

**PROJECT TITLE : RENOVATION OF ADMINISTRATION AND RECORDS BUILDING**

**LOCATION : WVSU MAIN CAMPUS**

**I. SITE WORK**

**A. WORK INCLUDED**

1. Establishment of lines, grades and benchmarks and provision of temporary facility
2. All backfolding, filling and grading, removal of excess materials from site.
3. Protection of property, work and structures, workmen, and other people from damage and injury.
4. All interior works will be coordinated with respective offices involved in the renovation works.
5. Any damages on site will be shouldered by the contractor

**II. CONCRETE AND REINFORCED CONCRETE**

**A. GENERAL**

1. Unless otherwise specified herein, concrete works shall conform to the requirements of the ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

**B. MATERIALS**

1. Cement for concrete shall conform to the requirements of specifications for Portland Cement (ASTM C – 150)
2. Water used in mixing concrete shall be clean and free from other injurious amounts of oils, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.
3. Fine aggregates shall consist of hard, tough, durable, uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by the processing of natural sand or by the production of a suitably graded manufactured sand.
4. Coarse aggregates shall consist of gravel, crushed gravel or rock, or a combination of a gravel and rock, coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The sizes of coarse aggregates to be used in the various parts of the works shall be in accordance of the following:

Maximum Size – 1 ½” for all concreting works

5. Reinforcing bars shall conform to the requirements of ASTM standard specifications for Billet Steel Bars for concrete reinforcement (A15-625) and to Specification for requirements for the deformed steel bars for concrete reinforcement (A 305-56).

All secondary ties such as stirrups, spirals and inserts may also be deformed bars. The main reinforcing bars shall be as follows:

No. 4 (1/2”) 12 mm	No. 8 (1”) 25 mm
No. 3 (3/8”) 10 mm	No. 9 (1 11/8”) 28 mm

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No. 5 (5/8") 16 mm	fy – 33,000 psi
No. 6 (3/4") 20 mm	fy – 40,000 psi
No. 7 (7/8") 22 mm	fy – 60,000 psi

## C. PROPORTIONING AND MIXING

1. Proportioning and mixing of concrete shall conform to the requirements for Item 405 of the standard specification with the following proportions:

Cement: Sand : Gravel

Class "A" –	1	:	2	:	3
Class "B" -	1	:	2	:	4
Class "C" -	1	:	2 ½	:	5

6. Class of Concrete – concrete shall have 28-day cylinder strength of 3,000 psi. for all concrete works, including columns and beams unless otherwise indicated in the plans or approved by the engineer.  
Concrete for slab-on-fill shall have a 28-day cylinder strength of 2,500 psi.
7. Mixing – concrete shall be machine mixed. Mixing shall begin within 30 minutes after the cement has been added to the aggregates. In the absence of the concrete mixer, manual mixing is allowed.

## D. FORMS

1. General – Forms shall be used whatever necessary to confine the concrete and shape it to the required lines, or to insure the concrete of contamination with materials caving from adjacent, excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss or mortar from the concrete. Forms for exposed surfaces against which backfill is not be placed shall be lines with a form grade plywood.
2. Cleaning and Oiling of Forms – before placing the concrete, the contact surfaces of the formed hall be cleaned of encrustations of mortar, the grout or other foreign material, and shall be coated with a commercial form oil that will effectively prevent sticking and will not stain the concrete surfaces.
3. Removal of Forms – forms shall be removed in a manner which will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be formed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

## E. PLACING REINFORCEMENT:

1. General – steel reinforcement shall be provided as indicated, together with all necessary wire tires, chairs, spacer supported and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete.

Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

## F. CONVEYING AND PLACING CONCRETE:

1. Conveying – concrete shall be conveyed from mixer to forms as rapidly as applicable, by methods which will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.

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2. Placing – concrete shall be worked readily into the corners and angles of the forms and around all reinforcement and imbedded items without permitting the material to segregate, concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequently segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed, the discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified.
3. Time interval between mixing and placing. Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes. No concrete mix shall be placed before 60 complete revolution of the machine mixer.
4. Consolidation of Concrete – concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by the hand spading and tamping. Vibrators shall not be inserted into lower cured that have commenced initial set; and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.
5. Placing Concrete through reinforcement – In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratios as used in concrete shall be first deposited to cover the surfaces.

## G. CURING

1. General – All concrete shall be moist cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.
2. Moist Curing – The surface of the concrete shall be kept continuously wet by covering with burlap plastic or other approved materials thoroughly saturated with water and keeping the covering spraying or intermittent hosing.

## H. FINISHING

1. Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with plywood, and after removal of forms, the surfaces shall be smooth, true to line and shall present or finished appearance except for minor defects which can be easily repaired with patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form works.
2. Concrete Slabs on Fill. The concrete slabs on fill shall be laid on a prepared foundation consisting of sub grade and granular fill with thickness equal to the thickness of the overlaying slab except as indicated otherwise.

## III. MASONRY WORKS

### A. MATERIALS

1. Concrete Hollow Blocks shall have a minimum face shell thickness of 1" (.025). Nominal size shall be 4" x 8" x 16" or 6" x 8" x 16" with minimum compressive strength as follows:
  - Class "A" – 900 psi
  - Class "B" – 750 psiAll units shall be stoned for a period of not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the strengths equal or exceed those mentioned in these specifications.

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2. Wall Reinforcement shall be 10mmØ or 12mmØ steel bars as specified in the plans.
3. Sand shall be river sand, well screened, clean, hard, sharp sillicious, free from loam, silt or other impurities, composed of grains of varying sizes within the following limits:

Sieve No.		Percent (%)
9	Passing	100
16	Retained	5
100	Retained	95

4. Cement shall be standard Portland cement, ASTM D-150-68 Type 1.
5. Mortar – Mix Mortar from 3 to 5 minutes in such quantities as needed for immediate use. Retampering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those which 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) part Portland cement and three (3) parts sand by volume.

## B. ERECTION

1. All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with its course breaking joint with the source below. Bond shall be kept plumb throughout; corners and reveals shall be plumb and true. Units with greater 12 percent absorption shall be wet before laying. Work required to b built in with masonry, including anchors, wall plugs and accessories shall be built in as the erection progresses.
2. Masonry Units. Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of unfurrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cell shall be left open in face surfaces. All cell shall be filled up with mortar for exterior walls. Units terminating against beam or slab suffits shall be wedge tight with mortar. Do not lay cracked, broken defaced block.
3. Lintels shall be of concrete and shall be enforced as shown in the drawings. Lintels shall have a minimum depth of 0.20 (8") and on each side of opening.

## C. WORKMANSHIP AND INSTALLATION:

1. Plastering: Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat after scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not apply finish until brown coat has seasoned for seven (7) days. Just before applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster; with final toweling, leave surfaces banished smooth, free from rough area, trowel marks, cheeks, other blemishes. Keep finish cost mist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.
2. Pea Gravel Washout: Before start of work, provide desired pitch for drainage. Roughen concrete surface with pick or similar tool. Clean off loose particles and other materials which may prevent bond, keep surface wet for at least four (4) hours before applying. Scratch coat of mortar. Coat more than ¾" thick. Apply mixture of pea gravel and Portland cement with pressure to obtain solid adhesion. Trowel pea gravel to hard, smooth, and even plain and rod and float to uniform surface or even texture. When surface is semi-dry evenly spray surfaces with clean water with spray machine to washout loose cement to part exposed pea gravel. Remove and wash down remaining cement paste with soft brush, to leave pea gravel in its

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natural texture appearance. Before applying pea gravel finish, submit samples to owner for approval.

## D. SCAFFOLDING

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

## IV. ARCHITECTURAL FINISHES SCHEDULE

### A. Bush-Hammered Finish

1. General – The work includes the performance of all work required in connection with bush hammered finish on concrete and masonry surfaces as shown on the drawings.

#### 1.1 Materials

- 1.1.1 Cement shall conform to ASRM Standard, C150, Type 1.
- 1.1.2 Adobe Granules shall be of high quality subject to the approval of the Engineer.

1. Requirements. The surface to be finished shall be thoroughly cleaned. Bush-Hammered finish shall be composed of one part cement and two parts of adobe granules. The base coat shall be applied with sufficient materials and pressure to form a good bond with masonry and then it shall be dressed with a bush-hammer to provide a uniformly roughened surface. No abrupt irregularities shall be permitted and the granules shall not exceed in any case one (1) mm, using a straight edge or templates for testing irregularities. Corrective work, if any, shall be done by the Contractor to the satisfaction of the Engineer.

### B. Pea-Gravel Finish

1. Pea-Gravel Finish shall have a composition of cleaned “Bohol” pea-gravel, No. 10 size, and with a 70 percent beige and 30 percent white color of pebble, unless otherwise indicated.
2. Sealer. Penetrating type, free from harmful alkali or acid content. Sealer shall not discolor the surface nor leave a tacky or sticky finish film on surface.
3. Pea-Gravel Washout Matrix shall be composed of 100 kilograms of pea-gravel composition per bag of Portland cement. Thoroughly mix dry ingredients before adding water in the amount of 18 liters per bag of cement. Apply to a minimum thickness of 13mm.
4. Installation Pea-Gravel Washout Matrix. Thoroughly moisten substrate but do not saturate; slush with neat cement into the substrate surfaces and then place the matrix. Compact by toweling to extract all excess cement and water. Sprinkle with pebble composition where required to produce even texture of matrix. Follow immediately with water fogging to expose pebbles over matrix.
5. Curing. Keep the completed pea-gravel washout continuously moist for a period of 6 days by sprinkling water.
6. Cleaning and Sealing. After curing, remove all laitance from washout surfaces with an acid bath, using a 1 to 10 solution of muriatic acid to water and screebbling surface, followed by thoroughly rinsing with clean water. When surface is dry, apply sealer in accordance with sealer manufacturer’s instructions.
7. Protection. Protect pea-gravel washout works from damage until completion of the work of all other trades.

### C. TILEWORKS

1. General – Consist of furnishing all materials, labor and performing all operations in connection with tile finishing of floors and walls, complete including mortar beds for the tile. Tilework shall not be started until roughing-ins for plumbing and electrical work has been completed and tested. The work of all other trades in the area where the work is to be done shall be protected from damage in a workmanship manner as directed by the Engineer.

2. Materials

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- 2.1 Floor tiles shall be standard grade unglazed natural clay tile of 6mm thick manufactured by "Mariwasa" or its equivalent. Color and pattern shall be specified in the drawings or as approved by the Architect/Engineer. Present actual samples for approval before implementation
- 2.2 Wall and Special Tiles shall be of 6 mm thick non-vitreous body glazed tiles, manufactured by "Mariwasa" or its approved equivalent. Color and pattern shall be as specified in the drawings or as approved by the Engineer. Tiles shall be free from laminations, serrated edges, chipped off corners and other imperfection affecting their quality, appearance and strength.
- 2.3 Cement shall conform to ASTM Standard c150, Type 1.
- 2.4 Heavy duty tile and heavy duty tile adhesive be used when specified by the Architect/Engineer.
- 2.5 Sand shall be natural sand and shall be retained between No. 50 and No. 100 sieves.
- 2.6 Lime shall be hydrated lime where the free (unhydrated) calcium oxide and magnesium oxide content does not exceed 8 percent by weight.
- 2.7 Cement Pigment non-Fading mineral oxides of the quality as approved by the Engineer.
- 2.8 White cement shall be of the standard quality approved by the Engineer.

Manufactured materials shall be delivered in the original unbroken packages or containers that are labeled plainly with the manufacturer's names and brands. Containers for tiles shall be grade-sealed. Materials shall be stored in dry, weather tight enclosures and shall be handled in a manner that will prevent the intrusion of deleterious materials that will affect the quality and appearance of the tiles.

3. Mortar – A scratch coat for wall tile shall consist of one part Portland cement, ¼ part lime putty and 3 parts sand by volume. Scratch coat shall have a minimum thickness of 9mm. The Buttering mortar for setting wall tiles and mortar setting bed for floor tiles shall have the same proportion as that of scratch coat.
  - a. surface to the proper distance back from the finished wall. The setting bed shall be applied, rodded, and floated flushed with the screeds over an area no greater than will be covered with the tile while the bed remain plastic. The thickness of the setting bed shall not exceed 20mm and the mortar shall not be retempered.
  - b. Application of Wall Tile. Tiles shall be soaked in clean water for a minimum of one (1) hour before they are installed. A skim coat of Portland cement mortar, mixed with water to the consistency of thick cream shall be applied .75mm thick to the mortar setting bed, or to the back of each tile. The tiles shall then be pressed firmly upon the setting bed and tapped until flush and in the place of the other tiles. The tiles shall be applied before the mortar bed has taken its initial set. Intersections and returns shall be formed accurately. All lines shall be kept straight and true, and all finished surfaces brought to true and even planes, internal corners squared and external corners, rounded. Horizontal joints shall be maintained level and vertical joints plumb in alignment.

## D. JOINTS

1. Joints shall be parallel and uniform in width, plumb level and in alignment. End joints in broken-joint shall be made, as far as practicable, on the center line of the adjoining tiles. Joint widths shall be uniform and measured to accommodate the tiles in the given spaces with a minimum cutting.

## E. PROTECTION

- a. Areas where tiles are being laid shall be closed to traffic of other work until the floors are completed and the tiles have firmly set. Tile works shall be adequately protected from damage until the completion of the Contract.

## F. GROUTING

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- a. Grouting shall be done as soon as the mortar beds have sufficiently set. All cement shall be Portland cement, colored or white, as required. Where light colored mortar is required in joints, a mixture of white cement and non-fading mineral oxide shall be used to produce the desired colors. The quantity of mineral oxides shall not exceed 10 % of the volume of the cement in any case.

## G. CLEANING

- a. Upon completion of the grouting, the tiles shall be thoroughly cleaned and maintained in this condition until completion of the Contract.

## V. CEILINGS

- A. General – This item shall consist of all fabricated materials complete with hardware necessary for the proper functioning thereafter as called for in this specification unless indicated otherwise in the drawing.

1. All interior ceilings shall be as specified in the drawings.
2. Outside ceiling eaves shall be as specified in the drawing.

## VI. DRYWALL PARTITIONS

- A. General – This item shall consist of all fabricated materials complete with hardware necessary for the proper functioning thereafter as called for in this specification unless indicated otherwise in the drawing. Materials will be dry wall partition with metal studs. Submit samples for approval.

## VII. WOOD DOORS

- A. General – This item shall consist of all fabricated wooden doors complete with hardware necessary for the proper functioning thereafter as called for in this specification unless indicated otherwise in the drawing.

- B. Materials – All limber for doors, jambs, door bars, shall be kiln dried with not more than fourteen percent (14%) moisture content.

1. Doors (Swing-Doors). Doors shall have 44mm thickness unless otherwise specified or shown on plans, except counter or louver doors which shall be 31mm thick. In cases where varifold type is indicated on plans, the manufacturers' specifications shall be followed subject to the approval of the Engineer.
2. Door Types (as applicable)
  - 2.1 Solid Core Doors (Glazed and/or Wood Panel). This Type of door shall have cores of the stile and nail type raised on both faces, set loose and either nailed or glued in place. It can either be of glass or wood panels or combination thereof.
  - 2.2 Hollow Core Doors (Flush Door). Except as otherwise specified, flush door shall be done in accordance with the details as shown on the plans. The plywood edge protection shall be around and into the outside frame of the door in order to prevent "pulling off" of the plywood veneers at the edges.
  - 2.3 Glass Window Pane. This type of window shall consist of a single plate of glass framed in kiln-dried lumber, fabricated, shaped and molded true to details and joined properly to acquire rigidity.

## C. REQUIREMENTS

1. Pre-fitting and Factory-Priming or Factory Finishing. Doors with surfaces to receive paint finish may be furnished factory primed, and doors with natural finish may be furnished factory pre-finish. Final finishing shall be done in site in accordance with painting and varnishing specifications.
2. Adhesive and Bonds. Adhesive and Bonds shall be in accordance with manufacturer's recommendations for all types of doors subject to the approval of the Engineer. Adhesive for doors with natural finish shall be non-staining.

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- D. INSTALLATION. Installations shall be installed only after completion of other work which may affect the moisture content of the doors. Doors shall be fitted and trimmed as required by the opening they will cover. Doors shall have a clearance of 3mm at the side and top and shall have a bottom clearance of 6mm over threshold or as known on details. The lock edge of doors shall be beveled at the rate of 3mm in 50mm. Cuts made on the jambs shall be sealed immediately after cutting, using a clear water resist and varnish or sanding sealer.

## VIII. CARPENTRY AND JOINERY WORK

### A. Materials

1. Quality of Lumber: Lumber shall be approved quality of the respective kinds of the various parts of the work, well seasoned, thoroughly dry, and free from large, loose, or unsound knots, sups, shakes, and other imperfections impairing its strength, durability or appearance. All finishing lumber to be used shall be completely dried and shall not contain more than 14% moisture. All flooring, tongue and groove shall be kiln dried.
2. Treatment of the Lumber:
  - a. All concealed lumber shall be sprayed with anti-anay or buk-bok liquid.
  - b. Surface in contact with masonry and concrete coated with creosote or equivalent.
3. Door Sashes: All door sashes shall be well seasoned, flush type, semi-hollow core and solid core, Tanguile plywood veneers on both sides. Exterior doors shall be of kiln dried Tanguile panel doors.
4. Kind of Lumber:

All unexposed lumber for framings shall be of Apitong.  
All windows and door jambs shall be of Apitong or Tanguile.

### B. WORKMANSHIP

1. Execute rough carpentry in best, substantial, workmen like manner. Erect framing true to line, levels and dimensions, squared, aligned, plumbed, well spliced and nailed, and adequately braced, properly fitted using mortise and tennon joists.
2. Millwork – Accurately milled to details, clean cut moldings profiles, lines, scrape, sand smooth; mortise, tennon, splice, join, block, nail screw, bolt together, as approved, in manner to allow free play of panels; avoid swelling, shrinkage, ensure work remaining in place without warping, splitting opening or joints. Do not install mill work and case until concrete and masonry work have been cured and will not release moisture harmful to woodwork.
3. Secure work to ground, otherwise fasten in position to hold correct surfaces, lines and level, Make finished work flat, plumb, true.

## IX. PAINTING, VARNISHING AND FINISHING

### SCOPE OF WORK

- 1.1 This section includes the supply and furnishing of all materials, labor, and equipment required for the preparation, painting and finishing of all shown on the Drawings and all other work required to complete Painting work as required by these Specifications.

### 1.2 GENERAL REQUIREMENTS

- a. Refer to Drawings and schedule for location, extent of work and other requirements;
- b. Materials Handling: Deliver all materials to the jobsite in clean, sealed, original containers with all labels and markings intact. Store materials, in designated storage areas that will be kept neat, clean and locked;
- c. Protection: Protect designated and adjacent areas and materials, lawns, shrubbery and other areas not to be painted, from stains and paint splatters resulting in the performance of painting work;
- d. Fire Prevention: Contractor shall take every precaution to prevent fires. At the end of each day's work, all oily rags, empty containers and combustible materials must be removed from the premises;
- e. Clean-up: Upon completion of work, Contractor shall remove all paint splatters and leave the area in neat and orderly condition;



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- f. Color Scheme: The Contractor shall faithfully follow the color chips supplied for matching the Color Scheme and Painting Schedule of the Project Engineer. All undercoats shall be tinted to approximate the finish color coat.

## MATERIALS

- a. All paints, latex, enamels, varnishes, lacquers, and other products to be used in this project shall be of excellent brand and quality
- b. Materials necessary to complete the painting and finishing schedule that are specified in these Specifications are standards for kind, quality and function.

## PREPARATION OF SURFACES

### 3.1 GENERAL

Follow standard surface preparation Specification or as specified by the Architect;

- a. Metal Surfaces - Remove dust, rust, oil and grease before application of priming coat;
- b. Concrete and Masonry surfaces - Remove all loose grit, mortar, dust, dirt, grease, oil and any other foreign matter. Treat with Masonry Neutralizer;
- c. Wood Surfaces - Follow manufacturer's instruction for both exterior surface preparation producers before painting work;
- d. Fill, caulk or putty all holes, cracks and open joints. Apply putty with knife where necessary, after application of priming coats.

## WORKMANSHIP AND APPLICATION

- 4.1 Apply paint as per manufacturer's Specifications and recommended application procedures.

### 4.2 WORKMANSHIP

- a. Finished surfaces shall be smooth, even and free from defects;
- b. Apply paint to completely dry surfaces only and no succeeding coat applied until preceding coat is completely dry;
- c. Paint by spray, brush or rollers as per Architect's instructions and specifications.

### 4.2 PAINTING SCHEDULE

- a. Exterior concrete and masonry surfaces:

Coating System	Semi-gloss Finish (acrylic solvent type )
Primer	Flat latex paint
Putty	Masonry glazing putty
2 <sup>nd</sup> /3 <sup>rd</sup> Coats	Latex semi gloss

- b. interior concrete and masonry surfaces:

Coating System	Semi-gloss Finish (acrylic solvent type )
Primer	Flat latex paint
Putty	Masonry glazing putty
2 <sup>nd</sup> /3 <sup>rd</sup> Coats	Latex semi gloss

- c. Fiber Cement board and similar materials surfaces:

Coating System	Semi-gloss Finish (acrylic solvent type )
Primer	Flat latex paint
Putty	Masonry glazing putty
2 <sup>nd</sup> /3 <sup>rd</sup> Coats	Latex semi gloss

- d. Wood flush doors, jambs, and cabinets:

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Coating System	Acrylic Finish
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## e. Architectural Metal surfaces

Coating System	
Primer	Epoxy Paint Finish
2 <sup>nd</sup> /3 <sup>rd</sup> Coat	Acrylic Finish

## X. GLASS JALOUSIE WINDOWS

- Scope. This section covers furnishing of all glass jalousie window type materials and fixing accessories necessary for the proper functioning thereafter as shown on plans and as herein specified.
- Materials
  - i. Lever Type Operation. This type of jalousie window shall be capable of locking the unit in any position and cannot be opened outside. Louver or glass slats clip and tilt bar casing shall be extruded aluminum sections, true to details with clear, straight, sharply defined profiles and free from defects impairing its strength or durability. Aluminum extruded section and strips shall be type AA conforming to ASTM B 235-50T.
  - ii. Window Frames (Wood Jambs). Opening frames for jalousie window shall be well seasoned thoroughly dried "Yakal" to avoid any possibility of warping after this glass jalousie window type material has been set in place.
  - iii. Glass panes shall be "Industrex" glass of high quality free from unevenness or other imperfection that affects its quality and form.
- Construction Requirements. All wood frames used as jambs for window opening shall be shaped, molded true to details and properly equipped with weather strip to prevent penetration of rain water. Corners of frames shall be mitered and mechanically locked resulting in extremes rigidity. Aluminum lever casing with glass clips, tilt bar and locking handles shall be set and properly adjusted leveled and aligned to acquire satisfactory operation and to assure weather tight construction. Aluminum parts shall be protected in adequate manner to insure against damage during delivery and construction operation. Glass panes shall be fitted and accurately cut to size as required in the plans

## XI. GLASS AND GLAZING

- A. Scope of Work. The Contractor shall furnish all materials, equipment, tools, labor and incidentals necessary for the satisfactory performance of all works for glass and glazing, including mirrors as shown in the drawings and as specified herein.
- B. Materials.
  - i. Materials shall be delivered and stored in a safe location.
  - ii. Label shall be affixed to each pane at the factory and shall remain intact until final cleaning.
  - iii. Quality and thickness of glass shall be mentioned in USGM Specification No. 123 in so far as it is established as a requirement. For other qualities and thickness, recognized commercial standards can be referred to subject to the approval of the Engineer.
  - iv. Putty on wood or steel sash shall be of the approved type as recommended by the manufacturer and acceptable to the Engineer.
- C. Quality of Glass and Glazing Materials
  - 1. All glass sheets for doors and windows, unless otherwise specified herein or otherwise indicated in the drawings, shall be locally manufactured.
  - 2. All glass sheets used in aluminum and steel doors and windows shall be 5.6mm (7/32") thick or as required by the Engineer.

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3. All tempered glass specified herein or indicated on drawings shall be locally manufactured safety glass, 5.6mm (7/32") thick or as required by the Engineer.
4. Plate glass for mirrors shall be 6mm (1/4") thick, polished glass mirror, copper-backed, with exposed edges, leveled and polished. Mirror should project a clear image without refractory effect.
5. Samples of all glass and glazing shall be submitted to the Engineer for approval prior to any installation work.

## D. Workmanship

1. All glass shall be accurately cut to fit openings and set with equal bearing on the entire width of the pane. Convex side of glass shall be on the outside.
2. The Contractor shall be responsible for all glass broken due to faulty setting and shall be replaced to the satisfaction of the Engineer.
3. Mirrors, as specified, shall have the proper backing of 6mm (1/4") thick tongue and groove or palosapis veneer plywood with brass chromium plated frame.
4. Putty shall be neatly run in straight line parallel with inside of glazing frame. Corners shall be carefully made; all excess putty shall be removed and surfaces left clean.

## E. Installation

1. Set glass after steel framing have been primed and dried.
2. All glass shall be bedded, back and face puttied, secured in place. Secure glass in aluminum frames with non-corrosive clips excepts where glazing beads are required. Apply putty uniformly in straight lines, with accurately formed levels and clean cut corners; remove excess putty from glass.
3. Set glass in hollow metal doors and in metal frames to interior partitions in felt channel inserts or bed in putty to prevent any rattle; secure glass in wood doors with glazing stops; secure stops on doors with screws. High quality sealants are to be used in the installation.
4. Improperly set glass shall be replaced to the satisfaction of the Engineer. Any damages with areas involving installation of such items will be repaired by the contractor.

## F. Cleaning

1. Clean all glass on both sides after puttying has been done completely. Do not disturb edge of putty with scraper. At completion of work leave glass whole free from cracks and rattles.

## XII. FINISH HARDWARE AND SPECIALITIES

### A. General Requirements

1. The Contractor shall provide all rough hardware required for the completion of the work, including nails, spikes, bolts, screws, etc., and shall provide and fit in place all finishing hardware.
2. The Contractor shall provide and fit in place all hardware not herein specifically mentioned but necessary to complete the work. All such hardware, should be there be any, shall conform in every respect to the hardware herein specified.
3. Finishing hardware, suitable to the service required to fully equip in the most satisfactory operative condition, for all doors and windows transoms, screen doors and windows, closet, built-in cabinet counters, drawers, lockers, and other operating members throughout the project shall be furnished and installed or fitted by the Contractor.
4. Where the exact types of hardware specified are not adaptable to the finishing, shape or size or members requiring the hardware, suitable types as applicable to same operation and quality as the corresponding individual types specified shall be furnished subject to the approval of the Engineer.

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## B. Make

1. The model numbers herein given designate and quality and style (type, design, operation, materials and finish) of hardware designed. Any other hardware equally good, may be substituted only in cases of urgent necessity and subject to the written approval of the Engineer.

## C. Finish

1. Unless otherwise specified, exposed surfaces shall have the following U.S. Standard Finishes:
  - 1.1 US9 (Polished, Bright Brass or Bronze), Bronze surfaces exposed on exterior building not specified to have US26 finish.
  - 1.2 US26 (Polished Chromium plated over nickel or brass). Brass or bronze surfaces exposed in toilets, lavatory and shower rooms and all others in the interior of the building.
  - 1.3 USP (Prime Coated for Painting) Ferrous metal surfaces, unless zinc coated.

## D. Fastenings

1. Fastenings of suitable size, quality and type shall be provided to secure hardware in position. Machine screws and expansion shields shall be provided for securing items of hardware to concrete, brick tile or masonry instead of wood screws.

## E. Exposed Items of Hardware

1. After hardware has been properly fitted, all exposed items such as knobs, plates, pulls, locks, etc., shall be removed until final coat of painter's finish has been applied, and then hardware installed.
2. Other items of hardware that are not to be removed before painting shall be properly marked or completely covered until final coat of painter's finish has been applied, after which such protective cover shall be removed.

## F. Placing Order of Hardware

1. The Contractor shall schedule his order for all hardware in such a way to avoid delay in the job.
2. No request for extension of time will be entertained by the Engineer consequence to Contractor's delay in placing his order.
3. No substitution of hardware shall be allowed due to negligence of the Contractor to place his order ahead of time.

## G. Door Knobs, Locks and Latch Strikes. A

1. All lock and latch strikes shall be installed in door frames at the same height from the floor. Door knobs shall be so located that the center of the knob is 0.95 m. from the finished floor.

## H. Butt Hinges

1. Each panel of hinged doors shall be provided with two (2) butts for doors 1.50m or less in height; three (3) butts over 1.50 m high and not over 2.10 m; four (4) butts, above 2.10 m in height.
2. Doors of a greater height than 2.10 m, unless otherwise specified, shall be provided with an additional one (1) butt for each 0.65 m or fraction thereof.
3. Size of Butt Hinges required:

Thickness Of Door	Width of Door	Size of Butt Hinges
21mm or 25mm (7/8" or 1")	:	63mm(2 1/2")
28mm (1-1/8")	:	75mm x 75mm (3"x3")
35mm (1-3/8")	:	0.90 mtrs. (3') (3-1/2"x3-1/2")

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44mm (1-3/4")	:	:	or less 100mm x125mm (4" x 4")
56mm x 63mm (2-1/4" x 2-1/4")	:	:	125mm x 125mm (5" x 5")

The shower doors shall be covered by the above schedule for hinges.

4. Where size of the butt hinges is not sufficient to allow door to clear door trim in open position, same shall be increased.
  5. Unless otherwise specified, and except for toilet or shower or water closet compartment doors, provide in all double acting doors type Nu-Jamb No. 42024 – ½ double acting hinge or approved equivalent.
- I. Butt Hinges (Make)
1. For all doors in butt hinges, unless otherwise specified, use bottom tip butts, "HAGER", "STANLEY", U.S., or approved equivalent, highly polished and plated with non-raising pin for door opening outside. For size and number to each door, refer to section H.3 of this section of the specifications.
- J. Door Latches, Indicator.
1. Provide and fit each door of all water closets compartment with No. 1990 rim bolt No. 1985 indicator, cast brass, chromium plated and polished as illustrated and describe on Hinges Catalog, or any approved equivalent of similar type.
- K. Locks
1. The Contractor shall provide and set complete, ready for operation, one pin tumbler cylinder lock of the medium or standard type, for each door in accordance with the schedule below. Standard finished as specified, shall apply to all locks, used "YALE", "CORBINE" of the standard type, or approved equivalent.
- The trademark and plate numbers given herein are to designate only the quality, type, operation, materials and style (design) required.
- L. Schedule of Lockset and Door Closers
1. Lockset shall be of any approved equivalent installed complete ready for use and service in accordance with the manufacturer's institutions for the doors on all rooms and Comfort Rooms.

## XIII. PLUMBING WORKS

- A. Scope. This section consist of performing essential works in furnishing and installing Piping materials and other devices and fixtures necessary to construct and complete the plumbing system in accordance with this specification unless otherwise specified in the drawing.
- B. General. The work includes furnishing and installing water piping and Appurtenances, sanitary and drainage piping, vents, plumbing fixtures and miscellaneous devices as shown in the drawings and as specified therein. No plumbing fixture devices, or piping shall be installed that will cause a cross connection or interconnection between potable water piping and polluted drain, soil or waste water piping.
1. Standard Products. Materials and equipment furnished under this specification shall be standard products of manufacturer regularly engaged in the production of such materials or equipment and shall be manufacturer's latest standard design that complies with the specification requirements.'
  2. Defective Equipment. Defective equipment or fixtures damage in the course of installation or testing shall be replaced or repaired by the contractor in a manner approved by the Engineer.

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3. Proposed Changes. If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the work, and the reasons thereof, shall be submitted as soon as practicable after contract award to the Engineer for written approval. Approved departures shall be made at no additional cost.
4. Utilities. Water and drainage piping shall be extended to points outside the building as indicated. Pipes shall be capped or plugged for final connection with the service pipes.
5. Code Compliance. All materials and installation shall comply with the National Plumbing Code unless modified by the specifications.

## C. Materials.

1. Soil, Waste, Drain, Vent Pipes and Fittings.
  - 1.1 Underground soil, waste and drain piping shall be PVC Piping conforming To the National Plumbing Code
  - 1.2 Above ground soil waste, drain and vent piping shall be polyvinyl chloride Pipe conforming to ASTD 2729 or as had shown in the drawing.
  - 1.3 Flashing. Vent pipes shall be flashed and made watertight at the roof with 4 pound sheet lead or 16 ounce sheet copper, Flashing shall extend not less than 200mm from the vent pipes in all directions. Flashing shall be turned down into the pipes or hubs.
  - 1.4 Traps. Each Fixtures and pieces of equipment requiring connections to the drainage system shall be equipped with a metal trap. Traps installed on threaded pipe shall be recess drainage pattern.

## D. Water Pipe and Fittings

1. Galvanized Steel pipe for below or above ground cold and hot water lines shall conform to ASTM A120. Fittings shall be malleable-iron, zinc-coated, screwed, unless otherwise indicated in the plan. Note: Use updated materials for water lines, PPR pipes with equivalent fittings will be used. Present samples for approval.
2. Valves shall be brass or bronze with rough bodies and finished trimmings, except that valves on chromium-plated brass pipe shall be finished and chromium-plated.
3. Hose Bibbs shall be of rough brass body, with composition disc. Hand wheel, 19mm hose end and 12mm female inlet.

## E. Insulation. Insulations shall be ¾-inch thick mineral fiber insulation provided with a 7-1/2 ounce standard canvass jacket material.

## F. Plumbing and Fixture Trim. Plumbing and fixture trim shall be provided complete with fittings. Exposed traps and supply pipes for all fixtures and equipment shall be connected to the rough piping system at the wall, unless otherwise indicated. Floor plates, wall plates, and escutcheons shall be as required by the fixtures specified. Stops shall be provided at each fixture. Plumbing fixtures compound shall be used for fixture connection between earthenware fixtures and flanges on soil pipe. Closet volts shall be not less than 6mm in diameter and shall be equipped with chromium-plated nuts and washers. The exposed piping, fittings, and trimmings shall be chromium-plated or nickel-plated brass with polished bright surfaces.

1. Water Closets shall be as any approved quality or its equivalent. Tank Fittings shall be of approved equivalent.
2. Built-in Urinal Gutter. Built-in urinal gutter and step shall be glazed tile finish except for the step which shall be unglazed and shall be in accordance with the plans and specifications. Where shown on the drawings, the Contractor shall complete set of "American Standard" R-303, Universal Strainer with beehive grid, brass chrome-plated, for 50mm diameter C.I. Soil Pipe installation or any approved equivalent.

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3. Lavatories including fittings shall be as manufactured by any approved quality or equivalent.
4. Built-in Slop Sink. Built-in slop sink shall be in accordance with the detailed drawings and as specified herein.

- a. Floor and Wall -----Glazed Tiles
- b. Fittings and accessories -----Sink Faucet  
100mm x 100mm  
x 50mm brass strainer  
50mm diameter P-Trap

G. Other Fixtures. Other fixtures, fittings and accessories shown on or not shown on the drawings but necessary to complete the work shall be provided by the Contractor and approved by the Engineer/Architect before purchase and implementation.

## H. Installation

### 1. Water Pipe and Fittings

1.1 Pipes shall be installed as indicated in the drawings. The pipes shall be cut accurately to measurement, established at the building by the Contractor and shall be taken not to weaken the structural portion of the building. All piping above ground shall be run parallel with the lines of the building unless otherwise shown or noted on the drawings.

1.2 Joints. After cutting and before threading, all pipes shall be reamed and shall have burrs removed. All screw joints shall be made with graphite and oil or with an approved graphite compound applied to make threads only. Threads shall be full cut, and not more than three threads on pipe shall remain exposed. Caulking of threaded joints to prevent leaks shall not be permitted. Unions shall be provided where required for disconnections.

1.3 Fittings. Branches in piping and changes in pipe sizes shall be provided with necessary fittings as shown in the drawings.

1.4 Valves. Valves shall be provided on all supplied fixtures as specified. Where valves are indicated on the drawings in connection with run-outs, risers, branches and mains, they shall be in accordance with this specification.

1.5 Insulation. All hot water piping, if any, after being tested shall be cleaned and insulated with a minimum of 19mm insulation. Chromium plated supply piping line to plumbing fixtures shall not be installed.

I. Plumbing Fixtures. Fixtures secured to concrete masonry wall shall be cleaned and insulated with aluminum of 19mm brass bolts with 20 threads to the inch and of sufficient length to extend at least 75mm into solid concrete or hollow block work; fitted with a loose tubing or sleeve inserts; shall be securely anchored and installed flushed with the finished wall; and shall be completely concealed when the fixture are installed.

1. Fixture support and fastenings. All fixtures and equipment shall be supported and fastened in a satisfactory manner.
2. Where through bolts are used, they shall be provided with plates or washer at the back set so that head, nuts and washers will be concealed by plaster. Bolts and nuts shall be hexagonal and exposed bolts, nuts, cap nuts and screw heads shall be provided with chromium plated brass washers.

## J. Waste, Drain and Vent Pipe and Fittings

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1. Pipes. Horizontal soil and waste pipe shall be a grade of 20% where possible, but in any case not less than 1%. Vent pipes in roof spaces shall be run as close as possible to underside of roof, with horizontal piping pitches down to stacks without forming traps in pipes using fittings as required. Where circuits vent pipe from any fixtures or line of fixture shall be connected to a vent line carrying other fixtures, the connection shall be at least 120mm above floor on which the fixtures are located to prevent the use of any vent lines as waste.
2. Fittings. All changes in pipe sizes on soil, waste lines shall be made with reducing fittings or recessed reducers. All changes in direction shall be made by the appropriate use of forty five (45) degree wyes, half wye, long sweep, quarter bend, sixth, eight or sixteenth bends, except that sanitary tees may be used on vertical stacks. Where it becomes necessary to use short radius fittings in any other locations, the approval of the Engineer shall be obtained before they are installed.
3. Union connections. Slips joint shall be permitted only in traps or in the inlet side of the trap. Tucker or hub drainage fittings shall be used for making union connection wherever practicable in connection with dry vents.
4. Joints. All joints shall be air and water tight. For joining pipes the following materials shall be used:
  - 1.4 All PVC pipes shall be joined by the manufacturer's recommended adhesive as approved by the Engineer.
  - 1.5 Cast Iron Pipe. All joints in bell and spigot cast iron soils, waste and vent pipes, or between cast iron pipes, waste and vent pipe and threaded pipe or caulked ferrules shall be firmly packed with oakum or hemp and caulked with lead at least 25mm deep.
  - 1.6 Threaded joints shall be American National Standard Taper screw threads with graphite and oil compound applied to the male thread. Connections between pipes and soil pipe shall be similar and the threaded pipe shall have a ring or hard coupling screwed on to form spigot end.

## K. Quality Assurance Provisions

1. Tests. The Contractor shall conduct all tests required and shall furnish all equipment, labor and materials necessary. All defects disclosed as the result of the test shall be repaired or remedied and the system retested, until the results are satisfactory to the Engineer.
  - 1.1 Water piping shall be subjected to a hydrostatic pressure test of 100 pounds per square inch.
  - 1.2 Sanitary Piping. Before the installation of any fixtures, the end of the system shall be capped and all lines filled with water to the roof and allowed to stand 30 minutes without leakage. After the fixtures are set, a smoke or equivalent test shall be made using an approved apparatus. Test within building shall be made piping exposed. Underground piping shall be tested before backfilling.

## XIV. PAYMENT AND MEASUREMENT

- A. Payment shall be made at the Contract unit price or lump sum price of the various pay items in the Bid Schedule, which payment shall constitute full compensation for furnishings all materials, labor, equipment, tools, and other construction contingencies including profit, fees, and other expenses comprising the total and complete cost of all the work involved in each work item as shown in the plans, and as specified in this technical specification and the special provisions and



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as directed by the Engineer. When the contract does not include a contract pay item for associated or ancillary work requires to complete the work specified in the Bid Schedule, the cost shall be considered as included in the price paid for the listed bid

- B. Measurement for Payment of work covered by the various sections of the Technical Specifications shall be based on the net quantity required for the work based on the drawings unless otherwise directed by the Engineer. Allowance for any bulking, shrinkage, consolidation or loss of material shall be deemed to have been taken into account in the Contractor's unit prices. Only actual quantities of work performed shall be measured and paid for. In the cases of lump sum bid items, the value of the actual work performed shall be calculated by the Engineer and shall be the basis for progress payments.