reinforcement shall conform to BS 5139 or ASTM C 1116.

2. Wall Ceramic Tiles

   a. Wall tiles shall be glazed ceramic and as per Engineer's approval.
   b. Trimmers and moulding shall be lustrous, glazed with size and color corresponding to wall tiles.
   c. Portland cement, sand, bonding compound, lime and water shall conform with Sub-section above.

3. Marble

   a. Marble shall be local natural mined and polished for toilet countertops, fascia and splashboard. Dimensions as shown on the Drawings.
   b. Shall be sound material with uniform and favorable working qualities and with very limited natural faults.
   c. Color, veining and quality shall be approved by Engineer.
   d. Veining shall run vertically on all vertical surfaces and direction of veining shall continue in same directions over horizontal surfaces except as directed by the Engineer.
   e. Marble components shall be factory fabricated and finished and delivered ready for installation without further preparation or modification.
   f. Sealer

      1) Shall be a commercial penetrating type free from harmful alkali or acid content and especially prepared for marble work.
      2) Shall have a Ph factor between 7 and 9.
      3) Shall not discolor.
      4) Shall produce a slip resistant surface.
      5) Shall have a flash point not less than 35 degree C.

g. Cleaning fluid

1) Shall be commercial neutral liquid type especially prepared for marble work.
2) Shall have a Ph factor between 7 and 9.
3) Shall be free from crystallizing salts or water soluble alkaline salts.
4) Shall be biodegradable and phosphate free.

FLOOR FINISHES

1. Vinyl Tile Finish

   a. Samples of the tile for color selection shall be submitted and approved by the Engineer.
   b. Waterproof contact adhesive shall be as recommended by the tile manufacturer and approved by the Engineer.

2. Vitrified Ceramic Unglazed Tiles

   a. Vitrified ceramic unglazed floor tiles as shown on the drawings or to be designated by the Engineer.
   b. Portland cement, sand and water shall conform with the requirements specified in Sub-section above.
   c. Vitrified ceramic unglazed floor tiles shall be delivered in the manufacturer's original unbroken packages or containers that are labeled plainly with the manufacturer's name and brand. Containers shall be grade scaled. Materials shall be stored in dry weathertight enclosures, and shall be handled in a manner that will prevent the inclusion of foreign materials and damage by water or dampness.

3. Plain Cement Floor Finish

   a. Portland cement, sand, bonding compound and water shall conform with the requirements specified in Sub-section above.
   b. Mortar shall be one part of Portland cement to three parts sand.
   c. Hardener shall be non-metallic floor hardener, delivered in cartons, cans or bags to the construction site with the labels installed and seals unbroken.

4. Non-skid ceramic floor tiles

   Non-skid ceramic tiles as shown on the Drawings.

CEILING FINISHES

1. Rubbed Concrete Finish

   Portland cement, sand, bonding compound and water shall conform with the requirements specified in Sub-section above.

2. Gypsum Ceiling Board

   Gypsum board to be used for ceiling and shall conform with ASTM C36. Joint treatment materials and fastening system shall be as recommended by the gypsum board manufacturer and as approved by the Engineer.

3. Fiber Cement Board

   Plain fiber cement board on metal frame for interior ceiling and exterior ceiling.

4. Fiberglass Ceiling Board

   Fiberglass ceiling board shall be fashionetone, fissured design.

EXECUTION

WALL FINISHES

1. Plain Cement Plaster Steel Trowel Finish

   a. Preparation of Surfaces

      All surfaces shall be cleaned and projections, dust, loose particles and other materials, which would prevent good bond, shall be removed.

      All surfaces shall be thoroughly wetted before plastering.

   b. Trial Mix

      A trial mix of at least three (3) different water-cement ratios for a proposed mix shall be prepared under full scale conditions and adequate workability. The proportions by weight of cement to the weight of sand shall not be less than one part of Portland cement to two parts of sand.

      The proportion of cement-sand and water necessary to produce the cement plaster of the required consistency shall be subject to the approval of the Engineer. Such approval may be withdrawn at any time and a change in proportions may be required. Based on the approved mix proportions, the Contractor shall prepare a list showing the number of kilograms of the various materials to be used in the cement plaster finish mix.

      No cement plaster finish shall be started without an approved trial mix by the Engineer.

   c. Cement Plaster Finish Application

      A brown coat with sufficient pressure shall be applied to fill the gaps, and to secure a good bond. Moistened for 48 hours, each coat of cement plaster shall be kept after application and allow to dry.

A finish coat shall be applied after the brown coat has set. The brown coat shall be moistened before application of the finish coat. Finish coat shall be floated to plumb, even planes and surfaces.

Final plaster finishes shall be rubber sponged.

d. Tolerance

The Contractor shall finish plaster work plumb, level, square, without cracks and other imperfections.

e. Patching and Cleaning

Upon completion of the building, and when directed, all loose, cracked, damaged or defective plastering shall be cut out and replastered in a satisfactory and approved manner.

2. Wall Tiles

a. Mortar Preparation

All mortar setting beds shall be mixed by volume in the proportion of 1 part Portland cement and 3 parts dry sand and not more than 1/10 part hydrated lime.

Mortar materials shall be measured in approved containers, which will insure that the specified proportions of materials will be controlled and accurately maintained during the progress of the work. Measuring materials with shovels, "shovel count", will not be permitted. Unless specified otherwise, mortar shall be mixed in proportions by volume, in an approved mortar box.

The quantity of water shall be controlled accurately and uniformly. The aggregates shall be introduced and mixed in such manner that the materials will be distributed uniformly throughout the mass. A sufficient amount of water shall be added gradually and the mass further mixed until a mortar of the elasticity necessary for purpose intended is obtained. Mortar boxes, pans and wall surfaces shall be kept clean and free from debris or dried mortar. The mortar shall be used before the initial set of the cement has occurred. Re-tempering of mortar in which cement has started to set will not be allowed.

b. Application of Wall Tile

Interior masonry shall be clean, thoroughly dry, sound and sufficiently rough to provide strong mechanical bond. Surfaces shall be evenly damped immediately prior to the application of the scratch coat.

Scratch coat shall be applied to masonry, as backing for wall tile, not less than 24 hours or more than 48 hours before starting the tile setting. The scratch coat shall be applied with sufficient pressure to ensure a proper bond with the base for the setting bed. While the mortar is still plastic, the scratch coat shall be cut with a trowel at all internal vertical angles for the depth of the coat with the full height of the tile bed and shall be crossscratched for the extent of the tile bed.

Immediately before the application of mortar setting bed, the scratch coat shall be moistened thoroughly but not saturated. Temporary screeds shall be applied to the scratch coat with mortar to provide a true and plumb surface, the proper distance back from the finished wall line. The setting bed shall be applied, rodded and floated flush with the screeds over an area not greater than the area to be covered with the tile while the bed remains plastic. The mortar shall not be retempered. The setting bed shall be cut with a trowel at all internal corners as specified for the scratch coat.

Mounted tiles shall be soaked in clean water a minimum of one hour before they are set. Absorptive mounted tiles shall be damped by placing sheets on a wetted cloth in a shallow pan before setting. A skim coat of neat Portland cement mortar, mixed with water to the consistency of a pasty, thick cream, shall be applied to the mortar setting bed, or to the back of each tile as laid. The tiles shall then be pressed firmly on the setting bed and tamped until flush and in the plane of the other tiles. The tiles shall be applied before the mortar bed has taken its initial set.

Intersections and returns shall be formed accurately. Where cutting of tiles is necessary it shall be done at the internal angles of the walls or wainscots. Cutting and drilling tiles shall be done neatly without marring the surfaces. The cut edges of tiles against trim, built-in fixtures, and similar surfaces shall be ground and jointed carefully. The tiles shall fit closely with plumbing fixtures and around electric outlets, pipes and fittings, so that the plates or escutcheons will properly overlap the tiles. Wainscots shall be within one half of the heights indicated without cutting of the tiles.

Bases, caps, bull-nose corners, and all other trimmers moulded or shaped features, and accessories shall be backed thoroughly with mortar and set firmly into place. All lines shall be kept straight and true, and all finished surfaces brought to true and even planes, straight and plumb, and internal corners squared and external corners rounded.

Horizontal joints shall be maintained level and vertical joints plumb and in alignment. The completed work shall be free of broken, cracked, damaged or otherwise faulty tiles.

Joints shall be parallel and uniform in width, plumb, level and in alignment. End joints in broken-joint work shall be made as far as practicable, on the center line of adjoining tiles. Except in special arrangement and design, as indicated or specified, square tiles shall be set with straight joints, and oblong tiles shall be set with broken joints.

Joint widths shall be uniform and spaced to accommodate the tile in the given spaces with a minimum of cutting. Tiles shall be wetted, if they have become dry, before applying grout. Joints shall be grouted with a neat Portland cement grout of the consistency of thick cream. Other joints shall be pointed with mortar consisting of one part Portland cement and two parts pointing sand. The grout for walls and other vertical surfaces shall contain non-staining white Portland cement. Grout and pointing mortar shall be forced into joints by using trowel, brush or finger application.

Before the grout or mortar sets, the joints of cushion edge tiles shall be struck or tooled to the depth of cushion, filling all skips or gaps, and the joints of square edge tiles shall be filled completely flush with their surface. Dark cement shall not show through grouted white joints. Care shall be taken to avoid scratching glazed finishes. All mortar or grout shall be removed before it has set or hardened.

c. Cleaning and Curing

All completed tile work shall be thoroughly sponged and washed diagonally across joints, and finally polished with clean, dry cloth. Acid cleaning of unglazed tile, when necessary, shall not be done within ten days after setting tile. All metal shall be covered with an approved grease and the tile shall be wetted with clean water, before tile is cleaned with 10% muriatic acid solution. After acid cleaning, the tile shall be flushed with clean water, and the grease coating on metal shall be removed. Acid cleaners shall not be used on glazed tile.

d. Protection
Tiled walls outside corners (external angles) shall be protected with board corner strips in areas used as passage ways by workmen. Extreme care should be taken not to disturb walled tiled until mortar has fully set.

FLOOR FINISHES

1. Vinyl Tiles

No vinyl tile work shall start until the Engineer has approved the time when such work shall start.

The Contractor shall furnish and install all vinyl tiles and base where and as shown on the drawings or as specified. The temperature shall be maintained at 22°C for 48 hours before, during and 48 hours after the application of tiles.

Vinyl tile shall be laid in accordance with the approved manufacturers recommended method of laying.

Waterproof contact adhesive shall be applied both on the floor and tile, spread evenly and allowing 10 minutes drying time prior to installation.

Tiles shall be laid with close, straight joints, bedded in contact adhesive in accordance with method approved and rolled with roller of sufficient weight to press tile firmly in place and provide smooth, plush surfaces at the joints. Tiles shall be fitted close to all pipes, base and other intersection surfaces.

All finished floors shall be protected in a manner that will prevent the finish from any damage. The Contractor shall remove and replace any defective materials and/or workmanship or damage of the finished floors.

2. Vitrified Ceramic Tiles

a. Mortar Preparation

Mortar mix proportion and preparation shall be in accordance with the requirements in paragraph of sub-section.

b. Surface Preparation

Surfaces to receive the tiles shall be clean, free of dust, dirt, oil, grease, and other deleterious substances. Floor tile operations in spaces receiving wall tile shall not be started until wall tile installation has been completed. Before tile is applied with a dryset mortar bed, the structural floor shall be tested for levelness or uniformity of slope by flooding it with water. Areas where the water ponds shall be filled and leveled with mortar and shall be retested before the setting bed is applied.

c. Placing of Setting Beds and Floor Tile

The structural concrete slab shall be soaked thoroughly with clean fresh water on the day before the setting bed is to be applied. Immediately preceding the application of the setting bed, the structural slab shall again be wetted thoroughly, but no free water shall be permitted to remain on the surface.

A skim coat of neat Portland cement mortar shall then be applied not more than 4 mm thick. The mortar shall be spread until its surface is true and even and thoroughly compacted, either level or sloped uniformly for drainage, as the case requires. A setting bed, as large as can be covered with tile before the mortar has reached its initial set, shall be placed on one operation; but in the event that more setting mortar has been placed than can be covered, the unfinished portion shall be removed and cut back to a clean beveled edge.

All mounted tiles shall be soaked in clean water a minimum of one hour before they are set. Absorptive mounted tile shall be dampened by placing sheets on a wetted cloth in a shallow pan before setting. No free water shall remain on the tiles at the time of setting. Before the initial set has taken place in the setting bed, a skim coat of neat Portland cement mortar, shall be trowelled or brushed over the setting bed and/or the back of the tile, or a thin layer of Portland cement, may be hand-dusted uniformly over the setting bed and worked lightly with a trowel or brush until thoroughly damp.

The tiles shall then be pressed firmly upon the setting bed, and beaten into the mortar until true and even with the plane of the finished floor line. Beating and leveling shall be completed within one hour after placing tiles or sheets. Borders and defined lines shall be laid before the field or body of the floor. Where floor drains are provided, the floors shall be sloped to drain properly to the drains. Intersections and returns shall be formed accurately.

Cutting of tile, where necessary, shall be done along the outer edges of the floor. As far as practicable, no tiles of less than half size shall be used. Cutting and drilling of tiles shall be done neatly without marring the tile surfaces. The cut edges of tile against trim, bases, thresholds, pipes, built-in fixtures, and similar surfaces shall be ground and jointed carefully. Tile shall fit closely and neatly at all plumbing fixtures and around electrical outlets, pipes and fittings so that cover plates or escutcheons will overlap the tiles properly. Tiles shall be secured firmly in place and loose tiles or tiles sounding hollow shall be removed and replaced. All lines shall be kept straight, parallel, and true, and all finished surfaces brought to true and even planes. The inner edges of borders shall be kept straight and, where practicable, shall form right angles at all returns. The paper and glue shall be removed from mounted tile, without using excess water, within one hour after installing the tiles.

Joints shall be parallel and uniform in width, plumb, level and in alignment. End joints in broken-joint work shall be made as far as practicable, on the center lines of adjoining tiles. Except in special arrangement and design, as indicated or specified, square tiles shall be set with straight joints, and oblong tiles shall be set with broken joints. Joint widths shall be uniform and spaced to accommodate the tile in the given spaces with a minimum of cutting. Tiles shall be wetted, if they have become dry, before applying grout. Joints shall be grouted with a neat Portland cement grout of the consistency of thick cream. Other joints shall be pointed with mortar consisting of one part Portland cement and two parts pointing sand.

The grout or mortar for joints on floors shall be white Portland cement or as specified by the Engineer. Grout painting mortar shall be forced into joints by using trowel, brush or finger application. Before the grout or mortar sets, the joints of cushion edge tile shall be struck or tooled to the depth of the cushion, filling all skips or gaps, and the joints of square edged tiles shall be filled completely flush with their surface. Dark cement shall not be seen through grouted white joints.

All surplus mortar or grout shall be removed before it has set or hardened.

d. Cleaning and Curing

Floors shall be covered with waterproofed paper with all joints lapped and allowed to damp cure for at least 72 hours before foot traffic is permitted thereon.

All completed tile work shall be thoroughly sponged and washed diagonally across joints, and finally polished with clean, dry cloth. Acid cleaning of unglazed tile, when necessary, shall not be done within ten days after setting the tile. All metal shall be covered with approved grease and the tile shall be wetted with clean water, before tile is cleaned with 10% muriatic acid solution. After acid cleaning, the tile shall be flushed with clean water, and the grease coating on metal shall be removed.

Finished tile floors shall be covered with clean building paper before foot traffic is permitted on them. Board walkways shall be placed on floors that are to be continuously used as passage ways by workmen. Thresholds shall be covered with boards. Tiles vertical outside corners (external angles) shall be protected with board corners strips in areas used as passage by workmen.

3. Plain Cement Floor Finish with Non-metallic Floor Hardener

   a. Trial Mix

      No plain cement floor finish work shall be started without the approval of the Engineer of the trial mix.

   b. Application

      The concrete sub-floor shall be cleaned and projection, dust, loose particles and other materials which would prevent good bond shall be removed. The sub-floor surface shall be moistened but not soaked, dry cement shall then be sprinkled over it and the mortar shall be spreaded on the setting bed. The surface shall be tamped to assure a good bond over the entire area and screeded to provide a smooth and level bed at proper height.

      Mortar mix shall be one part Portland cement to three parts sand. Following the placing of leveling concrete on the floor and after the concrete is free from excess water, a dry mixture of 2 parts of floor Floor hardener shall be used for every square meter of flooring or in accordance with approved manufacturer's specifications. The dry mixture shall be floated thoroughly into the surface which shall be finished by steel trowelling and cured by water or curing compound for seven (7) days.

4. Pebble washout Finish

   a. Trial Mix

      No exposed aggregate or pebble wash-out finish shall be started without the approval of the Engineer of the trial mix.

   b. Preparation of Surface

All surface shall be cleansed and projections, dust, loose particles and other material which would prevent the good bond shall be removed.

   c. Placing

The well graded "pea" gravel shall be trowelled or floated into the cement-mortar finish (1:2 mix), pressed into it to an even surface after the mortar has been placed even but before the initial set.

All exposed gravel, covering about 90-95% of the mortar surface shall not be fully embedded into the cement mortar bedding.

At the proper time, "pea" graven finish of mortar splatter shall be cleaned and exposed with brush and water leaving it clean in its natural color and texture.

5. Protection

   a. Before turn over of the building to the Owner, wash pebble surfaces with 1 part muriatic acid to 6 parts clean water.

   b. Apply an overlapping strokes of watershield using brush or by low pressure spraying. Dries to a tack-free surface in 4-6 hours and cures to form an effective water repellant film in approximately 24 hours.

   c. Protect finished surface with specified hardeners and sealants.

CEILING FINISH

1. Rubbed Concrete Finish

   After removal of forms, the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for a minimum period of three hours. Sufficient time shall have elapsed before the wetting down to allow the mortar used in the pointing of holes, honeycomb spots, broken corners or edges and other defects to thoroughly set. Surfaces to be finished shall be rubbed with a minimum coarse carborundum stone using a small amount of mortar on each face. The mortar shall be composed of cement and fine sand mixed in the proportions used in the concrete being finished. Rubbing shall be continued until all form marks, projections and irregularities have been removed, all voids have been filled, and a uniform surface has been obtained. The face produced by this rubbing shall be left in place at this time.

   After all concrete above the surface being created has been cast, the final finish shall be obtained by rubbing with a fine carborundum stone and water. This rubbing shall be continued until the entire surface is of smooth texture and uniform color.

   After the final rubbing is completed and the surface has dried, it should be rubbed with burlap to remove loose powder and shall be left free from all unsound patches, paste, powder and objectionable marks.

2. Gypsum Ceiling Board

   The board shall be installed in accordance with ASTM C 840 and the requirements specified on the Specifications and Drawings. Neatly fit abutting end and edge joints. Use gypsum board of maximum practical length. Cut out gypsum board as required to make neat close joints around openings. Apply gypsum board in accordance with ASTM C840.

3. Fiber Cement Board

   a. Install fiber cement board in accordance with approved layouts on metal grid supports. When structural supporting members are set at such spacing that the above requirements cannot be complied with, adequate intermediate supports shall also be provided.

   b. Each board shall be tightly and rigidly secured in place and free from unnecessary movement.

   c. Each board shall be set square, straight, plumb and/or level, accurately positioned at locations and to layouts required, with adjacent like units or members accurately aligned.

   d. Board joints shall be tightly abutting and flush across adjacent units.

   e. The installation shall be free from exposed fastenings, unnecessary cuts or holes, other than as particularly shown, specified or approved.

   f. Exposed surfaces shall be completely clean and free from dust, dirt, smudges, fingerprints, scratches, dents, warping, waviness, buckling, broken parts or units, chips, cracks, misaligned or improperly fitted joints, stains, discoloration or other defects or damage.

4. Fiberglass Ceiling Board

   Edges of ceiling board shall be in close contact with the metal supports and in true alignment. Arrange units so that units less than 1/2 width are minimized.

ITEM 09 : PAINTING

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

This Section covers the surface preparation, coating materials and application of coatings systems required for the Works.

The work shall consist of furnishing of all labor, materials, equipment and other incidentals necessary for the supply of painting materials and the complete painting of surfaces as shown on the drawings in accordance with this Specification and as directed by the Engineer.

The term paint as hereinafter used includes emulsion paints, varnishes, oils, pigments, thinner and dryers.

All exposed metal surfaces, except metal surfaces embedded in concrete, shall be painted unless otherwise specified.

STANDARD

The following publications listed below, but referred to thereafter by basic designation only, forms a part of these Specifications to the extent indicated by the reference thereto:

Steel Structures Painting Council (SSPC) U.S. Specification JIS K 5628 Red-lead Zinc Chromate Anti-Corrosive Paint.

SUBMITTAL

1. The Contractor shall submit work method statements with lists of materials to the Engineer for approval twenty eight days before the starting of works. This statement shall include following items:

    a. Type of paint and manufacturer
    b. Manufacturer's specifications
    c. Storage and delivery of materials
    d. Surface preparation
    e. Finish painting and drying
    f. Touch-up painting, if any
    g. Equipment

2. 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

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.

100% Acrylic, water based, quick-drying, easy to clean-up and environmentally friendly, resist dirt, stains, alkali, water, humidity, algae, mold and mildew growth and highly durable paint for interior finish.

An all-purpose synthetic quick dry paint for all types of wood and metal surfaces. It has high gloss, good color retention and outstanding durability.

For pipes, valves and equipment, galvanized and ungalvanized ferrous metal, use a 100% acrylic gloss paint, has excellent resistance to ultraviolet rays and resists chalking, cracking and color fading, dries fast and environmentally friendly.

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
b. Interior Finishes Location of the various finishes are listed in the Finish Schedule on the drawings or else will be confirmed by PPA	

1. On primer and coated metal two coats of interior semi-gloss enamel or as indicated in the Schedule finish	Red Oxide Primer #310, Quick Dry Enamel or approved equal
2. On Plaster	
First Coat	Masonry Neutralizer #44 or approved equal
Three Coats	Elastomeric Paint or approved equal
3. On Wood	
First Coat Enamel undercoater	Flatwall Enamel or approved equal
Second & Third Coat Exterior enamel	Quick Drying Enamel or approved equal
4. Wood Stain Finish	
First Coat Second & Third Coats Fourth & Fifth Coats	Oil Wood Stain , Lacquer Sanding Seale r#1254 Clear Gloss Lacquer #1250 or approved equal
c. Non – Architectural Items (Piping, valves, equipment, etc.)	
1. Piping, valves, equipment etc. in rooms are to be painted	
2. Galvanized pipes and ducts	
Primer – one coat Finish – one coat	Red Oxide Primer, #310 or approved equal Quick Dry Enamel or approved equal
3. Black steel pipes	
Primer – one coat Finish – one coat	Red Oxide Primer, #310 or approved equal Quick Dry Enamel or approved equal
4. Mechanical Items	
a. Ungalvanized ferrous metal Primer – one coat Finish – one coat	 Red Oxide Primer, #310 or approved equal Quick Dry Enamel or approved equal or approved equal
b. Galvanized ferrous metal Primer – one coat Finish – one coat	 Red Oxide Primer, #310 or approved equal Quick Dry Enamel or approved equal or approved equal
c. Submerged galvanized ferrous metal Primer – one coat	Red Oxide Primer, #310 or approved equal
d. Buried miscellaneous ferrous surface valves, & flanged joints (excl. pipe) Primer – one coat	Red Oxide Primer, #310 or approved equal

EXECUTION

SURFACE PREPARATION OF STEEL

1. Steel surfaces shall be cleaned as follows:

   a. All round welds, burrs and sharp surface projections shall be ground smooth and all weld splatter shall be removed prior to blast cleaning.

   b. Sand abrasives, if used, shall be clean, and free from salt and extraneous matter. The sand shall pass through a 2.0mm test sieve, and be substantially retained on a 0.18mm test sieve, with at least 25 percent retained on a 0.355mm test sieve.

   c. Metallic abrasive, if used, shall be sharp, hard and free from dust, and shall pass through a 1.8 mm test sieve.

   d. Blast cleaning operations shall not be conducted on surfaces that will be wet after blasting and before coating, or when the surfaces are less than 10°C above degree points, or when the relative humidity of the air is greater than 95 percent.

   e. Any oil, grease, soil, dust or other foreign matter deposited on the cleaned surfaces shall be removed prior to painting. In the event that rusting occurs after completion of the surface preparation, the surfaces shall be cleaned again in accordance with the specified method.

   f. Particular care shall be taken to prevent the contamination of other corrosive chemicals before the application of the paint. Such contamination shall be removed from the cleaned surface by flash blasting and the paint applied immediately.

   g. Care shall be taken to prevent contamination of cleaned and painted surfaces by cleaning operations in an adjacent area.

   h. Surfaces not to be painted shall be suitably protected from the effects of cleaning and painting operations.

SURFACE PREPARATION OF WOOD

1. Wood surfaces shall be sanded to a fresh surface. Surface mould where present, shall be removed by washing, rubbing down and burning off as necessary. Resinous exudation and large knots shall be removed and replaced with filler or other materials approved by the Engineer.

2. Parts of timber to be enclosed in walls shall always be primed unless already impregnated. Priming shall be brushed on and a minimum of two coats applied to end grain. When the priming paint is hard, all cracks, holds, open joints, etc. shall be made good with hard stopping and rubbed down with fine abrasive paper. Priming of joinery shall be applied only on site after the Engineer has approved such joinery and before it is fixed. For internal surfaces primer coats shall be carefully flatted.

SURFACE PREPARATION OF CONCRETE AND PLASTER

Concrete and cement plaster surfaces to be painted shall be prepared by removing efflorescence, dust, dirt, grease, oil, asphalt, tar, excessive mortar and mortar dropping and by roughening to remove glaze. A zinc sulfate solution shall be applied before prime cost.

SURFACE PREPARATION FOR FIBER 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.

ALUMINUM FRAMES FOR DOORS AND WINDOWS

All metal surfaces shall undergo pre-treatment process which includes: desmutting, water-rinsing, degreasing/etching, water rinsing, zinc phosphating, water rinsing and acid rinsing.

Powder coating application, shall be factory applied and shall be done in one operation using an electro-static powder gun. The materials to be coated should be well connected to earth. Coating thickness should be kept to a minimum of 60 microns for exposed areas. On details which are to be treated mechanically after coating (drilling, sawing, etc.), the coating film must not exceed 100 microns.

The powder coating shall be oven cured in the range of 20 minutes at 220° C (metal temperature measured on the area with greatest metal thickness). The temperature variation in the oven should not exceed +/- 10° C.

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.

WOOD REPAIR

Badly decayed areas shall be removed and repaired. Areas and pieces decayed beyond repair shall be replaced with new pieces that match originals in all respects. Moderately decayed areas, weathered, or gouged wood shall be patched with approved patching compounds, and shall be sanded smooth. The source or cause of wood decay shall be identified and corrected prior to application of patching materials. Wet wood shall be completely dried to a moisture content not exceeding 12 percent, as measured by a moisture meter, to its full depth before patching, unless otherwise authorized. Wood that is to be patched shall be clean of dust, grease, and loose paint.

1. Epoxy Wood Repair

   Epoxy wood repair materials shall be applied in accordance with manufacturer's written instructions. Health and safety instructions shall be followed in accordance with the manufacturer's instructions. Clean mixing equipment shall be used to avoid contamination. Mix and proportions shall be as directed by the manufacturer. Batches shall be only large enough to complete the specific job intended. Patching materials shall be completely cured before painting or reinstallation of patched pieces.

2. Epoxy Consolidant and Epoxy Paste

   Epoxy liquid wood consolidant shall be used:

   1. To penetrate and impregnate deteriorated wood sections in order to reinforce wood fibers that have become softened or absorbent.

   2. As a primer for areas that are to receive epoxy paste filler. Epoxy paste shall be used to fill areas where portions of wood are missing such as holes, cracks, gaps, gouges, and other voids.

MIXING AND THINNING

Mixing and thinning of paint shall be done in accordance with the approved manufacturer's printed instructions. The pot life of each paint as stated by the manufacturer shall not be exceeded.

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.

Plain enamel and varnish shall be applied carefully with good clean brushes or approved spraying equipment, except that the initial coat on any surface shall be applied with brush. Sufficient time shall be allowed between coats to assure thorough drying and each coat shall be in proper condition before receiving the next coat.

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. Powdered metallic pigments added at the time of use shall be mixed by adding the powder in small increments to about one-third of the base paint or vehicle, with thorough mixing to obtain a smooth paste. The remainder of the base paint shall then be thoroughly stirred in.

Different brands of emulsion paints shall not be mixed prior to application of the materials.

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.

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 as specified in sub-section 4.14.3.7 above.

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 Project-In-Charge.

2. The Contractor shall correct such works or replace such materials found defective under these Specifications at his own expense.

ITEM 10 : PROJECT BILLBOARD

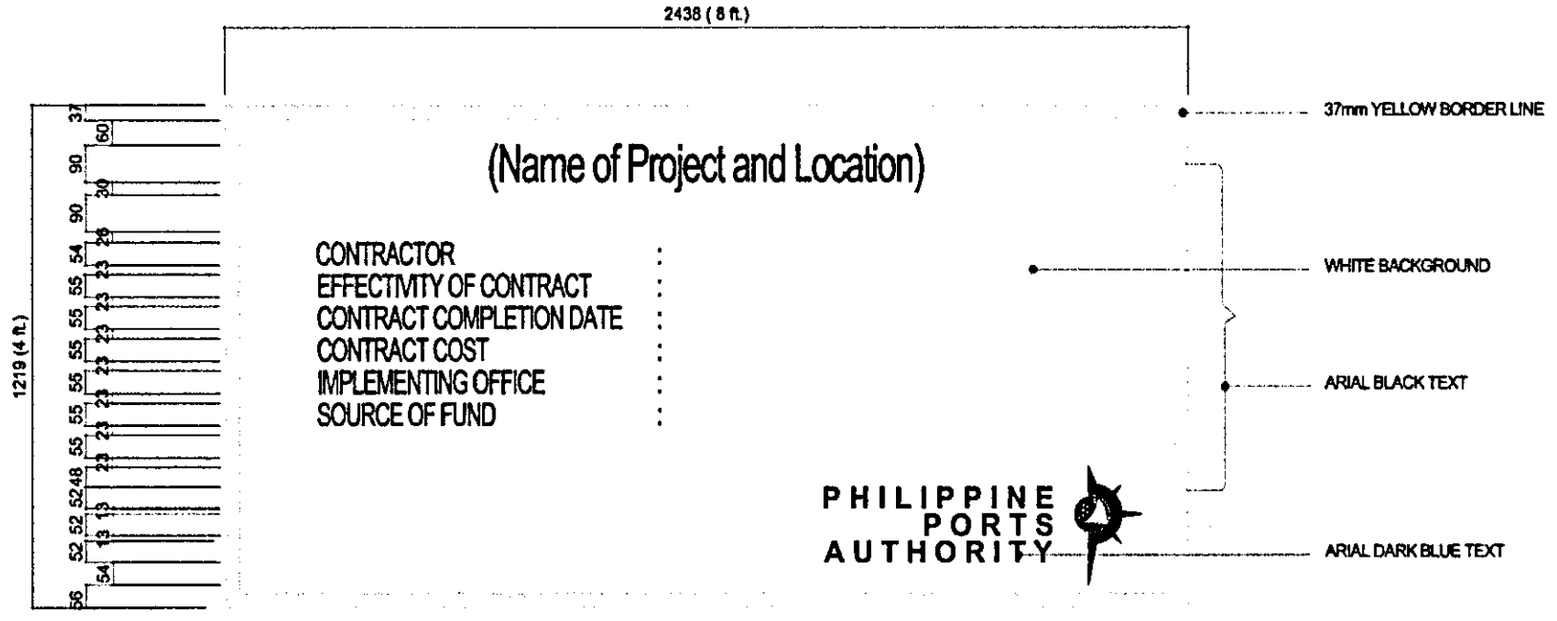
SPECIFICATION

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

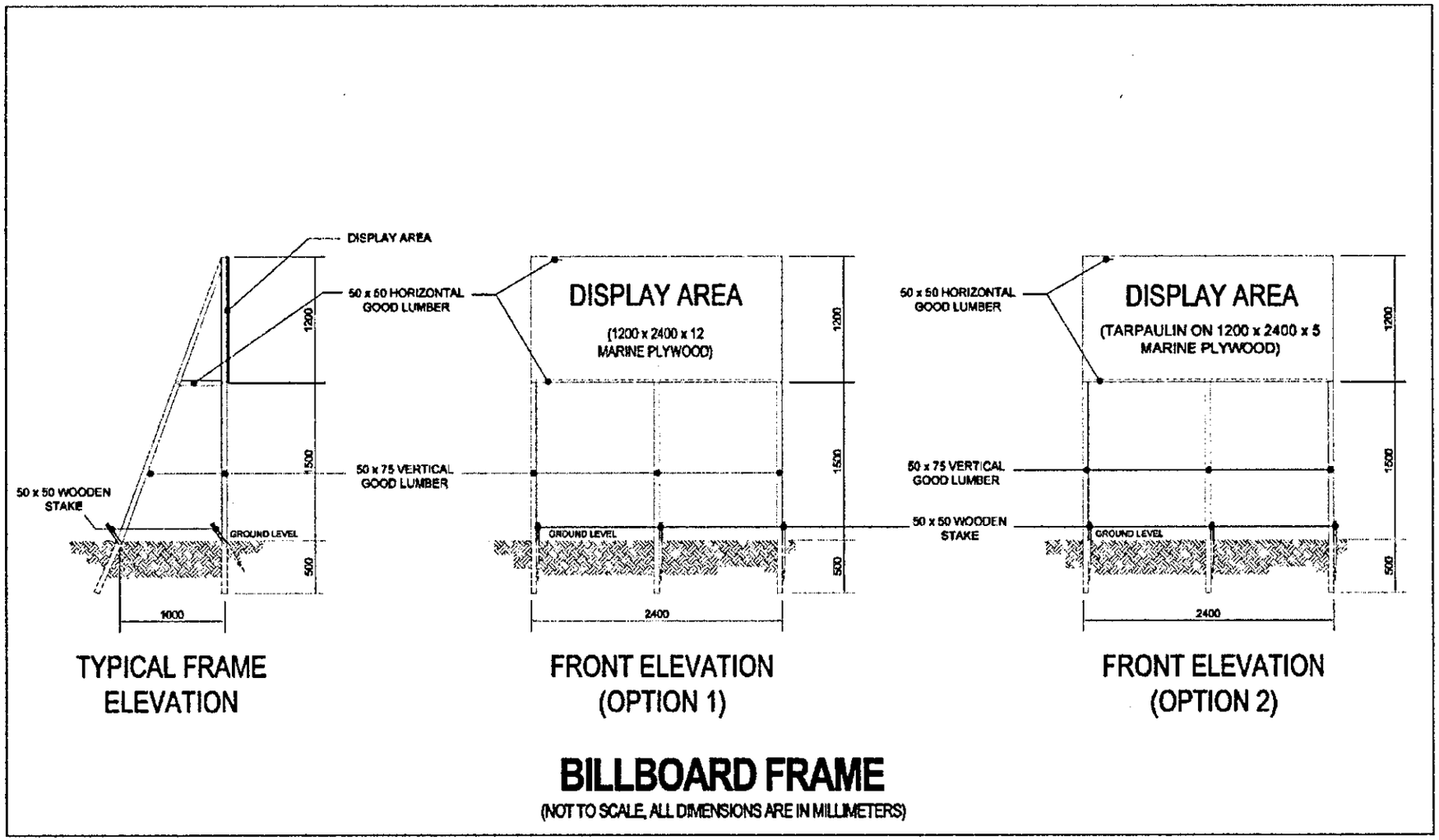
The size and specifications of materials for the standard billboard shall be 4ft. x 8ft. (1,200mm x 2,400mm) using ½ inch (12mm) marine plywood or tarpaulin poster on 3/16 inch (5mm) marine plywood.

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

See attached drawings for further details of the standard billboard.



STANDARD PROJECT BILLBOARD



BILLBOARD FRAME

(NOT TO SCALE, ALL DIMENSIONS ARE IN MILLIMETERS)

ITEM 11 : SAFETY SIGNAGES AND BARRICADES

DESCRIPTION

This work includes the furnishing and installing of safety signages and barricades in accordance with the specifications and to the details shown below in the drawings, or as directed by the Engineer.

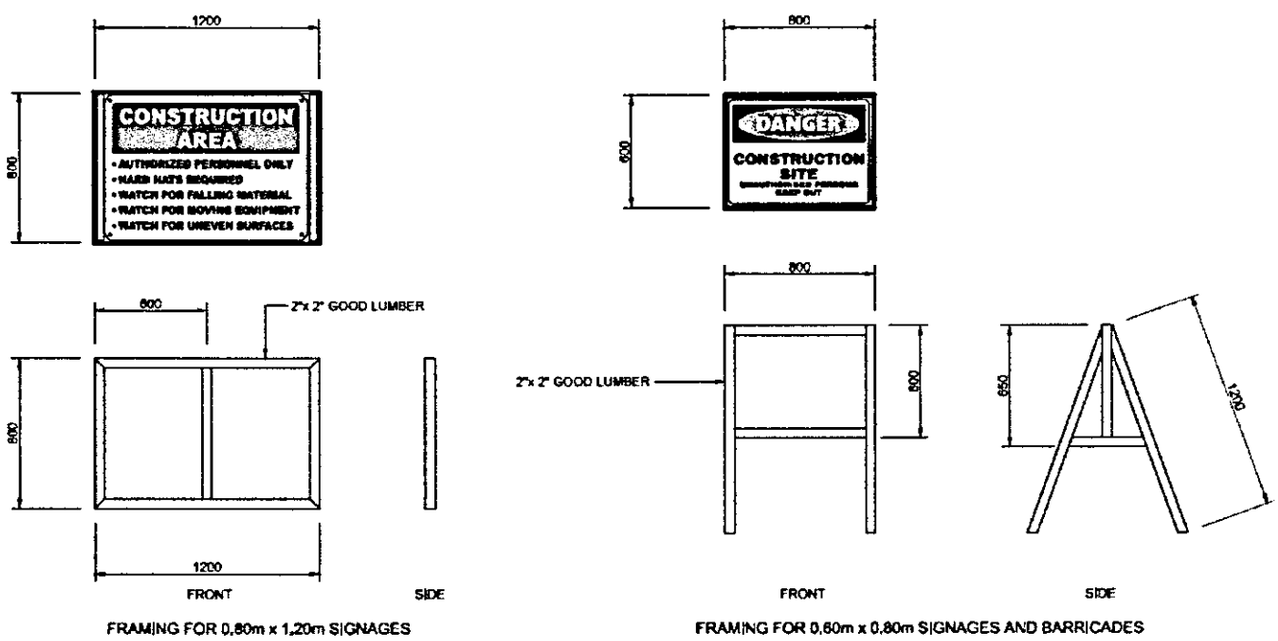
SPECIFICATION

The Signage's and Barricades shall be installed at location(s) designated by the Engineer.

The sizes of the standard signages shall be 2-2/3ft x 4ft (800mm X 1,200mm) for fixed type and 2ft x 2–2/3ft (600mm x 800mm) for mobile type. For barricade standard 2ft x 2–2/3ft (600mm x 800mm) shall be provided.

The materials to be used for signages and barricades are ½ inch (12mm) marine plywood or tarpaulin poster on 2" x 2" (50mm x 50mm) good lumber frame (see drawing below).

The printing or painting shall be the discretion of the Engineer.



STANDARD PLAN FOR SIGNAGES AND BARRICADES

SECTION VII

DRAWINGS
(APPROVED PLANS)

SECTION VII

DRAWINGS AND APPROVED PLANS
(SEE ISSUED APPROVED PLANS)

LIST OF DRAWINGS:

1 of 30 - General Plan

2 of 30 - Ground Floor Plan

3 of 30 - Second Floor Plan

4 of 30 - Ground Floor Lighting Layout

5 of 30 - Second Floor Lighting Layout

6 of 30 - Ground Floor Reflected Ceiling Plan

7 of 30 - Second Floor Reflected Ceiling Plan

8 of 30 - Detailed Ceiling Plan (Second Floor)

9 of 30 - PTB Ground Floor Plan (Existing)

10 of 30 - Front Elevation, Rear Elevation

11 of 30 - Right Side Elevation, Left Side Elevation

12 of 30 - Cross Section, Longitudinal Section

13 of 30 - Comfort Rooms Ground Floor Plans

14 of 30 - Comfort Rooms Second Floor Plans

15 of 30 - Section "A", Section "B", Section "C", Section "D", Section "E",

16 of 30 - Front Elevation, Detail of Steel Grilles at Covered Walkway

17 of 30 - Plan of PTB Perimeter Fence

18 of 30 - Plan of Perimeter Fence - 2

19 of 30 - Fence Elevation-1, Fence Elevation-2, Fence Elevation-3

20 of 30 - Fence Elevation, Gate Layout

21 of 30 - Gate No. 2 Details

22 of 30 - Gate No. 3 Details

23 of 30 - Typical Detail Fabricated Reinforced Hinge,
Typical Detail Fabricated Reinforced Bolts

24 of 30 - RC Post Detail, Location Plan

25 of 30 - Typical Detail of Steel Fence at Covered Walkway,
Detail of Steel Fence at Covered Walkway,
Elevation of Steel Fence at Covered Walkway

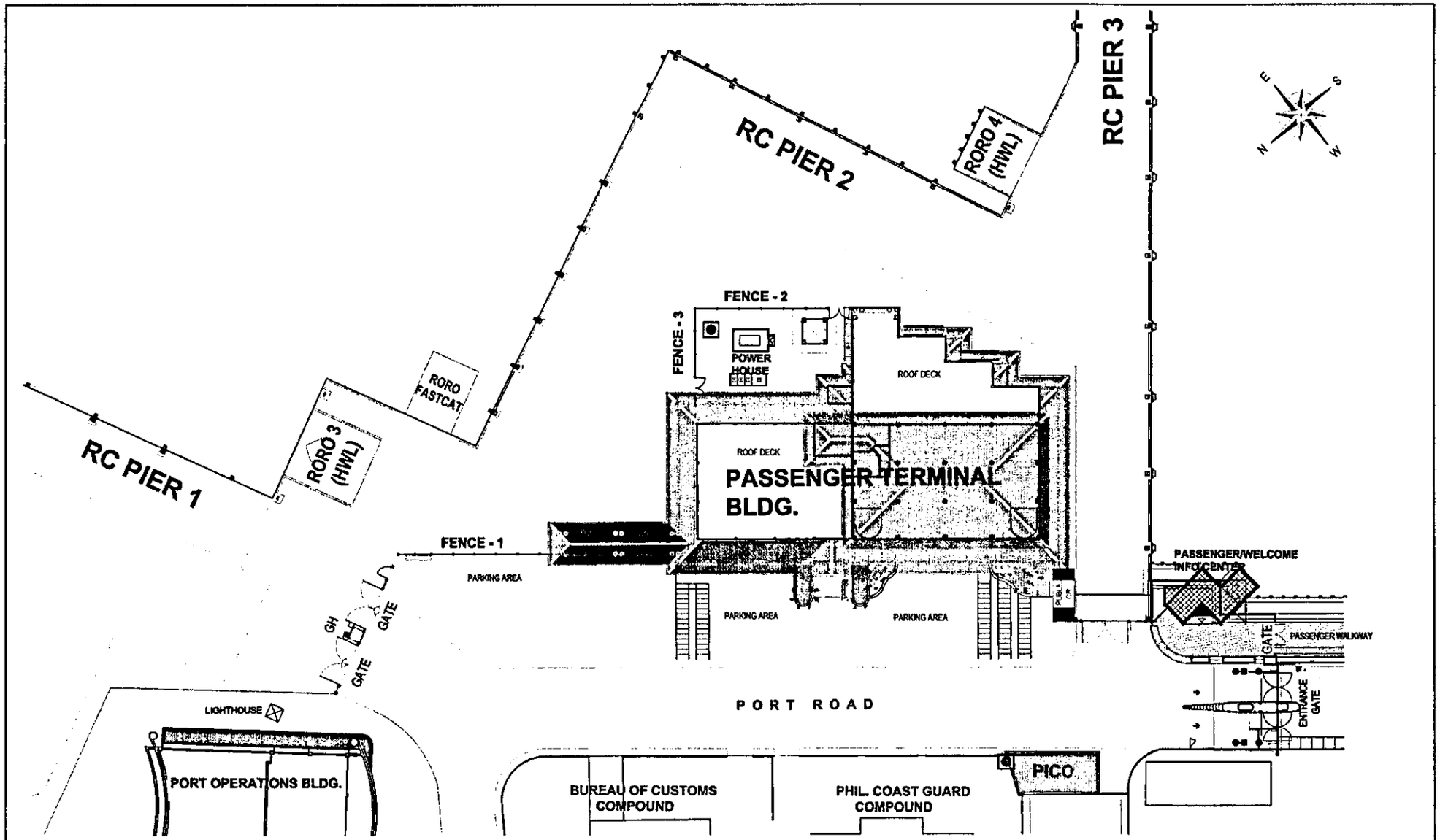
26 of 30 - Detail of Steel Fence at Main Exit

27 of 30 - Powerhouse (Floor Plan, Reflected Ceiling Plan, Longitudinal Section,
Front Elevation, Left Side Elevation and Rear Elevation)

28 of 30 - Ground Floor Plumbing Layout (New), Detailed Connection

29 of 30 - Second Floor Plumbing Layout (New)

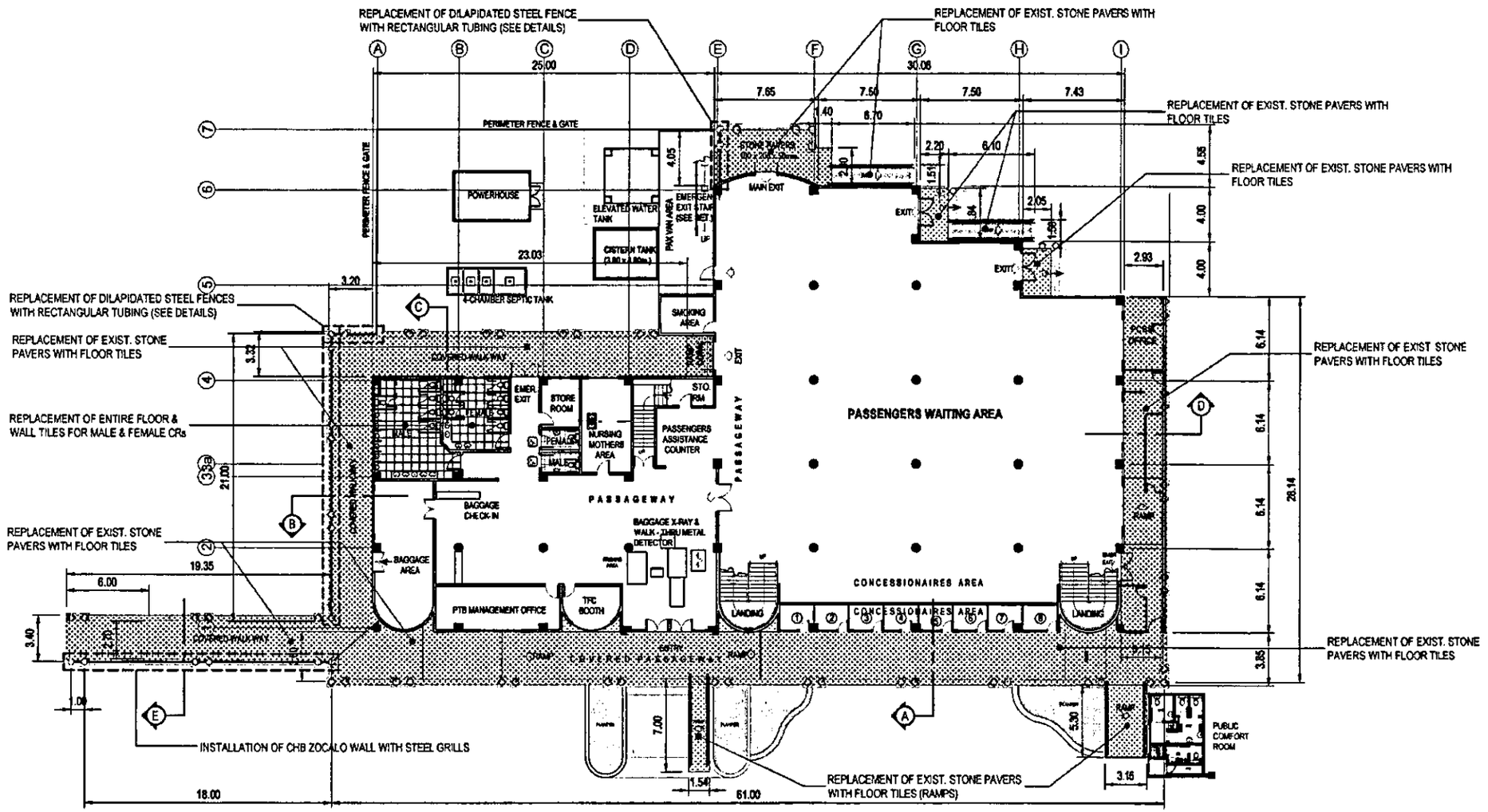
30 of 30 - Plan, Section "C-C", Location Plan



GENERAL PLAN

SCALE: 1 : 250 MTS.

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES Construction Foreman A	JOEL S. LARENA Principal Engineer A	HUBERT P. MITMIT ESD Manager	SARAH R. MIJARES Port Manager	1 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY						

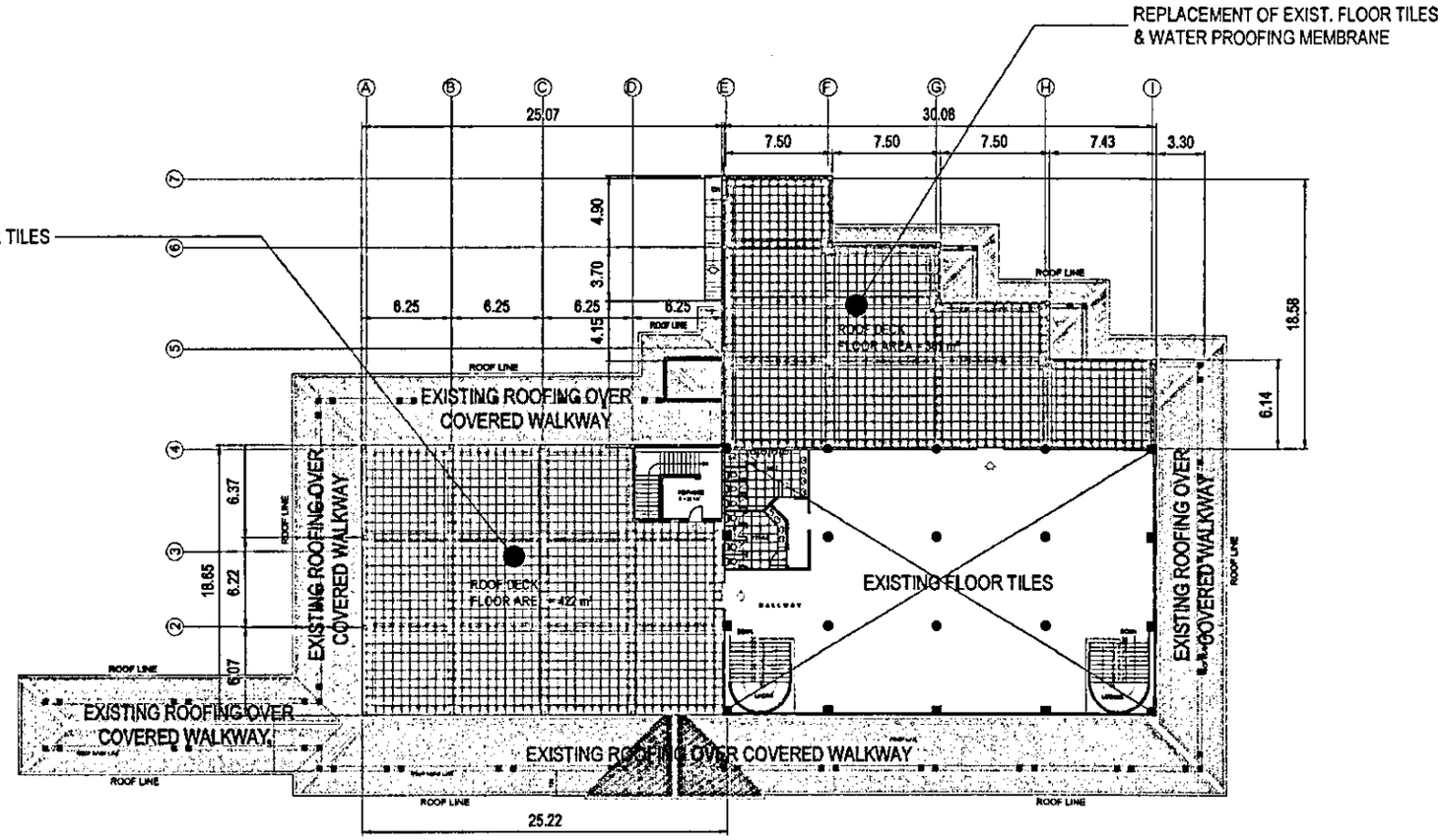


GROUND FLOOR PLAN (EXISTING)

SCALE: 1 : 250 MTS.

REPLACEMENT OF STONE PAVERS WITH NON-SKID FLOOR TILES OF COVERED WALKWAY & INSTALLATION OF CHB ZOCALO WALL WITH STEEL GRILLS

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITWIT	SARAH R. TAGARES	2 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	



SECOND FLOOR PLAN (EXISTING)

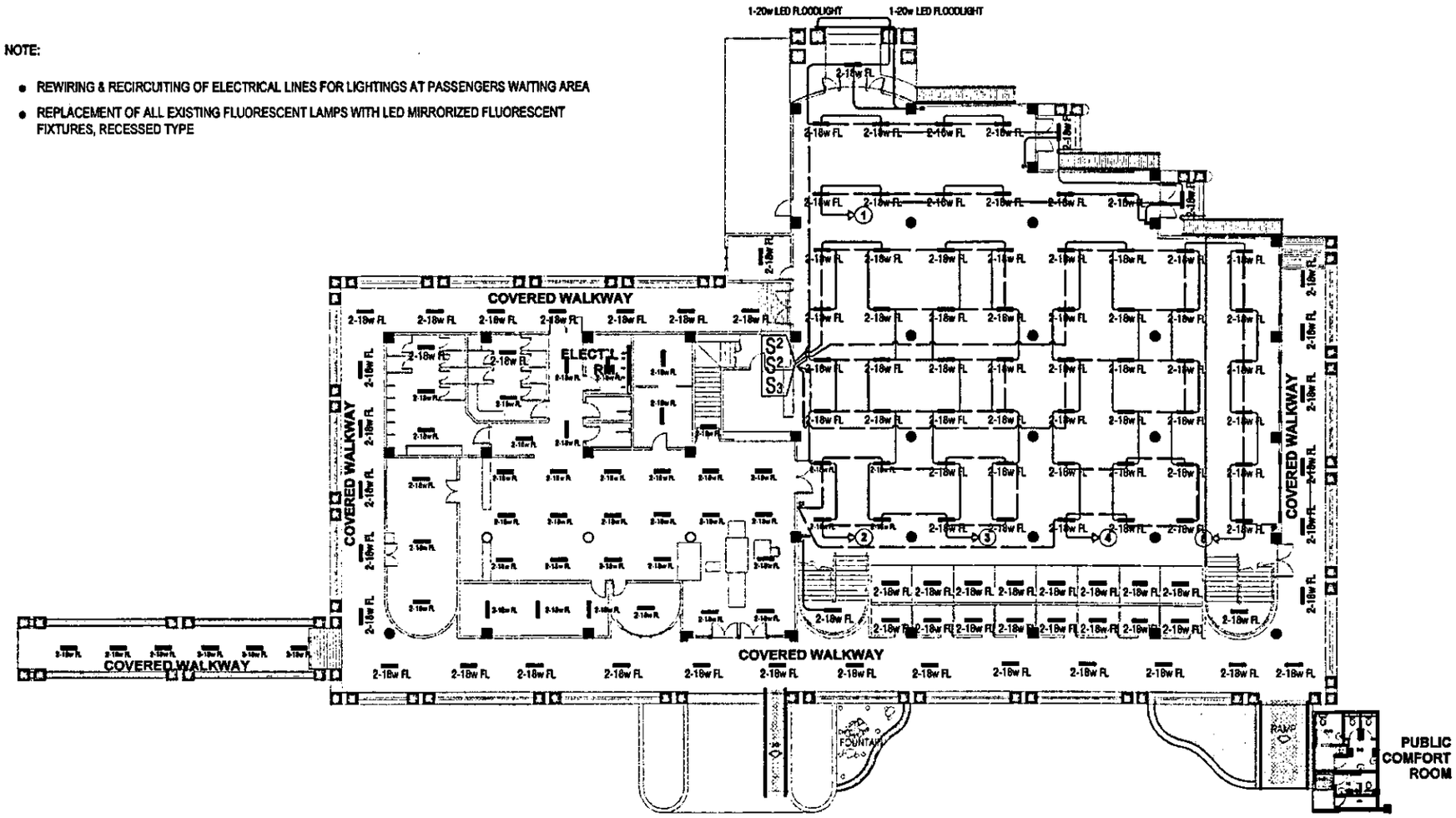
SCALE: 1 : 250 MTS.

REPLACEMENT OF NON-SKID FLOOR TILES ON ROOF DECKS INCLUDING REPLACEMENT OF WATERPROOFING MEMBRANE

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	3 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	

NOTE:

- REWIRING & RECIRCUITING OF ELECTRICAL LINES FOR LIGHTINGS AT PASSENGERS WAITING AREA
- REPLACEMENT OF ALL EXISTING FLUORESCENT LAMPS WITH LED MIRRORIZED FLUORESCENT FIXTURES, RECESSED TYPE



GROUND FLOOR LIGHTING LAYOUT

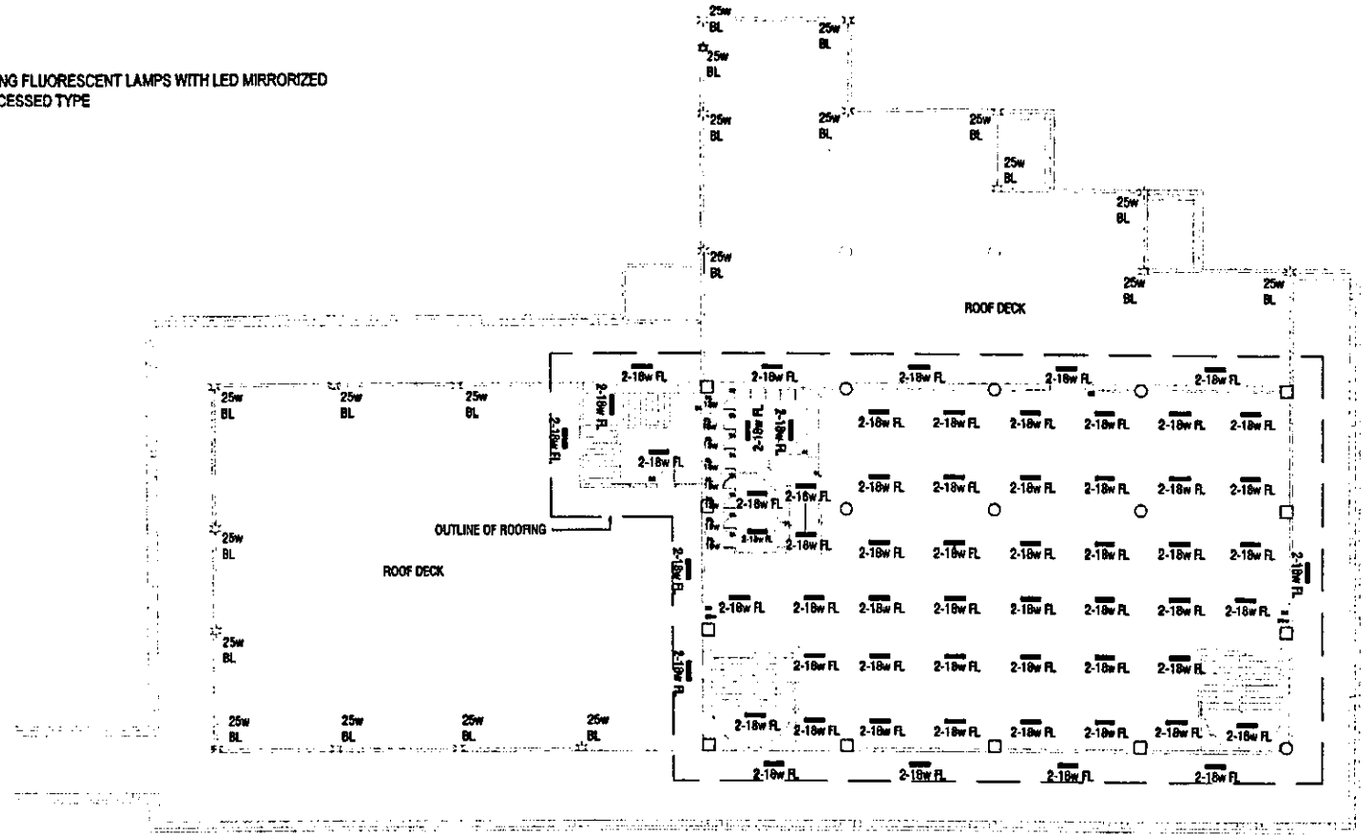
SCALE: 1 : 250 MTS.

REWIRING OF ELECTRICAL LINES FOR LIGHTINGS & RECIRCUITS AT PASSENGERS WAITING AREA PORTION

	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	AS SHOWN	ROLANDO C. AMORES Construction Foreman A	JOEL S. LARENA Principal Engineer A	HUBERT P. MITMIT ESD Manager	SARAH R. MIJARES Port Manager	4 30

NOTE:

- REPLACEMENT OF ALL EXISTING FLUORESCENT LAMPS WITH LED MIRRORIZED FLUORESCENT FIXTURES, RECESSED TYPE

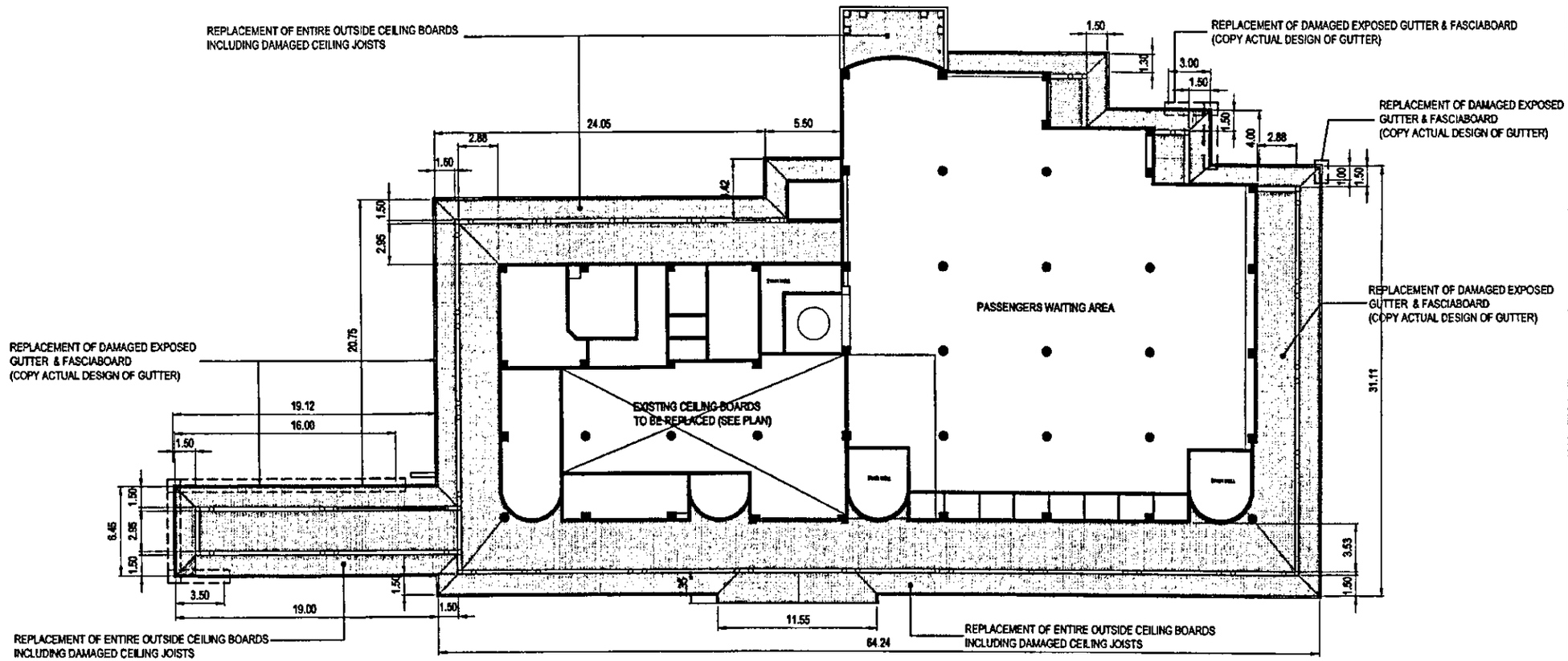


SECOND FLOOR LIGHTING LAYOUT

SCALE: 1 : 250 MTS.

REPLACEMENT OF EXISTING FLUORESCENT TUBES WITH LED MIRRORIZED FLUORESCENT FIXTURES, RECESSED TYPE

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	5 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	

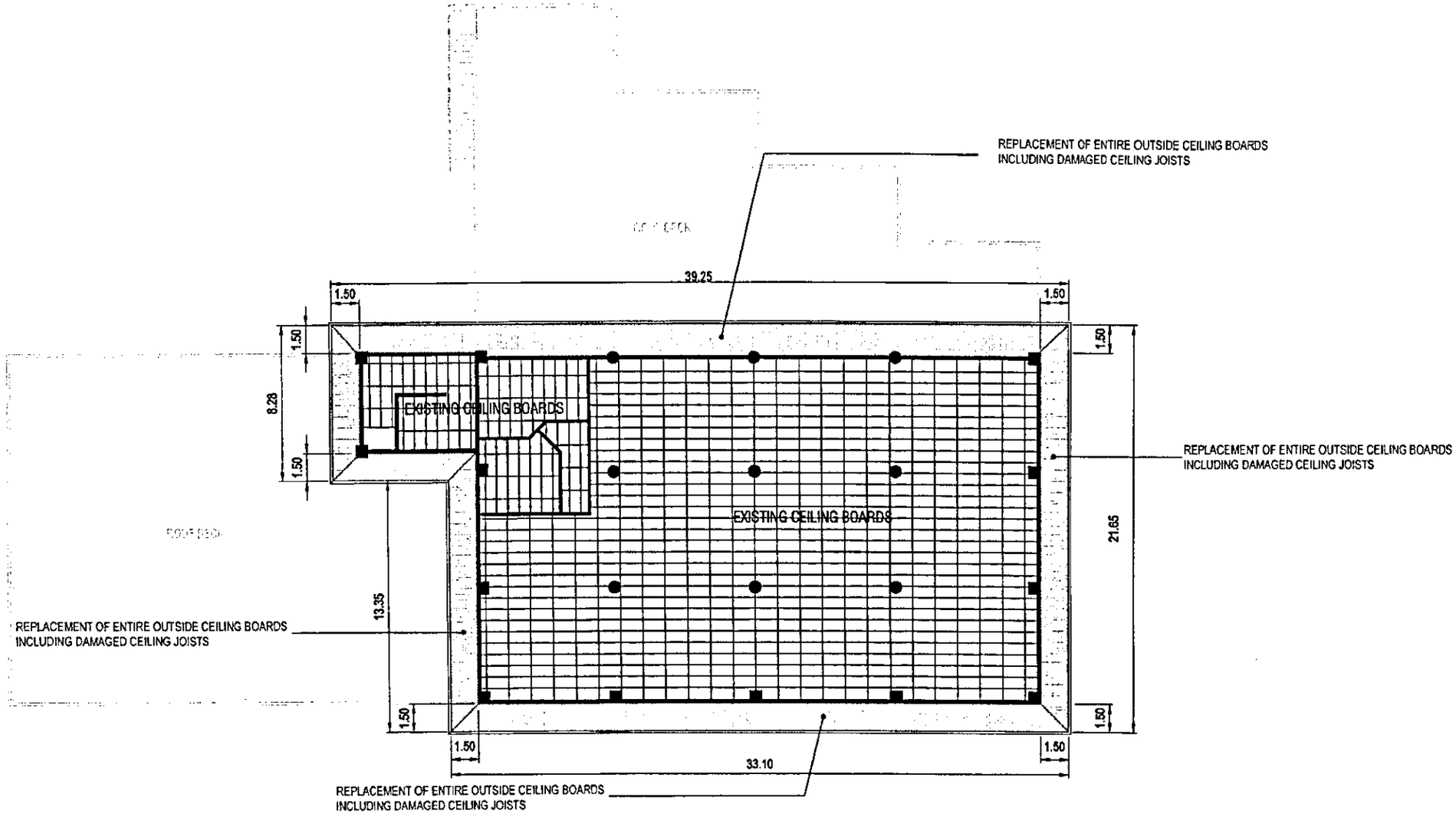


GROUND FLOOR REFLECTED CEILING PLAN

SCALE: 1 : 250 MTS.

RESTORATION & REPLACEMENT OF DILAPIDATED EXTERIOR CEILINGS, METAL FURRING, FASCIABOARD & EXPOSED GUTTER

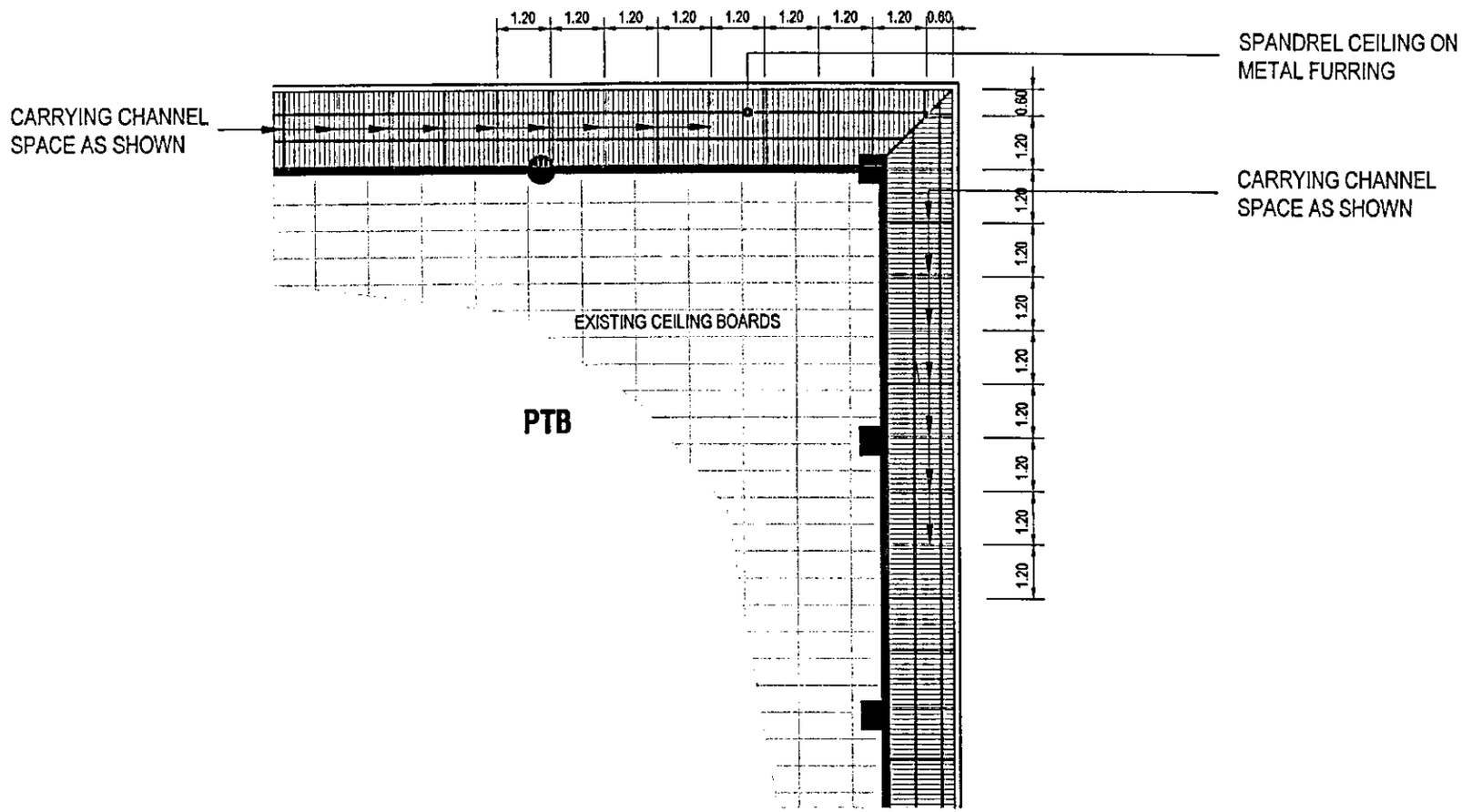
PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	AS SHOWN	ROLANDO C. AMORES Construction Foreman A	JOEL S. LARENA Principal Engineer A	HUBERT P. MITMIT ESD Manager	SARAH R. MIJARES Port Manager	6 30



SECOND FLOOR REFLECTED CEILING PLAN

REPLACEMENT OF ENTIRE OUTSIDE CEILING BOARDS INCLUDING DAMAGED CEILING JOISTS

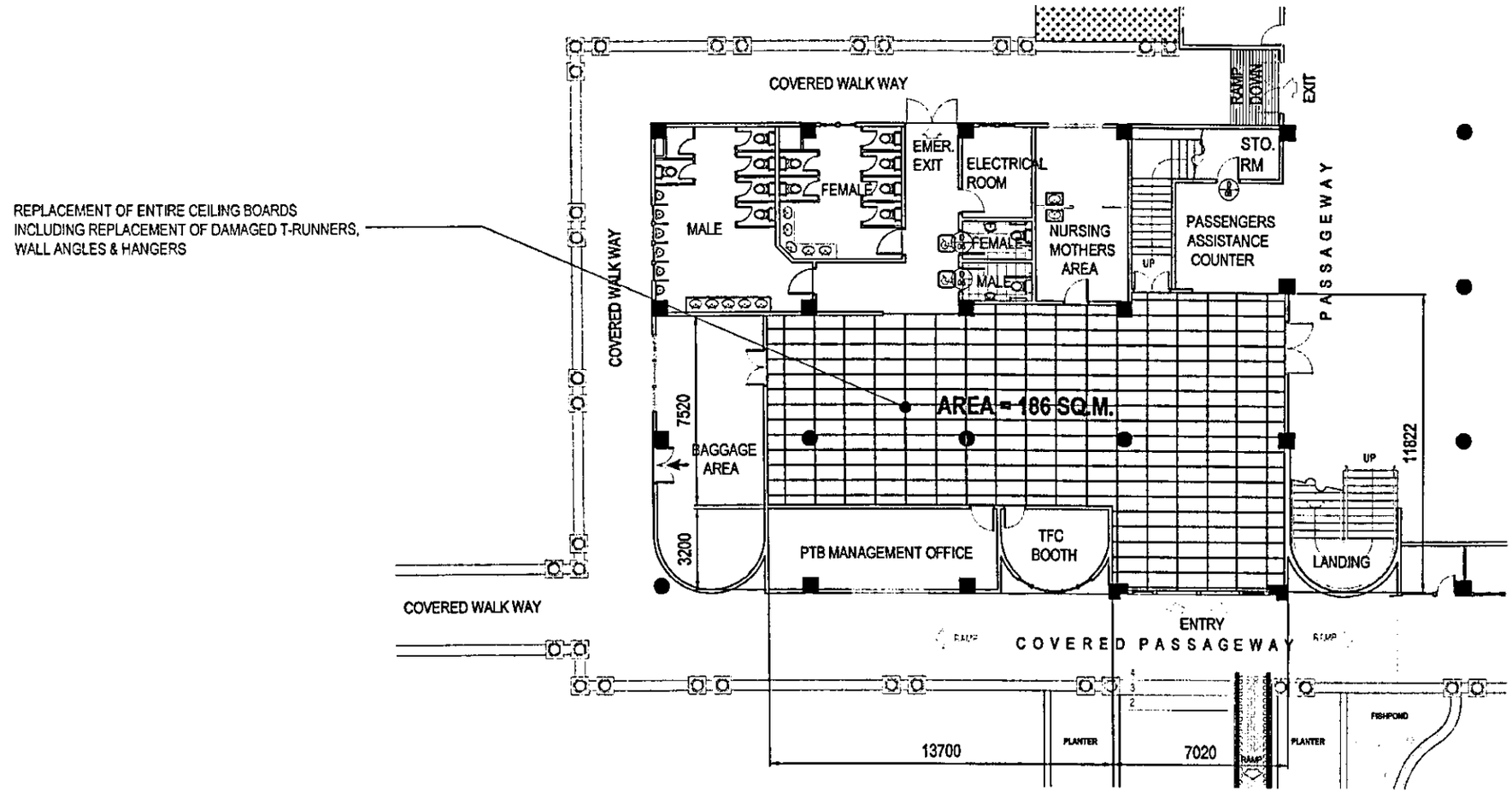
PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES Construction Foreman A	JOEL S. LARENA Principal Engineer A	HUBERT P. MITMIT ESD Manager	SARAH R. MIJARES Port Manager	7 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY						



DETAILED CEILING PLAN (SECOND FLOOR)

REPLACEMENT OF CEILING BOARDS

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL S. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 8 / 30

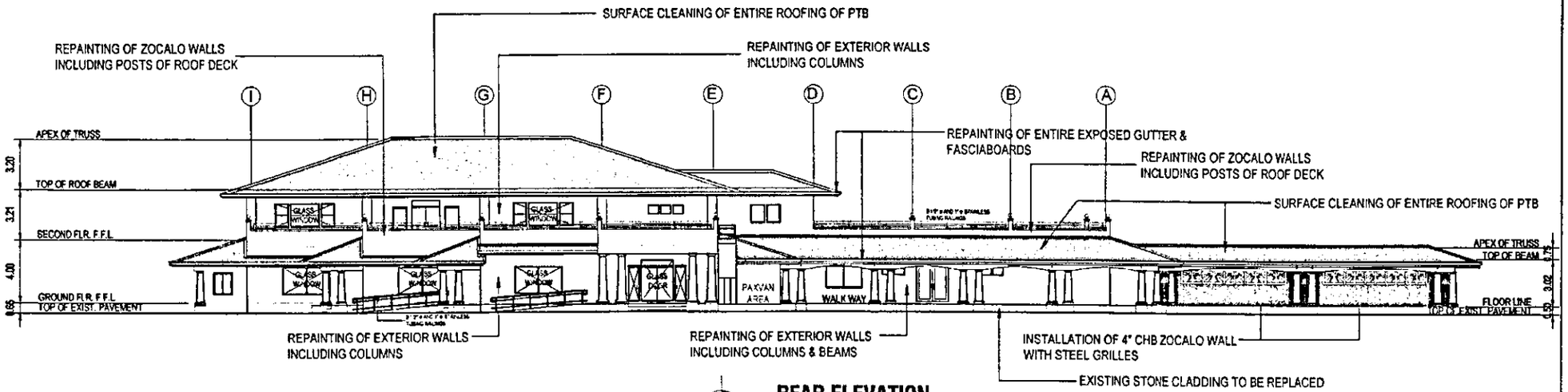


PTB GROUND FLOOR PLAN (EXISTING)

SCALE: 1 : 250 MTS.

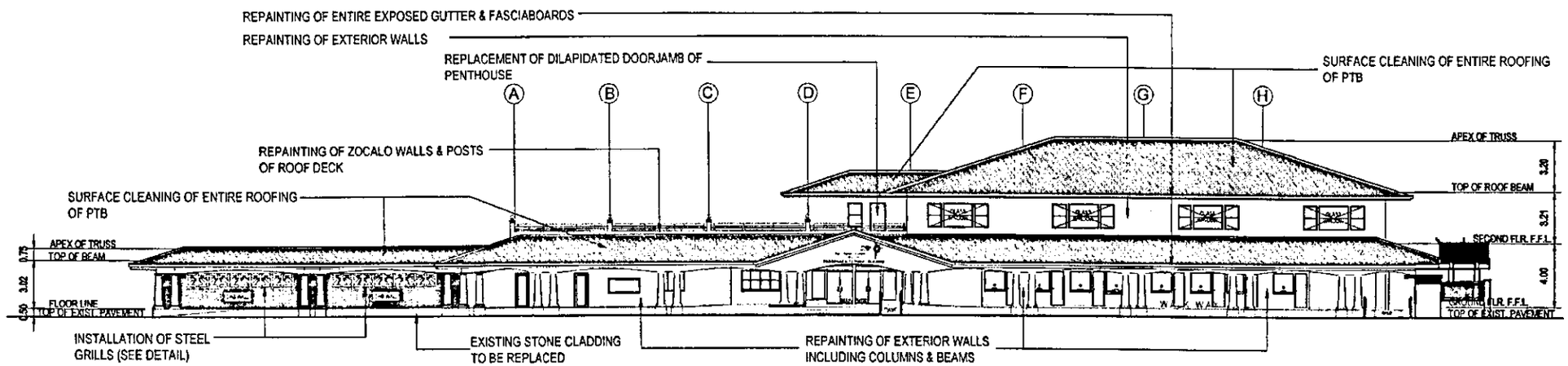
REPLACEMENT OF CEILING BOARDS

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL S. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 9 / 30



REAR ELEVATION

SCALE: 1 : 250 MTS.

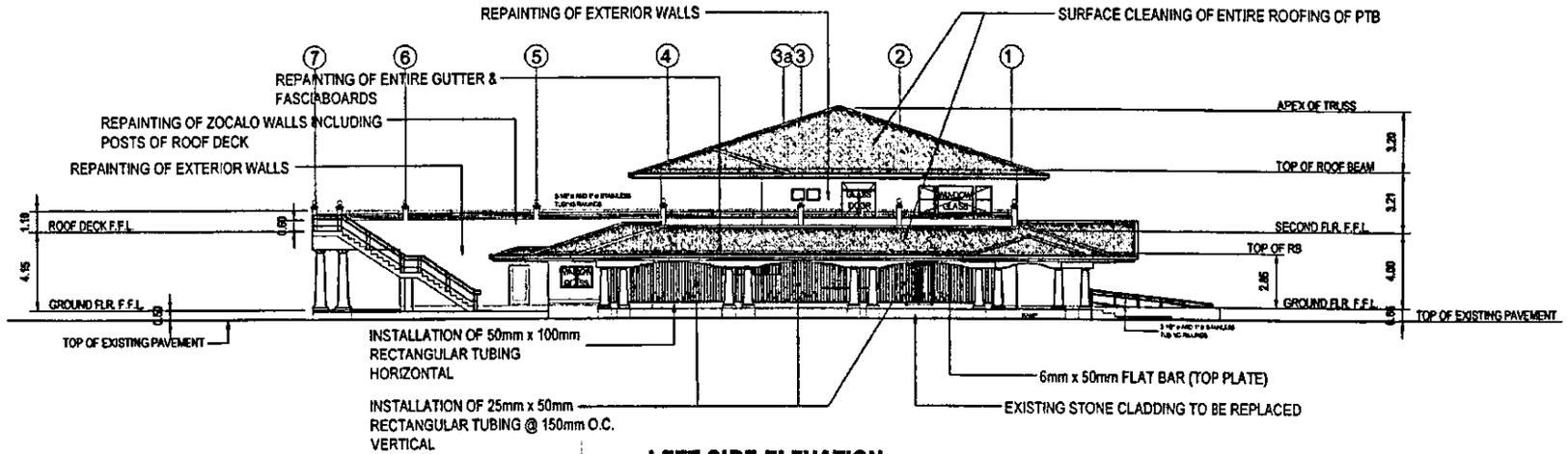


FRONT ELEVATION

SCALE: 1 : 250 MTS.

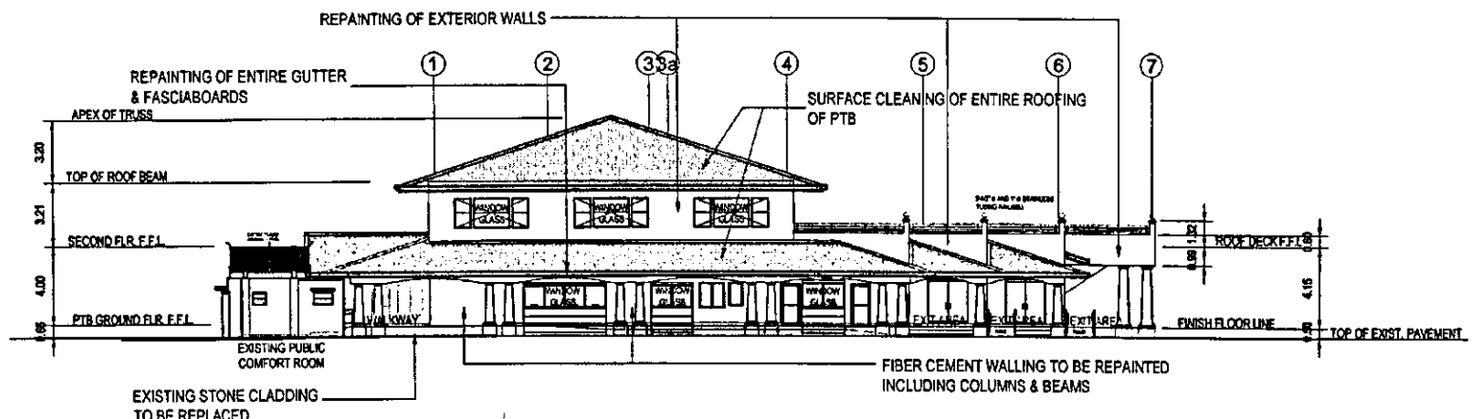
REPAINTING OF EXTERIOR WALLS INCLUDING COLUMNS & BEAMS

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL S. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 10/30



LEFT SIDE ELEVATION

SCALE: 1 : 250 MTS.

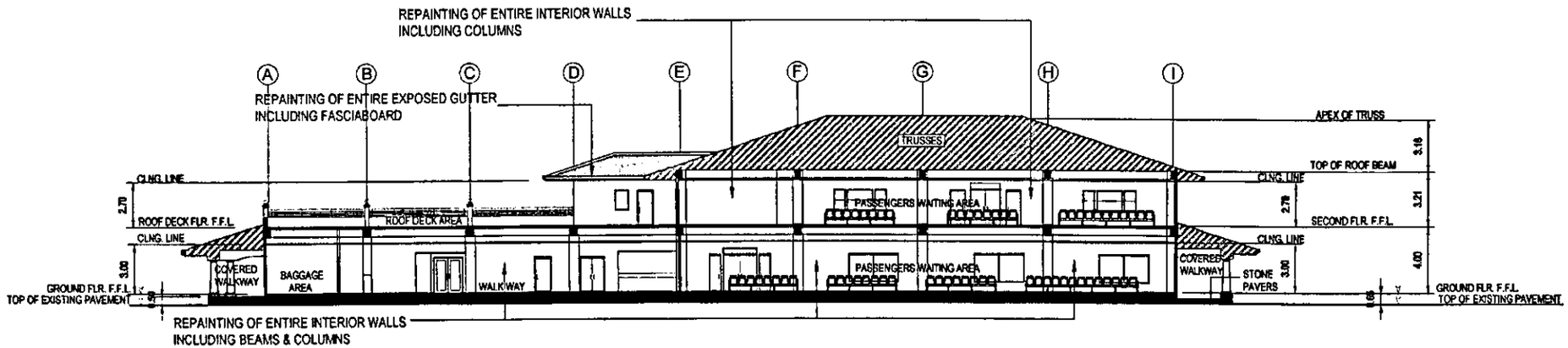


RIGHT SIDE ELEVATION

SCALE: 1 : 250 MTS.

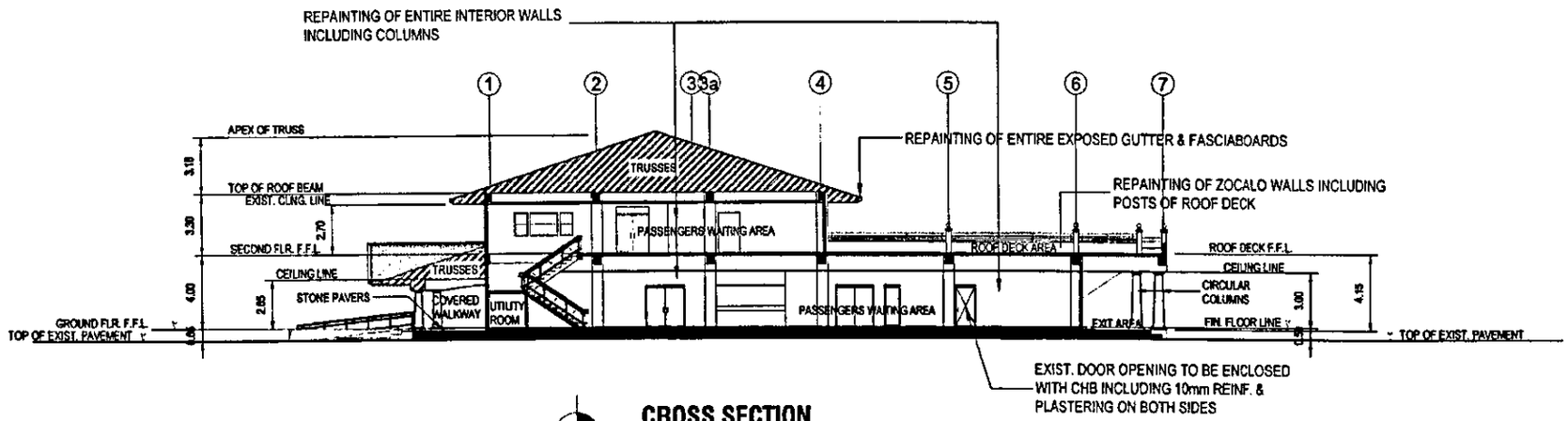
REPAINTING OF ENTIRE INTERIOR WALLS INCLUDING COLUMNS & BEAMS

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	11 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	



LONGITUDINAL SECTION

SCALE: 1 : 250 MTS.

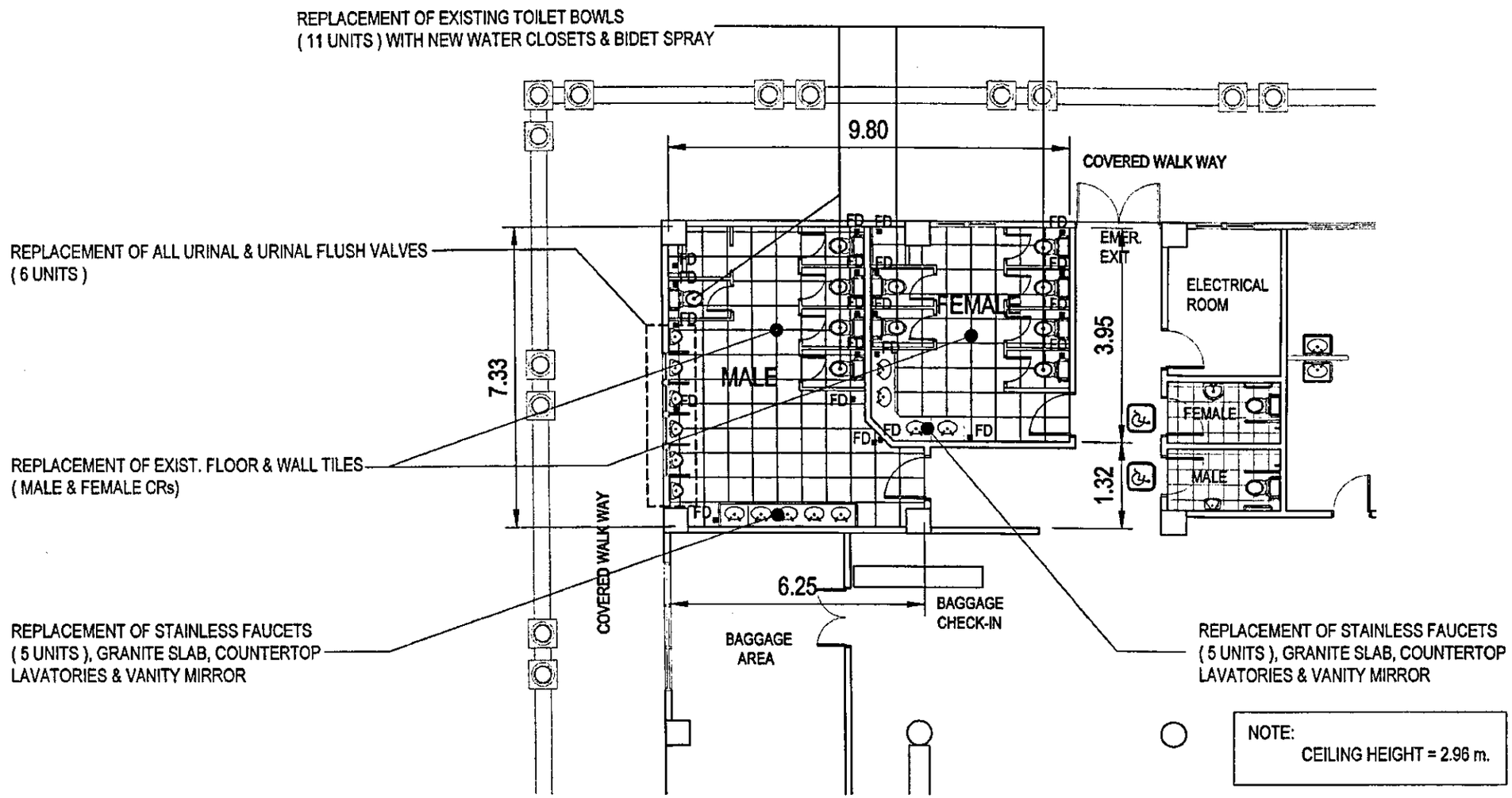


CROSS SECTION

SCALE: 1 : 250 MTS.

REPAINTING OF EXTERIOR WALLS INCLUDING COLUMNS, BEAMS & FASCIABOARDS

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL S. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT R. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 12/30



NOTE:
CEILING HEIGHT = 2.96 m.

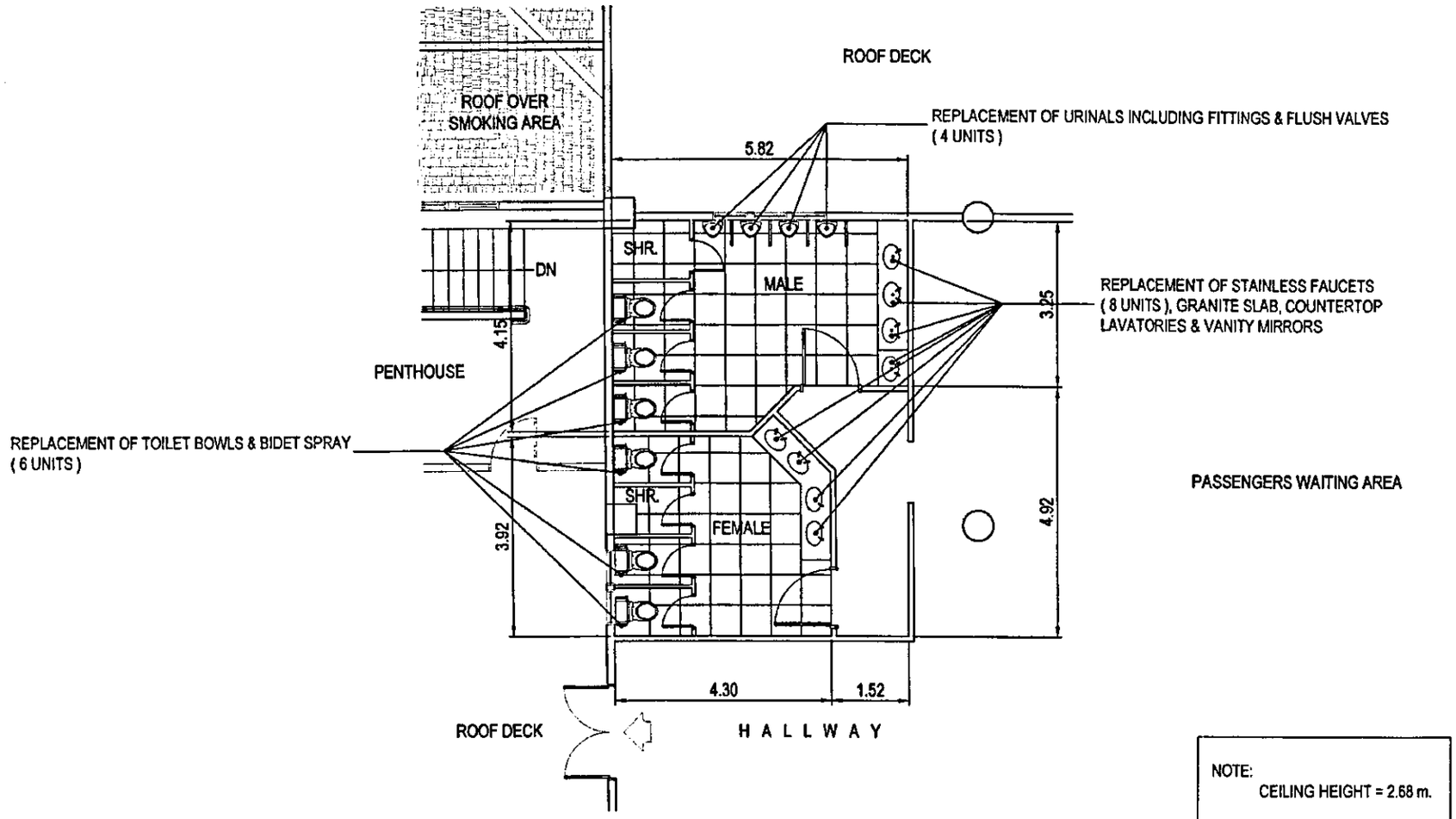
COMFORT ROOMS GROUND FLOOR PLAN (EXISTING)

SCALE: 1 : 60 MTS.

NOTE:

- RESTORATION OF COMFORT ROOMS FOR MALE & FEMALE CR (REPLACEMENT OF ENTIRE FLOOR & WALL TILES, URINAL FLUSH VALVES, FAUCETS, FLOOR DRAINS, TOILET BOWLS WITH TANK & BIDET SPRAY, GRANITE SLAB, COUNTERTOP LAVATORIES & VANITY MIRRORS)

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL S. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 13/30



NOTE:
CEILING HEIGHT = 2.68 m.

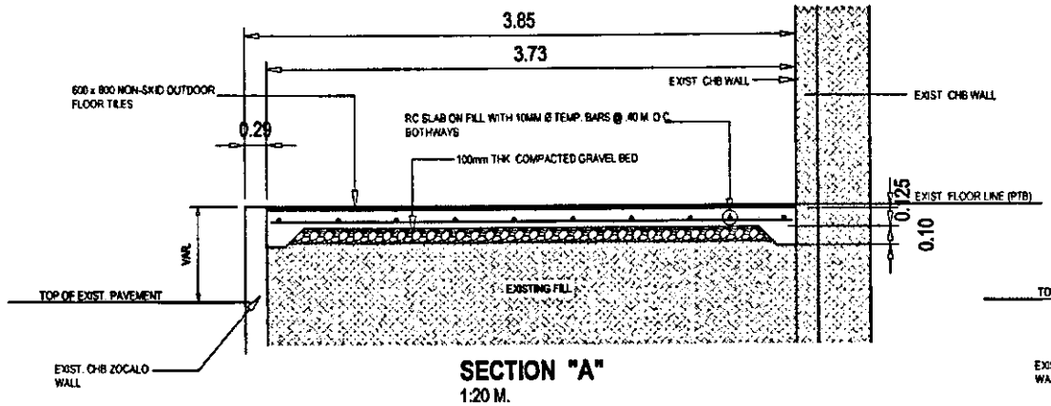
COMFORT ROOMS SECOND FLOOR PLAN (EXISTING)

SCALE: 1 : 50 MTS.

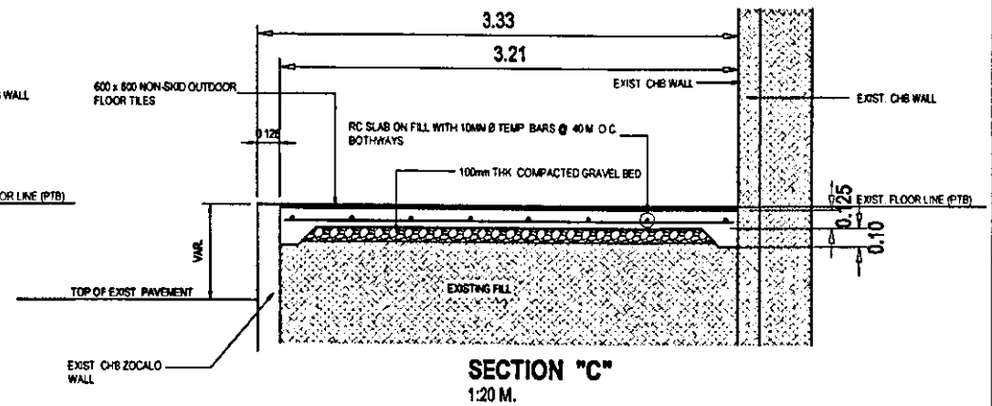
NOTE:

- RESTORATION OF COMFORT ROOMS FOR MALE & FEMALE CR (REPLACEMENT OF ENTIRE FLOOR TILES, URINAL FLUSH VALVES, FAUCETS, FLOOR DRAINS, TOILET BOWLS WITH TANK & BIDET SPRAY, GRANITE SLAB, COUNTERTOP LAVATORIES & VANITY MIRRORS)

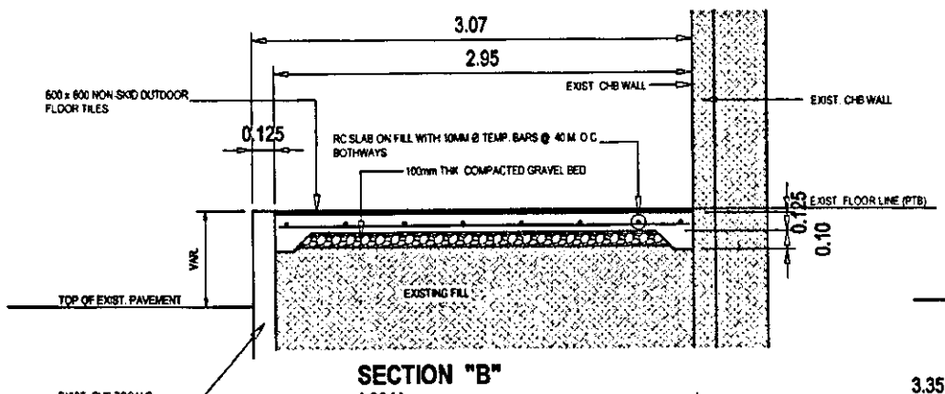
PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL B. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 14 / 30



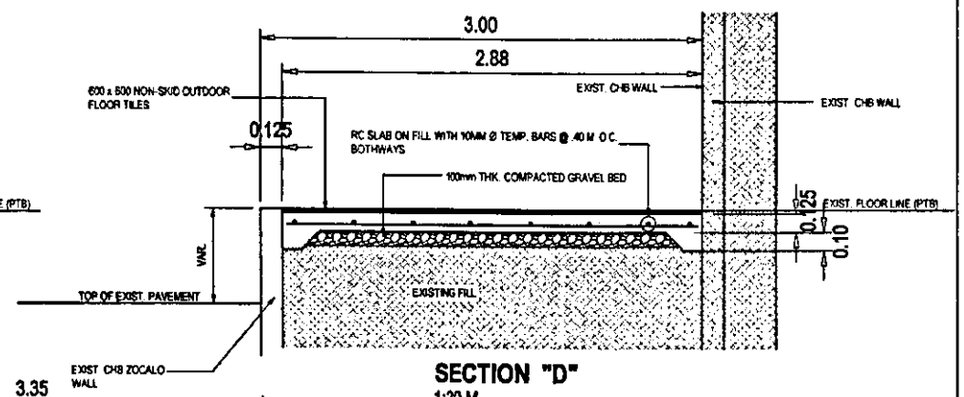
SECTION "A"
1:20 M.



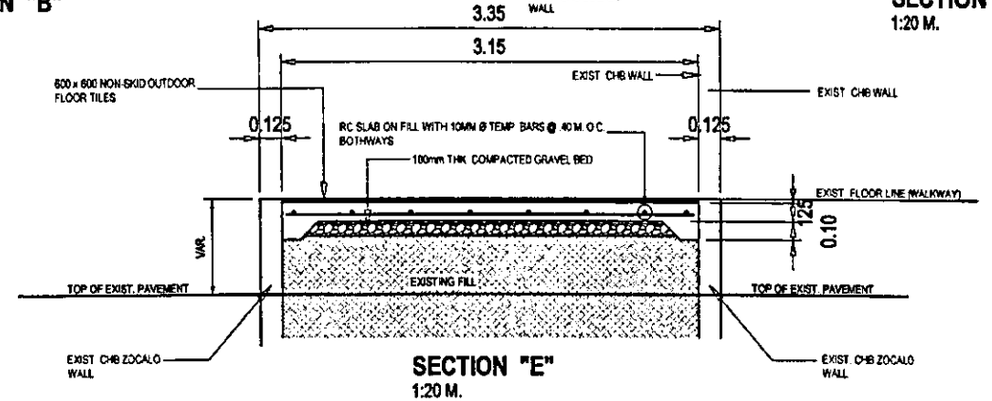
SECTION "C"
1:20 M.



SECTION "B"
1:20 M.



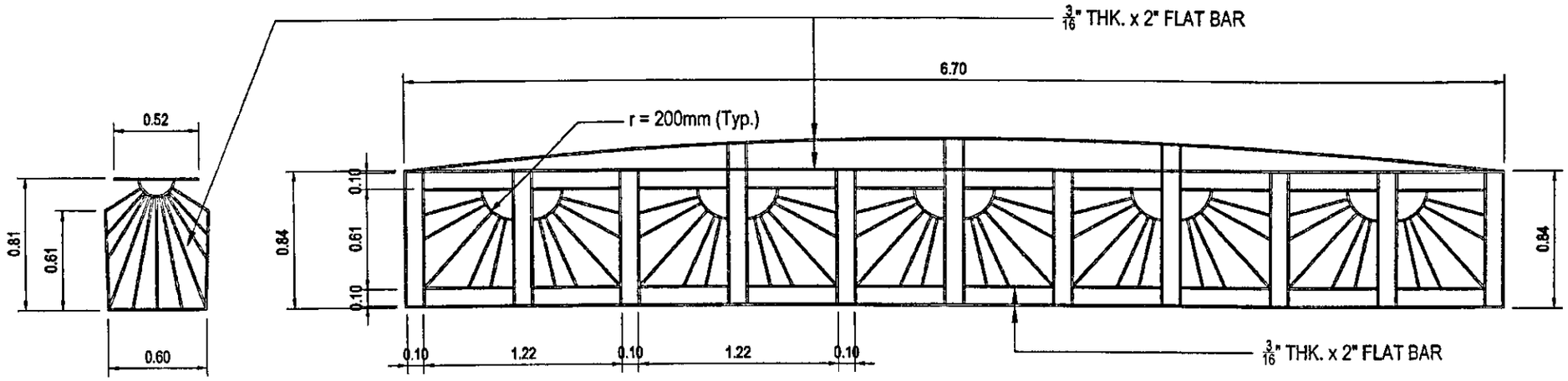
SECTION "D"
1:20 M.



SECTION "E"
1:20 M.

REPLACEMENT OF STONE PAVERS WITH NON-SKID FLOOR TILES AT COVERED WALKWAY

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL B. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 15 / 30

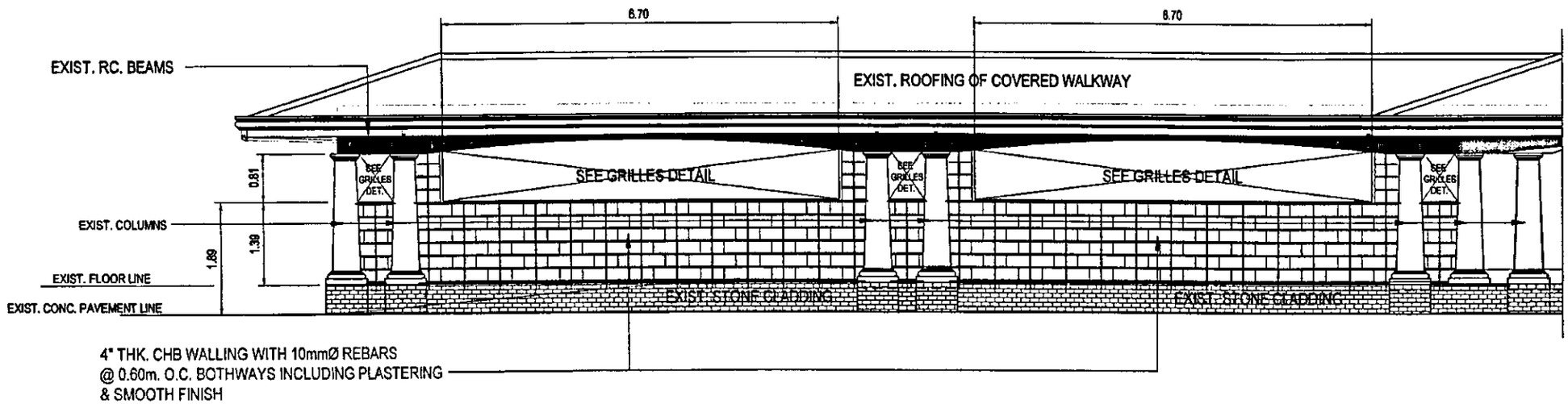


REQUIRED: THREE (3) SETS

REQUIRED: TWO (2) SETS

DETAIL OF STEEL GRILLS AT COVERED WALKWAY

SCALE: 1 : 25 MTS.

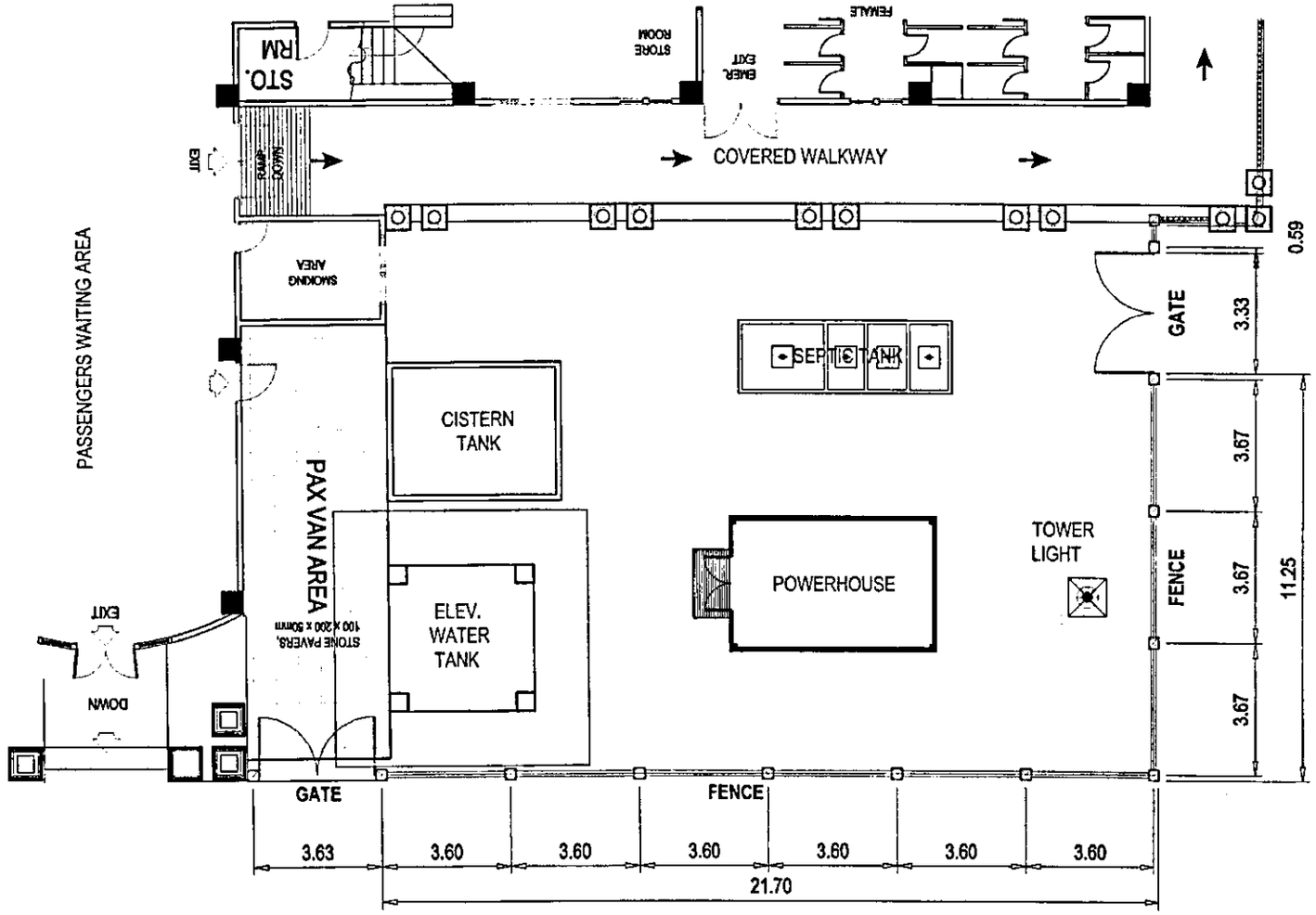


FRONT ELEVATION

SCALE: 1:250 MTS.

INSTALLATION OF CHB ZOCALO WALL & STEEL GRILLS AT COVERED WALKWAY

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL S. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 16 / 30

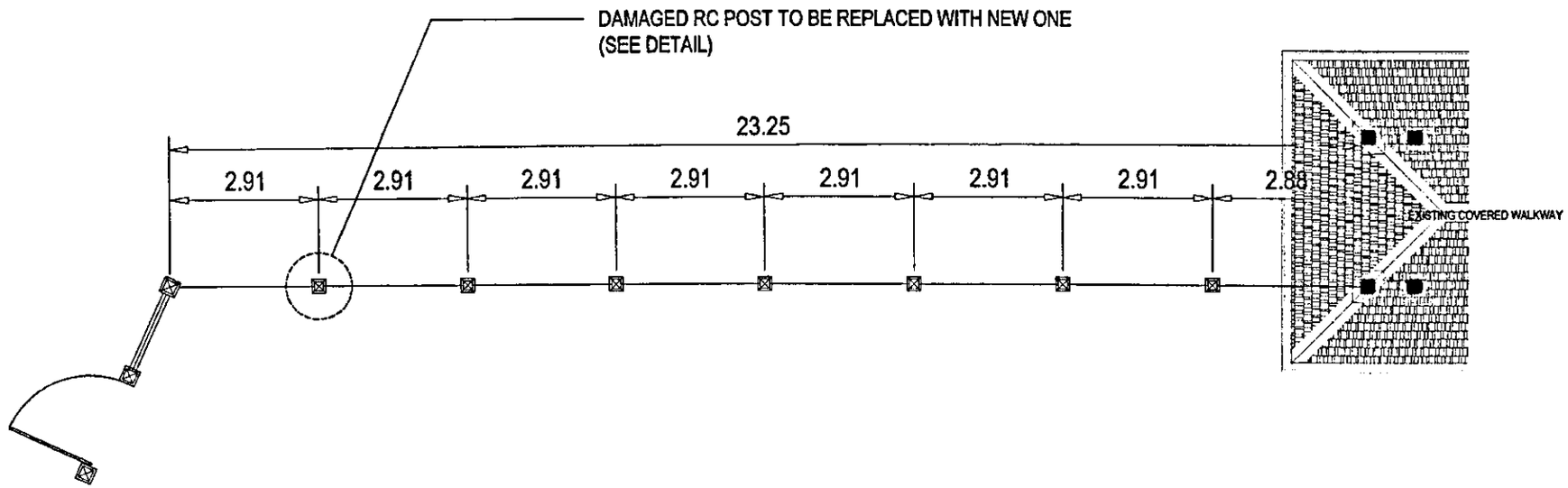


PLAN OF PTB PERIMETER FENCE

SCALE: 1 : 50 MTS.

RESTORATION & REPLACEMENT OF EXISTING PTB PERIMETER STEEL FENCE & GATES

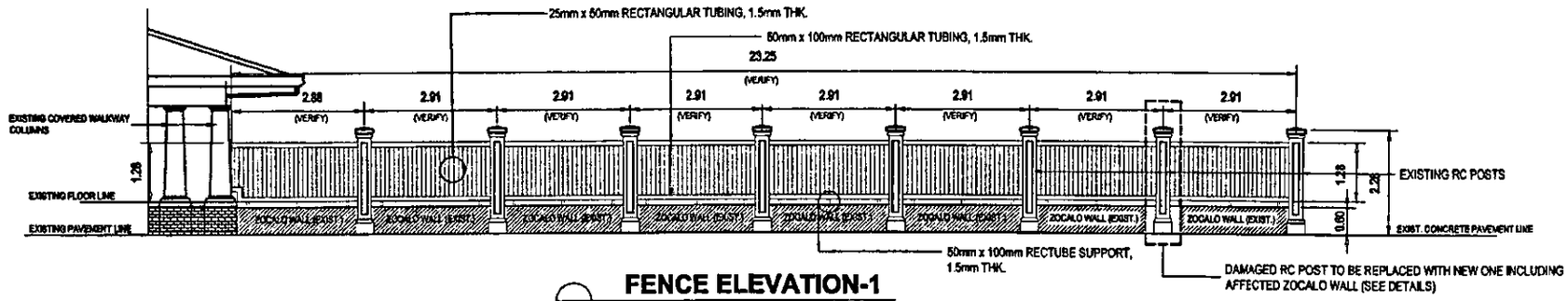
PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	AS SHOWN	ROLANDO C. AMORES Construction Foreman A	JOEL S. LARENA Principal Engineer A	HUBERT P. MITMIT ESD Manager	SARAH R. MIJARES Port Manager	17 30



PLAN OF PERIMETER FENCE - 2

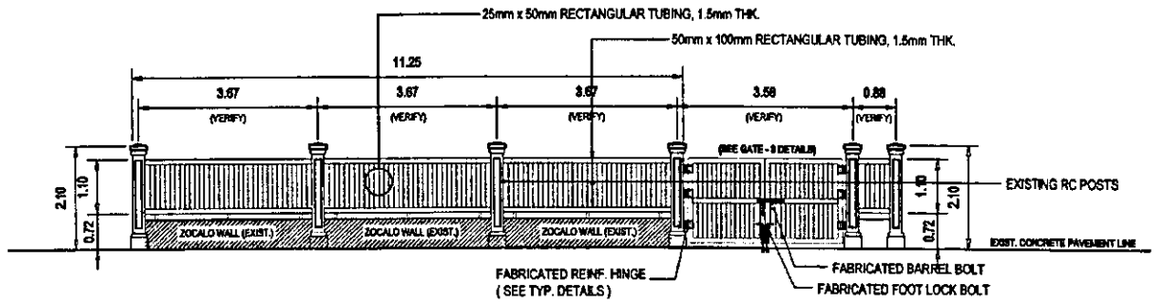
RESTORATION & REPLACEMENT OF DILAPIDATED STEEL FENCE INCLUDING
RESTORATION OF DAMAGED RC POST

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL S. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 18/30



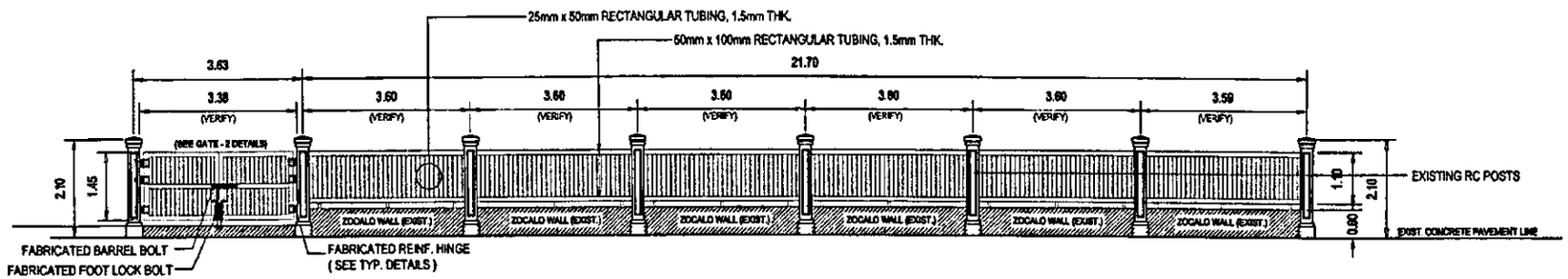
FENCE ELEVATION-1

SCALE: 1 : 100 MTS.



FENCE ELEVATION-3

SCALE: 1 : 100 MTS.

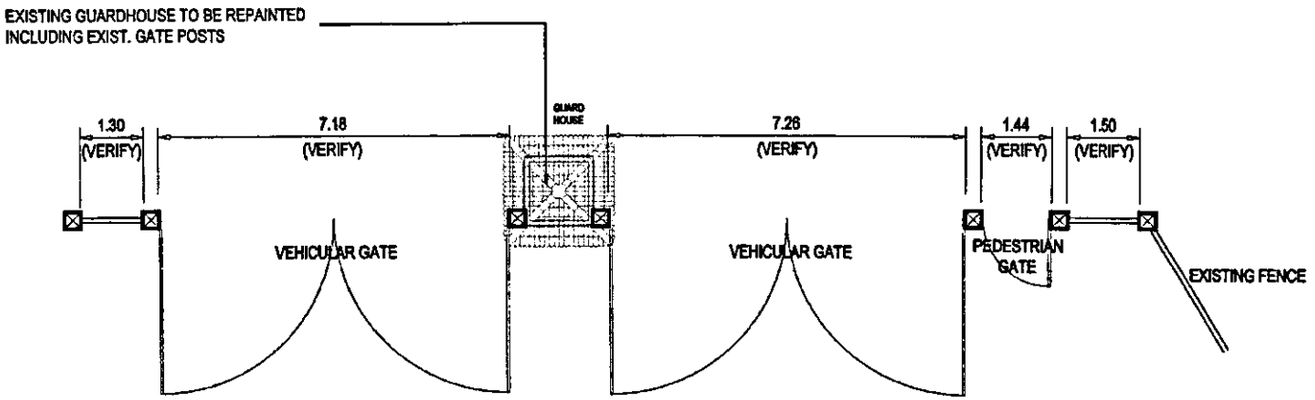


FENCE ELEVATION-2

SCALE: 1 : 100 MTS.

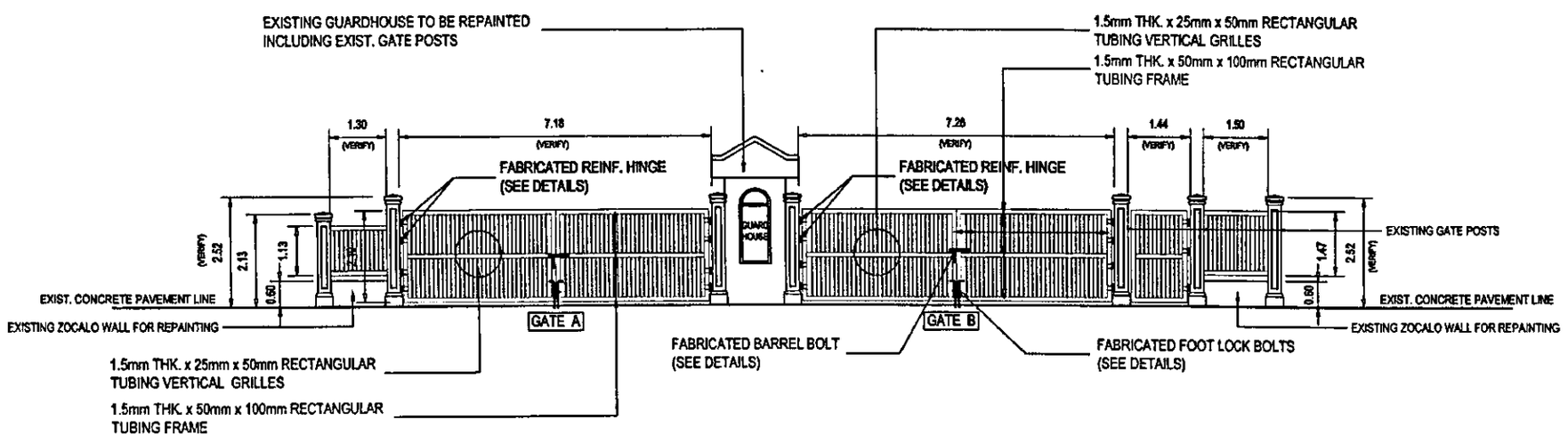
RESTORATION OF PTB PERIMETER FENCE & GATES

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	19 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	



GATE LAYOUT (EXISTING)

SCALE: 1 : 100 MTS.

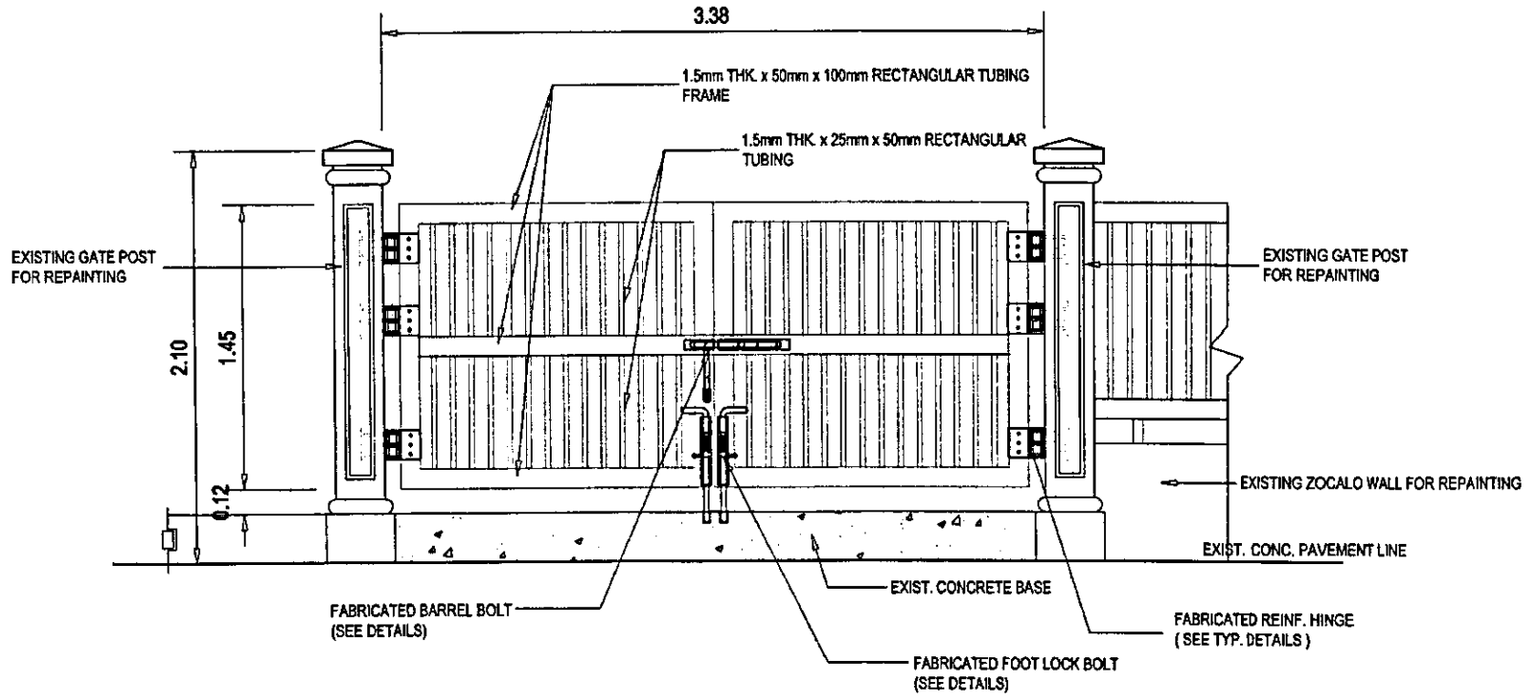


FENCE ELEVATION

SCALE: 1 : 100 MTS.

RESTORATION & REPLACEMENT OF DAMAGED STEEL GATES OF PIER 1

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	20 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	

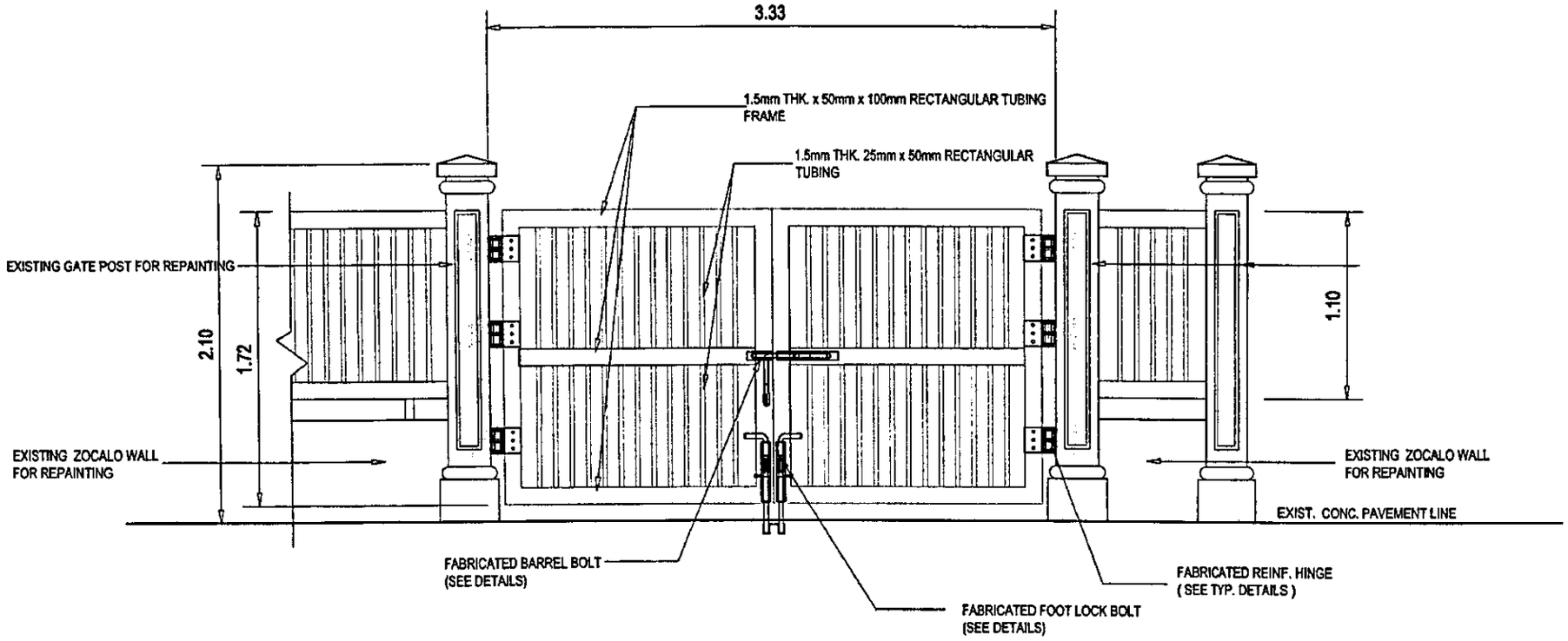


GATE NO. 2 DETAILS

SCALE : 1 : 25 MTS.

RESTORATION & REPLACEMENT OF DILAPIDATED STEEL GATE

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL B. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 21/30

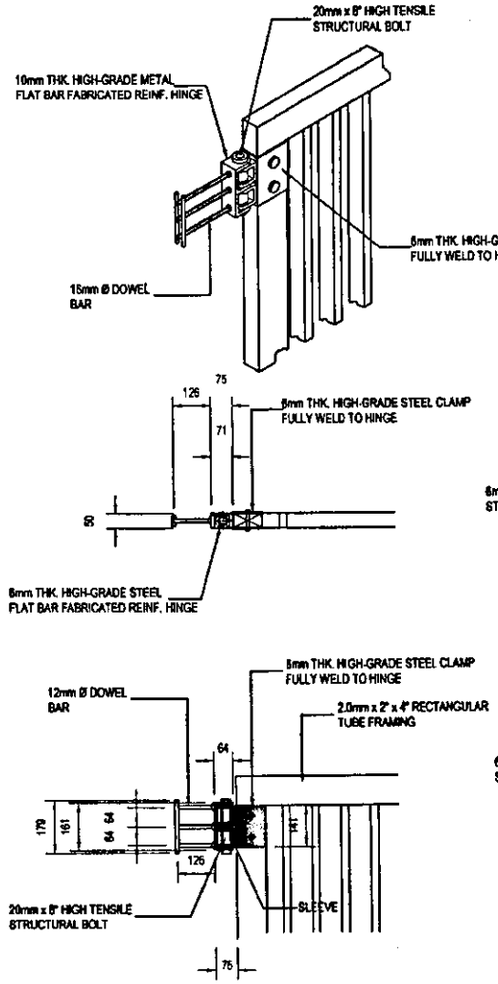


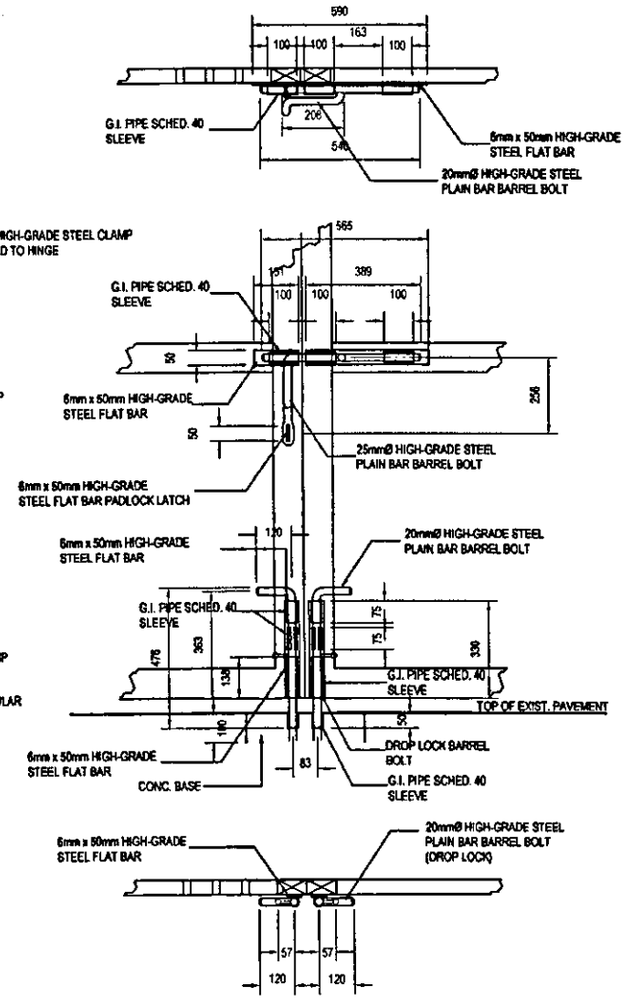
GATE NO. 3 DETAILS

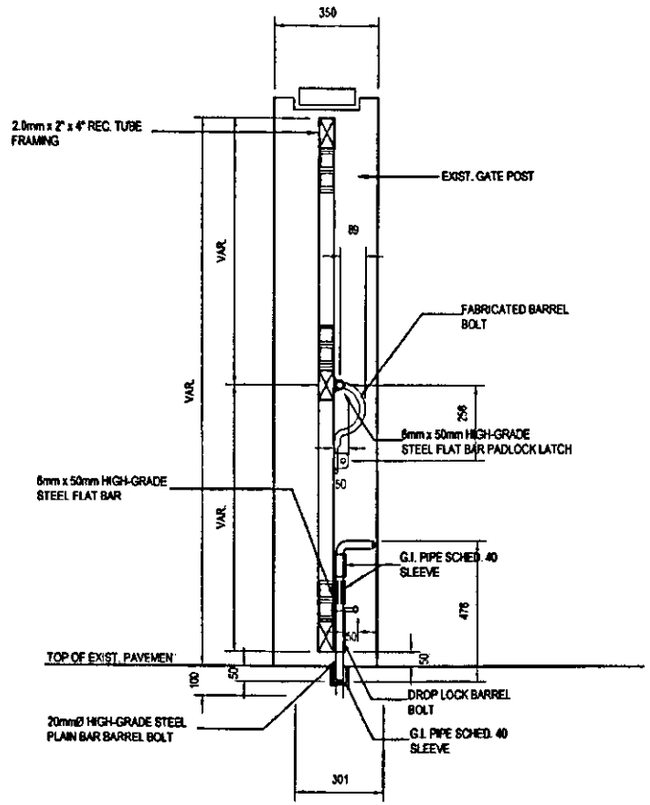
SCALE : 1 : 25 MTS.

RESTORATION & REPLACEMENT OF DILAPIDATED STEEL GATE

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	22 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESO Manager	Port Manager	







TYP. DET. FABRICATED REINFORCED HINGE

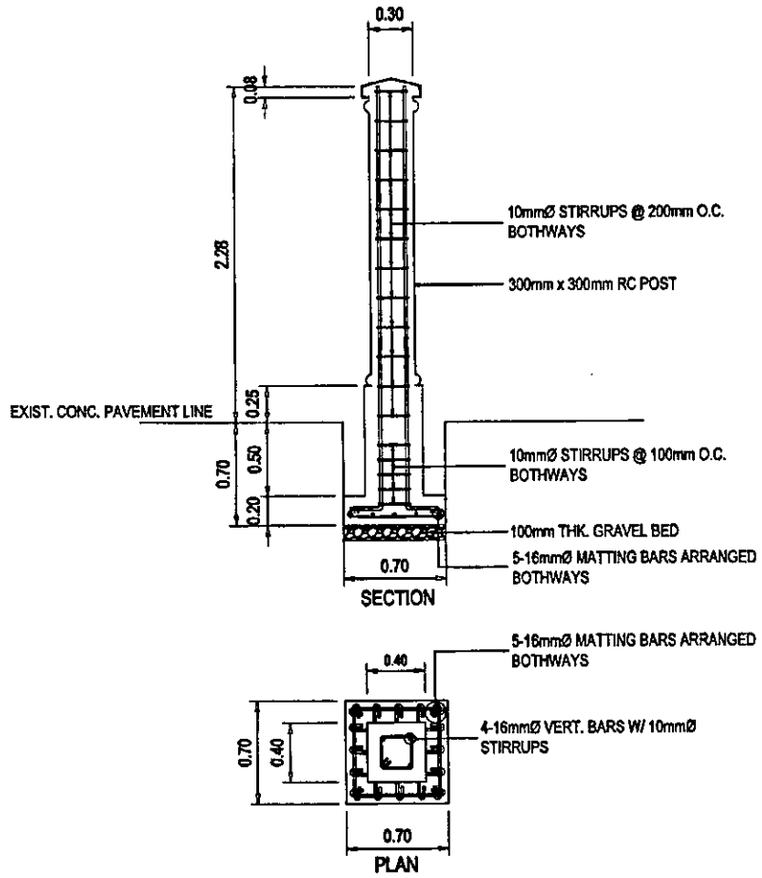
SCALE: 1 : 15 M.

TYP. DETAIL OF FABRICATED REINF. BARREL BOLTS

SCALE 1 : 15 M.

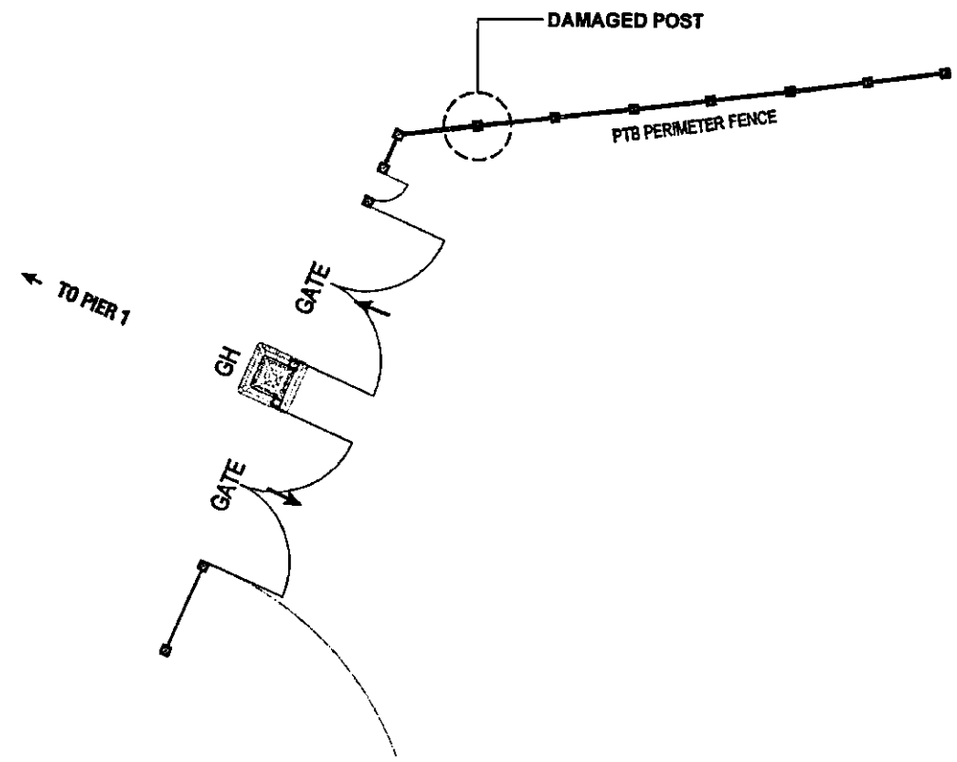
RESTORATION & REPLACEMENT OF VARIOUS DILAPIDATED STEEL GATES

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE: RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	SHEET CONTENTS: AS SHOWN	PREPARED BY: ROLANDO C. AMORES, Construction Foreman A	CHECKED BY: JOEL S. LARENA, Principal Engineer A	RECOMMENDING APPROVAL: HUBERT P. MITMIT, ESD Manager	APPROVED: SARAH R. MIJARES, Port Manager	SHEET NO.: 23 / 30



R.C. POST DETAIL

SCALE: 1 : 30 MTS.

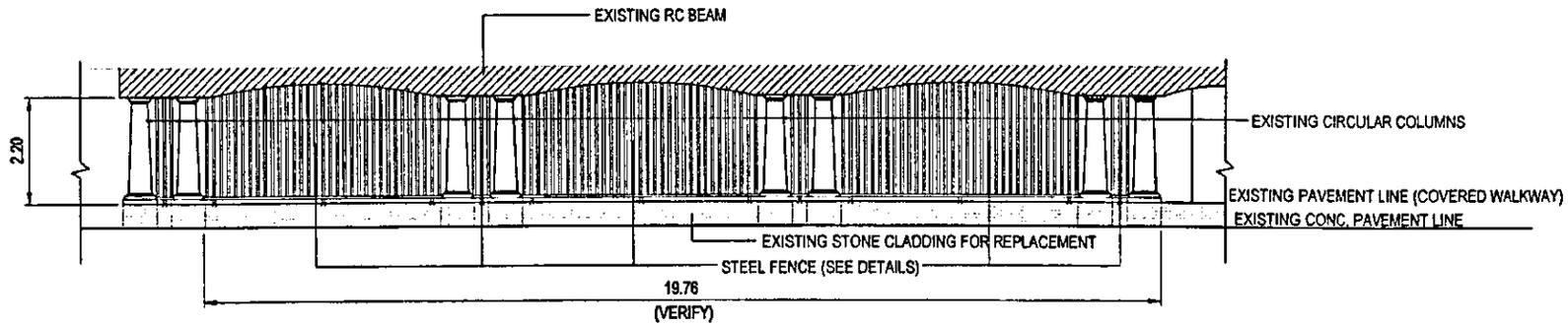


LOCATION PLAN

SCALE: 1 : 50 MTS.

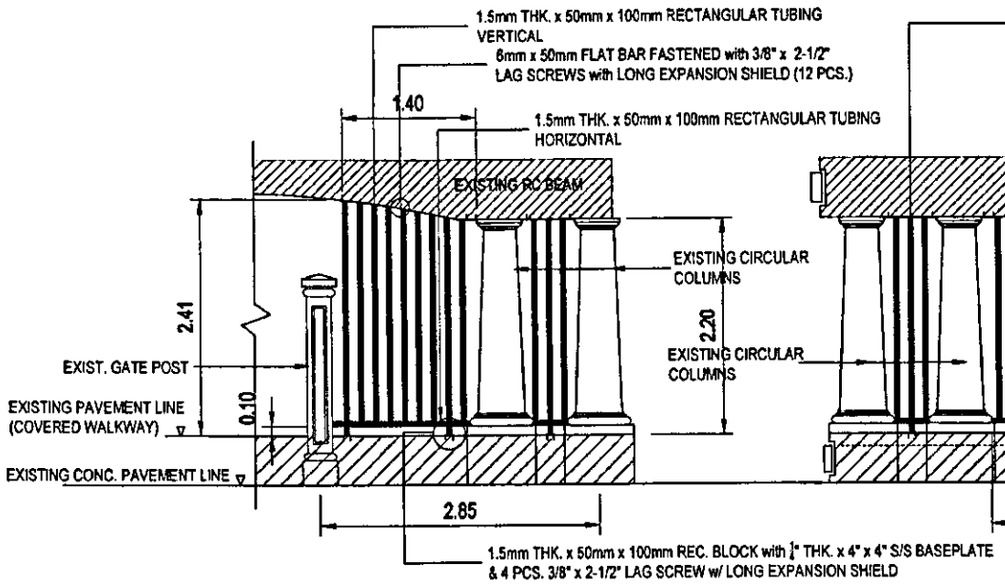
RESTORATION OF DAMAGED CONCRETE POST

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	24 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	



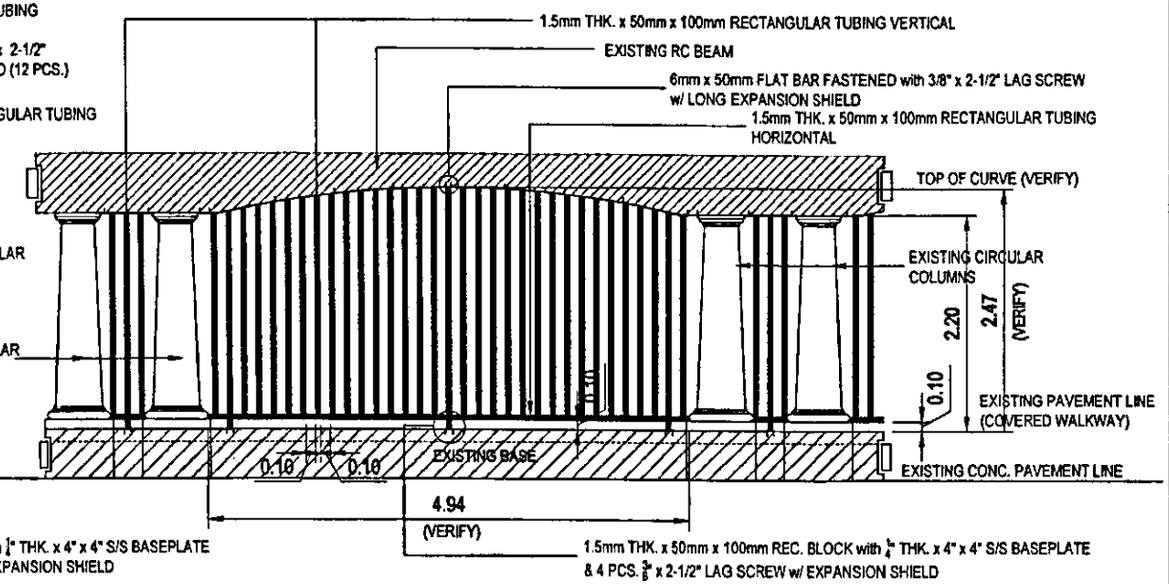
ELEVATION OF STEEL FENCE AT COVERED WALKWAY

SCALE: 1 : 125 MTS.



DETAIL OF STEEL FENCE AT COVERED WALKWAY

SCALE: 1 : 50 MTS.

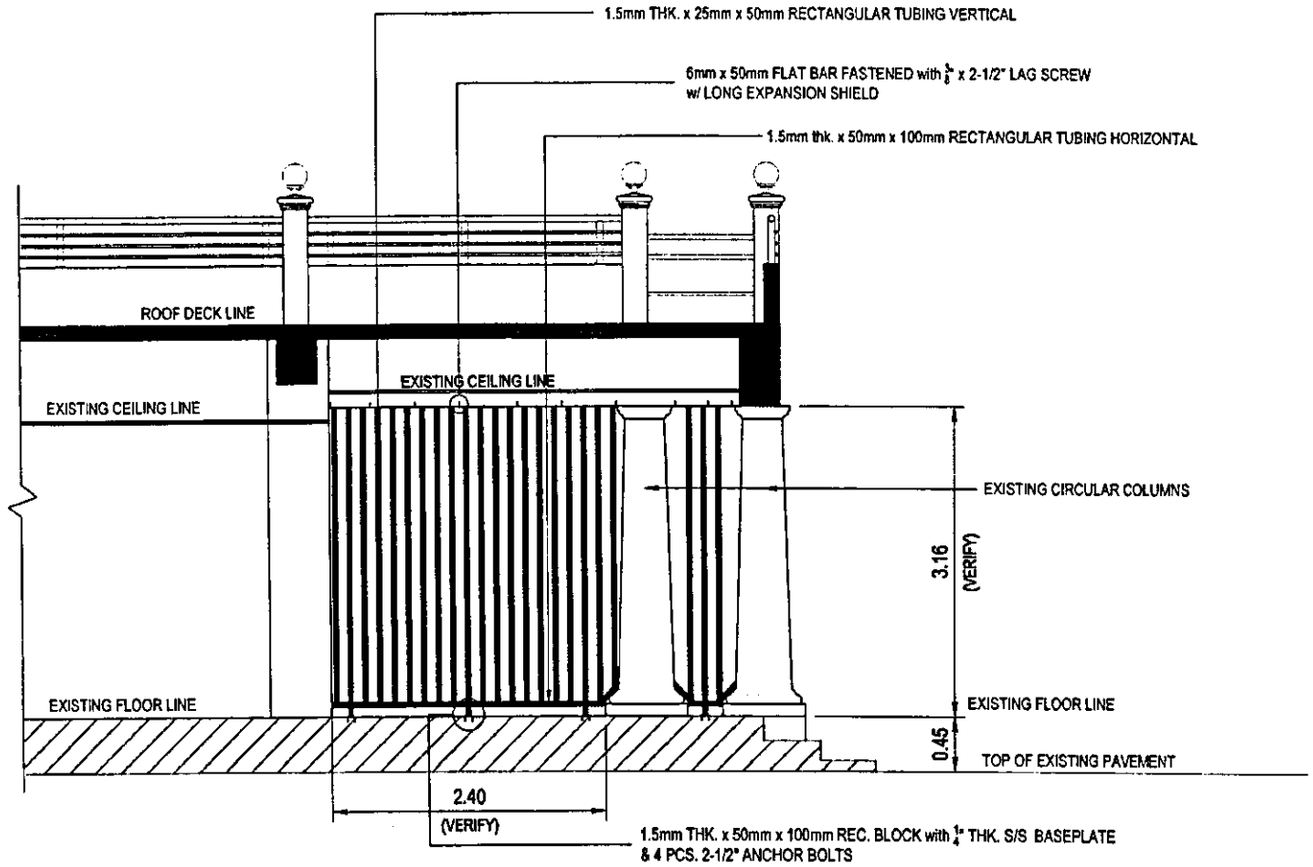


TYPICAL DETAIL OF STEEL FENCE AT COVERED WALKWAY

SCALE: 1 : 50 MTS.

REPLACEMENT OF DILAPIDATED STEEL GRILLES AT COVERED WALKWAY

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	25 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	

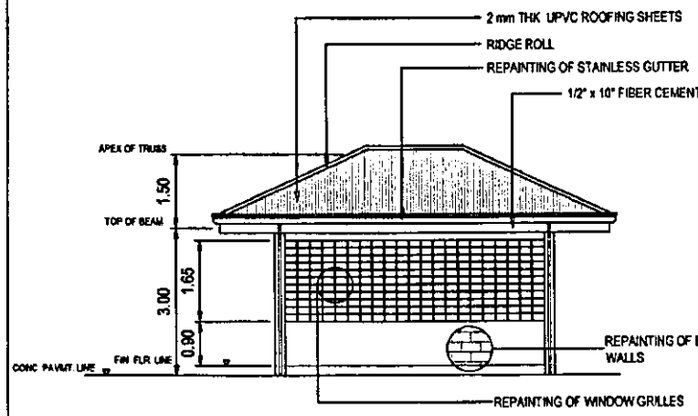


DETAIL OF STEEL FENCE AT MAIN EXIT

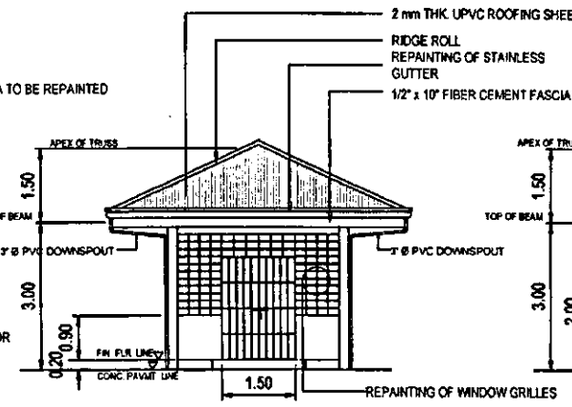
SCALE: 1 : 50 MTS.

REPLACEMENT OF DILAPIDATED STEEL FENCE AT THE MAIN EXIT OF PTB

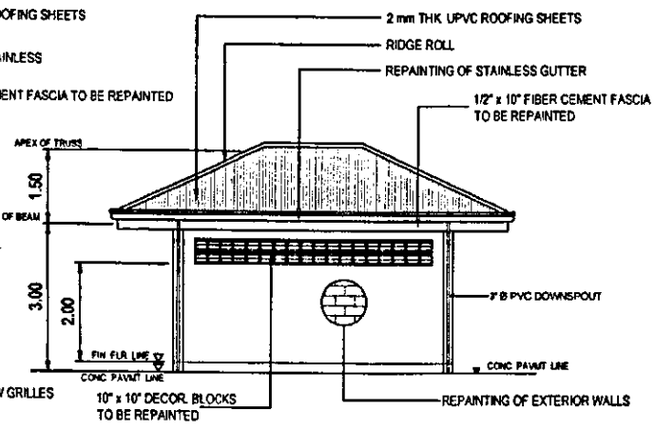
PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	26 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	



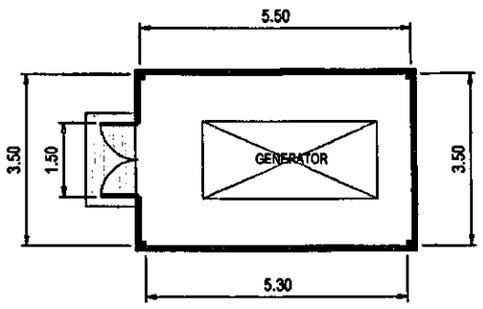
FRONT ELEVATION
SCALE: 1 : 100 MTS.



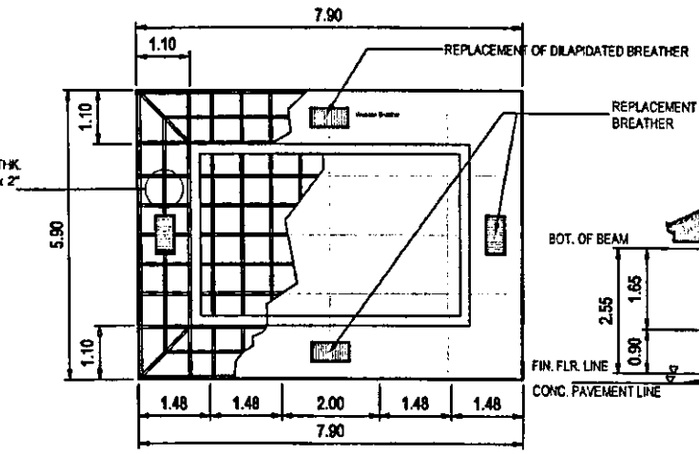
LEFT SIDE ELEVATION
SCALE: 1 : 100 MTS.



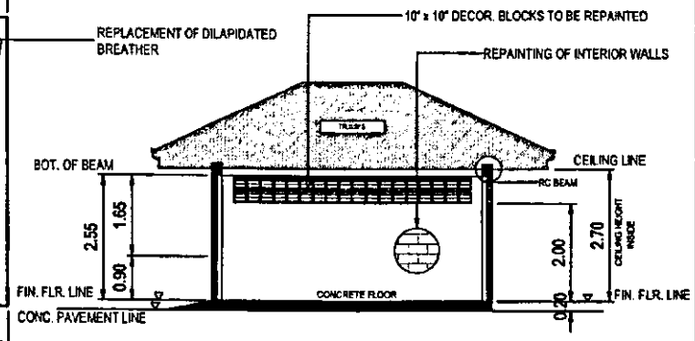
REAR ELEVATION
SCALE: 1 : 100 MTS.



FLOOR PLAN
SCALE: 1 : 100 MTS.



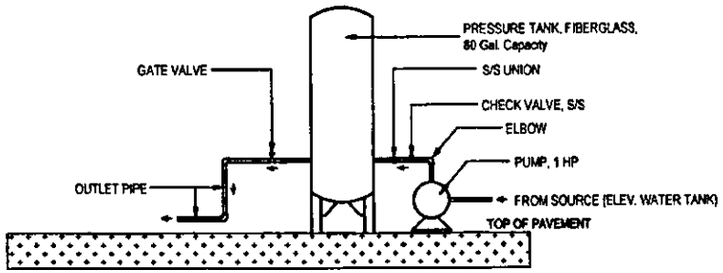
REFLECTED CEILING PLAN
SCALE: 1 : 100 MTS.



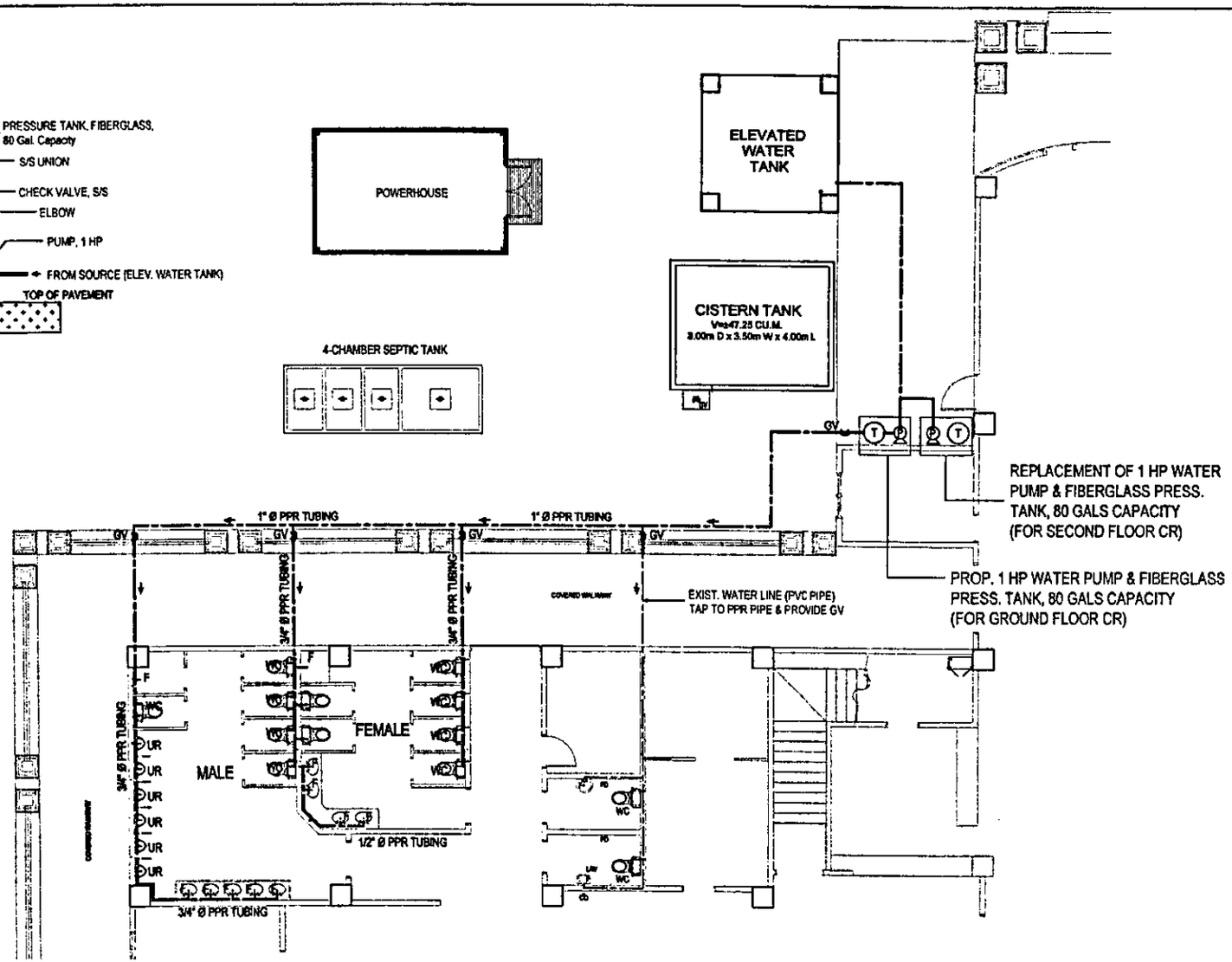
LONGITUDINAL SECTION
SCALE: 1 : 100 MTS.

RESTORATION & REPAINTING OF POWERHOUSE OF PTB

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY	AS SHOWN	ROLANDO C. AMORES Construction Foreman A	JOEL S. LARENA Principal Engineer A	HUBERT P. MITMIT ESD Manager	SARAH R. MIJARES Port Manager	27 30



DETAILED CONNECTION



LEGEND:

F	FAUCET
WC	WATER CLOSET
LAV	LAVATORY
UR	URINAL
GV	GATE VALVE
P	PUMP
T	PRESSURE TANK
—·—	PPR WATER LINE

GROUND FLOOR PLUMBING LAYOUT (NEW)

SCALE 1:300 MTS

REPLACEMENT OF WATER PIPELINE FOR EXISTING GROUND FLOOR COMFORT ROOMS

PHILIPPINE PORTS AUTHORITY PMO - NEGROS ORIENTAL / SIQUIJOR	PROJECT TITLE:	SHEET CONTENTS:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL	APPROVED:	SHEET NO.:
	RESTORATION OF DAMAGED PTB FACILITIES INCLUDING POWERHOUSE AND PERIMETER FENCE	AS SHOWN	ROLANDO C. AMORES	JOEL S. LARENA	HUBERT P. MITMIT	SARAH R. MIJARES	28 / 30
	LOCATION: PORT OF DUMAGUETE, DUMAGUETE CITY		Construction Foreman A	Principal Engineer A	ESD Manager	Port Manager	