- RDovetail Anchor Slots

  Standard size, 20 gauge galvanized steel with removable filler installed for abutting masonry and at 24 inch o. c. for facing masonry where shown.

- Flashing Reglets

  26 gauged galvanized sheet, with removable filler and beveled edges.

- Anchoring Inserts

  Approved propriety type inserts for the load capacity and use shown.

- Fabricated Embedments

  Install only as shown and as specified.

- Form Release

  Non-staining, non-reactive rust preventive guaranteed not to affect bond of surface application to concrete.

F. FABRICATION AND ERECTION

- Forms
  Design, construct, erect, support, brace, maintain and remove forms in conformance with the requirements of ACI318 part 1, 2 and 3 exclusive and ACI347 for loads lateral pressure and allowable stresses; in addition to other design parameters such as wind loads.

- Shores

  Shores shall be adjustable by screw jacks or wedges.
- Preparation of Forms

  Clean forms before each use. All steel forms shall be free of rust and scale.

- Form Re-use: The Number of reuses is dependent on the resulting finish quality and is subject to approval.

- Form Joints; Forms shall be butted types.

- External Corner: Chamfered unless noted.

- Cleanouts: Where required provide temporary openings panels in the forms to facilitate cleaning, placing and inspection.

- Cambers: Where specified camber is noted position the forms to maintain hardened concrete lines with specified tolerances measured for camber lines. Camber is to maintain as noted plus or minus 3mm (1/8 inch) until shoring is removed.

- Form Release: Coat removable forms with forms release agent before reinforcing is placed and in accordance with manufacturer's instruction. Remove release agents from reinforcing steel embedments solvents recommended by the manufacturer.

G. STRIPPING AND RESHORING

- General: Do not remove forms or shoring until the concrete members have acquired sufficient strength to support their weight and subsequent construction loads without defection. Forms shall be moved in a manner to assure safety of the structure.

- Time: Form and supports shall remain in place until the concrete has attained sufficient strength to support the loads to be applied but in no case shall they be stripped in less than the following minimum periods.

Columns	-	2 days
Walls	-	2 days
Sides of Beams and Girders	-	2 days
Floor Slabs	-	14 days
Shoring for Beams and Girders	-	14 days
Beam and Girders	-	14days

- Reshore: Reshore immediately after stripping slab, beams and girders that support subsequent formwork. Retain reshore for as many levels as required to combine the liveload capacities of cured floors to support the loads of the subsequent fresh construction loads. Reshore at minimum of two consecutive levels.

MASONRY WORK

A. SCOPE OF WORK

- Furnish all labor, materials, equipment, plant and other facilities and perform all operations on necessary to complete the Masonry Work requirements hereinafter specified.

- All work under this Division shall be subject to the General Conditions accompanying these specifications. The Contractor and Sub-Contractor for this portion of the work are required to refer specifically thereto.

B. MATERIALS

- Concrete Hollow Blocks: Shall be Machine Bilt, Non-Load Bearing (NLB) or approved equivalent. Minimum face shell thickness shall be 1” Nominal face 7” x 17” normal thickness shown. Hold all units in storage for a period of not less than 28 days (including curing period) and do not deliver prior to that time unless strength and other test indicate compliance with this specification.

- Mortar Aggregate: Natural river sand, clean free from soluble salts and organic matter, grades from fine to coarse, compatible with the thickness of joints in which used.

- Cement: Shall be Portland cement/Union Premium or approved equal.

- Mortar:

  General: Mix mortar from 3 to 5 minutes in such quantities as are needed for immediate use. No retampering will be permitted on mortar stiffness because of premature setting. Discard such materials, as well as those that have not been used within one hour after mixing.

  Proportioning: Cement mortar shall be one (1) part Portland Cement and two (2) parts sand by volume but not more than one (1) Portland cement and three (3) parts sand by volume.

C. HANDLING AND STRUCTURE

- Take care in handling masonry units to avoid chipping and breakage. Locate storage piles and stacks so as to avoid being disturbed. Barricade to protect from damage by

construction operation. Stack masonry units, reinforcement and other materials on wood blocking above ground.

D. SCAFFOLDING

- Provide all scaffolding required for masonry work, including cleaning down on completion, remove.

E. SAMPLES AND TESTING

- Sample blocks shall be taken at random from every one thousand (1000) blocks delivered. Average strength of concrete hollow blocks shall not be less than 400 lbs. per square inch. Test shall be at the expense of the Contractor.

F. CUTTING AND PATCHING

- Consulting other trades in advance of masonry work and make provision for installation of their work to avoid unnecessary cutting and patching. Experienced masons shall do all cutting and patching.

G. HOLLOW METAL FRAMES

- Fill jamb of all pressed steel hollow frames occurring in masonry walls with mortar and carefully point all joints between metal frames and adjacent masonry and other construction.

H. WALL FLASHING

- Build in wall flashing at base of cavity wall formed to exclude water, bended in and covered with mortar. Keep joints to a minimum but where necessary, lap 6’ and seal with plastic cement.

I. LAYING CONCRETE BLOCKS

- Lay units in common bond with uniform coursing and jointing. All concrete block joints shall be uniform thickness, approximately 3/8 tooled concave where exposed and flush cut where concealed, making 16’ x 8’ course. Butter vertical and horizontal joints full with mortar.

  Bond courses at corners and intersection and tie to abutting walls as per TRU-LOK Specifications.

  Reinforce concrete block walls continuously in two 2) consecutive courses below openings; using TRU-LOK shall be provided at every 16” of vertical wall height for load bearing walls. Lay units full thickness of partition from floor slabs to height shown, and where necessary cut.

GLASS AND GLAZING

A. SCOPE OF WORK

- Furnish all labor equipment, plant and other facilities required to complete all glazing work as shown in the drains and schedule and hereinafter specified.

- All work included under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and the Sub-Contractor for this portion of the work is required to refer especially thereto.

B. GENERAL

- The type and the location of the glass are indicated. Determine the actual size by measuring the opening to be glazed, each piece of glass shall bear the Manufacturer's label giving his name and the quality, type and thickness of the glass. Do not remove label until final cleaning.

C. MATERIALS

- All glass for the aluminum storefront and drops shall be…" thick tinted polish plate glass as indicated in the schedule of windows and shall be those manufactured by the Republic Glass or approved equal.

- Size shall be those shown on the drawings.

D. SHOP DRAWINGS

- The Contractor shall furnish copies of the drawings showing dimensions and details and indicating all necessary items to the Architect for approval.

- Any correction required by the Architect shall be done immediately by the Contractor and corrected copies of drawings affected shall be returned to the Architect. The examination and approval of show drawings by the Architect shall not relieved the Contractor from any obligation to perform the work strictly in accordance with plans and specifications. The responsibility for errors in shop drawings shall remain with the Contractor.

E. INSTALLATION OF GLASS

- General: Employ only skilled labor. Set glass without springing, accurately fitted and carefully set using setting and spacer blocks in accordance with the recommendation of the glass manufacturer. Set all glass before final painting. Take every precaution to insure first-glass free from edge chips cracks or other defects and all glazing materials properly installed to meet approval.

- Examination of Surfaces: Before commencing the setting examines surfaces and report to the Architect in writing any defect in it. Commencement of work shall indicate the acceptance of the surface as satisfactory.

- Breakage: The Contractor shall be responsible for all glass broken because of faulty setting and shall be replaced at his expense.

- Expansion: Allow for expansion of glass as per manufacturer's recommendation.

F. GUARANTEE

- Furnish guarantee to Owner as per requirements of the General Conditions for the period of one year after date of final acceptance of building.

WATERPROOFING

1. SCOPE OF WORK

- Furnish all materials, equipment, labor, plant and other facilities to complete all waterproofing works as shown on the plans and hereinafter specified.

- All work included under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and Sub-Contractor are required to refer especially thereto.

2. WATERPROOFING OF PARAPET AND ROOFDECK

- Materials

- Materials shall be Cold Applied Waterproofing or approved equivalent.

- Applications

  The concrete surface shall be wood troweled smooth, firm, dry, clean and free of loose or foreign materials and without any projects, indention and other imperfections. Cabinets shall be installed in the angle formed by the floor and adjoining vertical wall. All drainage connection shall be set to permit free flow of water.

  On this concrete surface, apply 2 coats of Cold Applied Waterproofing to a roofdeck and vertical wall to a height of 10" (250mm) unless otherwise shown on the drawings surrounding the area to be waterproofed.

  Sprinkler fine sand topping

  Apply 2 base coats of Cold Applied Waterproofing and apply 2 topcoats of 2mm thick of Polyethylene sheet.

  The installation of the waterproofing shall be done by an approved roofing contractor by the manufacturer.

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

  All materials composing the waterproofing underlayment shall be delivered into the job in unopened bags, pails and packages clearly labeled by the manufacturer's name.

- All the request of the Architect, the Contractor shall deliver to the Architect the following:

  Samples of the materials proposed for use as waterproof underlayment, clearly labeled as to brand name manufacturer's name.

  The manufacturer's complete printed specifications for the application of the materials.

C. FLOOR HARDENER

(For Transformer vaults room. Emergency Genset, Electrical Room, Pump Room and elevator machine room.)

- The concrete floor shall be monolithically finished with "Koradur" non-ferrous colored floor hardener in accordance with manufacturer's specifications for heavy-duty floor of 1.00 lbs. of "Korudur" per square foot of floor area. Colors to be approved by the Architect.

D. WATERPROOFING OF ALL EXTERIOR WALLS

- Materials

  Class B concrete
  Thoro-Seal White

- Application

  Pour all holes of exterior concrete hollow blocks with class B concrete (coarse, aggregates shall be of such size so that no voids are formed) with Thoro-Seal White of the type recommend by the manufacturer.

E. GUARANTEE

- The Contractor shall guarantee that work specified in this division shall be free from defects of materials and workmanship for period of five (5) years from the date of acceptance.

- The Contractor shall make good all damages or failures resulting from the use of defective materials and poor workmanship.

- The following failures will be considered as defective work.

  Leakage
  Peeling of waterproofing materials
  Delaminating of plies
  Air bubbles

- Approved Equal Brand
  Other approved equal brands shall be those that are representative by well-established firms to insure the period of guarantee.

HARDWARE

A. SCOPE OF WORK

- Furnish all labor equipment, and other facilities required to complete the installation of hardware as shown on the drawings and hereinafter specified.

- All work included under this division shall be subject to the General Conditions Accompanying these specifications. The Contractor and Sub-Contractor for this portion of the work are required to refer specifically thereto.

- The intent of the specifications is to cover the complete hardware requirements for this building, and any hardware called for in the specifications not shown on the drawings or vice versa shall be furnished the same as if it were shown on the drawings and called for in the specifications. Also any hardware which has been omitted from both drawings and specifications but is evidently necessary for complete building shall be finished the same as if it were shown on the drawings and called for in the specification.

B. GENERAL

- Determine the quality of hardware to be furnished from the drawings and schedules. Provide all complete finish hardware for doors and other movable parts of the building with exception of items specified elsewhere or not included.

- The hardware herein specified are given as a means of describing the type, materials, strength, design, quality, weight, mechanical constructions, operation and requirements to which such hardware shall conform.

- It is the responsibility of the contractor to thoroughly check the drawings and specifications and to furnish all required materials whether specifically mentioned or not.

C. FINISHING

- Hardware finishes specified are in accordance with U.S. Standard finishes flush bolts, push plates, pulls, and knobs and other finishing hardware shall be polished chromium plated over nickel or brass (US 26/625).

D. PROTECTION

- After hardware has been properly fitted exposed items such as door knobs, escutcheons, plates, locks, etc. shall be removed after final coat has been applied. All hardware unless to be painted over, that are not removed after painting shall be properly masked.

E. HARDWARE LOCATION

- Unless otherwise specified locate hardware as follows;

Doorknobs shall be 39” from finished floor level to center knob.
Push plates shall be 50” from finish floor level to center of push plate.
Door pulls shall be 40” from finish floor level to grip center.
Cylinder dead lock shall be 55” from finish floor level to center of lock.

- Butt Hinges : the number of butt hinges to be furnished for each door shall be determined as follows :

  For door 5’-0” high less, provide two (2) butts.
  For door 5’-0” high less than 7’-0” high provide three (3) butts.
  For doors over 7’-0”high unless otherwise required, provide additional one (1) butt for every 2’-0” or fraction thereof.

  For metal doors, provide four (4) heavy duty hinges per cash. Butt hinges shall be 8” from top and bottom of door to center of hinges and the rest equally spaced.

F. HARDWARE SCHEDULE

- Refer to schedule on drawings

G. GUARANTEE

- Furnish guarantee to the owner as per requirements of the General Conditions for one year after date of final acceptance of building.

ROOFING WORKS

A. SCOPE OF WORK

- The work under this division shall include all labor equipment; plant and other facilities and the satisfactory performance of all work necessary to complete all the roofing works as shown on the drawings and hereinafter specified.

- All work included under this division shall include all labor equipment, plant and other facilities and the satisfactory performance of all work necessary to complete all the roofing works as shown on the drawings and hereinafter specified.

- All work included under this division shall be subject to the General Conditions accompanying this specifications. The Contractor and Sub-Contractor for this portion of the work are required to refer especially thereto.

B. ROOFING MATERIALS

- All roofing materials including accessories will be supplied by the Contractor.

C. INSTALLATION

- Lay roofing sheets as per manufacturer’s recommendations with overlaps oriented following storm wind direction. Manufacturer’s installation details.

- All roofing works shall be done by experienced tinsmiths known to the Contractor.

- Rat proofing works shall be in accordance with ordinances of the National Building Code and its Implementing Rules.

- All welded and solded connection in the roofing shall be painted by red lead paint then painted to match color of roofing sheets.

D. GUARANTEE

- Furnish guarantee to the owner as per requirements of the general conditions for period of one year after date of final acceptance.

PAINTING

A. SCOPE OF WORK

- Furnish all labor materials, equipment, plans and facilities to complete all painting and varnishing as shown and hereinafter specified.

- The Contractor shall examine the specification for the various other trades and shall thoroughly familiarize himself with the items and surfaces of work to be included.

- All work included under this division shall be subject to the General Conditions accompanying this specifications. The Contractor and Sub-Contractor for this portion of work are required to refer especially thereto.

B. GENERAL

- This work includes interior and exterior painting and finishing of all items as required to produce a finished painting job throughout all of the areas affected by work under this contract, except items which are specifically excluded.

- Complete color scheme for the painting of the building (exterior and interior) shall be furnished by the Architect to the Contractor. Color schemes samples required by these specifications and/or by the Architect shall be submitted by the Contractor for approval at his expense.

- All exposed work shall be protected while the building is being painted. The floor steps and all other surfaces not to be painted shall be well protected during painting by sufficient covers. Any stains, dirt, smear, etc. shall be removed by the Contractor to the satisfaction of the Architect.

C. SURFACES NOT TO BE PAINTED NOR VARNISHED

- Neither paint nor varnish shall be applied on finish like glazed tiles, glass, plastic, brass, bronze, aluminum and other corrosive metal finishes.

D. MATERIALS

- Make and Certificate of Origin and Quality

- All paint materials shall meet the requirements of the Standard Specifications of the Standardization Committee on Suppliers and shall be delivered on the site in the original containers, with label intact and seal unbroken.

- The manufacturer's certificate of origin and quality shall be submitted to the Architect for inspection and approval before using any of the paint materials herein specified.

- Use materials only as specified by manufacturer's direction on label of container unless otherwise specified herein.

- Paint materials only as specified by manufacturer's direction on label of container unless specified herein.

- Paint materials such as linseed oil, shellac, turpentine etc., shall be pure, higher quality and should bear identifying label on container.

- The use of white zinc (lithopone) shall not be allowed.

- Pigment for Tinting

- Tinting color for oil paint shall be color -in-oil, ground in pure linseed oil, and of the highest grade obtainable.

- Colors shall be non-fading.

- Color pigments shall be used to produce the exact shades of paint, which shall conform to the approved color scheme of the finish coat. The first coat shall be white.

E. INSPECTION OF SURFACES

- The Contractor shall inspect all surfaces to be painted and all defects shall be remedied before starting work. Commencing of work by the Contractor indicates his acceptance of the surface.

- No work shall be started unless the Contractor shall have made certain as to the dryness of surfaces. Tests shall be made, in the presence of the Architect or his representative, to verify dryness of surfaces to be painted.

F. PREPARATION OF SURFACE

- All concrete shall be allowed to weather for two months before painting.

- Clean all surfaces to be painted and varnished off loose dirt and dust before painting is started. Do the customary amount of sanding in the Architect's opinion to produce a surface suitable to receive paint or varnish.

- Inspect all surfaces with regards to their suitability to receive a finishing. In the event that imperfection due to materials of workmanship appear on any surfaces after the application of the paint the cost of any correction shall be borne by the Contractor. Damages to any painted or varnished finish due to carelessness or negligence of others shall be corrected.

- Touch all knots, pitch streaks and soppy spots with shellac or other approved sealer. Putty nail holes cracks, etc. after the first coat with non-shrinking putty of a color to match that of the finish.

- Wash all metal surfaces with benzene, mineral spirits, or detergent to remove any dirt or grease before applying materials. Where rust or scale is present, wire brush or sandpaper cleans before painting. Where shop coats of paint have become marred clean, and touch up with a compound designed for this purpose, or approved acid solution before applying the first coat of paint.

- Prepare masonry surfaces to be painted by removing all dirt, dust, oil and grease stain sand efflorescence. The method of surface preparation shall be left to the discretion of the Contractor provided that the result is satisfactory to the Architect. Masonry surfaces to be painted shall be free from alkali and thoroughly dry before paint is applied.

- Before applying succeeding coats, primers, and undercoats shall be completely integral and performing the function for which they are specified. Properly prepare and touch up all scratches, abrasions, or any other disfigurement and remove any foreign matter before proceeding with the following coat.

- Do not apply final coat on interior work until after others are finished with their work in any given area in normal sequence and all materials and debris removed, and the premises left in satisfactory broom clean condition as approved.

- Remove or protect hardware, hardware accessory plates, lighting, fixtures and similar items placed prior to paintings or remove protection upon completion of each space.

Disconnect equipment adjacent to walls where necessary move to permit painting of all wall surfaces, and following completion of painting, replace and reconnect.

- Paint the backsides of access panels, removable or hinged covers and the like.

- All wood shall be sanded lightly with #00 Sandpaper between coats. Paint coats shall be thoroughly dry before sanding.

G. WORKMANSHIP

- All painting and varnish work shall be done in workmanlike manner by skilled house painter and varnisher only.

- All materials shall be evenly applied, so as to form a film of uniform thickness, free from sags, runs, crawls, or other defects. The use of heavy brush (nylon brushes for oil paints) is required. Light brushes shall not be permitted. Paint shall be thoroughly stirred so as to have the pigment evenly in suspension while paint is being applied.

- In general or unless otherwise specified, and/ or instructed by the Architect due to actual conditions on the job, no less than 48 hours time shall elapse between application of succeeding coats. Each of paint shall be allowed to dry thoroughly and inspected for approval before the succeeding coat is applied.

- No oil painting shall be done in damp weather.

- Except where otherwise noted or specified all paints shall be applied in three coats (priming body and finish coats). Each coat shall be roller applied (except as otherwise noted) spread evenly and in full covering body.

- No work shall be done in conditions unsuitable for the production of good results. No painting or varnishing on woodwork shall be done while plastering is in processor is drying.

- Surfaces which cannot be satisfactorily finished on the number of coats specified shall have additional coats or such preparation coats and subsequent coated as many as may required to produced satisfactory finished work without additional cost to the Owner.

- Spray gun application shall be used where indicated in the color schedule.

- All parts of molding and ornaments shall be left clean and true to details.

- All finishes shall be uniform as to sheen color and texture, except when glazing is required.

- The Painting Contractor since he is the last tradesman on the project shall include in his work all final clean up and washing of glass, spots on floors, hardware fixtures, etc.

H. PAINTING SCHEDULE

- The type of paint specified are intended to illustrate the quality and are taken from paint catalogue equivalent materials from manufacturers listed herein, which the Contractor desires to use other than those specified should accompany proposal with such request in writing for approval by the Architect. Give manufacturers name, specific name of each product offered as a substitute. After the award, no substitution of materials for those mentioned in the accepted proposal will be permitted. Other brands of paint and primer are the following: Dutch Boy; Sinclair; Sherwin Williams; Boysen; General Paint and Finch.

Exterior Concrete Walls

Cement Plaster over Concrete give:

- 1 Coat Concrete Primer
- 1 Coat Concrete Sealer
- 1 Coat Latex Flat Paint (Primer)
- 1 Coat Latex Flat Paint (Finishing)

Exterior and Interior Work

Metal steel doors, frames, railings, balusters, and grating give:

Coat Primer Paint
Coats Quick Drying Enamel

Apply one generous coat of "Raincheck "water repellant by spraying on all exposed non-painted concrete finish.

Interior work

- Plywood walls (painted) give: (Roller Painted)

  1 Coat flat wall enamel washable paint after which putty all over and sand smooth
  1 Coat interior Primer Sealer
  1 Coat paint (Flat Enamel Paint)
- Plywood ceiling give: (Roller Painted)

  1 Coat Flat Enamel Paint
  1 Coat Sealer
  1 Semigloss Enamel Paint

- Cement plaster and sunblasted finish over concrete and hollow concrete blocks, give:

  1 coat interior primer sealer
  coats Flat Wall enamel washable paints:

I. GUARANTEE

- The Contractor shall guarantee his work for a period of one (1) year from date of the acceptance. Under such guarantee, the Contractor shall make good any defect due to faulty materials or workmanship caused by him by without any additional cost to the Owner for the period specified.

WOOD AND PLASTICS

A. SCOPE OF WORK

- Furnish all materials and equipment and perform labor required to complete wooden framing and related rough carpentry work as indicated in the drawings and/or specified herein.

- Include in the works, nailing strips, scaffoldings, plates, straps, joists, hangers, rods, dowels, rough hardware, fasteners, and other miscellaneous iron and steel items pertinent to rough carpentry work.

B. STORAGE AND PROTECTION

- Stack framing lumber to insure against deformation and maintain proper ventilation.

- Protect Lumber from elements.

- Lumber in contact with concrete masonry shall be coated with two (2) coats of asphalt, applied hot.

- Temporary Protection

Provide and maintain temporary protection of the work as required to safeguard completed or partially completed work during the progress.

Provide all the necessary rough stairs, ladders, runways, for convenient access to all parts of the building until other permanent facilities are in place.

C. SCOPE OF WORK

- Lumber

  Moisture content – not to exceed 18 percent

  Grade and Trade Mark – required on each piece of lumber. All lumber including scaffoldings, conforming to 63 % stress grade lumber in accordance to the requirements of the National Structural Code of the Philippines, Volume 1, latest edition.

  Refer to summary of Materials and Finishes

  Substitution of Lumber

Any lumber equally good for the purpose intended may be substituted for kinds specified, provided however, that the substitution be authorized in writing by the Architect.

D. ROUGH HARDWARE AND METAL FASTENERS

- Plates, straps, nails, spikes, bolts, joists, hangers, rods, dowels, fasteners, and miscellaneous iron steel items shall be of sizes and types to rigidly secure member in place.

- Execution

  Fit carefully mortise and tenon joists of all framing including tongues and grooves of sheathing. Anchor all frames coming in contact with concrete, unless otherwise specified, by means of 20 D nails, spaced not more than 0.20 m (8”) apart all around the contact surfaces. Plane and dress side of frames that will receive the wallboards or sidings.

  Wood nailers shall be in accordance with detail drawings or mentioned herein, nailing strips shall be 1” x 2” at 16 inches on centers both ways. Fasten securely by expansion bolts or other approved device at every (2) feet on center.

  Make all exposed nails countersunk. Do scrubbing, metering and joining accurately and neatly to conform to data

MILLWORK

A. SCOPE OF WORK

- Furnish materials and equipment and perform labor required to complete wooden jambs and doors and ceiling panels and related rough carpentry work indicated in the drawings and/or specified herein. Coordinate work with all other trades.

B. STORAGE AND PROTECTION

- Protect millwork against dampness during and after delivery.

- Do not bring in interior finish, including doors into building until plaster thoroughly dry.

C. PRODUCTS

- Lumber

Kiln dried, selected, quarter sawn containing not more than 12 % moisture, free from imperfections impairing its strength, function and appearance with the same shade, color, grain configuration.

Trademark is required in each piece of lumber.

- Plywood

  For interior plywood, use class B plywood whose species and thickness conform to schedule and drawings.

- Finish Hardware

D. EXECUTION

- Workmanship

  Make all wood finish and millwork true to details clean and sharply defined.

  Set panels to allow free movement in case of swelling shrinkage.

  Conceal means of fastening various parts together.

E. FINISH

- Mill fabricates and erects interior finish as indicated on the drawings. Machine sand at the mill and hand smooth at the job.
- Separate with ¼ inch stone-cut joints all interior trims set against concrete masonry or wood.
- Make joints tight and in a manner to conceal shrinkage. Secure trim with fine finishing nails, screws, or glue where required.
- Set nails for putty stopping.
- Make window and door trim single length.
- Meter molding at corner, cope at angles.

F. WOOD JAMBS

- Set doorframes plumb and level and brace until built-in.
- Anchor wood frames to masonry with approved metal anchors on each side of jamb. Place top and bottom anchors 8 inches from head to floor.

G. WOOD SHELVING

- Each shelf shall be supported on a continuous wood cleat at walls.
- Secure cleats to masonry walls be expansion bolt or approved fastening device.

H. HARDWARE

- Accurately fit and install all required finish hardware items.
- If surface-applied hardware is fitted and applied before painting, remove all such items, except butts, and reinstall after painting work is completed.

WOOD DOORS

A. SCOPE OF WORK

- Furnish all materials and equipment and perform labor required to complete flush doors / panel doors.

B. SAMPLES

- Submit sample corner sections of wood doors and jamb for approval of the Architect.

C. PROTECTION

- Protect door adequately from scratches, and other stains with heavy building appear

D. PRODUCTS

- Fabricates

  Assemble joints and doors with water resistant glue. Keep door under pressure until glue has thoroughly set.

  Sand smooth finish doors. Provide with joints and clean cured molding.

  Keep faces free from defects or machine marks that will show through the finish.

  Flush doors Hollow Core

  Provide doors with cross bending/solid section and edging. Make face veneer first quality-selected plywood or lawanit as indicated in the drawings or as specified herein.

E. EXECUTION

- Installation

  Cut, trim and fit each door to each frame and hardware accurately.

  Give allowance for painter's finish and possible swelling or shrinkage.

  Provide not more than 1/8-inch clearance at lock end hanging styles and not more than ¼ inch at bottom.

  Round all corners to 1/16-inch radius. Level slight lock and rail edge.

  All doors shall operate freely and all hardware shall be properly adjusted and functioning.

GLASS JALOUSIE / STEEL WINDOWS AND FRAMES

A. SCOPE OF WORK

- Unless otherwise specified, the Contractor or his Sub-Contractor shall furnish all materials, tools, equipment apparatus, transportation, labor, supervision, management, and incidentals necessary and required for the completion and satisfactory performance of work in strict accordance with this section of the specification and the applicable drawings, subject to the terms and conditions of the Contractor.

B. SHOP DRAWINGS AND SAMPLES

- The Contractor shall before proceeding with the manufacture/assembly glass jalousie/steel windows prepare and submit complete manufacturing and installation drawings in full size and in triplicate, together with samples of member, section and hardware to be used for the approval of the Architect. Windows to be manufactured shall conform to the approved drawings and samples.

- Submit shop drawings of metal windows for approval. The drawings shall show complete details of construction, anchorage and samples.

- Guarantee

  All steel works shall be guaranteed for one year from final acceptance of the Owner and the Architect.

C. PRODUCTS

- All members shall be hot-rolled new billet steel with frame and ventilator section not less than 25mm deep from front to back. Frame members to be of equally designed section only at points where called for by the detail drawings and continuous angle pins, as indicated on drawings shall be furnished. For frame at sills, zee type section of special design. With offset permitting downtrend left of the vent member to set flush when vent is in a fully closed position shall be used. Ventilator member shall have integral weathering baffles providing double flat weathering contacts of not less than 6mm width on all four sides of the vent. Muntin shall be 22mm x 25mm rolled to a section.

D. EXECUTION

- Construction

- Corners of vent shall be metered, electrically butt-welded and ground smooth. Corners of frame and all other window, joints and intersection of muntin with frame and vent members shall be coped and electrically welded. Muntin bars except where ventilators are to be continuous from head to sill and from jamb to jamb. Muntin cross joints shall be rigidly and neatly interlocked with faces flushed. Frame section and vent sills shall have weep-holes to provide drainage. Continuous weather drips shall be provided where required at the heads for side hinges ventilators or door. Windows and doors shall be designed for glazing from the outside with wire glazing clips and steel casement putty. All units shall be prepared for and supplied with necessary standard hardware, and for screen plans or drawings.
- Mullions

  Rolled-steel T–bars, pipes, plate or other formed section or a combination of the as shown on drawings shall be furnished where two or more window units are installed in the same opening.

- Installation

  No window unit shall be allowed, in any case, to be installed in place in the formwork previous to pouring concrete. Instead, grooves for grouting shall be caused to be formed along the side and heads of wall openings as indicated on detail.

  Windows shall be erected and prepared openings by experienced window erection men. They be set plumb and true securely wedged and anchored as shown on detailed drawings and held in alignment during construction. All contacts between window and door wall units and adjacent steel including mullions shall be tightly sealed or bedded in mastic or approved sealing compound applied by the Contractor Ventilators shall be carefully adjusted before glazing.

  Standard anchors, clips, and mullions, bolts or screws shall be provided by the window manufacturer provided suitable sinkages and frames for all mortised or counter-sunk hardware and insert steel reinforcement drilled and tapped for attaching all hardware.

Frames in masonry shall have steel adjustable anchors for each jamb, spaced approximately 0.60m on center. Provide special anchors for securing to concrete as detailed.
Steel Doorframes or jambs formed to details shown with rebates to receive the doors. Make allowance of not more than 3mm clearance for doors. Neatly form all returns and edge. Frames shall be smooth and free from warp and buckle, the finish work shall be strong and rigid, neat in appearance and free from corners, and shall be reinforced and may be metered, their full length welded length and dressed of flush on the exposed surface. Meters shall be well formed and in true alignment. Set frames properly and braced against displacement during construction operation. During masonry work, grout the jambs solidly with masonry mortar. Protect all metal frames during construction.

- Field Painting

  Prior to or immediately after steel windows has been erected and before glazing, one coat of oil-based metal protective paint shall applied. A second coat shall be applied after putty has dried and set, not sooner than 3 weeks after glazing.

- Glass and Glazing

  Windows shall be glazed from the outside, using steel grade sash compound. Glass panels shall be bed-putted secured in place by copper-covered spring wire glazing clips furnished by the door manufacturer, and then face-puttees to a neat trim line. Glass shall be 6mm thick, clear, American or European made, unless other thickness is indicated on the drawings or as specified in the Schedule of Windows.

CEMENT FINISHES

A. SCOPE OF WORK

- Furnish materials and equipment and perform labor required to complete all plain cement, plaster finish.

- Samples

  Submit test panels for Architect's approval before execution of the work.

B. EXECUTION

- Plain cement plaster finish

  Provide all walls indicated with three coats of cement plasters (scratch coat, brown coat, finish coat). Mix each coat in the proportion of 1 part Portland Cement to Three parts sand by volume.

  Apply the scratch coat with sufficient materials and pressure to insure a good bond and then scratch to a rough surface. Provide a thickness of 3/8-inch scratch coat.

  Apply brown coat one day after applying scratch coat, with a thickness of 3/8 inch and level to a flat even surface. When stiff enough, trowel with a wooden float and cross hatch or broom lightly and evenly to secure a good mechanical bond for the finish coat. Wet the surface and keep from drying out for at least three days.

  Apply finish coat seven days after the application of brown coat. Provide thickness of 1/8 inch. Keep the finish coat damp but not saturated for a period of seven days.

CERAMIC TILEWORK

A. SCOPE OF WORK

- Furnish materials equipment and perform labor required to complete all types of tile works.

- Samples
- Submit samples of floor and wall tiles including all required beads and moldings.

B. EXECUTION

- Application of scratch coat.

  Thoroughly dampen but not saturated, surfaces of masonry or concrete walls before applying the scratch coat. Make surface areas appear slightly damp. Allow no free water on the surface.

  On masonry, first apply a thin coat with pressure, then bring it out sufficient to compensate for the major irregularities on the masonry surfaces to a thickness of not less than ¼ inch at any point.

  Evenly rake scratch coats, but not dash coats, to provide good mechanical key for subsequent coats before the mortar applied by dashing until it has hardened.

  On surfaces not sufficiently rough to provide good mechanical key, dash on the first coat with whisk brown or otherwise disturb mortar applied by dashing until it has hardened.

- Floor Tile Installation on Mortar Bed

  Before spreading the setting bed, establish lines of borders and center the field work in the both directions to permit the pattern to be laid with a minimum of cut tiles.

  Clean concrete sub-floor then moistens but not soaked. Afterwards, sprinkle dry cement over the surface and spread the mortar on the setting bed.

  Mix mortar and one part Portland Cement to three parts sand. Tamp to assure good cover the entire area and screened to provide a smooth and level bed at proper height and slope.

  Pitch floor to drains as required.

  After setting bed has set sufficiently to be worked over, sprinkle dry cement over the surface and lay tile.

  Keep tile joints parallel and straight over the entire area by using straight edge.

  Tamp the tiles solidly onto the bed using wood blocks of size to ensure solid bedding free from depressions.

  Lay tiles from centerlines outward and make adjustment at walls.

- Wall the installation on mortar bed.

  Before application of mortar bed, dampen the surface of the scratch coat evenly to obtain uniform suction.

  Use temporary or spot grounds to control the thickness of the mortar bed. Fill out the mortar bed even with grounds and rod it to a true plane.

  Apply the mortar bed over an area no greater than can be covered with tile while the coat is still plastic.

  Allow no single application of mortar to be ¼ inch thick.

Completely immerse wall tiles in clean water and soak of at least ½ hour. After removal, stack tiles on edge long enough to drain off excess water. Re-soak and drain individual tiles that dry along edges.

Apply a bond coat 1/32 – 1/16 inches which to the plastic setting bed or to the back of each sheet or tile.

Press tiles firmly into the bed and beat into place within one hour.

Lay tile fields in rectangular block areas not exceeding 25 by 25 inches.

- Grouting

After tile has sufficiently set, force a maximum of grout into joints by trowel, brush or finger application
.
Before grout sets, strike or tool the joints of cushion-edgetile to the depth of the cushion

Fill all joints of square-edged tile flush with the surface of the tile. Fill all gaps and slips.

During grouting, clean all excess grout off with clean burdock, cloth or sponge.

- Cleaning

Sponge and wash tile thoroughly with clean water after the grout had stiffened. Then clean by rubbing with damp cloth or sponge and polish

Clean with dry cloth.

RESILIENT TILE FLOORING

A. SCOPE OF WORK

- Summary

The General Conditions apply to all work under this section of the specification.

- Unless otherwise specified, the Contractor shall furnish all materials, tool, equipment, apparatus, appliances, transportation, labor, supervision, management and incidentals necessary and required for the completion and satisfactory performance of work in strict accordance with this section of the Specifications and the applicable drawings, subject to terms and conditions of the Contractor.

B. PRODUCTS

- Vinyl Tiles

Details and color schemes to be determined by Architect.

- Tile Adhesive

As manufacturer's specifications.

- Floor Divider Strips

Heavy top strips, brass ¼ inch top thickness with an offset or projection below the top of the strip and extending it from one side.

C. EXECUTION

- Preparation of surface

Clean the floor thoroughly of all dirt, grease, paint drops, etc. leaving a surface suitable for the installation of the vinyl tile the resulting concrete surface therefore, shall be smooth, even thoroughly dry and clean, before a layer of the manufacturer's adhesive is laid to receive the tile in accordance with the manufacturer's primer.
If the Engineer so requires, because of the concrete surface conditions, the manufacturer's primer shall prime the concrete surface.

- Laying Vinyl Tile Workmanship

  The Vinyl Tiles shall be laid according to details and color scheme approved by the consulting Architect and shall be carefully matched and the seams cut. All seams and edges shall be cemented carefully smug fit with the manufacturer's adhesive for the purpose. The surface of the finish floor shall be left smooth, clean and in first class condition.

  Only experienced men shall be employed in this work.

  All borders shall follow the line of the permanent fixtures and the width of the border may vary to allow for variations in the dimensions of rooms, size of tiles and design selected. The tiles shall but against the base floor level. Approved metal moldings shall be provided at door openings and such points where so required.
  Do not begin work until work of other trades including painting has been completed.

- Floor divider metal

  Floor divider strips (heavy top strip), ¼ inch thickness with an offset or projection below the top of the strip and extending from it on one side, shall be laid straight and true between Vinyl Tile flooring and other floor finishes like cement, terrazzo, granolithic, tile, etc. This projection provides a bearing surface for a vinyl tile and brass strips to the flush. Where jointing occur at door openings, strips shall be set directly under center of doors.

- Cleaning, Waxing, and Polishing

  At completion of the work, the Contractor shall clean all Vinyl Tile works, remove all cement dirt or other foreign substances.

  Apply two coats of water emulsion wax and polish each coat to produce a well-polished finish.

  Do not permit traffic on finished floors unless they are protected with heavy papers.

- Adjustments

  The installation shall be thoroughly inspected and all necessary adjustment shall be made within one-month time.

  Tiles that have not "seated" in level glance with surrounding tiles shall have heat applied locally or quickly rolled to surrounding floor tile level. Repair tile showing minor fracture, shall have heat locally applied and then quickly rolled.

  Tiles showing broken corners or fracture line entirely across their surface shall be warmed and then removed. Substitute new tile of same color and thickness.

WROUGHT IRON GRILLES

A. SCOPE OF WORK

- Furnish all labor materials, equipment, plant and other facilities necessary for fabrication, delivery and installation of all security grill work shown on drawings and as herein specified.

- All work under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and the Sub-Contractor for this portion of the work is required to refer thereto.

B. GENERAL

- The Contractor shall furnish and installs all wrought iron grillwork indicated on the drawings or specified herein.

C. FABRICATION

- All work is to be first quality, by experienced craftsman and fabricated in a shop capable of producing the higher grade of metal work and whose principal business is the manufacturer of architectural metals.
- All joints and splices shall be electrically welded and ground smooth.
- Before delivery to the job site, all wrought iron grille work shall be shop painted with a coat of rust inhibitive primer such as red lead.
- All seams shall be ground smooth.

D. INSTALLATION

- All work shall rigidly install in a first class manner done by experienced mechanics.

E. GUARANTEE

- Furnish guarantee to Owner per requirements of the General Conditions for period of one year after date of final acceptance of building.

SPECIFICATIONS FOR STRUCTURAL WORKS

Working Drawings

- This "General Notes & Specifications for Structural Works" shall form a part of the Structural Plans.
- In the interpretation of these structural plans, indicated dimensions shall govern and distances or sizes shall not be scaled for construction purposes.
- In cases of conflict in details or dimensions between the Architectural and Structural Plans, refer to the Engineer or his authorized representative for final decision.
- In cases of conflict between the Structural Plans and the General Notes and Specifications, the Plans shall govern.

A. DESIGN LOADS

- Dead Loads

The design loads unless otherwise specified in the structural plans are as follows:

Concrete	150 pcf
Partitions (As reflected on plan)	20 psf (minimum)
Concrete Topping	25 psf
Ceiling Utilities/Mechanical/Electrical/ Plumbing	5 psf

The Architect and building contractor shall get the approval of the Structural Engineer for any loading different from exceeding these loads.

The Concrete Hollow Block partition and R.C. walls as indicated in the structural plans. Additional CHB and R.C. walls shall be subject to the approval of the Structural Engineer.

- Live Loads

  The design live loads unless otherwise specified in the plans are 50 psf:

Classrooms	40 psf
Corridor / Stair	100 psf
Roof	20 psf

  These design live loads shall never be exceeded at any time during the life of the structure without the written consent of the Structural engineer.

  It shall be the responsibility of the Owner of the building to get the approval of the Structural Engineer of any live load that will be imposed on any area of the building different from and or exceeding the design live loads specified herein.

  No portion of the building shall be used as temporary storage of construction materials in excess of the design live loads with the consent of the Structural Engineer.

- Earthquake Loads

  The design earthquake loads are as per the provision of the "Uniform Building Code (USA) 1994 Edition" for Earthquake Zone 4. These loads are assumed to be statically applied to the structure.

- Wind Loads

  The design wind loads are as per the provision of the "National Structural Code for Building (PHIL) 2001"

- Equipment Loading

  Equipment not indicated in the plans shall be not installed without the approval of the Structural Engineer.

  The manufacturer shall submit equipment data specifying the weight, and its reaction at the base, and its vibration characteristics.

B. REINFORCED CONCRETE CONSTRUCTION

- Cement shall conform to Portland Cement ASTM C150.

- Concrete aggregates shall conform to ASTM C33 except the aggregates failing to meet these specifications but which have produced concrete of adequate strength and durability may be used to the approval of the Structural Engineer.

- Water used in mixing concrete shall be clean and free from injurious amounts of oil, acids, alkalis, salts, organic material or other substances deleterious to concrete or steel. In addition, the mixing water for pre-stressed concrete shall not contain deleterious amounts of chloride ion.

- Reinforcing bars shall conform to ASTM A615.

- Admixtures to be used in concrete shall be subject to prior approval by the Structural Engineer.

- Cement and aggregates shall be stored in such a manner as to prevent their deterioration or the intrusion of foreign matter.

  Concrete cylinder samples for strength tests of each glass of concrete shall be taken not less than twice a day nor less than once for each 50 cum. of concrete or for each 490 sq.m. of surface area place. The cylinder samples for strength tests shall be taken cured and tested in accordance with ASTM C172, ASTM C31, and ASTM C39.
- Acceptance of Concrete

  Concrete poured will be considered satisfactory if the average of all sets of these consecutive strength test falls below the required fc' and not individual strength test falls below the required fc' by more than 500 psi.

- Core tests and load tests

  If individual tests of laboratory cured cylinder samples produced strength more than 500 psi below fc' core test and or load tests may be resorted subject to the approval by the Structural Engineer.

- Mixing of Concrete

  All concrete shall be mixed until there is a uniform distribution of the materials and shall be discharged completely before the mixer is recharged.

- Conveying of Concrete

  Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent the separation or loss of materials.

- Depositing of Concrete

  Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to re handling or flowing.

- Curing

  Concrete shall be maintained in a moist condition for at least 7 days after placing. Wet burlap may be laid over the slab constantly applied with water.

C. CONCRETE MIXES

Unless otherwise indicated in the drawings, the minimum 28-day cylinder compressive strength shall be as follows:

a) Foundation ---------- fc' = 3000 psi
b) Columns ---------- fc' = 3000 psi
c) Slab on Fill ---------- fc' = 3000 psi
d) Suspended beam & Slab ---------- fc' = 3000 psi
e) All others ---------- fc' = 2000 psi

D. FOOTINGS

- Assumed allowable soil bearing capacity, in the absence of soil investigation report, is 2000 psf. The Contractor shall verify actual soil condition at site.

- Existing underground pipes, tunnels, etc., shall be brought to the attention of the Structural Engineer for evaluation.

- An excavation adjacent to an existing structure shall be provided with adequate sheet piling by the Contractor. The sheet piles shall be properly designed to resist earth and

water pressure as well as surcharge loading on the footings of the adjacent existing structures.

- Unless otherwise detailed in the plans CHB wall footing shall be as per figures on Sheet SS-1.

- RC Slab on fill other than pressure slab @ basement shall be .125m thick with 10-mm bars at 0.30 m.o.c. each way unless otherwise indicated in the plans.
- All earth fill supporting ground slabs for flooring, parking, sidewalk, etc., shall be compacted to 90% proctor in layers of 0.30m. Unless otherwise specified by the Structural Engineer.

E. REINFORCED CONCRETE BEAMS

- Unless otherwise noted in the plans or specifications camber all RC beams at least 6 mm (1/4") for every 4500mm (15') of clear span except cantilevers which shall be 19mm (3/4") for every 3000 mm (10') of clear span.

- If there are two or more layers of reinforcing bars, use 25-mm separators spaced at 0.90 m.o.c. In no case shall there be less than two separators between layers of bars.

- If beam reinforcing bars end in a wall, the clear distance for the bar to the farther face of the wall shall be not less than 5 bar diameters. The reinforcing bar shall terminate on a standard 90 degrees hook.

- Beam reinforcing bars supporting slab reinforcement shall be 25 mm from the bottom of the finish.

- When a beam crosses a girder, rest beam bars on top of the girder bars. At column intersection girder bars shall be on top of beam bars.

- Lengths of bar cut off and bar clearances shall be as specified in Sheet S-1.

- Top bar splices shall be located at mid-span and bottom bar splices at column supports. Unless otherwise indicated in the plans splice lengths shall follow those given for development length as per figure on Sheet S-1.

F. REINFORCED CONCRETE SLABS

- Unless otherwise noted in plans or specifications, camber all R.C. slabs 3mm (1/8") per 3000 mm (10') of shorter span.

- If slabs are reinforced both ways, bar along the shorter span shall be placed below those along the long span at the center and over the longer span bars near the supports.

- Lengths of bar cut off shall be as specified in Sheet SS-1.

- Concrete covering shall be 18 mm for top and bottom bars.

- Unless otherwise specified by the Engineer, bar chairs shall be provided at least 600 mm. each way to support top and bottom bars separately.

G. REINFORCED CONCRETE COLUMNS

- Unless otherwise indicated, the column pedestal embedded in the ground shall be 50 mm. larger than the column as per plan at the basement floor level, or ground floor level if there is no basement.

- Construction joints in columns shall be located at the top of the pedestal (basement floor line, or ground floor line if there is no basement) or at least a distance above the floor equal to the maximum dimension of the column or 1/6 story height.

- All ties shall be fastened to column vertical reinforcement by means of wires at all intersection portions of ties and columns rebar.

- Not more than one-half (1/2) of the total number of bars shall be spliced at the same level. The lap be 1.3 ld of the bar development length. Splices shall be staggered at a distance of at least 40 bar diameters.

- Column bar splice lengths shall follow those tabulated for development on Sheet SS-1.

- Lap welded splice maybe used ion lieu of the above. The capacity of the weld provided shall be 125% larger than the tensile capacity of the bigger bar being spliced. No butt-welded splices are allowed unless otherwise permitted by the Structural Engineer.

- Confinement ties shall be provided on all columns at beam column intersections as shown in S-1.

H. REINFORCED CONCRETE WALLS

- Unless otherwise indicated in the plans, the R.C. wall horizontal bars shall be inside the vertical bars – (retaining wall).

- Reinforcing bars shall have at least 30mm concrete clearance except in 100-mm wall or less where they shall be at the center.

- Carry vertical bar 600 mm above floor level to provided for splices when necessary. Elsewhere stop at 50 mm. below the top of the slab, the bar shall terminate on a standard 90-degree hook.

- Horizontal and vertical bars conforming to ASTM A615 shall have a minimum splice lapping and wired with No. 16 G.I. wire provided that splices in adjacent bars are staggered at least 1.50 m.o.c. Not more than one-half (1/2) of the total number of bars shall be spliced at the same line. Splices shall be staggered a distance of at least 40 bar diameters.

- All opening on walls or slabs less than 300mm thick shall be reinforced as per Figure on Sheet SS-1.

- At wall intersections and corners, the anchorage length provided shall be as shown on Figure on SS-1.

I. C.H.B. WALLS

- Unless otherwise specified, the vertical and horizontal reinforcements for CHB shall be as indicated in the standard details.

- Lintel beams to be used shall be (t x 0.20m.) reinforced by 4-12 mm bars with 10 mm at 300 mm o.c. ties where “t” is the CHB wall thickness.

- Lintel beam shall be provided at top of CHB wall openings. It shall extend at least 200mm beyond the openings.

- For high walls, lintel beams shall be provided at 3000mm o.c.

- For long walls, stiffener columns shall be provided at 3000mm o.c.

- Where CHB walls adjoin R.C. Columns and beams, provide dowels on R.C. column and beams prior to pouring to match CHB wall reinforcement. The dowels shall be 12mm bars at 600 mm. o.c.

- Where columns and beams have been poured without the CHB wall dowels, provided ½” dia bolts at 400mm o.c. These anchors shall be drilled and grouted w/ conc. Epoxy. No chipping off of concrete columns and beams is allowed unless permitted by the Engineer.

J. STRUCTURAL TOLERANCES

Unless otherwise specified by the Engineer, the following are the acceptable structural tolerances for cast-in-place concrete construction. All dimensions, which are not within the required tolerances, shall be corrected prior to pouring of concrete. Tolerances for pre-cast concrete construction shall be ½ of the values given below:

a) Cross sectional dimensions and location of reinforcement, pre-stressing steel and pre-stressing steel ducts.

Dimensions less than 200 mm	-	+ 6mm
200mm to 600 mm	-	+ 9mm
Over 600mm	-	+12mm

b) Member lengths or height (Max. limitation = 12mm)	-	6mm per 3.0 meters
c) Deviation from straight line (Sweep and or plumpness)	-	6mm per 3.0 meters
d) Locations of bar cut-off or bonds	-	+50mm

K. CONCRETE PROTECTIONS FOR REINFORCEMENT

The following minimum concrete cover shall be provided for reinforcing bars. For bar bundles, the minimum cover shall equal the equivalent diameter of the bundled bars needed but not be more than 2 inches on the tabulated minimum whichever is greater.

- Cast-in-place concrete (pre-stressed concrete construction)

a) Cast against and permanently Exposed to earth	75 mm
b) Exposed to earth or weather 20mm dia. and larger	50 mm
c) Not exposed to weather or in contact with ground, Slabs walls and joints.	
36 mm dia. and smaller	19mm
No. 14 and No. 18	38mm
Beams, girders and columns Principal reinforcements, ties Stirrups or spirals	38mm

L. REINFORCING BARS

- All reinforcing bars shall be deformed conforming to ASTM A615-68 unless otherwise noted in the plans the minimum yield strength of the reinforcing bars to be used corresponding to the structural member shall be as enumerated below:

  a) fy = 33,000 psi for 12mm & smaller sizes
  b) fy = 40,000 psi for 16mm & larger sizes

- Splice and anchorage lengths requirements follow those set for development length (ld) as shown in SS-1 unless otherwise indicated in the plans or approved by the Structural Engineer.

- Equivalent metric size bars when used shall be as per tabulations below:

No. 3	10mm∅
No. 4	12mm∅
No. 5	16mm∅

No. 6	20mm∅
No. 8	25mm∅
No. 9	28mm∅
No. 10	32mm∅
No. 11	36mm∅

M. STANDARD HOOK

- A standard hook for rebars if required shall be either of the following:

  A semicircular turn plus an extension of at least 4-bar diameter but not less than 62mm at the free end of the bar.

  A 90-degree turn plus an extension of at least 12 bars diameter at the free end of the bar.

- Minimum diameter of bend measured on the inside of the bar shall be as follows :

10mm∅ to 25mm∅	- 6 bar diameter
28mm∅ to 36mm∅	- 8 bar diameter
No.14 to 18	- 10 bar diameter

N. WELDED SPLICES

- Lap welded splices when used shall develop a resistance equal to at least 125 percent of the tensile capacity of the bar being spliced.

- Butt-welded splice when used shall be considered 75% efficient. The remaining 50% capacity to develop 125 percent of the tensile capacity of the bar shall be provided for by an additional welded lap splice connection on the same joint.

- The Contractor for approval shall submit details of all welded splices by the Structural Engineer.

- Only certified welders shall be allowed to perform welding operations. These welders shall be subject to the approval of the Work Engineers.

- Testing of welds shall be by X-ray Method (non-destructive tests) unless otherwise directed by the Structural Engineer.

- Connection of crossing bars by track welding is not permitted.

PLUMBING WORKS

A. GENERAL

- **Scope of Work**

  The work to be undertaken in this Division shall consist of the furnishing of all materials, labor, tools, equipment and other facilities and equipment and the satisfactory performance of all work necessary of complete installation, testing and operation of the plumbing system in accordance with the applicable consisting of, but not necessarily limited to the following :

  Water distribution and supply pipes to equipment and plumbing fixtures.

  Install storm drainage system which include canopy drain, roof downspout, junction boxes and connection to storm drain or to open channel or to on the low ground.

  Provide oil, waste and vent pipes system and connection to septic tank and connection of outlet waste line to nearest existing storm drain.

  Install plumbing fixtures, fittings, trims and accessories for the toilets.

Leakage tests of water supplies, sanitary and storm drainage system.

Pressure test of newly installed water system.

Disinfecting of water distribution system.
Submit certificate of test on installed equipment and piping system.

Secure all permits and licenses as required.

Prepare and submit reproducible Final As-built plans and (4) set of white prints signed and sealed by Registered Sanitary Engineer or Master Plumber.

Furnish a written one-year warranty on the plumbing and equipment installation.

Investigate and coordinate with other trades of all possible conflicts of plumbing works with others.

- Coordinate With Other Trades

  The Contractor is required to refer to the General Conditions and to all architectural, structural, electrical and mechanical plans and specifications and shall investigate all possible interference and conditions affecting this work.

- Responsibility

  The contractor and all persons or Companies providing or both for this project are specially referred to the General Conditions of the Specifications and the various other contract documents, which may affect the completion of any work of the other trades. In the absence of complete agreement among the Sub-contractors of the General Contractor (Authorized by the Owner), supply dealers, or others affected by the construction, the General Contractor is to be held responsible for the Coordination and completion of all the works.

- Drawings and Specification

  The General Drawings and these Specifications are complementary to each other and any labor or materials whether called for or both if necessary for the successful operation of any particular type of fixtures or equipment specified under this contract shall be furnished and installed without additional cost to the Owner.

- Intent

  It is not intended that the drawings shall show every pipe, fitting, valve and appliance. All such items, whether specifically mentioned or not, or indicated on drawings, shall be furnished and installed necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the Owner/Architect.

- Permits and Inspection

  The Contractor shall obtain and pay for all permits bonds and inspection fees and shall be responsible for all penalties incurred by himself or his agents.

- Workmanship

  All works shall be performed in first class and neat workmanship by plumbers and their work shall be satisfactory to the Architect and to the Owner.

- Code to be followed

  All plumbing work to be done shall be in accordance with the National Plumbing Code of the Philippines and with the requirements of all applicable laws of the Republic and all local codes and ordinances.

B. MATERIALS

- Approved Materials

  Within 30 days after the award of contract, the Contractor shall submit for the Owner's Representative approval, four (4) copies of all equipment and materials he proposes to use under this contract.

  After written approval of the above list, and before purchase of any equipment or material, the Contractor shall submit for approval four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and part list of equipment and the materials to be provided under this contract.

  The Contractor shall assume the cost of and the entire responsibility for any change in the work as shown on the Contract, which maybe occasioned by approval of materials other than specified.

- Standard for Materials

  All materials shall conform to the standard listed below:
  Centrifugal cast iron pipe - ANSI A21.6
  Cast iron soil pipe fitting - ANSI A21.6
  Black Iron Pipe - ASTM a 53 Standard, Schedule 40
  Malleable Iron Fittings - ASTM A – 338
  PVC pipe and fittings - ASTM - D 1784, CS 256 for water
  Pressure pipes, sanitary II, Series 1000 for waste and vent pipes.
  Union patent (malleable iron, for ferrous pipes): U.S. Federal Specifications
  WW U – 531. Type B Zinc – coated.
  Non-reinforced concrete sewer, storm drain and culvert pipe - ASTM C–14-82
  Galvanized Iron Pipe - ASTM A – 53, Schedule 40
  Reinforced concrete culvert, storm drain and sewer pipe - ASTM C 76-84
  Cement - ASTM C150 – 86 Type I
  Deformed reinforcement bar- ASTM A496

- Alternate Materials

  Use of any materials, device, fixtures and appurtenances not specified in these specifications maybe allowed, provided that such alternate item has been approved in writing by the Owner's Representative and Contractors claim for its suitability. The cost for testing shall be paid for by the Contractor.

  Test shall be done by any agency approved by the Owner's Representative and in accordance with generally accepted standards. In the absence of such standards, the Owner's Representative may specify the test procedure.

  To any substitution, all health and safety requirements shall be observed.

  The Contractor shall, together with his bid, submit a list of materials which he intends to use in list of the materials specified in the contract documents which he believes he cannot supply and stating the reason for the substitution. Material shown in this list shall be installed as specified and no further request for substitution shall be made except when he can show a valid reason.

  Request for substitution shall be accompanied by:

  - Reason for substitution;
  - Certificate of test indicating quality of substitute materials;
  - Cost comparison with materials originally specified.

- Identification of materials

Each length pipe, each fitting, trap, fixture and device used in the plumbing and piping system shall be cast, stamped or indelibly marked on name, the weight, the type, the class of product when as required but the standard mentioned in the Sub-section 2.2 mentioned above.
All plumbing fixtures and materials installed without the above trade marks shall be removed and replaced with properly marked fixtures and fittings without any extra cost to the Owner.

- Materials schedule

PIPE AND FITTINGS MATERIALS

ITEMS	GIP Sch. 40 Standard	PVC Sanitary II Series 1000	Cast Iron Pipe (CIP)	CU Type L
A. Plumbing	X (indoor)			
1. Cold water supply				
2. Hot water supply				X
3.Outdoor Sanitary Sewer system		X		
4. Indoor House drain System			X	
5. Downspout	X			
6. Soil, waste	(Sch.20)			
7. Vent		X		

Legend:
GI - Galvanized Iron Pipe
PVCP - Polyvinyl Chloride Pipe
CIP - Cast Iron Pipe
Cu Type L - Copper Pipe

- **Notes:**

Where uneven settlement at pipe joints is likely to occur, use Gilbault joint or the other suitable flexible fittings.

GI pipe when buried underground shall be given corrosion protection (painted with coal tar enamel and wrapped with non-water absorbent and painted again with coal tar enamel and wrapped with non water absorbent felt).

Gate Valves and Check Valves

Of Valves	Disc	Stem	Body	Connection	Standards	Remarks
75 mm (3") and Larger check Valves,10.5 kgs/cm^2 (150 psi)	Swing Disc	-	Iron with Bronze Trim	Flanged	AWWA c.500-71	
63mm (2-1/2") and smaller check valves, 10.5 kgs/sq.cm. (150psi) Working pressure.	Lift Disc	-	All Bronze	Female Threaded	Federal WW-V-58	
75mm (3") and larger Gate valves exposed 10.5 kg/sq.cm.(150psi) working pressure.	-	Rising	Iron with Bronze Trim	Flanged	AWWA c.500-71	
63mm (2-1/2") and smaller gate valves 10.5kg/sq.cm. (150psi) working pressure.	-	OS&Y	All Bronze	Federal Female Threaded	Specs WW-V-58	
75mm (3") and larger gate valves 10.5 kgs/sq.cm (150 psi) working pressure.	-	-	IBBM	AWWA	-	For use with pumping install.

- **Notes:**

  Swing Check valves 75mm and larger shall be provided with spring or weighty load control attached to flap disc axle.

  When valves are placed or located in a box or compartment the valve stem shall be non-rising but provided with VALVE OPEN and CLOSE indicator attached to stem.

Hose Bibbs

Hose bibb shall be size 13mm (1/2") male and 19mm (3/4") hose thread, bronze body conforming to ASTM Specification B62 suitable for cold water pressure up to 10.5 kg/cm (150psi), equal or similar to No. 58 Chicago hose valve screwed connections, with rubber composition disc, American Standard Taper Pipe Thread on the inlet and standard hose thread on male outlet.

Pipe Hangers

- Horizontal Runs:
- Adjustable mild steel or malleable iron pipe hangers
- Vertical Runs:
- Mild steel clamp or collars
- Hangers for water and vent pipes:
- For 63mm (2-1/2") and larger: Band Type 6.285mm x 32.5 mm (¼" x 1¼") flat mild steel black iron with round iron rod with plates and knots.
- For 50mm (2") and smaller: Split Ring Type with 9.4mm (3/8") iron rods with inserts, plates and knots, toggle bolt clamps expansion shield.

Jointing

- Cold Water Lines:
- Flanged Joints Gasket "Garlock" of equal Screwed Joints: U.S.
- Federal Specification GG – P –251.
- Sanitary Drainage Lines: Lead and oakum CISP, PVC cement or
- Rubber ring for PVC.
- Storm Drainage Lines:
- Cement mortar for concrete drain pipes, PVC cement for PVC pipes.
- Dissimilar Pipes: Adapter fittings shall be used.

Drains

- Similar or equal to "ASA" Model No.- 40B, with Type 125mm
- Strainer or approved equal.
- Floor drains (at toilets/baths): "ASA" Model No. – 40B, with Type 125mm strainer or approved equal.
- Balcony drains: ASA No. 40 – 9A
- Roof Drains: ASA No.10 – 8.2

Outdoor Pipe Lines, Appurtenances

- Sewer Junction Boxes
- -2000 psi reinforced concrete with pre-cast R.C. cover provided 2 recessed steel lifting eyes.
- Area- Drain Catch Basin – 2000 psi R.C. with cast iron grating cover.
- Storm Drain Junction Boxes – 2000 psi R.C. cover provided 2
- Recessed lifting eyes.
- Sewer Pipe Concrete Encasement – 3000psi R.C.

Float Valve

- Shall be hydraulically operated, pilot controlled diaphragm actuated, single seated with disc. Valve shall open wide when float is at low water level and close drip type when float is high level. Class 125 Cast Iron body with bronze trim.

Testing of Materials

Samples of various types and kinds of materials shall be approved by the Owner's Representative before any work is started. During the progress of work, a sufficient number of samples to ascertain the quality, maybe tested and the cost of such samples shall be included in the price bid by the Contractor. Results of test shall be submitted to the architect for evaluation at least working days before materials is due for installation the job.

C. INSTALLATION

- General

Cutting and repairing

The work shall be laid out in advance and any cutting of construction shall be done with the written permission of the Owner's Representative or his authorized representative. Roughing in for pipes and fixtures shall be carried out along with the construction of the building of structure. Openings shall be left in walls and floors of proper sizes correctly located for the pipes but the contractor shall do any additional cutting needed in case of error or omission and shall properly replace any concrete work or flashing around the pipes as maybe required without additional cost to the Owner.

All items to be embedded in concrete shall be thoroughly cleaned free from all rust, scale and paint.

Protection

The Plumbing Contractor shall protect all his work and materials from loss, injury or defacement. Protection of fixtures and materials shall be provided by boards, papers and or cloth as required as required, and any loss, damage or deface materials shall be replaced by the Plumbing Contractor at his own expense.

Installation

The work throughout shall be executed in accordance with the best practice of the trade and in the best and true manner under the direction of the licensed Sanitary Engineer or Master Plumber and to the satisfaction of the Owner's Representative who will interpret the intent of the contract drawings and specifications and shall have the power to eject any work or materials which are not in full accordance herewith.

The piping in any location shall be closed-up, furred-in, or Covered before the examination and testing of it by the government inspector, Owner or their representative.

- Plumbing Fixtures and Equipment:

All bids to be considered shall include installation of all plumbing fixtures shown on the drawing and specified by the Owner's Representative.

All plumbing fixtures and equipment shall be installed free and open in a manner to prove easy access for cleaning and shall be furnished with all brackets, cleats, plates and anchor required to support the fixtures and equipment rigidly in place.

After installation of a any or all the plumbing fixtures for the building, same shall be kept clean and in working order and shall not be used by any one until the building has been formally turned over to and accepted by the Owner.

Fixtures, fittings, trims, faucets, escutcheon, traps and waste pipes that are exposed to view in finished spaces shall be brushed, with polished chromium plating or nickel finish, unless otherwise specified.

The Plumbing Contractor shall be responsible for the supply of fixture fittings (or trims) which are not provided with the fixture but required for the complete installation. All fixtures shall be carefully checked to determine the items that must be provided to complete the installation.

All fixtures shall be provided with the individual shut-off valve so that any fixture maybe separately controlled without affecting other fixtures supplied from the same distribution line.

All flushometer valves shall be equipped with vacuum breaking devices.

- Fittings

All change in size of soil waste and drain lines shall be made with reducing fittings or reducers.

Where it becomes necessary to use short-radius fittings in any other locations, prior written approval of the Architect shall be obtained.

No fitting or connections that offers abnormal obstruction to flow shall be used.

Enlargement of a 75mm (3”) closet bend or stub to a 100mm (4”) pipe is acceptable.

- Cleanout Plugs and Traps

Cleanout Plugs

Cleanout installed in connection with cast iron-bell and spigot shall consist of a long – sweep quarter bend, or one or two eight-bends extended to an easily accessible place, or where indicated on the drawings.
An extra-heavy, cast brass ferrule with counter-sunk tap screw cover shall be caulked into the hub of the fittings and shall be even or level with finish floor or wall.

Where clean-outs in connection with thread pipes are indicated and are accessible, they shall be cast-iron drainage T pattern 90 degree branch fittings with the extra heavy brass screw plugs of the same size as the pipe up to, and including 100mm (4”).

Traps

Every plumbing fixtures connected to the sanitary drainage system shall be equipped with a trap. Traps are specified to be supplied with the fixture, i.e. water closets and urinals.

Each trap shall be placed as near to the fixture as possible.

Traps installed on hub and spigot type shall be extra-heavy cast iron.

Traps installed on threaded type shall be recessed drainage pattern.

- Sleeves and Supports

General

Pipe sleeves, pipes support, and fixture shall be furnished and set, and the Contractor shall be responsible for their proper permanent locations.

Pipes shall no be permitted to pass through columns, footings, beams or ribs unless noted on the drawings or with the written approval of the Owner's Representative.

Pipe Sleeves

Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry of concrete.

Pipe sleeves except sleeves through footings shall be sufficient diameter to provide approximately ¼" clearance around the pipe or insulation.

Pipe sleeves in walls and partition shall be cast-iron or steel pipe.

Flashing sleeves shall be installed where pipes pass through waterproofing membrane.

The sleeves shall be provided with an integral flashing flange or a clamping device to which a flashing shield can be clamped or soldered.

The space between the pipe sleeve shall be made watertight by inserting packed-oakum and filling the remaining space with poured lead or epoxy and caulking thoroughly.

Escutcheon shall be installed around all exposed pipes except water closet starts or bends passing through finished floors, walls or ceilings. Escutcheons shall be of sufficient outside diameter to cover the sleeve opening and shall fit snugly around the pipe. Escutcheons shall be cast–brass chrome plated of the approved size and make, provided with a set screw to properly hold escutcheons in place.

Fixtures and Equipment Supports and Fastening

All fixtures and equipment shall be supported and fastened in a safe and satisfactory manner.

Inserts shall be securely anchored and the anchors shall be properly filled with mortar. Inserts shall be installed even or level with finish wall and shall be completely concealed with the fixtures and installed.

Where through bolts are used, they shall be provided plates or washers at the back and set so the heads, nuts, cap nuts and screw heads shall be chromium plated and shall be provided with chrome plated brass washer.

Use a water closet floor flange for mounting fixtures with an appropriate ball wax as gasket. Use stainless steel bolt and knots to fasten the flange and foot of the water closet.

- Hangers, Anchors, Guide Inside Buildings

  All piping shall be rigidly supported by means of approved hangers and support. Piping shall be supported to maintain required position and pitching of lines to prevent vibration and to secure piping in place and shall be so arranged as to provide space for expansion and contraction.

  Hangers shall conform to the standard details but the contractor may, if he elects use other commercial hangers having parts not lighter than indicated on the details, provided that he has obtained prior to written approval of the engineer. Chains, straps, perforated bars or wire hangers will not be permitted.

  Inserts shall be cast-iron steel and shall be of type to receive a machine bolt in one horizontal direction and shall be installed before the concrete is poured.

  Vertical runs of pipe shall be supported by mild steel clamps or collars spaced not more than two floors apart.

  Schedule of hangers on water piping shall be as shown on the detailed plan.
- Ceilings, Plates, and Flashing:

Floor, Walls and Ceiling Plates:

Where uncovered or exposed pipes through floor, finish walls or finished ceilings, they shall be fitted with chromium plated steel plates.

Plates shall be large enough to completely close the hole around the pipe and shall be squared, octagonal, or round with the less dimension not less than 38mm (1 ½") larger than the diameter of the pipe.

- Joints and Connections

Fixture connections:

Closet bolts shall not be less than 6mm (1/4") in diameter and shall be equipped with chromium plated cap nuts washers.

The system shall hold this water for a full 30 minutes during which time there shall be drop more than 100mm (4").

If and when the Architect decides, the additional test is needed such, as an air or smoke test on the drainage system, the Contractor shall perform such test without additional cost to the Owner.

- Pressure Test for Water System

Upon completion of the roughing-in and before setting fixtures, the entire hot and clod water piping system shall be tested at a hydrostatic pressure one-and-half times the expected working pressure in the system when in operation, and proved tight this pressure (but not less than10.57 kg/c.m. or 150 psi) for a period of two hours.

Where the portion of the water piping system is concealed before completion, this portion shall be tested separately in a manner similar to the described for the entire system and in the presence of the Owner's Representative.

- Leakage Test for the Water System

Leakage test shall be conducted after the satisfactory completion of the pressure test and shall consist of an examination of all joints for leakage test for the completed pipeline.

The pressure to be maintained during the test shall be the designed working pressure of the system.

Leakage test shall be made only after the minimum of 24 hours after the pipe to be tested has been filled with water. No test shall be made until at least 7 days after the last concrete thrust or reaction backing has been cast with standard cement.

The duration of each leakage test shall be two hours unless otherwise specified by the Architect.

Each section of pipeline shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation, shall be applied by means of a positive displacement type pump, in manner satisfactorily to the Owner's Representative.
Before starting the leakage test, all air shall be expelled from the pipe. All exposed pipes, fittings and valves, joints shall be examined for leakage during the test.

ALLOWABLE LEAKAGE RATE PER 100 JOINTS PER OR PIPE DIAMETER AT PRESSURE STIPULATED.

PRESSURE		LEAKAGE RATE	
PSI	Kg/cm^2	Liters/Hour	Liters/2Hour
50	3.50	1.45	2.90
75	5.30	1.75	3.50
100	7.00	2.05	4.10
125	8.80	2.30	4.60
150	10.50	2.50	5.00
200	14.00	2.90	5.80

- Defective Work

  If inspection or test shows any defect, such work or materials shall be replaced and the inspection and test repeated until satisfactory to the Owner's Representative.

  All repairs to piping shall be made of new materials at the expense of the Contractor.

  No caulking of screw joints or holes will be accepted.

- Disinfection of Water Distribution System

  The entire water system shall be thoroughly flushed and disinfected with chlorine before it is placed in operation.

  Chlorinating materials shall be either liquid chlorine or hypochlorite, as specified, and shall be introduced into the water lines in a manner approved by the Owner's Representative.

  The chlorine dosage shall be such as to provide not less than 50mg per liter of available chlorine.

  Following a contact period of not less than 24 hours, the heavily chlorinated water shall be flushed from the system with clean water until the residual chlorine content is not greater than 2 tenths (0.02) mg/L. All valves in water lines being sterilized shall be closed several times during the testing period.

- Disinfection of Water Tanks

  The water tanks and reservoir shall be thoroughly finished and disinfected with chlorine before it is placed in operation.

  Chlorinating materials shall be liquid chlorine or hypechlorite, as specified and shall be introduced into the water tanks and reservoir by swabbing and approved protection for the worker's safety shall be provided during the swabbing work.

  The chlorine dosage shall be such as to provide not less than 50 parts per million (50ppm) of available chlorine.

  Following a contact period of not less than a period of 24 hours, the heavily chlorinated water shall be flushed from the system with clean water until the residual chlorine content is not greater than two tenths (0.02ppm).

- Refer to Structural Specification for Reinforcement

- Painting

  All exposed soil, waste and vent piping of cast-iron is asphalt or tar coated shall be given two coats of shellac and two coats of oil enamel finish coating.

  Color Code

All exposed piping, shall be adequately and durably identified by distinctive color paints as follows:

Cold water pipe	-	Blue
Hot water pipe	-	Blue with Red bands at 1.00m on center
Aluminum	-	Gray Green
Storm water pipe	-	Orange
Sewerage pipe	-	Black
Vent pipe	-	Gray

E. GUARANTEE

- The Plumbing Contractor shall furnish to the Owner a written guarantee covering the satisfactory operation of the plumbing installation in all its part for a period of one year after date of acceptance. During this period the plumbing contractor shall repair or replace any defective work and pay for any repair or replacement cost.

F. WATER RESERVOIRS

- Piping, fittings, and miscellaneous metal works

  Furnish and install all pipes, fittings, valves, specials, pipe supports, miscellaneous metal works and all required appurtenances as shown in the plans and as required to make the entire water tank piping system operable.

  All materials furnished and installed shall be new and guaranteed free from defects, in design materials and workmanship.

  Adequate protection, measures shall be provided to protect pipe, fittings, valves and all other materials from damage and injury during storage and installation.

  Wall pipe sleeves shall be cast-iron seepage ring or anchor ring.

- Manhole Frame Cover

  All casting for manhole frames shall tough gray iron, free from wraps, cracks, holes, swells, and cold shuts, and approximately 3.2mm (1/8”) thick.

  All casting shall conform to the requirements of ASTM Standard A-48 for gray iron casting.

- Ladder Rungs

  Ladder rungs inside the reservoir shall be 19mm (3/4”) diameter round bars, stainless steel for outside the reservoir, shall be cast iron and as shown in the drawing They shall be placed on the walls as shown in the drawings.

- Installation

  All pipes shall be carefully placed and supported at the proper lines and grades and where possible shall be sloped to permit complete draining.
  Piping runs shown in the drawings shall be followed as closely as possible, except for minor adjustments to avoid architectural and/or structural features. If major relocation is required they shall be subjected to the approval of the Architect.

  Piping shall be properly supported by suitable anchors, brackets, or hangers. Vertical pipes shall be anchored by suitable galvanized steel traps. Pipes supports shall be provided as shown on the plans and whatever else necessary to prevent strain on joints to facilitate taking down pipes.

Carefully inspect all pipes and fittings before installation. Inspection of pipes shall include light tapping with a hammer to detect cracks or defects. No pipe, fittings or valves are cracked or show defects shall be used.

All pipes and fittings shall be carefully cleaned immediately before installation. Every open end of a pipe shall be carefully capped or plugged before leaving the work.

- Pipe Jointing

  Flanged Pipe shall true to length. Joints shall be made up square with even pressure upon the gaskets and must be perfectly watertight. Gasket shall fit the outside dimension of the pipe accurately so that surplus materials projects out into the flow area. The completed joint shall be smooth and properly aligned.

- Pipe Through Walls

  All equipment shall be supplied from reputable firms engaged in the manufacture of each particular item. The entire assembly when installed shall be given a start-up and test run to prove that all specifications have met before acceptance. The test duration shall be 24 hours.

G. EQUIPMENT

- All equipment shall be supplied from the reputable firms engage in the manufacture of each particular item. The entire assembly when installed shall be given a start-up and test run to prove that all specifications have met before acceptance. The test duration shall be 24 hours.

- The equipment and installation shall be guaranteed for a period of at least one-year trouble free operation.

H. PUMPS

- General

  The specification hereinstated are basic guides only. Another items not so indicated but which are obviously necessary for the proper operation of the system as intended shall be supplied and installed, in accordance with accepted engineering standards.

  Manual of operation and maintenance and list of spare parts shall be supplied together with the equipment.

  The supplier shall submit at least four (4) copies of pumps performance curves showing among others, the pump rating and the pump efficiency, properly marked out.

  Accessories to be supplied for each pump shall include non-slam type check valve (Cla-val), two vibration insulators and two gate valves, of size as the pump suction and another discharge and rated 68 kg/cm^2 (150psi) for each pump and pipe fittings necessary for complete installation.

  Price quoted shall include cost of delivery of all quoted items to the jobsite, proper installation and pump and motor installation dimension drawings.

  The brands, names and place of manufacture of pumps, motors, valves, controls and all accessories where applicable shall be indicated in the quotation. Include also a description of the pump impellers being offered.

  A metal name plate indicating in indelible letters for the correct specifications of the pump and motors shall be properly attached to the assembly at a location such that the information written thereon can be conveniently read by all concerned.

- Booster Pumps for the Hydropneumatic System

  Number of units: Two identical units.

  Capacity of each unit: As shown in the drawings.

  Type: Centrifugal horizontal-end suction vertical split, coupled to an electric motor in common base, suitable for pumping domestic water supply.

  Electric Motor Drive: 230 V, 3 Phase, 60 cycles open drip proof.

  Motor Controls: Reduced voltage magnetic starter, H-O-A switches over load relays, alternators and pressure switch to stop and start the pumps at high and low pressure cut-off/cut-in and liquid level detector at reservoir to prevent pump from running dry.

  Accessories: Vibration insulating hose connection at suction and discharge line and pressure relief valve at discharge only.

- Pressure Tanks

  Vertical Tank, stainless steel and 100 psi rating. The tank capacity is shown in the drawing. Provide with accessories as relief valve, sight glass tube level indicator encased in copper or stainless steel tubing, fully automatic air volume controller device, pressure gauge (in100man dial face diameter), cocks, pressures switch and drain valve.

I. As-Built Drawings

The plumbing Contractor, shall mark down with the red pencil on the two sets of plumbing plans all the revision, omissions, and or additions to various plumbing installation, drawings as the construction progress. One set of the plans as marked shall be submitted to the Architect after completion of the work.

Before the final payment is made to the Contractor, he shall submit to the Owner, As-Built drawing incorporating all the change made and noted in the marked plans retained by him. The As-Built Drawings shall be prepared on reproducible form.

The Plumbing Contractor shall prepare and submit the As-Built Drawings without extra cost to the Owner.

J. Miscellaneous

- Throughout the construction period, open ends of all installed pipelines shall be kept closed by temporary plugs. Drainage lines shall not be kept closed by temporary plugs. Drainage lines shall not be used to conduct dirty construction wash-water, especially those with cement, to avoid possible clogging.

- The contractor shall provide a temporary fire protection system, at each building during the construction period. This shall be of sufficient capacity to put out any fire that maybe break out at any of the building floors due to the construction operations. This is in addition to temporary extinguisher required.

- A temporary potable water supply shall be available to construction workers at each building floor as the construction work progress.

- A temporary human excreta disposal system shall be provided by the Contractor to serve the workers during the construction period.

ELECTRICAL WORKS

I. GENERAL PROVISIONS:

A. WORK DESCRIPTION, GENERAL:

- The work to be done under this specification consist of fabrication, complete details of the electrical works at the subject premises and all work and materials incidental to the proper completion of the installation except those portion of the work which are expressly stated to be done by others.

- All works shall be in accordance with governing codes and regulations and with the specifications.

- The requirements with regards to materials and workmanship specify the required standards for the furnishing of all labor, materials, and appliances necessary for the complete installation of the work specified herein and indicated on the drawings.

- These specifications are intended to provide a broad outline of the required installation but are not intended to include all details of design and construction.

B. CODES, INSPECTION, PERMITS AND FEES

- The work under this contract is to be installed according to the latest requirements of the following:

  1. Philippine National Building Code
  2. Philippine Electrical Code
  3. Electric Cooperative in that areas

- All construction permits and fees required for these works shall obtain by and at the expense of the Contractor. The Contractor shall furnish the Architect, the Engineers and the Owner of the final certificate of inspection and approval from the concerned government authorities after the completion of the work. The Contractor shall prepare all shop drawings, as-built plans and other paper work required by the approving authorities.

- The Contractor shall secure approval from authorities of all plans for construction.

C. RECORD OF DRAWINGS

- The contractor shall record all deviations of the actual installation based on the contract drawings. Upon completion of work, the Contractor shall submit two copies of the as-built drawings indicating the work installed and finished including new information (revisions) not originally shown in the contract drawings to the Engineers for the approval as to conformance with the design concepts and compliance with pertinent code provisions. After such approval, the Contractor shall submit the as-built drawings original to the Owner.

D. COORDINATION

- Coordinate timing of installation with work of other trades.

- Systems provided shall be completed and operable and shall include required accessories fastenings and supports.

- Determine required locations, arrangements and quantities of equipment and materials from drawings, schedules and specifications.

- All equipment shall be installed in strict compliance with manufacturer's recommendations.

- On certain items of equipment specified on other contracts requiring electrical connections, the Contractor shall provide such connections as required.

E. MINOR MODIFICATIONS

- The plans as drawn are based upon architectural plans and details. Show conditions as accurately as possible to indicate them to scale. The plans do not show all fittings necessary to fit the building conditions. The location of outlets, apparatus, and equipment shown on the plan are just approximated. The Contractor shall be responsible for the proper location in order to make them fit, with architectural details and instructions from engineers representative at the site.

F. GUARANTEE

- The Contractor shall guarantee that the electrical system is free from all grounds, from all-defective workmanship and materials that will remain in good condition for a period of one year from the date of acceptance of work. This Contractor at his own expense shall repair any defects appearing within the aforementioned period.

- The Contractor shall indemnify and save the Owner, the Architect and the Engineers from and against all liability for damage arising from injuries or disabilities to persons or damage to property occasioned by an act or omissions of the Contractor or any of his subcontractors including any and all expenses, legal or otherwise which maybe incurred by the Owner, the Architect or the Engineers in the defense of any claim, action and suit.

G. APPROVALS, SUBSTITUTIONS, Etc.

- Wherever hereafter the word “Approval” or “Approved” (make, type, size, arrangement, etc.) are used specifically with regard to manufactured items, etc., or wherever it is desired to substitute a different make or type, all information pertinent to the adequacy and adaptability of the proposed apparatus, shall be submitted to the engineers for their approval before the apparatus is ordered or installed.

H. SUB-CONTRACTS, Etc.

- This Contractor shall be held fully responsible for the work of any sub-contractor or manufacturer performing work for or supplying materials as it is intended that the entire electrical work when finally delivered to the Owner shall be ready in every respect for satisfactory and efficient operation.

I. WORKMANSHIP

- The work throughout shall be executed in the best and most thorough manner to the satisfaction of the Architect and Engineers, who will jointly interpret the meaning of the drawings and specifications and shall have power to reject any works and materials which in their judgement are not fully in accordance therewith.

II BASIC MATERIALS AND METHODS

A. GENERAL

- Furnish and install all conduits, joints, outlet boxes, wires and miscellaneous materials required for wiring, as specified herein and as shown on drawings.

- Furnish and install all power and control wiring to all equipment except as otherwise specified.

- Perform test and adjustments and submit specific reports herein.

B. POLYVINYLCHLORIDE CONDUIT

- General: Standard trade size, heavy wall, manufactured to NEMA TC – 2 type rated for 90-degree C cable.

- Materials: Polyvinyl chloride conduit extruded use Atlanta or approved equivalent.

- Nominal Size: 20mm diameter minimum.

- Couplings and Fittings:

- Use Limitations

  As specified in the latest edition of the PEC.
  Not permitted where subject to mechanical damage

- Pulling Hardware: flat fish tape with ball and flexible leather or polyethylene or manila rope. Use of steel pulling cable not permitted.

C. CONDUIT INSTALLATION

- General: Install in accordance with applicable codes and recognized standard of good practice.

- Actual routing subject to approval

- Joints: Make with approved couplings and unions to provide electrically continuous and moisture tight systems.

D. CONDUCTOR INSTALLATION

- Place all wiring, in a raceway or types indicated. Provide all required and indicated accessories for proper installation of all wiring

- Splicing:

  Permissible only in junction boxes or similar accessible location. Number of splices held to absolute minimum.

E. DISTRIBUTION PANEL BOARD-FUSIBLE SWITCH

- General: Furnish and install distribution and power panel boards as indicated in the panel board schedule and where shown on the drawings. Panel boards shall be dead front safety types, equipped with quick-break fusible branch switches and approved for service entrance. The acceptable manufacturers of the panel board are General Electric and Square “D” or approved equal.

- Fusible switches: All fusible branch switches shall be quick-make, quick-break, with visible blades and dual horsepower ratings. Switch handles shall physically indicate ON and OFF position. Such handles shall be able to accept three padlocks having heavy duty industrial type shackles. Covers shall be interlocked with the switch handles to prevent opening in the ON position. A means shall be provided to allow authorized personnel to release the interlock for inspection purposes when a switch is ON. A cardholder providing circuit identification shall be mounted on each branch switch. Switches shall be provided with a Bussman Fusetron fuses or as noted on the drawings.

- Bussing Assembly: Panel board bus structure and main lugs or main switch shall have current ratings as shown on the board schedule. The bus structure shall accommodate plug-on or bolted branch switches and motor starters as indicated in the panel board schedule without modification to the bus assembly. Provide solid neutral (S/N) assembly when required.

- Equipment Rating: Switches and panel board bus structure shall be safe and without failure withstand short circuits on the systems capable of delivering up to 50,000 amperes RMS symmetrical, unless otherwise noted.

- Cabinet: Panel board assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel is to be as specified in UL Standard for Cabinets. The size of wiring gutters shall be in accordance with UL Standard. Cabinets shall be equipped with a front door and shall be full finish steel with rust inhibiting primer and baked enamel finish.

F. PANEL AND BOX

- Box, plain steel front, complete with hinged door, polished metal catch and lock Manufacturer's standard finish. Repair any damage to finish in a manner acceptable to the engineer.

- Mounting: Flush and surface required.

- Cardholder on inside of the door with clear plastic cover and complete type written schedule of panel branch circuits. Leave spare circuits blank.

- Nameplate: Required at each panel.

- Installation: As shown, maximum distance from the floor to the highest breaker (centerline) shall be 1.8m. Provided mounting materials required make connections specified as shown. Use collars around mounting bolts or equivalent means to provide air space between panels and walls.

- Warranty: A warranty for a period of one year shall be provided for failure of components resulting from normal use and/or factory defects.

G. SERVICE ENTRANCE

- Service Voltage: 230V, single phase, 2 wire, 60 Hz.

- Installation: Contractor shall furnish and install the complete service entrance, conduits and accessories.

- Conduits: Use RSC "NICHI" or approved equal.

III. LIGHTING

A. GENERAL

- Furnish, install and wire all equipment and materials required for complete lighting system as specified as shown.

B. LIGHTING FIXTURES

- Fluorescent Fixture: housing - #22 gauge, B. I. Sheet formed, screw with machine stove bolt and/or welded.

- Fluorescent Fixture Ballast: 230V, high power factor, rapid start, manufactured by Philips, G. E. or approved equal.

- Wiring:

  General: Fixture wiring shall comply with fixture manufacturer's recommendation and PEC requirements.

  Incandescent Fixtures: Use type TF wire in unwired fixtures. Minimum wire size 3.5mm″.

- Location: Approximately as shown. Modify to avoid other equipment or structural components. Provide necessary conduits, wire, fittings and miscellaneous materials.

C. COORDINATION

- Coordination installation of all lighting fixtures with work of other trades

- Coordination exact location of fixtures with respect to suspended ceiling layout to achieve uniformity.

D. SHOP DRAWINGS AND SAMPLES

- Prepare and submit for approval before manufacturing the following:

  Fabrication drawings
  Sample of each fixtures

E. WARRANTY

- All fixture components shall be covered with a warranty for a period of one year against failure resulting from normal use and/or factory defects.

F. GENERATOR

- General

  The generator shall be _____ Kw standby duty, single phase, 2w, 60Hz, 1800 RPM, 240V, and shall have two bearings of the sleeve type and shall be direct connected to the engine flywheel with a flexible coupling. The generator shall have full armature winding. The transient voltage drop on sudden application of 100% rated load shall be less than 15%.

  Voltage Regulator shall be of the same manufacturer as generator, with manual/automatic switch.

  Generator shall be open drift-proof construction with an over all efficient of at least 90% of at full load.

  The generator shall have full rated neutral brought out at the terminals for system use.

- Conduits and Fittings:

  Conduits in general shall be Intermediate Metallic Conduit (IMC).

  No Conduits shall be used in any system smaller than 15mm internal diameter electric trade size, nor shall have more than four (4) 90 degrees bends in any one run and where necessary, pull boxes shall be provided as directed.

  No wire shall be pulled into any conduits until the conduit system is completed in all details, in the case of concealed work until all rough plastering machinery has been completed, and in the exposed work until the conduit work has completed in every detail.

- Wires and Cables

  All wire shall be copper; soft drawn and annealed shall be of 98% conductivity, shall be smooth and true of cylindrical form and vibration shall be within 1% of the actual size.

  All wires and cables shall comply with the requirements of UL as they apply to the particular usage.

  All wires and cables shall be as manufactured by Phelps Dodge, American Wires and Cables, or approved equal.

THHN/THWN can be used for the same size of wires provided the allowable current do not exceed that of

All wires 8 mm″ and larger shall be stranded copper.

For power system, no wire smaller than 3.5 mm″ shall be used except for control leads unless otherwise specified.

- Installation

Installation shall conform to the requirement of the code.

Testing

The generator set shall receive the manufacturer's factory load testing prior to delivery.

Prior to acceptance of the installation, equipment shall be tested on site for 8 hrs. Continuous operation without any failure to show it is free of any defects will easily start and be subjected to full load test or that load that is available at the job site. Should failure occur during the testing, the Contractor shall rectify the deficiencies and shall repeat testing procedure at his own expense and to the satisfaction of the owner.

On completion, of the installation, a factory trained supplier or dealer's representative shall perform start-up based on operating instructions book.

SPECIALTY WORKS

A. STRUCTURAL STEEL WORKS

Scope:

- This section includes structural steel work complete.

General:

- Connection for which details are not indicated shall be deigned in accordance with the "American Institute of Steel Construction Manual of Sheet Construction" and shall be welded and bolted.

Requirements.

- Handling, shipping and storing of steel work.
- All materials shall be handled shipped and stored in a manner that will prevent distortion or other damage. Materials shall be stored in a clean location and keep properly drained. All damage materials shall be replaced or repaired by at the expense of the Contractor.
- Anchor bolts and sag rods shall conform to ASTM A 307 and applicable portions of A 36.
- Structural carbon steel for plates, angles, or shapes shall conform to ASTM specification A36.
- Cold-formed, light gauge structural member shall be formed from sheet or strip not less than 5mm thick and conforming to "Specifications for the Designed Light Gauge Cold-Form Steel Structural Members" of the American Iron and Steel Institute.
- Saddle shall be standard manufactured products of section shown and shall be heat treated, extruded aluminum alloy 6063-TS, conforming to ASTM Specification B221.

- Expansion shields shall be of the style, type and size suited for the intended use. Shields shall be accurately recessed and unless otherwise indicated shall be not less than 50mm into concrete or masonry.

- Bolts, nuts and washers shall be zinc-coated, regular commercial grade size as indicated and shall conform to ASTM specification A307.

- Power driven nails shall be steel, especially formulated to produce high ductility and hardness and capable of being explosively driven through the medium to be attached.

- Welding electrodes and rods for manual welding shall conform to AWS Specification A5.1 860.

- Expanded metal lath shall be as indicated and shall be of the close mesh, heavy duty and rigid type.

- Nails shall be common or finishing of the proper sizes for the intended use and shall be of the best commercial standard.

- Stainless steel and anchor clips, bolts and plates shall be of configuration and sizes shown and shall conform to the best commercial standard as approved.

- Workmanship and finish shall be equal to the best practice of modern shops for the respective work. Exposed surfaces shall have the smooth finish; sharp and well defined lines. Section shall be well framed to shape and size with the sharp lines and angles; curved work shall be sprung evenly to curves. All necessary rivets, lags and brackets shall be provided so that the work can be assembled in a neat and substantial manner. Holes for bolts and screws shall be drilled. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide ample strength and stiffness. Joints exposed to the weather shall be formed to exclude worker. Metal work shall be provided with proper clearances. Works shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent the shearing of bolts, screws and other fastening, insure rigidity and provide close fitting of sections.

- Inserts and sleeves. Inserts of suitable and approved type shall be furnished and installed where necessary for the support of piping, mechanical equipment or apparatus, or other work. Steel pipe sleeves of suitable types and size shall be provided where indicated and where required for all pipe passing through floors, roofs or walls.

- Anchors and bolts shall be provided where indicated and where necessary for fastening work in place. They shall be embedded in the concrete and masonry as the work progresses and shall be spaced about 61cm on centers, unless otherwise indicated or specified. Sizes, kinds and spacing of anchors not indicated or specified shall be necessary for their purposes. All anchor and anchor bolts in exterior walls and in area exposed to weather shall be zinc coated, all those in other location shall be coated heavily bituminous paint.

Structure's subject to static loading.

- Holes fore bolts shall be drilled or sub-punched and reamed except that where the thickness of the material is not greater than the nominal diameter of the bolt plus 3mm, the holes may be punched full size.

Common bolts.

- Bolts transmitting shear shall be threaded to such a length that not more than one thread would be within the grip of the metal. The bolts shall be of such length that they will extend entirely through the nuts with the beveled end outside the nut. Bolt heads and nuts shall be drawn tight against the work with a suitable wrench not less than 38 cm long. Bolt heads shall be tapped with a hammer while the nut is being tightened.

Shop Painting

- All structural steel work, except zinc coated surfaces and steelwork to be embedded in concrete or mortar, shall be shop painted. Surfaces to be welded shall be not coated within 75mm of the weld, prior to welding. Surfaces shall thoroughly dry and clean when the paint is applied. No painting shall be done in wet weather except undercover; the temperature shall be above 45 degrees F but not over 90 degrees F. Paint shall be applied thoroughly. Surfaces that will be concealed or inaccessible after assembly shall be painted prior to assembly.

Cleaning

- Except as modified herein, surfaces shall be cleaned to bare metal by a suitable blasting process. Surfaces that maybe damaged by blasting shall be cleaned to bare metal by powered wire brushing or other mechanical means. Surface that will be enclosed from the weather and subject to exposure no more corrosive than an indoor atmosphere controlled for human comfort, maybe cleaned by wire brushing or other manual or mechanical means for removal of loose mill scale, rust, dirt and grease. Baring surfaces, including contact surfaces within friction type joints shall not be painted or galvanized but shall be coated with rust preventive coating applied, applied in the shop. The coating shall be removed just prior to field erection using a remover approved by the rust preventive manufacturer. The surfaces when assembled shall be free from rust, greases, dirt and other foreign matter.

Pre-treatment

1. Except as modified herein, immediately after cleaning surfaces shall be coated with coat of pre-treatment coating applied to a dry film thickness of 0.3 to 0.5 mil or be given a crystalline phosphate base coating shall be applied only to blast-cleaned bare metal surfaces.

Match marking

- Members and component part of structures shall be assembled and match marked prior to erection to ensure accurate assembly and adjustment of position on final erection. Painted assembly markings shall be removed from any surface to be welded or riveted. Scratch or notch marks shall be located in a manner that will not affect the strength of member or cause concentrations of stress.

Erection

1. General. Except as modified herein, erection shall be done in accordance with the applicable specifications and standards of the AISC “Manual of Steel Construction”. Erecting equipment shall be suitable for the work and shall be in first class condition. Where parts cannot be assembled or fitted properly as results of errors in fabrication or of deformation due to handling or transportation, such condition shall be reported immediately to the construction architect/engineer and his approval of the method correction obtained The correction shall be made in his presence. Bent or damaged parts shall be rejected. Steelwork shall drain properly. Pockets in structure exposed to the weather shall be filled with waterproof materials. Safety belts and lines shall be used by workers on high structures, unless safe working platforms or safety nets are provided.

Assembly.

- The frame of steel structure shall be carried up true as shown and all match markings shall be followed. Temporary bracing shall be used wherever necessary to support all loads to which the structure maybe subjected, including equipment and operation thereof and piles of materials. Such bracing shall be left in a place as long as maybe required for safety. The various members forming parts of a completed frame after being assembled shall be aligned and adjusted accurately before being fastened. Fastening of splices of compression members shall be done after the abutting surfaces have been brought completely into contact. No riveting, welding or bolting shall be done until match of the structure has been stiffened and aligned properly. Bearing surfaces and surfaces, which will be in permanent contact, shall be cleaned before the members are assembled. As erection progress, the works shall be bolted or welded sufficiently to take care of all dead load, wind and erection stresses. Splices will be permitted only where indicated. Erection

bolts used in welded construction maybe tightened securely and left in place, if removed, the holes shall be filled with plug welds.

Field Welding

Shall be as specified for shop fabrication of welded construction. Any shop paint on surfaces adjacent to joints to be field-welded shall be wire-brushed to reduce the paint film to a minimum.

Field Painting

All exposed surfaces of steelwork shall be shop painted. Surfaces where the shop coat of paint to be damaged shall be retouched using the same system as the original shop painting. Surfaces, which will be in contact after erection except when in contact with bolted and welded connections, shall be given one finish coat before erection. The cleaning, pre-treatment and priming of welds and the areas adjacent thereto shall be done promptly after the acceptance of the weld and shall be as specified under the shop painting.

B. FIRE ALARM SYSTEM

- Furnish and install a Fire Alarm system as manufactured by Edwards or approved equal as described in this specification and indicated in the drawings. The system is to be wired and installed in accordance and left in the first class operating conditions.
- Operation: At each stairway, exits and other locations shown in the plans, there shall be non-coded fire alarm station. At each location where shown, there shall be a bell or horn operating in any station and shall cause all sounding devices to operate continuously until the fire alarm station has been restored to normal. It shall also be possible for those in authority to transmit a test signal in any station. The station and sounding devices shall be connected to a control panel, which shall permit a small supervisory current to pass through the entire system. A trouble bell shall also be provided and shall sound continuously in the event of failure of the main power supply source or a ground fault at each installation wearing circuits.
- Equipment: Install where shown a flush non-coded manual fire alarm station. Flush station shall mount on standard outlet boxes with single gang cover.
- Install where shown on plans and under dome vibrating bell. Size and number of signals to be located so that they maybe heard by all occupants of the building.
- The Electrical Contractor shall provide and install smoke detectors, wiring and connection flow switches. The fire alarm panel shall be factory wired to accept this and any other devices specified herein or as shown on the drawings.
- Fire Extinguishers

  Furnish and install eight (8) units of fire extinguishers, brand Stallion, 10 lbs. Per unit, mounted at 1.2 high at locations specified by the Consultant/Architect, four (4) units at the first floor and four (4) units at the second floor.

DIGEST SPECIFICATION

1. Soil Poisoning	Mapecon/Chlordane Solution F-3 orF-5 or approved equivalent.
2. Wood Preservation	Cuprinol/Solignum or approvedequivalent.
3. Roofing Works	0.40mm thick Long-Span Roofing,Corrugated, Pre-painted
4. Concrete Works consistent	a. Portland Cement Island, Republic or any equivalentbrand but b. Rebars Structural grade conforming toBureau of Product Standard andASTM specifications c. Tie wires Gauge 16 commercial G.I. wires
5. Masonry Works	Non-load Bearing6” THK CHB, 4” THK CHB
6. Finishing Works	a. Glazed and Vitrified tiles Vitrified or Ceramic Tiles for toilet

wallsand floor, “Mariwasa, Fil-Hispano” orapproved equivalent.
b. Paints “Davies”/”Boysen” Quick-Dry, Latex,Red Lead Primer and Enamel Paintsor approved equivalent.

7. Plumbing Worksa. PPR PN16 (COLD) “Wavin, Thermovar, Bugatti” or approved equivalent with ISOstandard
b. PPR PN20 (HOT) “Wavin, Thermovar, Bugatti” orapproved equivalent with ISOstandard
c. G.I. Pipes “Mayer” Galvanized Iron, Gauge #40 approved equivalent
d. Drainage, Waste, Vent PVC pipes Polyvinyl Chloride for DWV Systemwith ISO Standard or approvedequivalent.
e. Water Closet “Saniware, Karat”, 1.6 GPF RoundFront or approved equivalent.
f. Lavatory “Saniware Monica, Sarah” Wall-Hung Type Lavatory or approvedequivalent
g. Tissue Holder “Saniware, Sabrina” PorcelainCoated Tissue Holder or approvedequivalent.
h. Faucets “Price Pfister”, Nickel-Plated, Plainor approved equivalent.
i. Floor & Roof drain Stainless Steel, beehive type with detachable stainless strainer.

8. Electrical Worksa. Wires Type as specified, “Columbia”,“Philflex”, American wires & Cables”or approved equivalent.

b. Pipes & Fittings Rigid Steel Conduits (RSC) &Fittings or Intermediate MetalConduit (IMC) & Fiitings: “Nitchi” or approved equivalent.PVC Conduits (Thick-walled type) & Fittings: “Neltex, Emerald, Moldex” orapproved equivalent.
c. Wiring Devices “Panasonic” or approved equivalent. (Convenience Outlet/Switch) Convenience oultet shall be grounding type
d. Lighting Fixture Lamp: T5 “Philips, G.E or approved equivalent.
Ballast: Electronic type
Lampholder: Heavy duty type
e. Pinlight Housing: 6” dia. aluminum withmirrorized reflector“
Lamp: Compact fluorescent, PLtype
f. Panelboard Branch circuit protection: Bolt-ontype (20AT – 70AT) “GE”Westinghouse, “Fuji”, Mitsubishi”,“Square-D” or approved equivalentMain protection: Molded case type(for 100AT and above), OR Bolt-ontype (for 30AT – 70AT) “GE”Westinghouse, “Fuji”, Mitsubishi”,“Square-D”
Enclosure: Dead-front, Nema-1 (forindoor); Nema-3R (for outdoor);flush or surface-mounted with appropriate ground terminals
g. Junction Box 4 x 4 PVC with cover & screw
h. Utility Box 2 x 4 PVC with cover & screw
i. Pull box Size as required; Nema-3R or Ga.#16 with cover and appropriateknock-outs, painted (1 coat primer; 2coats gray paint)

9. Hardwares a. Lock set “Schlage, Alpha”, or approvedequivalent. Lever type forClassroom doors and Toilet door forPerson with Disability (PWD)
b. Door Hinges “Stanley”, Loose pin, wrought steelbutton tip ball, or approvedequivalent.

10. Carpentry Worksa. Panel Doors Tanguile, Kiln Dried (1 ¾” thk.)
b. Flush Doors Hollow core (1 ¾” thk) with Two facemarine plywood, for toilet DoorsTanguile Kiln Dried (1 ¾” thk)

c. Door Jambs 2” x 6” (50mm x 150mm)Tanguile/Guijo/Yacal
d. Windows (Front) Clear Glass panel blades inJalouplus casing with transom(satin-finish) on2” x 6” Tanguile/Guijo sill.

e. Windows (Rear) For Multi-storey; Steel CasementWindows with ¼” thick clear glass
f. Chalkboards ¼” thk. Lawanit Paint Finish on 2”x2”Tanguile, Kiln Dried Studs

SECTION VII

DRAWINGS

SECTION VIII

BILL OF QUANTITIES

SECTION IX

BIDDING FORMS