

## **DIVISION 1 - GENERAL REQUIREMENTS**

### **SECTION 010 : SCOPE AND SPECIAL CONDITIONS**

#### **1.00 INTRODUCTION**

The Drawings and the Project Information Document are complementary to each other. Drawings are graphic means of showing work to be done. They are particularly suited to show where materials are located. Thus, drawings exist essentially to show dimension, location and placement. Not all works however can be presented in the drawings. Generalized works are usually in statement form and, hence, the Contractor is required to read the Project Information Document carefully and understand it properly.

This Project Information Document describe the materials, construction techniques, samples, shop drawings, guarantees and other needed contract requirements. This document together with the drawings are used to inform the Contractor.

The work specified herein is for the construction of the **Fish- and Marine-Based Product Building** located at **MMSU-CASAT, Currimao, Ilocos Norte, Philippines** amounting to **Twenty-Four Million Nine Hundred Ninety Nine Thousand Seven Hundred Fifteen Pesos and 22/100(P 24,999,715.22)**.

#### **2.00 NATIONAL LAWS, LOCAL ORDINANCES AND BUILDING RULES AND REGULATIONS**

Construction of the structure stipulated under this Project Information Document and related Contract Documents prepared for this project shall be in conformity with National Laws, Local Ordinances and Building Rules and Regulations.

#### **3.00 REFERENCE TO OTHER RELATED CONTRACT DOCUMENTS**

- A. Work listed and described in this document are subject to the General Conditions the Contract which forms part of this work.
- B. Detailed Specifications of more significant or more highly involved phases or trades of construction work, or those which under certain circumstances are deemed to require further elaboration or clarification, are also included in this PID.
- C. If necessary, materials, equipment and systems shall comply with the "Green Building" Requirements (USGBC/LEED).

#### **4.00 LANGUAGE OF THE PROJECT INFORMATION DOCUMENT**

The selection of structure depends on the underlying principles of this document.

- That this document are only one part of the Contract Documents;
- That the Contract is between the President (MMSU) and the General Contractor; and
- That the General Contractor is the only party responsible for completing the work in accordance with the Contract Documents.

Therefore,

- A. Only the General Contractor is referred to in the PID so as not to violate the intent of the Contract and so as not to undermine the proper chain of command.
- B. Any reference to Specialty Trade Contractor in the Technical Specifications is made only in so far as to selection. The General Contractor assumes all responsibilities for the execution of the whole project in accordance with the Contract Documents. Therefore, in the contract between the Procuring Entity and the General Contractor, the Specialty Trade Contractor is not referred to. In all Contract Documents, the word "Contractor" is meant the General Contractor.
- C. The omission of the phrase "The Contractor shall" is intentional because the whole project document is directed to the Contractor. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs in the Drawings.
- D. Where "as shown", "as indicated", "as detailed" or words of similar import are used, it shall be understood that the reference to the drawings accompanying this document is made, unless otherwise stated.
- E. As used herein, "provided" shall be understood to mean "provided complete in place" that is, "furnished and installed".

#### **5.00 NATURE AND SCOPE OF GENERAL CONSTRUCTION WORK**

- A. Work contemplated under comprehensive work shall consist of furnishing materials, labor, plant, equipment, tools, appliances, utilities, transportation, detailed superintendence and supervision, temporary construction of every nature, taxes, and satisfactory performance of work and operations necessary for complete construction of this project and deliver complete in every respect within the specified time.
- B. The following are the divisions of work to be undertaken:  
Division 1        GENERAL REQUIREMENTS  
Division 2        EARTHWORKS

Division 3	PLAIN AND REINFORCED CONCRETE WORK
Division 4	MASONRY
Division 5	METALS
Division 6	WOOD
Division 7	THERMAL AND MOISTURE PROTECTION
Division 8	DOORS AND WINDOWS
Division 9	FINISHES
Division 10	PLUMBING WORKS
Division 11	ELECTRICAL WORKS
Division 12	ELECTRONICS WORKS
Division 13	MECHANICAL WORKS

- C. EXAMINATION OF SITE: Visit the site of the work and examine the premises to fully understand all existing conditions relative to the work. No increase in cost or extension of performance time will be considered for failure to verify and know actual site conditions.
- D. PERMITS & TAXES: The Contractor is responsible in securing all necessary permits and payment of taxes needed for the work. As such, the Contractor shall coordinate with the Procuring Entity for this part of the contract.
- E. INJURY TO PERSONS OR DAMAGE TO PROPERTY: The Contractor shall be responsible for all injury to persons and damage to property caused by the works or by the workmen. The Contractor shall be liable for any claims against the procuring Entity on account of such injury and/or damage.
- The Contractor shall likewise take necessary precaution to protect the property of the Owner against rain or other inclemency of the weather or theft due to the performance of his work. The Contractor shall be liable for any such damage or loss.
- F. TEMPORARY FACILITIES: The Contractor shall make all arrangement and pay for the provisions of the necessary electricity and water supply required for the work and shall clear away all temporary installation before or upon completion of the work.
- G. DEMOLITION AND PROTECTION OF EXISTING FACILITIES: Protect existing work, structures, utilities, etc. which are to remain in place. Promptly remove all debris and other products of construction such as waste, dirt, garbage from the job site for the Contractor's account.
- H. DISPOSAL OF MATERIALS: All materials having salvage value shall be carefully removed to avoid damage and shall be placed in neat piles at a designated location. Approved salvaged materials shall be used in other works if found suitable; otherwise, these materials shall be disposed of in such a manner as to prevent damage to property, create unsightly conditions or obstruction.

- I. STANDARD OF WORKMANSHIP: The works shall be executed in a neat and workmanlike manner in accordance with the best practice employed in the industry. It shall include all the necessary work whether stated or not in the Specifications or Drawings to make the works complete and ready for use by the Procuring Entity upon turn-over.
  
- J. STANDARDS OF MATERIALS/ PRODUCTS: All materials and products shall be new and of the standard or premium products of reputable manufacturer approved by PPDO. Materials and products shall bear the trademark of the manufacturer. The approval shall not relieve the Contractor of the responsibility of inspecting such materials for defects or non-conformity of the specification.  
  
Substitution of specified products shall have prior written approval of PPDO, after a written request from the Contractor for material substitution.
  
- K. WINDSTORM PROTECTION: The building roofs, walls and glass panels as well as other important structures are designed to withstand windstorm as per current local code.
  
- L. EARTHQUAKE PROTECTION: Refer to the Engineers' specifications.
  
- M. FLOOD PROTECTION:
  - a. The ground elevation of the building/s and other support facilities are above the flood level as confirmed from the relevant authorities.
  - b. The site drainage system is designed to levels higher than the adjacent creek/s if there is any.
  - c. No utilities and other support equipment are below flood level.
  - d. The fire pumps and associated equipment, if there are provisions, are not installed below flood level.
  
- N. SOLAR ENERGY COLLECTOR: The structure shall consider installation of solar panels at the roof deck in the future to make the building more energy efficient and compliant with green ratings.
  
- O. CONSTRUCTION MATERIALS GENERALLY: The buildings should be of non-combustible construction throughout. This will include the roof, floors, walls and internal partitions.

- P. MECHANICAL VENTILATION SERVICES: All works performed, equipment, materials and accessories supplied and installed for the complete mechanical ventilation system shall comply in every aspect with the rules, regulations and standards as per M&E specifications.
- Q. COORDINATION WITH OTHER TRADES: The Contractor shall examine and be familiar with the Specifications and Drawings of the Works and this Project Information Document. He shall arrange his work and dispose his materials so as not to interfere with the work or storage of materials of the other Trade Contractor.
- Should the Contractor cause damage to any other Contractor on the work, the Contractor shall upon due notice settle with such Trade Contractor by agreement or arbitration. The Contractor shall be liable for any claims by other Trade Contractor against the Owner on account of such damage.
- R. SUSPENSION OR DELAYS: The Contractor shall not suspend or fail to make proper progress with the work without justifiable cause. In the event of delays or suspension of the work still persisting after written complaint, the Procuring Entity shall have the right to take over the work and all the materials on the site and make arrangements that are necessary to have the work completed by others.
- S. CLEANING: The premises shall be kept at all times free from accumulations of waste materials or rubbish caused by the various portions of work. Maintain general cleanliness and sanitation of the site. The Contractor shall remove all unused materials, rubbish, etc. that have accumulated as a result of his work.

At the completion of the project and before final turn-over, the Contractor shall leave the entire project site "broom clean".

- T. GUARANTEE: The Contractor shall guarantee to make good any defects in the work of the project arising or discovered within one year after completion and acceptance of the project by the Procuring Entity.
- U. SHOP DRAWINGS: The Contractor shall submit to PPDO with such promptness as not to cause delay in his work or that of any Contractor two copies of all shop drawings and the schedule required by the work. The Contractor shall make any corrections required by PPDO and submit two corrected copies and other copies as needed.

## **6.00 SUBMITTALS**

The following are items for submission by the Contractor for PPDO's approval prior to order, purchase, work or manufacture.

- A. Samples
1. all specified sizes of steel reinforcement
  2. all specified sizes of angle bars

3. aggregates
4. all trims, mouldings, and frames
5. waterproofing materials
6. sealants
7. corner sections of door and jambs
8. aluminum framing for all framing of doors, windows and others
9. mock up of aluminum doors and windows
10. all finishing hardware
11. glass panels and glazing compounds
12. all tiles
13. all pipes and fittings
14. all toilet accessories, fixtures and trims
15. all lighting fixtures, switches, outlets, etc.
16. wiring devices
17. fire protection system components
18. mechanical system components
19. all other architectural finishing materials

B. Technical Catalogues and Brochures

C. Detailed Shop Drawings

1. formworks when required
2. reinforcing bar details and placements
3. all metal works
4. all metal doors
5. all aluminum doors and windows
6. all wood doors
7. all metal ceiling as per manufacturer's specifications
8. other needed detailed shop drawings

D. Laboratory Test Certificates

1. compaction test on filling materials
2. reinforcing steel
3. concrete (based on mix for specified phases of pouring works)
4. concrete hollow blocks

## 7.00 PROJECT DURATION

- A. Time is a very important factor in the implementation of this project and as such, all works indicated in the plans, Specifications, BOQ and in this document shall be completed within receipt of the Notice to Proceed **200 calendar days-** inclusive of **52** calendar days as pre-determined unworkable as reflected in the Program of Work/Budget Cost.
- B. Before final acceptance by the end-user, the Contractor shall post a warranty security in accordance with the following schedule as prescribed in Section 62.2.3.3 of RA 9184 to cover warranty against structural defects to cover the following periods as follows in accordance with Section 62.2.3.2

- a) Permanent Structures (15 years)
- b) Semi-Permanent Structures (5 years)
- c) Other Structures (2 years)

Form of Warranty Security	Amount of Warranty Security (Equal to percentage of the Total Contract Price)
a) Cash or Letter of Credit issued by a Universal or Commercial Bank: Provided, however, that the LC T shall be confirmed or authenticated by a Universal or Commercial Bank, if issued by a foreign bank.	Five percent (5%)
b) Bank guarantee confirmed by a Universal or Commercial Bank.	Ten percent (10%)
c) Surety bond callable upon demand issue by GSIS or a surety or rinsurance company duly certified by the Insurance Commission as authorized to issue such security.	Thirty percent (30%)

or, before turning over the completed project to the University, shall clean the areas covered by the contract and dispose all construction debris and wastes and leave the area spic and span.

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## **DIVISION 2 - EARTHWORKS**

### **SECTION 020: CLEARING OF THE SITE**

#### **1.00 GENERAL**

##### **1.01 S C O P E**

Furnish equipment and perform labor required to complete:

- A. Demolition and removal of existing structures such as foundation, old paving and sidewalks if any are encountered, which are in the project area and are not being reused.
- B. Removal and storing of salvageable materials, to be inspected and turned over to the Supply Section of the University.
- C. Clearing and grubbing of all trees, shrubs and bushes and disposal of resulting trash, waste, timber stumps, and other vegetation on the site of the structure and within the limits of grading.

##### **1.02 EXAMINATION OF SITE**

Visit the site of the work and examine the premises to fully understand all existing conditions relative to the work. No increase in cost or extension of performance time will be considered for failure to verify and know actual site conditions.

##### **1.03 PERMITS**

Secure and pay for all necessary permits needed for the work (if necessary).

##### **1.04 PROTECTION**

Protect adjacent properties, persons, shrubs, trees, lawns, structures, and utilities therein against harm or damage.

#### **2.00 PRODUCTS**

##### **2.01 DISPOSAL OF MATERIALS**

- A. All salvageable materials shall remain the property of the University (if there is any). Hauling and stacking of salvaged materials within a 300 meter radius to Procuring Entity's specified storage shall be for the account of the Contractor.
- B. All debris and other materials resulting from the demolition work(if there is any) shall be immediately removed from the premises and dumped at sites provided by the Contractor in a manner approved by PPDO and Supply Section of the University.



### **3.00 EXECUTION**

#### **3.01 DEMOLITION**

- A. Demolish and remove from site existing structures and other constructions within the building area (if there is any).
- B. Where existing concrete on ground is to be demolished, remove all existing concrete and other obstruction to a depth of 600 millimeters below grade.
- C. Cap all existing utility lines. Consult PPDO before commencing work.

#### **3.02 CLEARING AND GRUBBING**

- A. Uproot trees or cut down within 75 millimeters of ground surface or as directed by PPDO.
- B. Protect trees indicated in the plans as “trees to be preserved” if there is any.
- C. Cut down trees in a manner to avoid damage to trees to be preserved, to avoid unnecessary disturbance of the ground surface or destruction of low growing vegetation (grasses), prevent injury to structures or minimize danger to traffic.
- D. Remove tree stumps and roots to a depth of no less than 450 millimeters below the existing surface and holes left behind and filled with suitable material such as dry soil, compacted in accordance with Section: EARTHWORK.
- E. Grub up or clear undergrowth, bushes, vegetation, rubbish and all objectionable material and dispose it properly.

#### **3.03 REPAIRS**

Repair damages done to property of any person or persons on or off the premises, by reason of required work for Demolition, Clearing, and Grubbing.

#### **3.04 RESPONSIBILITIES**

- A. The Contractor shall be liable and hereby assumes full responsibility for and shall hold the Procuring Entity free and harmless from any and all claims arising out of or in connection with any injury or damage that may be sustained by any person or property in carrying out the works contracted for under this Agreement.

- B. Damage caused by the Contractor, whether by accident or negligence in connection with the work on any of the Procuring Entity's properties shall immediately be made good at the Contractor's expense, and in the event the Contractor fails or neglects to do so, the cost of such damages shall be deducted from any payment due the Contractor.

### **3.05 STAKES AND BATTER BOARDS**

- A. Stake out building accurately and establish grades.
- B. Batter boards and reference marks shall be erected at location where they will not be disturbed during construction.
- C. Construct two permanent benchmarks of previously known elevations near the site of construction.

### **3.06 EXCAVATION**

- A. The Contractor shall make all necessary excavations for foundations to grade indicated on the drawings without extra compensation, including all other excavations for drainage, sewer and water service systems required and necessary for the proper prosecution of the work.
- B. Trim excavation bottoms to required lines and grades. Include incidental excavation to level the bottom of footing, compacting and tamping same.
- C. The materials to be excavated shall include any rock, earth and other materials of every nature and description encountered in obtaining indicated lines and grades, which can be loosened, removed by hand tools or with proper shovels; assuming that all excavations to indicate lines and grades can be done by the aforementioned means.
- D. Protection, Pumping, Maintenance, Etc. The Contractor shall, at all times, protect the excavation and trenches from damage.

### **3.07 BACKFILLING AND COMPACTION**

- A. Backfill around structures only after concrete walls have attained full design strength to resist lateral pressure resulting from backfill and/or as directed by PPDO.
- B. Remove all forms, trash and debris prior to backfilling around structures.
- C. Use only approved, free from waste and objectionable matter backfill materials from excavations.
- D. All exterior grade shall be formed in accordance with drawings and specifications.

### **3.08 DISPOSAL OF EXCAVATED MATERIAL**

Surplus materials resulting from all earthworks operations not required or unsuitable for fill or backfill shall be disposed off by the Contractor at his expense in areas off site provided by the Contractor.

### **3.09 UTILITIES**

- A. The Contractor shall protect and maintain all conduits, drains, sewer pipes and other utility services (if there is any) that are to remain on the property or in the site where required for the proper excavation of the work.
- B. The Contractor shall notify all corporations, companies, individuals or other authorities concerned with the above conduits, drains, sewer pipes, and other utilities (if there is any), running to the property or site and protect, relocate, remove or discontinue all pipes, sewer and other utility services which interfere with the excavation of the work in accordance with the instruction and requirements of the above parties.

## **SECTION 022: SOIL POISONING**

### **1.00 GENERAL**

#### **1.01 EXAMINATION OF SITE**

Visit the site of work and examine the premises to fully understand all existing conditions with respect to the work involved. Inquire from local authorities the presence of termites and other rodents in the vicinity for more information.

### **2.00 EXECUTION**

#### **2.01 APPLICATION OF CHEMICALS**

- A. Application shall be done by certified pesticide applicator approved by PPDO and undertaken when the construction of the structure is substantially complete.
- B. Apply chemicals into the soil at re-sealable filter points by means of injection process using pressure calibrated power sprayers fitted with flow meters for accurate monitoring of actual quantity used.
- C. Treatment should not be made when the soil or fill is excessively wet or immediately after heavy rains to avoid surface flow of toxicant from the application area. Cover filler points immediately after application or take other precautions to prevent disturbance or treatment.

## **2.02 CONTRACTOR'S GUARANTEE**

Upon completion of work, and as a condition for final acceptance, the Contractor shall submit to procuring Entity a written guarantee which shall provide that:

- A. The soil poisoning system have been installed in accordance with the approved lay-out plan and installation program and it will be operationally effective for not less than 10 years from date of completed installation.

In the event of breakdown during the 10 year period, the Contractor shall undertake corrective measures and rectifications at the Contractor's expense.

- B. Soil poisoning treatment shall prevent subterranean termites from attacking the building or its contents for a period of not less than two years.

Should subterranean termite activity exists in or under the building during the two years, the Contractor shall re-treat the soil at the Contractor's expense using methods acceptable to the Procuring Entity and make good all damages to the building and its contents caused by subterranean termite activity.

- C. Should there be powder post beetle or *bukbok* infestation within the two years, the Contractor thereby agrees to do all necessary repairs on the damaged portions of the building caused by the infestation to the satisfaction of the Procuring Entity and at the Contractor's expense.

## **DIVISION 3 – PLAIN AND REINFORCED CONCRETE WORKS**

### **SECTION 030: CONCRETE**

#### **1.00 GENERAL**

##### **1.01 SCOPE**

- A. Furnish material and equipment and perform labor required to complete cast-in-place and finishing of concrete of all plain and reinforced concrete as shown on the drawings and as specified herein.
- B. Refer to the General Notes and Specifications prepared by the Civil and Structural Engineer.

##### **1.02 STANDARD SPECIFICATIONS AND CODES**

Works shall be governed by the National Structural Code of the Philippines (NSCP) 2015 edition Vol. I- Building, Towers and other vertical structures.

##### **1.03 SUBMITTAL**

- A. Samples: Submit samples of cement and aggregates proposed for exposed architectural concrete work for approval, labeled with names, sources and descriptions of material.
- B. Mill Certificates: Furnish two copies of manufacturer's certificates of mill tests of all reinforcing steel.
- C. Shop Drawings: Each reinforcing steel detail and placement drawings shall be submitted for approval in accordance with the requirements of the General Conditions. Any material fabricated before final approval of the shop drawings will be done at Contractor's risk, but no material shall be placed until shop drawings have final approval by PPDO. Shop drawings shall be in accordance with the the ASEP Guide to Earthquake Resistant Design of Structures, latest edition.
- D. Reports
  - a. Submit schedule of pours and location at least three (3) days prior to date of pouring for approval.
  - b. Submit three copies of mixed design and test results.

##### **1.04 LABELLING OF REINFORCING BARS**

Bars shall be properly labeled with weather proof tags to facilitate identification.

## **1.05 TESTING OF REINFORCING BARS**

Tests shall conform to ASTM Designations of specified materials. One tension and one bend test shall be made on each size of reinforcing steel bar for every 10 tons or every lot delivered, whichever is less. Testing shall be by an approved independent material agency. Samples of materials for testing and testing shall be provided by Contractor without additional cost to Procuring Entity. Copies of the results shall be furnished to the Procuring Entity, PPDO and TWG.

## **1.06 TESTS FOR FRESH CONCRETE**

Prior to concrete pouring, slump tests shall be undertaken, to determine the consistency and workability of fresh concrete. The minimum slump test shall be in accordance with Section 2.02 B.b.c.

## **1.07 DESIGN STRENGTH OF CONCRETE**

All strengths of concrete shall be as indicated on Construction Notes and Structural Specification. All concrete specimens shall be tested for compressive strength by a reputable third party Accredited Materials Testing Laboratory and as required by RA 9184 Annex E 11.1.

## **1.08 INSPECTION**

PPDO shall be notified in advance to provide ample time for inspection of reinforcing steel bars before any mixing and placing of concrete is commenced.

## **2.00 PRODUCTS**

### **2.01 MATERIALS**

- A. Forms: Use marine plywood with phenolic film panels, metal or surfaced lumber forms where it will best give the most advantage in the specific concrete work involved or as shown.

Forms shall be designed and constructed to facilitate easy removal without damage to textured concrete surfaces, free of offsets and square corners true to the lines and profiles as detailed, with a minimum number of joints, subject to PPDO's approval.

- B. Reinforcing Steel Bars

- a. Shall be new and free from rust, oil, grease, scale, defects or kinks or other coating which will impair the bond.
- b. Shall conform to the latest edition of ASTM Designation A615 Specification for Deformed Billet Steel Bars for Concrete Reinforcement.

- c. Grade of reinforcing steel shall be as indicated in the construction notes and structural specifications.
  - d. Accessories: Provide bar supports and other accessories necessary to hold bars in proper position while concrete is being placed. Bar supports which come in contact with forms for concrete exposed to view in the finished structure shall be galvanized. Bar supports are subject to approval of PPDO.
- C. Cement
- a. Portland cement shall conform to ASTM C-150 or C175: Standard Specifications for Portland Cement and of the American Society for Testing Materials and subsequent standards, thereof, to meet local conditions.
- D. Fine Aggregates
- a. Fine aggregates used in the composition of concrete, mortar, grout or plaster shall consist of natural sand, stone screenings or other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains, and free from injurious amounts of dusts, lumps, soft and flaky particles, shales, alkalis, organic matters, loams or clays.
  - b. All sand to be used shall have the local designation of S-1 or first class washed sand with greenish exterior color tone, sharp, fine and hard.
- E. Coarse Aggregates
- a. Coarse aggregates shall consist of crushed stones, gravel, or other approved inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated particles, free from injurious amounts of soft friable, thin, elongated or laminated pieces, alkalis, organic or deleterious matters, soft stones, limestones or stones having a distinct cleavage are not allowed. All coarse aggregates to be used shall have the local designation of G-1 first class machine crushed stone gravel.
  - b. Coarse aggregates shall be well graded as to size, ranging from 0.3 millimeters (1/8") up to a size which will readily pass between all reinforcing bars and not to exceed 18 millimeters (3/4") in size for reinforced beams, columns, floor slabs and others.
- F. Water used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic, matters or other substances that may be deleterious to concrete or steel.

## **2.02 CONCRETE PROPORTIONS AND CONSISTENCY**

### **A. Cement and Aggregate**

The Contractor shall employ a design mix as required and in accordance with the requirement of the specifications and drawings

Make proportions so as to produce a concrete mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing materials to avoid segregation or accumulation of excess free water on the surface.

If at any time during construction, the concrete resulting from approved mix designs proves to be unsatisfactory for any reason, such as too much water, lack of sufficient plasticity, or insufficient strength, the Contractor shall immediately notify PPDO.

### **B. Measurement**

- a. Measure concrete materials such that the proportions can be accurately controlled and easily checked at any time during work.
- b. Conform measurement of materials for ready mixed concrete to Standard Specifications for Ready Mixed Concrete.
- c. Allow job mix adjustment of water content only on permission of PPDO and TWG provided that cement is also added to keep the original water content ratio of the design mix.

Limit slumps to the following:

Portion of structure	Slumps (millimeters)
Columns, beams, girders slabs Foundation elements, bedded slabs and cantilevered beams and slabs	50 mm. – 150 mm.

## **2.03 MIXING CONCRETE**

### **A. Ready Mixed Concrete: ASTM C-94 and as herein specified.**

- a. All ready-mixed concrete shall be placed in forms within one hour after adding water or not more than 1-1/2 hours if a retarder is used. It shall be kept constantly agitated during the transit period.



### **3.00 EXECUTION**

#### **3.01 PREPARATION**

##### **A. FORMS**

- a. Check all forms to conform to the shape, lines, dimensions of the members as called for in the plans. The forms shall be substantial and designed to resist the pressure and weight of the concrete, and be properly tied and braced or shored to maintain position and shape.
- b. Check all formwork for plumbness and correct alignment.
- c. Provide openings in column forms for cleaning and inspection preferably at lowest point of pour lifts immediately before depositing concrete.
- d. Always provide continuous vertical supports for framework directly below pour line.
- e. Coat forms with approved form oil before reinforcement is placed. Remove all surplus oil on form surfaces.

##### **B. REINFORCING STEEL BARS**

- a. Before placing reinforcement and before pouring of concrete, remove all loose rust, mill scale, oil or other adhering materials which tend to reduce or destroy bond between concrete and reinforcement.
- b. All bars shall be bent cold. Bends for stirrups and ties shall be made around pins with a diameter of at least twice the thickness of the bars; for bars 25 millimeters and smaller, six times the thickness; for larger bars, eight times the thickness.

##### **C. CAST-IN-PLACE CONCRETE**

- a. Inspect and clean all forms and check installations before placing concrete.
- b. Wet surfaces thoroughly and grout before placing concrete.
- c. Clean all laitance from previous pouring and possibly expose aggregates before pouring.
- d. Inspect completeness and correct locations of embedded items.

### **3.02 STRIPPING AND RESHORING OF FORMS**

- A. Remove forms only upon approval of PPDO/TWG in such a manner and at such times to insure the complete safety of the structure. In no case shall the supporting forms and shorings be removed until the members have attained sufficient strength to support safely their weight and load thereon. Forms and supports shall remain in place for a minimum time of:
- |                                       |         |
|---------------------------------------|---------|
| columns . . . . .                     | 3 days  |
| walls and vertical surfaces . . . . . | 2 days  |
| beams and slabs . . . . .             | 14 days |
| sides of beams and girders . . . . .  | 2 days  |
- B. Exercise due care while stripping forms and protect corners subsequently against shipping or other damage by approved means.
- C. The results of suitable control tests shall be used as evidence that the concrete has attained sufficient strength to permit removal of shorings and supporting forms. Cylinders required for control tests shall be made in addition to those required by this document.
- D. Reshore immediately after stripping slabs, beams and girders that support subsequent formworks. Retain reshores for as many levels as required to combine the live load capacities of cured floors to support the loads of the subsequent fresh construction and construction loads.

### **3.03 PLACING REINFORCEMENT**

- A. Metal Reinforcement
- a. Placing shall be according to plans furnished. Refer to PPDO in case of doubt in placing steel.
  - b. Reinforcing bars shall be accurately placed and adequately secured with concrete metal wires, metal chair spacers, ties, anchors or other accessories to prevent displacement by construction loads or the placing of concrete.
  - c. All non-stirrups shall be held in place by the two No. 4 spacer bars unless otherwise shown in the drawings.
  - d. Reinforcement shall not be bent after being embedded on hardened concrete unless otherwise permitted by PPDO.
- B. Bar Spacing shall be done in accordance with the NSCP:
- a. Clear distance between parallel bars shall be 1-1/2 times the diameter of the bars.

- b. Clear distance shall not be less than 1-1/3 times the maximum size of aggregates, nor less than 25 millimeters.
- c. Where bars are used in two or more layers, the bars in the proper layers shall be placed directly above those in the lower layers at a clear distance of not less than 25 millimeters.

### **3.04 OFFSET AND SPLICE IN REINFORCEMENT**

#### **A. Splices**

- a. Generally, avoid splices in slabs, beams and girders at points of maximum stress. Splices may be allowed only upon written approval of splice details by PPDO or as shown or noted in the plans.
- b. Splice length shall follow the requirement of ASEP Guide to Earthquake Resistant Design of Structures latest edition and Sec. 418- Earthquake Resistant Design of NSCP 2015 ed. Vol. I.
- c. Splices in adjacent bars shall be staggered by a minimum distance of 40 bar diameters.

### **3.05 CONCRETE COVER**

Minimum protective covering shall be as indicated on the Construction Notes and Structural Specification and shall conform to Section 420.6.1.3 specified concrete cover requirements Table 420.6.1.3.1 of NSCP 2015 ed. Vol. I.

### **3.06 DEPOSITING CONCRETE**

- A. Do not start placing of concrete until the forms and reinforcements for the whole unit to be poured have been completed, cleaned, inspected and approved.
- B. Do depositing without segregation, rehandling or buggies, buckets or wheelbarrows. Never allow use of chutes except to transfer concrete from hoppers to buggies, wheelbarrows or buckets in which case shall not exceed six meters in aggregate length.
- C. Place immediately after mixing, and in no case more than 90 minutes after water has been added provided a retarder is used. In placing concrete, never drop it freely for a height exceeding 1.5 meters. Deposit in uniform, horizontal layers not more than 450 millimeters deep, work around all reinforcing and in corners of forms.
- D. Keep conveyors full of concrete and keep ends buried in the newly placed concrete as pouring progresses. Properly paddle by the use of rods, shovels and hand spades, and agitate by means of internal and/or external vibrators to obtain the best possible concrete without over-vibration to the point where separation results. Continue depositing of concrete until the

completion of the section or unit, and in no case suspend the pouring of a section once started, for more than 30 minutes.

- E. Concrete, upon approval, may be placed without the use of vibrators. In this event, place the concrete in layers of not more than 300 millimeters in thickness and spade, tamp, and agitate by other means of obtaining the same results as by vibrating.
- F. Construction Joints
  - a. Do concreting continuously, until section is complete. When stoppage of concrete operations occur, place construction joints either horizontally or vertically where it will not impair the strength of the structure or as indicated by PPDO. Provide shear keys or dowels to develop bond.
  - b. Roughen and clean construction joints. Wet and slush with cement mortar or grout just before placing of new concrete.
  - c. Consult drawings and/or PPDO as to the details of construction joints. Construction joints shall be located at L/3 of reinforced concrete beams and slabs and at clear height divided by 6(hc/6) or 600 mm. whichever is larger below bottom of reinforced concrete beams for reinforced concrete columns.

### **3.07 CURING CONCRETE**

- A. Finished Surface: Protect all concrete works from drying out after removal of forms by covering with waterproofed paper, polyethylene sheeting, burlap or coating of approved membrane curing compound with moisture retention property equal to 90 percent based on ASTM C-156, applied in accordance with the Manufacturer's instructions.

Wet burlap as often as required to keep concrete wet throughout each day for a period of, at least, seven days where normal Portland cement is used.

Protect freshly placed exposed concrete from rain and the element by tarpaulins at all times.

- B. Begin curing as soon as concrete has attained initial setting after 6 hours.
- C. Spray floors and vertical surface with an approved curing compound. However, membrane curing compound shall not be used where floor hardener, resilient floor tile or other applied finishes or surface treatments are to be subsequently applied.

### **3.08 SLAB FINISHES**

- A. Prepare slabs suitable in surface and elevation to receive finishes. Finish floor and roof slabs shall be level, plane surfaces unless otherwise indicated on the drawings, with a tolerance of three millimeters in 250 millimeters; surface shall be pitched to drains as required.
- B. Types of Finishes:
  - a. Resilient Floor, Granite Tile: Base slabs which are to receive these finishes requiring "thin-set" installation shall be floated and troweled with a steel trowel to provide a smooth surface as required to receive flooring.
  - b. Roof slab: water-proof membrane-type
  - c. Epoxy Flooring on plain cement finish

### **3.09 TEST OF CONCRETE**

The Contractor shall employ, at his own expense, an approved and independent testing laboratory which shall make the tests and immediately submit five copies of mixed designs and test reports to PPDO for approval before any concrete is placed.

The following tests shall be made for each 75 cubic meter of concrete or fraction thereof, but not less than one set for each day's pour. All three tests shall be made from the same batch.

- A. Compression Tests: Test in accordance with ASTM C-31 and C-39. Test one cylinder at the age of seven days, two cylinders at 28 days and one cylinder in reserve for 56 days test if 28 days does not meet the requirements. Make additional cylinders as required to check strength of concrete in construction. These cylinders are to be cured in the field in the same manner as the concrete in the construction are cured.
- B. Two Slump Tests: ASTM C 143. Keep a slump cone at the site at all times.
- C. Tests Reports: The testing laboratory shall submit four copies of its test cylinder reports which are to include as far as applicable, the following items: Location of pour in the structure, concrete design mix number, concrete design strength, type and manufacture of cement, amount of any admixture used (if any), slump tests, date of sampling, cylinder identification number, days cured in field, days cured in laboratory, age at time of testing, crushing stress, type of failure, who made the cylinders at the laboratory, and whether concrete strength meet specifications.
- D. Inspection of batch plant operation on a "spotcheck" basis as required to insure that concrete delivered to the job complies with the specifications and the design mix.

- E. Additional tests: If, in the opinion of PPDO and TWG, based on the cylinder strengths below specification requirements or visual defects, concrete of poor quality has been placed, additional tests shall be made as directed by PPDO and TWG and at the expense of the Contractor. Tests may be compression tests on cured cylinders, ASTM C 42, and/or load tests as outlined in ACI 318, section 202, or as directed.

The average strength of 3 concrete cylinder specimens representing each class of concrete shall be equal to or greater than the specified strength and not more than one specimen shall have a strength more than 3.5 mPa below the specified design compressive strength.

Where tests fail to give the required strength, the Owner shall have the right to order a change in the proportions of the concrete or in the procedure of curing for the rest of the structure.

### **3.10 FAILURE OF TEST SAMPLES**

In any case of failure to meet specified strengths, the Contractor may, at his expense, perform rebound hammer test and obtain concrete core samples from the poured concrete and have their compressive strength determined by a competent testing authority which shall be taken as a conclusive evidence of its strength and integrity, provided the cores will not impair the safety of the structure and can be satisfactorily replaced.

To determine adequacy of the structure, the Procuring Entity shall have the option to order load tests on parts of the structure where concrete strength tests are below 80% of those specified. These tests are to be done in accordance to ACI 318-17 and/ or NSCP Sec. 427 recommendations, and the costs are to be borne by the Contractor.

Demolition and concrete replacement if recommended by PPDO and TWG shall be borne by the Contractor or the Contractor may be required to prolong the curing of the poured concrete as directed by PPDO and TWG, in addition to payment of the liquidated damages.

### **3.11 LIQUIDATED DAMAGES for FAILURE to MEET CONCRETE REQUIREMENTS**

For strength of concrete obtained on molded or drilled test specimen less than those required on Item 3.09 TEST OF CONCRETE of this section, the Contractor shall pay to the Procuring Entity as liquidated damages, and not as a penalty or forfeiture, the following percentage of the proposed unit prices per cubic meter for the quantity of concrete directly and indirectly affected by the failure to meet strength requirements regardless of whether or not analysis of test results show that the concrete in place can still safely carry the design loads:

- A. For concrete less than 100 percent but greater than 90 percent of specified strengths, payments shall be 20 percent of the total concrete per cubic meter.
- B. For concrete less than 90 percent but greater than 80 percent of specified strength, payment shall be 50 percent.
- C. For concrete less than 80 percent of the specified strength, removal of the concrete so deposited and replacement of same at the expense of the Contractor.

### **3.12 GUARANTEE - WATER TIGHT CONCRETE**

Guarantee all waterproofing on deck roofs or where called for in plans to be absolutely waterproofed and free from leakage of a period of ten years. Should any leakage develop in these items, they shall be made waterproofed by approved waterproofing methods and materials and these shall be repeated, necessary until all leakage has been stopped. Guarantee shall extend to full **ten years** after last leak has stopped.

- A. All vertical construction joints in such walls shall be locked and keyed, the channels being not less than 75 millimeters deep, including joints where waterstops are required. These joints shall be bonded and absolutely tight.
- B. All piping under slabs must be completed before slab is poured.

## **DIVISION 4 – MASONRY**

### **SECTION 040: M O R T A R**

#### **1.00 GENERAL**

##### **1.01 SCOPE**

Furnish materials and equipment and perform labor required to complete all plaster work, masonry work, patching and filling mortar as shown or indicated in the drawings.

##### **1.02 MIXES**

Cement Mortar shall consist of homogeneous mixture of:

1 part Masonry or Portland cement and 2 parts sand, but not more than:

1 part Masonry or Portland cement and 3 parts sand

##### **1.03 SLUMP**

Cement Mortar shall have a minimum slump of 100 millimeters and a maximum slump of 150 millimeters.

##### **1.04 GROUT**

- A. Fine grout shall be mixed using one part Masonry or Portland cement and three parts sand for grout spaces less than 50 millimeters in any horizontal dimension and in which clearance between reinforcement and masonry is less than 20 millimeters.
- B. Coarse grout shall be mixed using one part Masonry or Portland cement, three parts sand and three parts pea gravel passing a 10 millimeters sieve for grout spaces 50 millimeters or greater in all horizontal dimensions and in which clearance between reinforcement and masonry is more than 20 millimeters.

### **SECTION 041: CONCRETE UNIT MASONRY**

#### **1.00 GENERAL**

##### **1.01 SCOPE**

- A. Furnish materials and equipment and perform labor required to complete concrete unit masonry.
- B. Include building-in of necessary items supplied by other trades as shown or indicated in the drawings. Include all necessary accessories.
- C. See drawings and details for location, extent and other requirements.



## **1.02 VISUAL INSPECTION**

- A. All units shall be sound and free from cracks or other defects that would interfere with the proper placing of the unit to impair the strength or permanence of the construction.
- B. Units that are intended to serve as a base for plaster shall have a sufficiently rough surface to afford good bond.

## **1.03 TESTING**

Units shall be tested in accordance with the standard method of testing masonry units of the American Society for Testing Material (ASTM) C 140. No blocks shall be used unless results of tests are known and duly approved by PPDO.

## **1.04 REJECTION**

In case the delivered CHB fails to conform with the requirements, the Contractor may sort it and new specimens shall be selected and tested at the expense of the Contractor. In case the second set of specimens fails to conform with the test requirements, the entire lot shall be rejected.

## **1.05 CLEANING**

- A. Clean down with dry brushing.
- B. Leave all work clean and free from mortar splashes. Hose down and brush off efflorescent deposits. Remove timer stains with 10 parts water to 1 part dilute hydrochloric acid then hose down.
- C. Wash finished surface in a manner most appropriate and satisfactory.

## **DIVISION 5 - M E T A L S**

### **SECTION 050: STRUCTURAL STEEL**

#### **1.00 GENERAL**

##### **1.01 SCOPE**

- A. Furnish materials, tools and equipment and perform labor required to complete fabrication and erection of all structural steel and miscellaneous steel items including: structural steel frames, pipe supports and hangers and connection systems.
- B. Where so indicated in the plans, structural members shall be joined by welding. The welds shall be of size and types indicated and shall be made by competent operators.

##### **1.02. RESPONSIBILITY**

- A. Contractor shall be responsible for the accurate location of all steel work including items used to attach materials to other parts of the work.
- B. Contractor shall see to it that any and all items of work which are to be built into the works of other trades are installed at the proper time.
- C. Contractor shall notify PPDO if the steel work shall be fabricated in a shop other than the site, so that arrangements can be made together with Project Representatives in the inspection of the delivered materials and in the fabrication of the steel work.

##### **1.03. SUBMITTALS**

- A. Shop Drawings: In accordance with the requirements of the General Conditions, furnish complete detailed fabrication tolerances and erection shop drawings including details of all connections and anchorages for review and approval of PPDO.  

PPDO will review and approve all shop drawings. Re-submit if any corrections are required.
- B. Mill Test: Submit to PPDO two copies of the certified mill test/mill certificate.
- C. Samples: Submit to PPDO three sets of specimen samples of all structural steel materials to be used for approval.

## **1.04 DELIVERY**

- A. The Project in Charge shall inspect materials per delivery and may request additional tests on materials delivered if in their opinion, there is reasonable doubt as to the materials specification. The fabrication and delivery of the fabricated structural steel should be in such sequence that permits the most efficient and economical performance of the work in coordination with the concrete Contractor. Items such as anchor bolts, anchorage and others that have to be placed in concrete shall be in the jobsite before such concrete structural member will be poured. Erection marks shall be painted on structural steel members and fabricated sections. Small structural members, such as rivets, bolts, nuts, washers, etc., shall be shipped and kept in properly marked suitable container.
- B. Epoxy primer shall be applied on all structural steel components before delivery to the jobsite. Damage to the paint due to handling shall be repaired properly.

## **2.00 PRODUCTS**

### **2.01 MATERIALS**

- A. Conform all materials and workmanship to the requirements of the NSCP Section 501 through 557, American Institute of Steel Construction, "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings", as amended to date or as specifically modified by the drawings or by these specifications.

Standard Solid Sections: Mild steel angles, flat bars, square bars, channels, U, and other sections shall be with stiffened flange.

Bracing Rods: Standard structural grade steel rods with turnbuckles whenever required.

- B. Conform structural steel plates and shapes to ASTM Designation A36 with a specified yield point of 36,000 psi. Refer to the construction notes.

Plates, Sheets and Connectors: From mild steel sheets or plates with thickness, size, shape, and design as indicated in the Drawings.

- C. Conform welding electrodes for manual or submerged shielded metal arc welding to E70 series of the Specifications for Mild Steel Arc Welding Electrodes (ASTM A 233), having a minimum yield point of 345 MPa (50,000 psi).
- D. Conform bolts to the Specifications for Low carbon Steel externally and internally threaded Standard Fasteners, ASTM A307. Type, shape, size, threading and corresponding nut and accessories as required.

- E. Use only approved brand of red lead paint and linseed oil for all shop painting and structural steel.

## **2.02 B O L T S**

- A. High Strength Bolted Construction: Bolts shall conform to ASTM A-325 (Specifications for High Strength Carbon Steel Bolts for Structural Steel Joints).
- B. Surfaces of high strength bolted parts in contact with bolt head and nut shall have a slope of more than 1:20 with respect to the plane normal to the bolt axis. Where the surface of a high strength bolted part has a slope of more than 1:20, a beveled washer shall be used to compensate the lack of parallelism. High strength bolted parts shall fit solidly together when assembled and shall not be separated by gaskets or other compressible material. When assembled, all joint surfaces including those adjacent to the washers shall be free from scales, dirt, burrs and other defects that would prevent solid seating of the parts.
- C. Each fastener shall be tightened to provide, when all fasteners in the joint are tight, at least the minimum tension as follows:

Bolt (diameter)	Minimum Tension (KN)
1/2	53.38
5/8	84.52
3/4	124.55
7/8	176.48
1	226.86
1-1/8	249.10

- D. Do tightening with properly calibrated wrenches or by the turn-of-nut method.
- E. When calibrated wrenches are used to provide the above bolt tension, their setting must induce a bolt tension five to ten percent in excess of the above. These wrenches shall be calibrated daily by tightening, in a device capable of indicating actual bolt tension, not less than three typical bolts of each diameter from the bolts being installed. When tightening several bolts in a single joint, the wrench shall be returned to touch up bolts previously tightened which may have been loosened by the tightening of subsequent bolts, until all are tightened to the prescribed amount.
- F. When the turn-of-nut method is used to provide the bolt tension specified above, there shall first be enough bolts brought to snug fit condition to insure that the parts of the joint are brought into good contact with each other. (Snug tight is defined as the tightness attained by the full effort of a man using an ordinary spud wrench). Following this initial operation, bolts shall be placed in any remaining holes in the connection and brought to snug tightness. All bolts in the joint shall then be tightened

additionally by the applicable amount of nut rotation of 1/2 turn with the tightening progressing from the most rigid parts of the joint to its free edges.

### **3.00 TOLERANCES**

- A. Let all structural members of single rolled shape and built-up members fabricated by riveting or welding, unless otherwise specified, be straight within the tolerances allowed by ASTM Specification A6.
- B. Never let compression members deviate from straightness by more than 1/100 of the axial length between points which are to be laterally supported.
- C. Let completed members be free from twists, bends and open joints. Sharp kinks or bends shall be the cause of rejection of materials.
- D. Members with ends not finished for contact bearing which are to be framed to other steel parts may have a variation from the detailed length not greater than plus 0 minus three millimeters for members nine meters or less in length and not greater than plus 0 minus 4.5 millimeters for members over nine meters in length. These tolerance shall not be cumulative.

### **4.00 SHOP PAINTING**

- A. Clean all steelwork specified for painting by hardwire brushing, or other methods chosen by the fabricator for cleaning loose mill scale, loose rust, weld slag, or flux deposit, dirt and other foreign matter after inspection, approval, and before leaving the shop.
- B. Give all steel work except those to be encased in concrete at least two coats of shop paint applied thoroughly and evenly to dry surfaces, by a brush, spray, roller coating, flow coating and/or dipping, as per instruction given by .PPDO
- C. Surfaces within 50 millimeters of any field weld location shall be free of materials that would prevent proper welding or produce objectionable fumes while welding is being done. If shop-painted, surfaces to be welded shall be wire brushed in the field before welding, to reduce the paint film to a minimum.
- D. Remove oil and grease deposits by solvent.
- E. Do not paint steel work that is to be encased in concrete. Clean oil or grease with solvent cleaners. Remove dirt and foreign materials by thorough sweeping with a fiber brush.
- F. Contact surfaces shall be cleaned but not painted.

- G. Machine finished surfaces shall be protected against corrosion by approved rust-inhibiting coating that can easily be removed prior to erection or which has characteristics that make removal unnecessary prior to erection.

## **5.00 WORKMANSHIP**

Structural steel members shall be aligned, plumbed, straight in fabrication, welding and installation. The structural steel shall be fabricated, handled and crated as per specifications and in conformity with the American Institute of Steel Construction Specification for design, fabrication and erection of structural steel for buildings.

## **6.00 FIELD PAINTING**

After erection, all field connections, field bolt heads and nuts, field welds and all unpainted areas including any marred or damaged surfaces shall receive one coat of same rust-inhibitive paint as used in the shop painting.

## **7.00 TESTING**

Testing of materials will be required on samples randomly selected by the Procuring Entity's representative. The Contractor shall be responsible in having the selected material being tested by a reputable testing outlet. Test results shall be submitted to PPDO for review and approval.

## **8.00 FINAL CLEAN UP**

Upon completion, of the erection and before final acceptance, Contractor shall remove from the jobsite all materials, rubbish and temporary structures furnished and earlier provided by him.

## **DIVISION 6 – WOOD**

### **SECTION 060: CARPENTRY AND MILLWORKS**

#### **1.00 GENERAL**

##### **1.01 SCOPE**

Furnish materials, hardware, accessories and equipment and perform labor required to complete, ready for use, wall panels, wood trims and architraves, wood doors and related carpentry work as indicated on the drawings and specified herein. Coordinate work with all other related trades.

##### **1.02 STORAGE AND PROTECTION**

- A. Protect lumber both in transit and at the jobsite from elements. Material shall not be delivered unduly long before it is required for the proper conduct of work.
- B. Protect millwork against dampness during and after delivery.
- C. Do not bring in interior finish, including doors, into building until plaster is thoroughly dry.
- D. Protect all finished woodwork from injury after it has been set in place until completion and final acceptance of the work.

#### **2.00 PRODUCTS**

##### **2.01 MATERIALS**

- A. Wood Panel Doors must be manufactured, solid, hard, free from imperfections. All panels shall be end-sealed before assembly.
- B. Wood trims and architrave, provided on wood panel doors as indicated on plans and specifications.
- C. Compact Board: high grade of fine wood chips fibers solidly and homogeneously compacted with special resins. Thickness and finish as per detailed drawings and specifications. Use High Moisture Resistant boards at areas with high humid conditions such as kitchens and toilets.
- D. Rough Hardware and Metal Fasteners: Plates, straps, nails, screws, spikes, bolts, joists, hangers, rods, dowels, fasteners and miscellaneous iron and steel items shall be of sizes and types to rigidly secure member in place.
- E. Assembly Materials: Water resistant glue, nails, screws, bolts or appropriate type, shape and size for all joints.

## **DIVISION 7 - THERMAL & MOISTURE PROTECTION**

### **SECTION 070: WATERPROOFING**

#### **1.00 GENERAL**

##### **1.01 SCOPE**

- A. Furnish materials and equipment and perform labor required to complete waterproofing works.
- B. See drawings and details for location and extent of requirements.

##### **1.02 SUBMITTAL**

- A. Samples: Submit to PPDO samples of materials to be used clearly labeled as to brand name and manufacturer's name and secured approval.
- B. Manufacturer's Instructions: Submit to PPDO the Manufacturer's complete printed instructions for the application of the material.
- C. Warranties: Upon completion, submit to PPDO written warranty that the waterproofing is effective for a period of Ten Years (10).

##### **1.03 DELIVERY AND STORAGE**

- A. Deliver waterproofing materials to the site in original sealed containers or packages bearing the manufacturer's name and brand designation, specification number, type and class.
- B. Store and protect waterproofing materials from damage, weather moisture and extreme temperature with extraordinary care.

#### **2.00 PRODUCTS**

##### **2.01 MATERIALS**

- A. Waterproofing cement-based material at Balcony and built-up and preformed membrane at Roof deck level shall be used as waterproofing materials for the project.

#### **3.00 EXECUTION**

##### **3.01 GENERAL**

- A. Clean, free from holes and projections, smooth and dry all surfaces to receive waterproofing materials. The Contractor shall perform the necessary surface preparation. Immediately before application of waterproofing, clean surfaces and secure approval. No application of waterproofing shall be permitted in wet weather.



### **3.02 SURFACE PREPARATION**

The concrete surface shall be troweled, smooth, firm, dry, clean and free of rubbish, loose or foreign materials, without any projections, indentations, and other imperfections.

### **3.03 TOPPING AND LINING**

Thickness as indicated in the drawings. Slope towards the drain.

### **3.04 APPLICATION**

As per manufacturers written instructions.

### **3.05 TESTING**

Flood test all applicable waterproofed areas prior to acceptance of the job. Plug all drains, build temporary dams at openings that water will be 25 millimeters deep at the high point of the waterproofed area. Maintain the water for at least 24 hours. Remedy any evidence of leakage at once.

### **3.06 CURING**

Where curing of waterproofing is required, cure strictly in accordance to the manufacturer's specifications. Allow foot traffic only after complete curing.

### **3.07 CLEANING AND INSPECTION**

Clean and clear all debris at site including tools and equipment prior to final inspection.

### **3.08 PROTECTION**

Do not allow traffic on coated surfaces until completely cured after completion of application.

### **3.09 GUARANTEE**

The Contractor shall guarantee all waterproofing works to be free from defects in materials and in workmanship and free from leaks for a period of ten years from the date of final acceptance.

## **SECTION 071: CAULKS AND SEALANTS**

### **1.00 GENERAL**

#### **1.01 SCOPE**

- A. Furnish materials and equipment and perform labor and services necessary to complete application of caulks and sealants for expansion joints, construction joints, window sills, etc.
- B. See drawings and details for location and extent of requirements.

#### **1.02 DEFINITION**

The term "waterproof" shall mean resistant to penetration of water from rainfall.

#### **1.03 SUBMITTALS**

Warranties: Upon completion, submit to PPDO written warranty that the waterproofing installed is effective for a period of five (5) years.

### **2.00 PRODUCTS**

#### **2.01 MATERIALS**

- A. Sealing around windows, glazing, and bedding: structural silicone sealant.
- B. Perimeter caulking of sanitary fixtures, interior and exterior electrical and mechanical fixture.
- C. Perimeter caulking of interior and exterior Electrical and Mechanical Fixtures.

#### **2.02 CLEANING**

The surface adjoining caulked and sealed joints shall be cleaned of all smears and other soiling.

#### **2.03 GUARANTEE**

The application shall guarantee the installation against poor workmanship for a period of five years from the date of acceptance by the Procuring Entity. The Contractor shall make all necessary repairs at his expense during that period. Manufacturer shall guarantee material against moisture penetration for five years.

## **DIVISION 8 – DOORS & WINDOWS**

### **SECTION 080: ALUMINUM DOORS and WINDOWS**

#### **1.00 GENERAL**

##### **1.01 SCOPE**

- A. Furnish materials, accessories and equipment and perform labor required to complete aluminum frames for doors and windows.
- B. See drawings and schedules for size, details and location of required work.

##### **1.02 SUBMITTALS**

- A. Submit for approval of PPDO and end user, materials and shop drawings of fabricated items showing sizes of all members, details of connections, fabrications and installation.
- B. Submit sample corner sections, hinges, tracks, handles and all other accessories.
- C. Secure approval prior to commencement of fabrication work.

##### **1.03 DELIVERY AND STORAGE**

- A. Inspect materials delivered to the site for damage.
- B. Store materials neatly, properly stacked on non-absorptive strips or wood platforms.

#### **2.00 PRODUCTS**

##### **2.01 MATERIALS**

- A. Sections as indicated and manufactured or fabricated.
- B. Aluminum Framed Tempered Glass Doors (10 mm.): Refer to Door and Window Schedule
- C. Aluminum Framed Tempered Glass Windows (6 mm): Refer to the Door and Window Schedule.
- D. Aluminum Sandwich Panel Doors and Panel Doors with Vision tempered Glass (10mm.thk.)

- E. Aluminum paint: extruded aluminum with powder-coated color as per PPDO and end users' color choice.
- F. Fasteners:
  - a. Exposed Fastening: aluminum, countersunk stainless steel head screws, or other non-corrosive material.
- H. Finish hardware:
  - a. Door hardware: Must be of heavy duty materials. Refer to the Door Schedule.
  - b. Sliding Windows: stainless steel cam latch. Provide with complete track and carrier assembly, stops, guide and pulls.
  - c. Awning: Locks must be properly and securely provided with heavy duty hinges.
- I. Weather stripping: Vinyl/Mohair: Must be properly provided where it is needed.
- J. Glass: See Door and Window Schedule.
  - a. Doors: 10 mm. thk glass
  - b. Windows: 6 mm. and 10 mm thick glass on powder coated white aluminum frame

### **3.00 INSTALLATION**

- A. Set and anchor frames as shown in details and approved shop drawings.
- B. Set frames plumb and square and brace where necessary to prevent distortion. Set frames without springing, forcing or distorting the product.

### **3.01 BREAKAGE AND FAULTY INSTALLATION OF GLASS**

- A. Glass breakage caused in executing the work or by faulty installation shall be replaced by the Contractor at his own expense.
- B. Improperly set glass which does not fully meet requirements for its grade shall not be accepted and shall be replaced by the Contractor at his own expense.
- C. Lost and damaged materials shall be replaced by the Contractor at his own expense.

### **3.02 ADJUSTMENTS**

Adjust all frames and attach hardware before glazing. Secure all windows and doors to be watertight and all hardware operating free and easy.

### **3.03 HARDWARE**

Install hardware to fit details as shown in the drawings and as per manufacturer's specifications with screws to match the finish. Supply all necessary templates and instructions required.

### **3.04 CLEANING**

- A. All glass shall be cleaned of any extraneous materials and washed by the Contractor, using materials and methods recommended by the glass manufacturer before final acceptance and occupancy.
- B. Upon completion and installation, thoroughly clean surfaces of windows and frames in accordance with the recommended method of the manufacturer.

## **DIVISION 9 - FINISHES**

### **SECTION 090: PLAIN CEMENT FLOOR FINISHES**

#### **1.00 GENERAL**

##### **1.01 S C O P E**

- A. Furnish materials, equipment, and perform labor necessary to complete all cement finishes.
- B. See drawings for details and location of work required.

#### **2.00 PRODUCTS**

##### **2.01 F I N I S H E S**

Plain cement floor finish: Consisting of the scratch and finish coats, with areas topped with epoxy flooring as reflected in the plans and specifications.

### **SECTION 091: TILEWORK**

#### **1.00 GENERAL**

##### **1.01 S C O P E**

- A. Furnish materials and equipment and perform labor necessary to complete all types of tile works. Include border, strip and accent tiles, if necessary. Provide angle beads accessory tiles and tile fittings.
- B. See drawings and details for location, and extent of work required.

##### **1.02 S A M P L E S**

Submit to PPDO samples of floor and wall tiles including all required beads and mouldings and secure approval prior to installation.

##### **1.03 P R O T E C T I O N**

Rooms and spaces in which tile work is being installed shall be closed to traffic until the tiles are set up. Where required, the tilework shall be protected from damage which might be caused by the work of other trades. Tiles of floors shall be covered with an approved covering during painting and varnishing work. All tiles shall be kept dry while in packages.

## **2.00 PRODUCTS**

### **2.01 MATERIALS**

Granite tiles non-skid floor tile, polished tiles for walls. Sizes, color and pattern as indicated on the Schedule of Finishes and on the drawings.

### **2.02 CHOICE OF COLORS AND PATTERNS**

PPDO and end-user shall have prerogative in the selection of the tiles on the particular pattern, color ranges and textures.

### **2.03 STAIN RESISTANCE**

Tiles must be durable, non-porous and not penetrable by colorant.

### **2.04 SURFACE QUALITY**

Tiles shall be free from crazing, visible defects and objectionable blemishes. Tiles shall be level and flat with even surface, rectangular in size, rectangular at the corners and straight at the edges. Tiles shall not warp or deformed in any manner.

### **2.05 GROUTING**

- A. After tile has sufficiently set, force a maximum of grout into joints by trowel, brush or finger application.
- B. Grouting, cleaning and installation shall be done in one continuous constructive operation
- C. Fill all joints of square edged tile flush with the surface of the tile. Fill all gaps.
- D. During grouting, clean off all excess grout with clean burlap, other cloth or sponges.
- E. When grouting glazed tiles, special care shall be taken to prevent scratching off of the glaze.

### **2.06 SEALING**

Laid out wainscoting shall be topped with an approved clear waterproofing prepared and applied as per manufacturer's instructions.

### **2.07 REMOVAL OF CONDEMNED TILE**

Prior to the final acceptance of the tile work, the Contractor shall, at his own expense, remove and replace condemned tiles.

## **2.08 CLEANING**

- A. Upon completion of the various portions of his work, the Contractor shall remove all unused materials, rubbish, etc. that have accumulated as a result of his work. After the pointing has sufficiently set or hardened, all tile on walls or vertical surfaces, or floors and horizontal surfaces shall be thoroughly cleaned. Sponge and wash tile thoroughly with clean water after grout has stiffened.
- B. Then clean by rubbing with damp cloth or sponge and polish clean with dry cloth. All traces of cement or dust accumulations shall be completely removed. In cases where acid solutions are required to clean the face of the finish tilework of surplus grouts or mortar used for pointing, all exposed hardware shall first be covered by heavy coating of vaseline to protect the metal from possible effect of the acid or its fumes. Acid solutions shall not be used for cleaning glazed tiles.
- C. The Contractor shall give the tilework one thorough final cleaning when so instructed.

## **SECTION 092: FIBER CEMENT BOARD ON METAL FURRING FRAME**

### **1.00 GENERAL**

#### **1.01 SCOPE**

Furnish all materials, equipment, tools and labor necessary to complete all ceiling works using fiber cement board on metal furring frames.

#### **1.02 DELIVERY AND STORAGE**

Deliver all manufactured materials in the original packages, containers and bundles bearing the name of the manufacturer and the brand. Material specification shall be in accordance with the approved program of work.

### **2.00 PRODUCTS**

#### **2.01 MATERIALS**

- A. Ceiling boards: 1.2 m. x 2.4 m. x 4.5 mm thk. Fiber cement board;
- B. Ceiling Frame:
  - 19mm x50mmx 0.40mm thk. Metal furring spaced at 0.40m on center;
  - 12mmx 38mmx0.8mm thk carrying channel spaced at 1.20m on center;
  - 25mmx25mmx0.40mm thk wall angle on all perimeter;
  - Hanger bars or rod spaced at 1.20m on center bothways



### **3.00 EXECUTION**

#### **3.01 GENERAL**

1. Erect framing for fire related assemblies in accordance with the requirements of listing;
2. Arrange hangers for suspended ceilings to provide support independent of walls, columns, pipes, ducts and install plumb.
3. Secure attached hangers structure to ensure the development of the full hanger strength.
4. Space hangers (0.60m to 0.61 m.) on center and not more than 0.15m from boundary walls, interruptions and continuity, and changes in direction.
5. Isolate ceiling suspension with hanger isolator at each suspension point.
6. Run carrying channels in opposite direction to structural framing members.
7. Space carrying channels at (1.20m to 1.22m.) center maximum.
8. Install furring channels perpendicular to carrying channels (0.60 m to 0.61m) on center maximum and not more than (0.15m) from perimeter. Secure furring channels to carrying channels with furring clips.
9. Secure the framing with metal framing screws. End joints to be staggered and aligned over framing and each end fastened to framing.
10. Install board sheets across the framing members, i.e. place the long edges of the sheet at right angles to the joist or furring channels.

#### **3.02 INSTALLATION**

- a. Fix and align accurately all steel angles.
- b. Tie the suspension rod securely to the steel angle.
- c. Attach the carrying channel to the suspension clip then use the rod joiner to connect the suspension rod to the suspension clip.
- d. Attach the metal furring to the carrying channel at right angle to each other using W-clip.
- e. Leave ready to receive the ceiling boards.

## **DIVISION 10: PLUMBING WORKS**

### **SECTION 100. PLUMBING**

#### **1.00 GENERAL**

##### **1.01 SCOPE**

This item shall consist of furnishing all materials, tools, equipment and fixtures required as shown on the plans for the satisfactory performance of the entire plumbing system including installation in accordance with the latest edition of the National Plumbing Code, and specifications. The contractor shall provide samples on all materials to be installed, subject for approval of the end user, Technical Working Group and Project in Charge. This item also includes the construction of two-unit septic tank as indicated in the approved plans and specifications. Tapping of sewer lines to the septic tanks shall also be done by contractor.

##### **1.02 SUBMITTALS**

- A. Submit samples of proposed materials for Architect's selection and secure approval.
- B. Submit as built plan upon completion of plumbing works. For repair and maintenance purposes.

#### **2.00 PRODUCTS**

All piping materials, fixtures and appliances fitting accessories whether specifically mentioned or not but necessary to complete this item shall be furnished and installed. Pipes shall be of quality made by reputable manufacturers free from defects, and shall be true, smooth and cylindrical. Pipes and fittings for Sanitary lines shall be Unplasticized Polyvinyl Chloride Series 1000. Pipes and fittings for Water lines shall be Polypropylene (PP-r) PN20.

##### **2.01 PLUMBING AND RELATED FIXTURES**

- Water closet shall be vitreous china, free standing toilet combination, close coupled push button dual flush, siphon jet flushing system, soft close seat cover and complete with fittings and mounting accessories.
- Lavatory shall be vitreous china, counter type with rear overflow, and complete with lever type faucets, supply pipe, stainless p-trap and mounting accessories.
- Toilet paper holder shall be vitreous china wall mounted. Color shall reconcile with the adjacent fixture and facing tiles. Refer location to the supervising architect.

- Soap holder shall be vitreous china, wall mounted. Color shall reconcile with the adjacent tile works. Refer location to the supervising architect.
- Faucets shall be lever type made of stainless steel for interior use.
- Floor drains shall be made of stainless steel, measuring 10cmx10cm and provided with detachable stainless strainer.
- The Contractor shall show samples of the required fixtures for the approval of the end-user before purchasing of the same.
- Storm drainage piping layout shall be installed considering aesthetic of the building. All roof deck and roof garden drains shall be dome type roof drain as shown in the approved plans.

### **3.00 EXECUTION**

#### **3.01 PLUMBING FIXTURES**

Include all plumbing fixtures shown on the drawings and specified herein by the Architect in all bids to be considered.

- A. Install all plumbing fixtures free and open in a manner to afford access for cleaning. Furnish with brackets, cleats, plates and anchors required to support the fixtures rigidly in place.
- B. After the installation of any, or all, of the plumbing fixtures, keep them clean and in working order but disallow all use until the building has been turned over and accepted by the Owner.
- C. Make fixtures, trims, faucets, escutcheons, and waste pipes that are exposed to view in finished spaces of brass material with polished chromium plating or nickle finish, unless otherwise specified.
- D. Be responsible for providing those portions of the fixtures, fittings (as trims) which are not provided with the fixture but are required for the complete installation. Check all the fixtures to determine the portions which must be provided to complete the installation.
- E. Provide each fixture and subsequently a set of fixtures in one space, with separate stop or gate valves so that each fixture or a row of fixtures, may be separately controlled without affecting any other fixtures in another space.

### **3.02 TRAPS**

- A. Except for the presence of grease interceptor and other devices where the trap is an integral part of the design, equipped with a trap every fixture and other equipment requiring connections to the drainage system.
- B. Used traps of recessed drainage pattern for threaded pipe.
- C. Set each trap as close as possible to the fixture served and render level with respect to their water seal.

### **3.03 PIPE INSTALLATIONS**

- A. Furnish and install all necessary pipe sleeves, hangers and supports at proper and appropriate locations. Never install pipes through columns, footings, beams, ribs, or other structural members unless clearly noted in the drawings, or with written approval of the Civil Engineer (designer).
- B. Offsets: Offsets shall be of 45 degree wyes, except as otherwise directed or noted by the Engineer. Changes in direction shall be by approved long sweep elbows or other acceptable fittings.
- C. Pipe Sleeves: Make all pipe sleeves secure in place. Size sleeves to provide approximately 6 millimeters clearance around the incoming pipe. Use PVC or steel pipes for pipe sleeves in general. Use galvanized iron pipes and sheets as the case may require for sleeves in floors. When appropriate and called for, provide the sleeves with an integral flashing flange or a clamping device to which a flashing shield can be clamped or soldered.
- D. Anchors and Guides: Support rigidly all piping along surfaces by means of approved supports. Support piping to maintain required position and pitching of lines to prevent vibration, and to secure piping in place. Arrange so as to provide for expansion and contraction.
- E. Tapping for Fixtures: Make connections between fixtures and flanges on soil pipes absolutely gas and water tight, and sealed.

For pipe terminals intended to be tapped to fixtures, practice care and precision in determining outlet or inlet locations during the pipe installation stage and considering the specific finished space housing such as fixtures.

For an array of fixtures in one space, and where distances between fixtures and walls are critical, use guide templates in locating the exact setting of fixtures that tapping joint location supply and drain pipes are pinpointed.

- F. Cleaning: Rid all exposed metal surfaces of grease, dirt, or foreign material. Polish all chromed components. For any damage, stoppage, or

discoloration of part of the building and its furnishings and equipment, resulting from failure to clean the piping system, repair or replace all such affected areas and components at no cost to the Owner.

## **SECTION 101: ROOF DRAINS WITH STRAINERS**

### **1.00 GENERAL**

- A. Furnish all items, articles, plant, equipment, labor and materials, and everything listed and mentioned or scheduled on drawings and/or herein performing all operations or methods necessary or required for the complete installations of all roof drains with strainers in accordance with all applicable drawings and F.S. details and subject to terms and conditions of the contract.
- B. Should there be any conflict between the sizes of roof drains and roof leaders (or downspouts), the size of the latter shall govern.

### **2.00 EXECUTION**

#### **2.01 INSTALLATION**

Soil Pipe- All soil and drainage pipe shall be sloped at 2% or 2cm per 1.0 meter run but in no case flatter than 1%. All changes in pipe sizes such as soil and waste lines shall be made with reducing fittings or recessed reducers. All changes in direction shall be made by appropriate use of 45 degrees fittings for soil and waste lines. All pipes shall be cut accurately to measurements and shall be worked into place without springing or forcing. All joints shall be neatly applied with marine epoxy to avoid leakage in sewer line pipes. Upon completion, thoroughly clean all fixtures and accessories to leave the work in a polished condition.

## **DIVISION 11 – ELECTRICAL WORKS**

### **SECTION 110: GENERAL ELECTRICAL WORKS**

#### **1.00 GENERAL**

##### **1.01 General Conditions**

The work under this Section shall be subject to the requirements of the General Conditions, which shall be included as part of these Project Information Document and which shall apply to all work to be performed under the Electrical Works. The contract documents, instructions, drawings and specifications shall be considered as one. Whatever is called for by any of the documents shall be as binding as if called for by all.

##### **1.02 General Description**

The Electrical Works include furnishing of materials, equipment, devices and related incidental items, perform labor and installation to complete a proper electrical system for the proposed FISH AND MARINE-BASED PRODUCT AND PROCESSING BUILDING WITH FACILITIES FOR FOOD SECURITY AND SUFFICIENCY, located at MMSU-CASAT, Currimao Ilocos Norte, except those portions of the work which are expressly stated to be done by others.

All work shall be in accordance with the Philippine Electrical Code, Ordinances of the local enforcing and governing authority, the drawings and as specified herein except where some shall conflict with codes, in which the latter shall then govern. The requirements in regard to materials and workmanship specify the required standard 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 equipment, but are not intended to include all details of the design and construction.

##### **1.03 WORK INCLUDED**

Under these specifications, provide all labor, materials and equipment and perform all the work necessary for the complete execution of the electrical systems shown on the electrical drawings with reference to the general construction drawings as herein specified.

The contractor shall undertake all contingent; incidental and required works to complete the Electrical Works as it is intended by the Designer. The contractor's bid amount shall be deemed to be complete in all aspects of the work.

#### **1.04 SCOPE OF WORKS**

The Electrical Works shall include but not limited to the following principal items of work:

- A. Supply and installation of complete electrical works for the entire project including main feeder and transformer installation and roughing in for Phase II the electrical lines for normal power.
- B. Supply and installation of complete electrical works for the entire project as called for in the plans, specifications and bid documents.
- C. Supply and installation of complete feeder lines.
- D. Supply and installation of all panelboards, breakers, and its accessories.
- E. All lighting fixtures and lamps, luminaries, power receptacles, switches and other wiring devices, except those marked or those specified to be done by others.
- F. Painting of all exposed electrical conduits, enclosures and equipment using the same shade of the location where it will be installed.
- G. Termination of all electrical system.
- H. Complete testing and commissioning of all electrical works and insulation of main feeder with sub-feeder. Testing must be done in the presence of the PPDO Project Inspector for Electrical Works.
- I. Securing and payment of electrical wiring permits and certificate of electrical inspections.
- J. Concrete chipping and restoration works.
- K. Supply and installation of all other items not stated herein but necessary to complete the Electrical Works.
- L. the Contractor shall coordinate with INEC (Ilocos Norte Electric Cooperative) for the primary line extension.

#### **1.05 CODES, INSPECTIONS, PERMITS AND FEES**

- A. The work under this Contract is to install according to the requirements of the latest Philippine Electrical Code, the rules and regulations of the City of Batac and the requirements of the local power and telephone companies. Nothing contained in these specifications or shown on the drawings shall be construed as to conflict with the national and local ordinances or laws governing the installation of the electrical work and all such laws and ordinances are hereby made part of these specifications. The Contractor is required to meet the requirements thereof.

- B. All permits and electrical fees required for this work shall be obtained by and at the expense of the Contractor. The Contractor shall furnish the Procuring Entity and PPDO the final certificate of inspection and approval from the proper government authorities after the completion of the work. The contractor shall prepare all “As-Built” plans and all other paperwork required by the approving authorities.

#### **1.06 DRAWINGS**

The Contractor shall, during the progress of the work, keep a careful record of all changes where the actual installation differs from that shown on the construction drawings. The engineers will furnish at cost a complete set of print outs on which the contractor shall, in a neat and accurate manner, make a complete record of all changes and revisions to the original design, as installed in the completed work. These drawings shall be submitted to PPDO for approval. After the approval, they shall become the property of PPDO and final payment will be withheld until receipt of the approved record drawings.

#### **1.07 SHOP DRAWINGS AND SAMPLES**

- A. Prepare and submit for approval to PPDO shop drawings and cuts of all equipment, appliances and fixtures to be furnished. After final approval by PPDO, a sufficient number of copies as directed shall be furnished for distribution. Fixture and device cuts and/or catalogues shall be clearly marked to indicate the items furnished. Do not submit individual sheets, cuts, catalogues or drawings, for instance, lighting fixture cuts should be for all types of fixtures to be furnished, rather than a few types.
- B. Submit to PPDO for approval samples of conduits, wires, wiring devices, finished plates and or any other items as may be required by the consultant.

#### **1.08 COORDINATION**

The contractor shall cooperate in every way and work with all other contractors to whose apparatus he shall connect is part of his work and also provide in his work connections and facilities for the connection of their work. The contractor is hereby called upon to prepare such drawings of details of his equipment, locations of sleeves, inserts and supports as may be required for the assistance of the general contractor and the contractors for other mechanical trades. Upon demand, he shall furnish these drawings in adequate numbers for the information of all parties concerned and shall coordinate the preparation of these drawings by consultation with other trades involved before submitting them. The approval of such drawings will not relieve the Contractor in anyway from the responsibility of not properly locating or coordinating his work with the work of others.



## **1.09 MINOR MODIFICATIONS**

The plans as drawn are based upon the architectural plans and the details and shown condition as accurately as it is possible to indicate them in scale. The plans are diagrammatical and do not necessarily shows all fittings necessary to fit to the building conditions. The locations of outlets, apparatus and appliances shown on the plans are approximate. The contractor shall be responsible for the proper location in order to make them fit with the architectural details and instructions from PPDO's representative on site.

## **1.10 GUARANTEES**

- A. The Contractor shall guarantee that the entire electrical systems are free from all defective workmanship and materials, and will remain so for a period of One (1) year from date of acceptance of the work.
- B. The Contractor shall indemnify and save harmless the Procuring Entity and PPDO from and against all liability for damages arising from injuries or disabilities to persons or damages to property occasioned by any or omission of the contractor or any of his subcontractors including any and all legal expenses or otherwise, which may be incurred by the Procuring Entity and PPDO in the defense of any claims, actions, or suit.

## **1.11 APPROVAL, SUBSTITUTIONS, ETC.**

Wherever hereinafter the work "for approval", or "approved" (make, type, size, arrangement, etc.) are used, especially in regard to manufactured specialties, or wherever it is desired to substitute a different make or type of apparatus, shall be submitted to PPDO and written approval must be secured before the apparatus is ordered or installed.

## **1.12 SUB-CONTRACTOR**

The contractor shall be held fully responsible for the work of any subcontractors or manufacturer performing work or supplying materials, as it is intended that the entire electrical work, when finally delivered to the Procuring Entity, shall be ready in every respect for satisfactory and efficient operation.

## **1.13 WORKMANSHIP**

- A. The work throughout shall be executed in the best and through manner under the direction of and to the satisfaction of the Procuring Entity and PPDO, who will jointly interpret the meaning of the drawings, PID and specifications and shall have the power to reject any work and materials which, in their judgment are not in full accordance therewith.
- B. The contractor shall have in his file, for ready access and reference, a set of drawings indicating all work as normally installed, incorporating in same all changes and additions. Upon the termination of the Contract, he

shall prepare a set of tracings indicating thereon the electrical work as actually and finally installed. These tracings shall be turned over to PPDO.

## **2.00 MATERIALS AND INSTALLATION**

### **2.01 STANDARD OF MATERIALS**

- A. All materials shall be new and shall conform with the standards of Underwriter's Laboratories, Inc., ASA, IEEE, NEMA, IPCEA and ASTM in every case where such a standard has been established for the particular type of materials in question.
- B. All materials on all systems shall comply with the following specifications, unless noted specifically and all materials when not specified shall be the best of their respective kind.
- C. Samples of any materials shall be submitted for approval to the designing electrical engineer.

### **2.02 INSTALLATION REQUIREMENTS**

- A. Approval of Materials: All electrical materials shall be new and must meet the requirements of the specifications and shall bear the inspection label wherever such standards have been established. As soon as practicable and within thirty days after the official award of Contract and before any materials or equipment is ordered, the Contractor shall submit to PPDO for approval, one complete list of materials, apparatus and equipment, in triplicate, giving the manufacturer's name, address, descriptive data, trade name of items, rated capacities, certified analysis catalog number, etc., when called upon to do so, the complete specifications and cut of drawings of such item, of whole or portion of list, as required by the Engineers, which he proposes to use of install.
- B. All circuits must have wire and ground installation and have individual guard wire connected to all fixtures, group connector, panel boards and other electrical equipment. Ground rod must be installed in a delta connection.
- C. Performance Test: It shall be the responsibility of the electrical contractor to test all systems of the entire electrical installation for proper operational conditions. This condition shall apply to the power, lighting and auxiliary installations. Where sequence operation is required, the electrical contractor shall test for proper sequence and he shall leave the entire electrical installation in satisfactory working condition.
- D. Cutting and Fittings: Contractor shall do all cutting and fittings required for the installation of the work to make and join the several parts and coordinate with the work of other trades, in accordance with the drawings and in a manner satisfactory to the Engineers.

- E. Protection: Contractor shall effectually protect his own work from damage during and as may be necessary after installation and he shall likewise protect adjoining work of other trades from damage resulting from the installation of electrical work.

### **2.03 CONTRACT DRAWINGS**

The location of various items indicated on the drawings are presumed to be approximately correct, but it is to be understood however, that the small scale drawings are necessarily diagrammatic and that such locations as shown, are subject to slight revision as the work is installed, which may be necessary to accommodate local construction conditions. No major change shall be made, however, without the approval in writing of PPDO. The Contractor shall examine and study the architectural scale drawings, large scale and full size details, the approved shop drawings of other trades and he shall frequently consult with the general contractor to ascertain any changes that may have been made and he shall be guided accordingly before establishing the precise locations of conduit runs, panels, pull and junction boxes and outlets for all lighting and power.

### **2.04 WIRES AND CABLES**

- A. All wires shall be copper, soft-drawn and annealed, shall be of 99% conductivity, shall be smooth and true and of a cylindrical form and shall be within 1% of the actual size called for and must be approved by the end user.
- B. All wires and cables shall comply with the requirements of the Underwriter's Laboratories.
- C. Wire and cables for lighting power and auxiliary systems shall be plastic insulated for 600 volts working pressure, type THHN and THW form main feeder and sub-feeders
- D. For lighting and power system, no wire smaller than 3.5 mm<sup>2</sup> shall be used.
- E. All wires and cable must be UL Listed brands and the color coding of wires are as follows:

Line A	-	Red	Line C	-	Blue
Line B	-	Yellow	Ground	-	Green
- F. Use only (1) brand of wire for the whole installation.

### **2.05 CONDUITS**

- A. Conduits for interior and exterior systems shall be standard weight, uPVC, and thick walled.

- B. No conduits shall be used in any system smaller than 20 millimeters in diameter. Electric trade size, nor shall have more than four 90-degree bends in any one run and when necessary, pull boxes shall be provided as directed. Location and sizes of pull boxes shall be cleared to the engineer prior to fabrication and installation.
- C. No wires shall be pulled into any conduit unless the conduit system is complete in all details. In the case of concealed work, until all rough plastering or masonry has been completed and in the case of exposed work, until the conduit has been completed in every detail.
- D. The ends of all conduits shall be tightly plugged to exclude plaster, dust and moisture while the building is in the process of construction.
- E. All pipes and fittings on exposed work shall be secured by means of Kindorff channels and clamps. Conduit lay outting, in all cases shall run perfectly straight and true.
- F. Wireways installed in wet locations shall be of rain-tight construction. Wireways shall be supported at intervals not to exceed 1,500 mm, or for individual lengths longer than 150 mm at each end or joint, unless listed for other supports intervals. In no case shall the distance between supports exceeds 3000 mm. Dead ends of wireways shall be closed. Wireways shall be marked so that their manufacturer's name or trademark will be visible after installation. Deflected Insulated Conductors, where insulated conductors are deflected within a wireway, either at the ends or where conduits, fittings, or other raceways or cables enter or leave the wireway, or where the direction of the wireway is deflected greater than 30 degrees, dimensions corresponding to Section 5.8.1.6 (PEC 92) shall apply. Wireways shall be gauge 14.

## **2.06 OUTLETS, BOXES AND FITTINGS**

- A. All outlets of whatever kind, for all systems, shall be provided with suitable fittings, which shall be either a box or other devices especially, designed to receive the type of fittings to be mounted thereon.
- B. The contractor shall consult with the Electrical Engineer to the nature of the various fittings to be used before installing the outlet fittings and shall conform strictly in the use of such fittings, to the nature of the appliance to be mounted on them, so that the work, when finished will be a completed design.
- C. At all outlets on concealed conduit work, provide plastic deep-type pressed-utility boxes of standard make. These boxes shall be especially designed for apparatus required and in all cases where such boxes are not available on the market, special boxes shall be made by the contractor at his own expense. Outlet boxes shall be deep type gauge # 16.

## **2.07 JUNCTION AND PULL BOXES**

Junction and pull boxes as indicated or as required for facilitating the pulling of wires and cables. Pull boxes in finished places shall be located and installed with the permission of and to the satisfaction of PPDO. Junction and pullboxes securely mounted on the studs.

## **2.08 WALL SWITCHES AND OUTLETS**

- A. Wall switches shall be rated at 15 amperes, 250 volts, one-way, two-pole, three-way or four-way as required. Certain combinations shall be furnished as required and where indicated on the drawings.

Switches shall be of the quick-connect terminal operated. The type of switch shall be thumbler operation and the color, plating and appearance of wall plates shall be selected by PPDO and appropriate samples shall be submitted prior to the purchase of wall switches and wall plates, wide series.

- B. Wall Receptacle outlets shall be for flush mounting, duplex rated at 15 ampere, 250 volts, grounding type 3-wire and must be wide series. Type and color of receptacle outlet plates be selected by PPDO and appropriate samples of outlets and plates shall be submitted prior to purchase of devices.

## **2.09 PLATES**

The contractor shall supply and install all switches and receptacle plates. Samples must be submitted to the Electrical Engineer of PPDO for approval prior to procurement.

## **2.10 PANELS AND CABINETS**

- A. Standard panels and cabinets as far as possible, shall be delivered at jobsite, as an assembly. All panels shall be of dead-front construction furnished with trims for flush or surface mounting, as required. Cabinets shall be of code gauge #16, powder coated with gutters at least 150 mm and wider, if necessary.
- B. Panels and cabinets shall be fabricated by a reputable fabricator, fabricator's shop drawings in triplicate shall be submitted for approval before fabricating the panels. Only one brand of circuit breakers and fabricator shall be used for the entire requirement of the project.
- C. Lighting panels shall be equipped with one or two pole circuit breaker in the branch circuits and three-pole in the main unless noted otherwise on plans. As indicated on plans, the panels shall be assembled in two or more sections where over 40 one-pole circuits. Ground bus terminals shall be a standard feature to the panel. The busbars must be Tin Plated and all Circuit Breakers must be single toggle, with a visible trip

indicator.

## **2.11 INDIVIDUAL BREAKING AND SWITCHES**

- A. All enclosures shall be Nema-1 for indoor and NEMA-3R for outdoor type, unless otherwise indicated in the plans.
- B. All protective devices shall meet NEMA and Underwriter's Laboratories, Inc. specifications.
- C. Only one single brand of circuit breakers shall be used on the entire project requirement.
- D. Minimum interrupting capacities of each circuit breakers are indicated on the load schedule application of circuit breakers shall be approved for the intended load per panelboard schedule.
- E. Safety and disconnected switches shall be non-fusible and of sizes indicated on plans and shall be normal duty type, except as noted otherwise. All enclosures shall be Nema-1 for indoor and Nema-3R for outdoor application.

## **2.12 DISCONNECTING MEANS**

Unfused safety switches shall be used where disconnecting means only are required and where the current supply to same is protected by a circuit breaker at the panelboards. Provide disconnect switch at each motor location where same is not within sight of respective control starter, unless indicated otherwise on the drawings. All disconnecting switches shall be enclosed and fabricated from gauge #14 fully protected against corrosion.

## **2.13 LOCATION OF WIRING AND OUTLETS**

- A. The contractor shall coordinate his work with all trades involved so that exact locations may be obtained for all outlets, apparatus, appliances and equipment. The circuit numbers indicated as numbers 1, 2, and 3, may not correspond to actual panel circuit connection numbers but must be balanced for better load distribution.
- B. The location of outlets shown on diagrammatic wiring plans shall be considered as approximate and it shall be incumbent upon the Contractor, before installation.

## **2.14 SERVICES**

Power supply should be three-phase, three-wire plus ground, 230 Volts.

## **2.15 POWER AND LIGHTING DISTRIBUTION SYSTEM**

- A. Furnish and install the lighting panels as indicated on plans and panelboards schedule.

- B. From the main breaker, install feeders to the various outlying panels, motors or equipment shown on plans.

## **2.16 POWER SYSTEM**

- A. Unless otherwise indicated on drawings, all motors shall be furnished, set up and secured in-place by other trades.
- B. Unless otherwise indicated on drawings, the electrical contractor shall do all wiring for power, including the connection up to the motors and such as line switches, motor starters, speed regulators, circuit breakers, compensators or any other appliances that may be furnished with the motors. He shall also have there the presence of his representative when the motors are first started by the trade furnishing same in order to determine if correctly done.

## **2.17 LIGHTING SYSTEM**

- A. The lighting shall be complete in every respect, all as indicated on the plans or specified.
- B. All wiring shall be installed in electrical conduit or as indicated in the plan and in general shall be concealed in the structure.
- C. Mounting heights of devices shall be as detailed on the plans or as follows:
  - a. Local switches - 1400 mm from center of device to finished floor line.
  - b. Receptacles - 400 mm above floor or 150 mm above counters, or as shown in architectural details.
- D. Provide all lighting fixtures and lamps of locations shown on plans or as directed by PPDO.

## **2.18 GROUNDING SYSTEM**

- A. The contractor shall furnish and install complete grounding system as shown in the drawing.
- B. Ground wire shall be bare copper stranded, with size as shown in the drawings and shall be of cylindrical form and variation shall be within 1% of the actual size called for.
- C. Ground rods shall be copper clad steel with a diameter of 20 millimeters by 2,800 millimeters long otherwise specified.
- D. All metallic conduit, cabinets and equipment shall be properly grounded and bonded by means of copper straps. The conduit of each system shall

be grounded by connecting to the ground grid.

- E. Contractor to test the grounding system to ensure that continuity and resistance to ground is not excessive. Submit written result of each test to PPDO for approval.

## **SECTION 111: ELECTRICAL FIXTURES AND ACCESSORIES**

### **1.00 GENERAL**

#### **1.01 SCOPE**

- A. Furnish materials, fixtures, accessories and equipment and perform labor required to complete but not be limited to the following:
  - a. All lighting fixtures and lamps, luminaries, power receptacles, switches, panel boards, wire gutters and other wiring devices.
  - b. The fire alarm system and fire detection system.
  - c. The fans and ACCU units.
- B. See drawings and details for sizes, location, extent and other requirements.

#### **1.02 MATERIALS AND EQUIPMENT**

- A. All materials and equipment shall be new and shall conform to the latest standards of the Philippine Electrical Code.
- B. Materials and equipment shall be standard of manufacturers regularly engaged in the production of such equipment and materials.
- C. For other required miscellaneous materials not specifically mentioned, provide the best of their respective kind.
- D. Defective equipment or materials damaged in the course of installation shall be replaced with a new one at no extra cost to the Owner.

#### **1.03 COORDINATION WITH OTHER TRADES**

The Contractor shall be responsible for proper coordination of his work with the other trades to avoid conflicts.

#### **1.04 WORKMANSHIP**

The electrical installation shall conform to these specifications, to all applicable standards, with the latest edition of the Philippine Electrical Code



and the existing ordinances, rules and regulations of the local enforcing authorities. Workmanship shall be of the highest degree.

### **1.05 SUBMITTALS**

- A. Samples: Submit samples or product brochures of the fixtures and equipment for approval as required by the Architect.
- B. Shop Drawings: submit shop drawings clearly indicating the following:
  - a. All drawings and erection dimensions.
  - b. Arrangements and sectional views.
  - c. Necessary details, including complete information for making connection with other work.
  - d. Kind of materials and finishes.
- C. Operation Instruction: The Contractor shall provide instructions on safe operating procedures. The Contractor shall also coordinate with the Owner, regarding instructions, materials, training aids, drawings and other facilities, required to be provided in the proper operation and maintenance of all equipment furnished and installed by the Contractor.

## **2.00 PRODUCTS**

### **2.01 BOXES, DEVICES, OUTLETS, SWITCHES AND PLATES**

- A. All utility boxes, junction boxes shall be PVC/Plastic. Submit sample for approval.
  - a. Waterproof Outlets: heavy duty 3-wire grounded receptacle.
- B. Plate frames and covers shall be of approved colors.
- C. All switches, outlets must be wide series type.

### **2.02 FIXTURES AND EQUIPMENTS**

- A. Light Fixtures. Power supply: 220V-240V. Colors as selected by PPDO.
- B. Lighting Fixtures, per PPDO selection and approval;
  - a. 6 Watts LED Round Surface Slim Downlight, must be in 6500K Daylight Temperature, 360 Lumens and with dimensions of Ø 115X35mm.
  - b. 10 Watts LED Recessed Circular Downlight, must be in 6500K Daylight Temperature, 850 Lumens and with a diameter of Ø 90mm.

- c. 15 Watts LED Recessed Circular Downlight, must be in 6500K Daylight Temperature, 1100 Lumens and with a diameter of Ø 120mm.
  - d. 4 Watts LED Weatherproof Wall Lamp, must be in 2700K Warm White Temperature, 120 Lumens and fixture in black coated finish.
  - e. 40 Watts LED Panel Light, must be in 6500K Daylight Temperature, 3200 Lumens with a dimension of 120X30mm.
  - f. 18 Watts LED Panel Light, must be in 6500K Daylight Temperature, 1630 Lumens, and must be Wall Mounted.
  - g. Emergency Lights must be having LED twin head rechargeable lamps.
  - h. Exit lights must be on AC Line and battery operated during power interruption, single faced, Acrylic Type.
- C. Fire Alarm System: The Contractor shall furnish and install a complete Fire Alarm System as shown on the plans. Refer to Refer to Mechanical specification.
- D. Fans and ACCU units: As scheduled and as per PPDO/end-user selection. Also refer to Mechanical specification.

### **2.03 MAKE**

The description herein given are intended to illustrate to the quality and design of fixtures or equipment that will be required. Any substitution made to any item of fixtures specified herein must first be approved by PPDO.

### **2.04 IDENTIFICATION OF MATERIALS**

- A. Fixtures and equipment shall have a cast stamp or indelible mark on it stating the manufacturer's trade mark or name, weight, type and the class of product.
- B. Rework and replace at no cost to the Owner all unidentified materials which may have been installed when so ordered by PPDO.

## **3.00 EXECUTION**

### **3.01 INSTALLATION**

- A. Installation shall be done by a duly licensed electrical practitioner and NCII holder for the helper.. No execution of electrical works without the presence of REE/RME on site. The electrical contractor must have at least 5 years of experience in the building wirings and installation and

have experience in the installation of panel boards and wire gutters. qualified and trained installer, well versed in the said works and as approved by PPDO.

- B. Coordinate with the other trade and specialty Contractors whose works are involved or affected in the installation of the fixtures as to schedule and other necessary tasks.
- C. Be responsible for providing those portions of the equipment such as trims which are not provided with the equipment but are required for the complete installation. Check all the equipment to determine the portions which must be provided to complete the installation.
- D. Furnish with brackets, cleats, plates and anchors required to support the equipment rigidly in place.
- E. After the installation of any, or all, of the fixtures, keep them clean and in working order but disallow all use until the building has been turned over and accepted by the Procuring Entity.

### **3.02 OUTLETS AND SWITCHES**

- A. The approximate location of each fixture, receptacle and floor outlet and switch is indicated on the Drawings, the exact location to be determined later at the site as the work progresses. The Contractor shall study the drawings in relation to the spaces and equipment surrounding each outlet so that the outlets and fixtures are symmetrically located according to the room layout and the architectural ceiling and floor plans.
- B. The right is reserved by the PPDO to change the exact location of any switches, lighting fixtures, receptacle outlet, and any other outlets in any location before installation.

If any outlet is installed by the Contractor in such a manner that is out of proper relation to beams, walls or other details of the building construction, its position or location shall be corrected by and at the expense of the Contractor, under the direction of PPDO.

- C. Boxes shall be of approved design and construction, and of such form and dimension as required to serve the kind of fixtures to be used and the number, size and arrangement of conduits connected thereto. Deep boxes, box rings, and raised plaster covers shall be used when necessary to obtain the required conductor capacity. Floor outlets shall have standard round adjustable boxes.
- D. Each outlet in the wiring or raceways system shall be provided with the box to suit the conditions encountered. Boxes for exposed or in wet location shall be of the cast-metal type having threaded hubs. Boxes for concealed work shall be cadmium plated or zinc-coated sheet metal type.

- E. Boxes installed in concealed locations shall be set flush with the proper extension rings or plaster covers where required. Boxes shall be installed in a rigid and satisfactory manner.
- F. Boxes shall not be less than 38 millimeters deep unless shallower boxes are required in the particular outlets and fixtures to be installed.

### **3.03 OPERATION TESTS**

After completion of electrical installation and at such time as Architect of his representatives may direct the Contractor in the presence of the Engineer or his authorized representative shall conduct circuit insulation, switching and equipment operation tests and adjustments that are required to fully and completely demonstrate that the electrical system has been installed and will operate in accordance with all applicable specifications, codes and drawings, free from any ground, shorts, or defects. The personnel and electrical power necessary for all the required tests shall be at his own expense.

### **3.04 GUARANTEE**

- A. The Contractor shall furnish written guarantee that all works shall be free from defects in materials, equipment and workmanship for a period agreed by both parties.
- B. Any work that becomes defective shall be made good by the Contractor at his own expense in a manner satisfactory to the Procuring Entity.

## **DIVISION 12 – ELECTRONIC WORKS**

### **SECTION 120: GENERAL ELECTRONIC WORKS**

#### **1.00 GENERAL**

##### **1.01 General Conditions**

The work under this Section shall be subject to the requirements of the General Conditions, which shall be included as part of these Project Information Document and which shall apply to all work to be performed under the Electronics Works. The contract documents, instructions, drawings and specifications shall be considered as one. Whatever is called for by any of the documents shall be as binding as if called for by all.

##### **1.02 General Description**

The Electronics Works include furnishing of materials, equipment, devices and related incidental items, perform labor and installation to complete a proper electronics system for the proposed Construction of University Health and Wellness Center located at MMSU, Batac City except those portions of the work which are expressly stated to be done by others.

All work shall be in accordance with the Philippine Electronics Code, R.A. 9292 and other existing laws, local ordinances of the local enforcing and governing authority, policies of the electric and Telephone Company, the drawings and as specified herein except where some shall conflict with codes, in which the latter shall then govern. The requirements in regard to materials and workmanship specify the required standard 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 project information document are intended to provide a broad outline of the required equipment, but are not intended to include all details of the design and construction.

All Electronic Works shall be under the direct supervision of a duly Licensed Professional Electronics Engineer and /or Electronics Engineer.

##### **1.03 WORK INCLUDED**

Under these specifications, provide all labor, materials and equipment and perform all the work necessary for the complete execution of the electronics systems shown on the electronics drawings with reference to the general construction drawings as herein specified.

The contractor shall undertake all contingent; incidental and required works to complete the Electronic Works as it is intended by the Designer. The contractor's bid amount shall be deemed to be complete in all aspects of the work.

## **SECTION 121: SCOPE OF WORKS**

### **1.01 The Electronics Works shall include but not limited to the following principal items of work:**

- A. Supply and installation of complete electronics and auxiliary works for the entire project including the following:
  - a. Structured cabling for all building electronics system
  - b. Redundant connections for backup purposes
  - c. Supervision and Commissioning
  
- B. Supply and installation of complete electronics works for the entire project as called for in the plans, specifications and bid documents.
  
- C. Supply and installation of the following support infrastructure:
  - 1. All horizontal pathways including
    - a. Conduit
    - b. Junction boxes
    - c. Drywall rings
    - d. Raceway
    - e. Cable tray
    - f. Pull boxes
    - g. Sleeves
  - 2. Communications Rooms including
    - a. Power
    - b. Lighting
    - c. Ventilation and Air Conditioning
    - d. Flooring
    - e. Access
  - 3. Vertical Infrastructure
    - a. Vertical risers
    - b. Vertical pathways
  - 4. Building Entrance
    - a. Conduit sleeves
    - b. Pathway to MDF
    - c. Outside plant connectivity to existing IT System infrastructure
    - d. Outside plant connectivity for external service providers
  
- D. The Voice/Telephone system and IT System: the work includes the provisions of all conduits, outlet boxes, and terminal cabinets and cables and fittings complete as required or as shown in the drawings.
  
- E. The fire detection and alarm system FDAS: furnish and install the fire alarm system equipment, cables and conduits shown on the plans.
  
- F. The general administration paging and intercom system furnish and install roughing-in works, equipment and cables as shown on the plans.
  
- G. Painting of all exposed cable conduits, enclosures and equipment.

- H. Termination of all electronic system.
- I. Complete testing and commissioning of all electronics works.
- J. Securing and payment of electronics permits and certificate of inspections.
- K. Application and securing the approval for the telecommunications service connections including the preparation of the necessary plans, forms and related documents, payment of fees and charges and coordination with telephone companies and other authorities or persons involved in the procedures.
- L. Concrete chipping and restoration works.
- M. Supply and installation of all other items not stated herein but necessary to complete the Electronics Works.

#### **1.02 CODES, INSPECTIONS, PERMITS AND FEES**

- A. The work under this Contract is to install according to the requirements of RA 9292, the latest Philippine Electronics Code, the rules and regulations of the City of Batac and the requirements of the local telecommunications companies. Nothing contained in these specifications or shown on the drawings shall be construed as to conflict with the national and local ordinances or laws governing the installation of the electronics work and all such laws and ordinances are hereby made part of these specifications. The Contractor is required to meet the requirements thereof.
- B. All permits and fees required for this work shall be obtained by and at the expense of the Contractor. The Contractor shall furnish the Procuring Entity and PPDO the final certificate of inspection and approval from the proper government authorities after the completion of the work. The contractor shall prepare all “As-Built” plans and all other paperwork required by the approving authorities.

#### **1.03 DRAWINGS**

The Contractor shall, during the progress of the work, keep a careful record of all changes where the actual installation differs from that shown on the construction drawings. The engineers will furnish at cost a complete set of print outs on which the contractor shall, in a neat and accurate manner, make a complete record of all changes and revisions to the original design, as installed in the completed work. These drawings shall be submitted to PPDO for approval. After the approval, they shall become the property of PPDO and final payment will be withheld until receipt of the approved record drawings.

#### **1.04 SHOP DRAWINGS AND SAMPLES**

- A. Prepare and submit for approval to PPDO shop drawings and cuts of all equipment, appliances and fixtures to be furnished. After final approval by PPDO, a sufficient number of copies as directed shall be furnished for distribution. Fixture and device cuts and/or catalogues shall be clearly marked to indicate the items furnished. Do not submit individual sheets, cuts, catalogues or drawings, for instance, lighting fixture cuts should be for all types of fixtures to be furnished, rather than a few types.
- B. Submit to PPDO for approval samples of conduits, wires, wiring devices, finished plates and or any other items as may be required by the consultant.

#### **1.05 COORDINATION**

The contractor shall cooperate in every way and work with all other contractors to whose apparatus he shall connect is part of his work and also provide in his work connections and facilities for the connection of their work. The contractor is hereby called upon to prepare such drawings of details of his equipment, locations of sleeves, inserts and supports as may be required for the assistance of the general contractor and the contractors for other mechanical trades. Upon demand, he shall furnish these drawings in adequate numbers for the information of all parties concerned and shall coordinate the preparation of these drawings by consultation with other trades involved before submitting them. The approval of such drawings will not relieve the Contractor in anyway from the responsibility of not properly locating or coordinating his work with the work of others.

#### **1.06 MINOR MODIFICATIONS**

The plans as drawn are based upon the architectural plans and the details and shown condition as accurately as it is possible to indicate them in scale. The plans are diagrammatical and do not necessarily shows all fittings necessary to fit to the building conditions. The locations of outlets, apparatus and appliances shown on the plans are approximate. The contractor shall be responsible for the proper location in order to make them fit with the architectural details and instructions from PPDO's representative on site.

#### **1.07 GUARANTEES**

- A. The Contractor shall guarantee, that the entire electrical systems are free from all defective workmanship and materials, and will remain so for a period of One (1) year from date of acceptance of the work.
- B. The Contractor shall indemnify and save harmless the Procuring Entity and PPDO from and against all liability for damages arising from injuries or disabilities to persons or damages to property occasioned by any or omission of the contractor or any of his subcontractors including any and all legal expenses or otherwise, which may be incurred by the Procuring



Entity and PPDO in the defense of any claims, actions, or suit.

#### **1.08 APPROVAL, SUBSTITUTIONS, ETC.**

Wherever hereinafter the work “for approval”, or “approved” (make, type, size, arrangement, etc.) are used, especially in regard to manufactured specialties, or wherever it is desired to substitute a different make or type of apparatus, shall be submitted to PPDO and written approval must be secured before the apparatus is ordered or installed.

#### **1.09 SUB-CONTRACTOR**

The contractor shall be held fully responsible for the work of any subcontractors or manufacturer performing work or supplying materials, as it is intended that the entire electrical work, when finally delivered to the Procuring Entity, shall be ready in every respect for satisfactory and efficient operation.

#### **1.10 WORKMANSHIP**

- A. The work throughout shall be executed in the best and through manner under the direction of and to the satisfaction of the Procuring Entity and PPDO, who will jointly interpret the meaning of the drawings, PID and specifications and shall have the power to reject any work and materials which, in their judgment are not in full accordance therewith.
- B. The contractor shall have in his file, for ready access and reference, a set of drawings indicating all work as normally installed, incorporating in same all changes and additions. Upon the termination of the Contract, he shall prepare a set of tracings indicating thereon the electrical work as actually and finally installed. These tracings shall be turned over to PPDO.

### **2.00 MATERIALS AND INSTALLATION**

#### **2.01 STANDARD OF MATERIALS**

- A. All materials shall be new and shall conform to the standards of Underwriter’s Laboratories, Inc., ISO, TIA, IEC, IEEE, ITU-T, ITU-R, ANSI latest edition, ASTM and NFPA 101 “Life Safety Code” in every case where such a standard has been established for the particular type of materials in question.
- B. All materials on all systems shall comply with the following specifications, unless noted specifically and all materials when not specified shall be the best of their respective kind.
- C. Samples of any materials shall be submitted for approval to the designing electrical engineer.

## **2.02 INSTALLATION REQUIREMENTS**

- A. Approval of Materials: All electronics materials shall be new and must meet the requirements of the specifications and shall bear the inspection label wherever such standards have been established. As soon as practicable and within thirty days after the official award of Contract and before any materials or equipment is ordered, the Contractor shall submit to PPDO for approval, one complete list of materials, apparatus and equipment, in triplicate, giving the manufacturer's name, address, descriptive data, trade name of items, rated capacities, certified analysis catalog number, etc., when called upon to do so, the complete specifications and cut of drawings of such item, of whole or portion of list, as required by the Engineers, which he proposes to use or install.
- B. Ground Test: The entire installation shall be free from improper ground and from short circuits. These shall be made and recorded in the presence of a representative of the Owner, project managers and the engineers. Failures shall be corrected in a manner satisfactory to the Engineers.
- C. Performance Test: It shall be the responsibility of the contractor to test all systems of the entire electronics installation for proper operational conditions. This condition shall apply to the building electronics and other auxiliary installations. When sequence operation is required, the contractor shall test for proper sequence and he shall leave the entire installation in satisfactory working condition.
- D. Cutting and Fittings: Contractor shall do all cutting and fittings required for the installation of the work to make and join the several parts and coordinate with the work of other trades, in accordance with the drawings and in a manner satisfactory to the Engineers.
- E. Protection: Contractor shall effectually protect his own work from damage during and as may be necessary after installation and he shall likewise protect adjoining work of other trades from damage resulting from the installation of electronics work.

## **3.00 GROUNDING SYSTEM**

- A. The contractor shall furnish and install complete grounding system as shown in the drawing.
- B. Grounding system should comply with **J-STD-607-A** Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
- C. TMGB (Telecommunication Main Grounding Bus Bar) shall be located in the MDF (Main Distribution Frame) or Main Terminal Cabinet. The TMGB shall be a minimum of 6-mm thick, 100mm wide, and 305mm in length.

- D. TGB (Telecommunication Grounding Bus Bar) shall be located in IDFs. The TGB shall be a minimum of 250mm long and 50mm wide by 6mm thick.
- E. A TBB (Telecommunication Bonding Backbone) shall connect the TMGB (Telecommunication Main Grounding Bus Bar) and TGB (Telecommunication Grounding Bus Bar).
- F. All basket tray, ladder rack, equipment racks and or cabinets within the MDF and IDF shall be grounded/ bonded to the TMGB or TGB. A minimum size BC (bonding conductor) of #6 AWG shall be used.
- G. The contractor shall conduct testing of the grounding system to ensure that continuity and resistance to ground is not excessive. Submit written result of each test to PPDO for approval.

#### **4.00 FIRE DETECTION AND ALARM SYSTEM**

##### **4.01 GENERAL**

The contractor shall furnish and install a complete, operational Fire Detection and Alarm System as shown on the drawings and as covered by these specifications.

The entire system shall be standard products of one manufacturer except where indicated and to ensure that it meets stringent Life Safety standards, shall be listed by the Underwriter's Laboratories, Inc. (UL) and Factory Mutual, Inc. (FM).

The entire system shall be installed only by a duly authorized representative of the manufacturer who shall be able to refer to existing similar installations 10 years or older in proper operation.

Branch conduit shall consist of either metallic EMT or IMC pipes with a minimum diameter of 20 mm. or as indicated in the plans. Riser conduits shall be metallic unless otherwise indicated.

Any deviations or substitutions from these specifications shall require submittals to the consulting engineer for approval of original manufacturer's brochures, technical manuals shall clearly indicate by highlighting all particular entries showing conclusively point-by-point that the specifications has been attained. This shall be determined upon actual testing and observation of system operational features.

##### **4.02 SYSTEM OPERATION**

Actuation of a double action, pull lever breakglass rod Fire Alarm Manual Stations shall cause the sounding of continuous ringing pre signal horn and

simultaneously light the annunciator lamp pertaining to the station and zone/origin from which the alarm originated.

Insertion of a special key in any of the manual stations shall cause the sounding of an alarm originated and the control panel is restored to normal.

#### **4.03 SYSTEM COMPONENTS**

Control Panel: The control panel shall be U. L. Listed. It shall meet requirements for power limited fire protection signaling circuits of the National Electrical Code.

It shall be of solid-state construction and shall be microprocessor based to provide flexibility. All operating features shall be software controlled making operational changes easy.

The Control Panel shall provide a minimum of 30 supervised programmable alarm-initiating circuits with Alarm and Trouble LED per circuit. The LED shall flash for alarm and light steady for trouble. Each circuit shall be programmable for alarm verification. Each circuit shall be provided with a switch to be used for programming and for circuit bypass. The Control Panel shall also provide at least 2 supervised signaling circuits. The circuits shall be field programmable as silenceable or non-silenceable. The signaling circuit shall include automatic signal disconnect circuitry for protection against signal current overload in addition to manual signal circuit silence.

The control panel shall include a solid state power supply and battery charger using selected maintenance free batteries. The power shall feature terminals with an auxiliary resettable filtered 24VDC output and an auxiliary unfiltered 24VDC output.

The batteries to be furnished shall be rated to enable complete system operation for a minimum of 24 hours in the standby mode and 5 minutes of alarm after complete loss of primary operating power. The Contractor shall submit battery calculations to prove compliance.

All components shall be house in a heavy gauge white enamel finished steel cabinet having a lockable hinged front door and key lock which shall control access to panel operating control circuits.

#### **4.04 MANUAL STATIONS**

Manual stations shall be non-coded, dual action, break glass rod type. It shall be constructed of red finished, fire retardant Lexan with raised white letters indicating Fire and Operating instructions.

#### **4.05 ADDRESSABLE SMOKE DETECTOR**

Addressable Smoke Detector shall be two-wire, system type photoelectric Detectors operating on a light obscuration principle. It shall feature low-current consumption to enable connection up to 50 smoke detectors per

initiating circuit. A built in LED shall be provided indicate detector status. Each smoke detector shall mount onto a separate base, which shall be provided with screw terminals for field wiring connections. Removal of detector head shall require the use of a special tool.

#### **4.06 ADDRESSABLE HEAT DETECTORS**

Addressable Heat Detectors shall be installed where shown on the drawing. They shall be of the fixed temperature type with an alarm setting of 190 Degrees Farenheight.

#### **4.07 ALARM SIGNALS**

Alarm Signals shall be low power consumption, high output electronic, horns. Each horn shall have a sound level rating of 90dB at 3.5 meters in an anarchic chamber and a rating of 92dB in a reverberant room. It shall have a maximum consumption of 8mA at 24VDC.

The electronic horn shall be low- profile and constructed of red finished, fire retardant Lexan and suitable for mounting on a standard 4 sq. in., 1.5 in. deep electrical box.

#### **4.08 ACCEPTANCE**

Upon advice by the contractor that system installation has been completed, the system shall be tested for both supervisory and alarm functions. Each initiating device shall be actuated or activated and each indicating appliance and telephone station shall be observed to show conclusively that the operation specifications herein are complied with.

#### **4.09 GUARANTEE**

The contractor shall guarantee all equipment installed to be free from defects in both material and workmanship for a period of one (1) year. Any equipment found to be defective should be repaired or replaced by the contractor at no additional cost to the owner.

As part of the guarantee, the contractor shall provide an owner's manual, which shall include brochures, installation manuals, and troubleshooting manuals and a point-to-point diagram of the system installed.

## **DIVISION 13 – MECHANICAL WORKS**

### **SECTION 130: GENERAL REQUIREMENTS**

#### **1.00 GENERAL**

##### **1.01 INTENT**

It is the intent of this Project Information Document to define the standards of components system forming part of the Supply and Installation of equipment. All work carried out shall conform to these standards and shall include all components required by Statutory Authorities.

##### **1.02 DESCRIPTION OF WORK**

The extent of works in this Contract includes: the supply, delivery to site, installation, testing, and commissioning air-conditioning and exhaust equipment; and installation of kitchen hood and kitchen suppression system.. A mechanical permit shall be secured prior to the installation of the said mechanical works.

##### **1.03 DESIGN CODES AND STANDARDS**

- A. The design, installation, and testing of the air conditioning and ventilation systems shall be in accordance with the latest standards and comply with the Rules and Regulation of:
- a. Philippine Mechanical Engineering Code.
  - b. Philippine Electrical Engineering Code
  - c. Fire Code of the Philippines
  - d. Building Code of the Philippine

##### **1.04 PERFORMANCE GUARANTEE**

The Contractor shall furnish a warranty to guarantee that the work offered will operate in accordance with the requirement of this Specification and will maintain the performance specified one year after the commissioning of the mechanical works.

##### **1.05 DETAILED SCOPE of WORK on AIRCONDITIONING and EXHAUST SYSTEM**

- a. Supply and installation of air-conditioning unit (an inverter type and of above average EER) both mechanical and electrical works from the unit to electrical supply line.
- b. Testing and commissioning of the ACU units
- c. Outdoor units must be installed at the roof deck of the building

- d. All condensate drains of ACU must be directed to main drains
- e. All refrigerant lines and condensate lines must be concealed or embedded, and properly insulated
- f. To perform preventive and corrective maintenance of the ACU units during the duration of its warranty period
- g. Supply and installation of exhaust fan complete with flexible duct and or PVC duct with vent cap
- h. Coordinate with the MMSU designated personnel before installation of units and to whatever changes in location, type, size, etc.
- i. Pay the necessary electrical consumption in the implementation of the project
- j. Bring and safe keep equipment and tools to include ACU units during the project implementation. Provide store rooms whenever necessary.
- k. Proper house-keeping and safety in the work area
- l. Fix or bringing back the original form of any affected area or component of the building affected in the installation or implementation of the project
- m. Cleaning and clearing of the area after the project
- n. Prepare as-built plan signed and sealed of the mechanical work as a requirement for occupancy permit

#### **1.06 DETAILED WORK: KITCHEN HOOD, KITCHEN SUPPRESSION AND RANGE HOOD**

- a. Fabrication and installation of kitchen hood made up of stainless sheet complete with grease arresting filter, grease cup, lighting using standard kitchen design;
- b. Supply and Installation of kitchen hood exhaust duct complete with high temp fiber blanket insulation, support and rain cap.
- c. Supply, installation and testing of centrifugal pump for the kitchen exhaust duct (backward blade) complete with support, vibration damper.
- d. Supply and installation of kitchen suppression system complete with nozzles, piping system, mechanical pull, fusible links, kitchen suppressor/agent and one additional type K10lbs. fire extinguisher.
- e. Supply and installation of range hood complete with ducting (flexible aluminum connector, duct) vent cap, cladding. Electrical switch of the range hood shall be separated to lighting and other equipment
- f. Proper housekeeping and safety in the work area.
- g. Cleaning and clearing of the area after the project.
- h. Provide as-built plan including sign and seal of a professional mechanical engineer.