



SEC DAVAO EXTENSION OFFICE (DAVEO)

SEC Davao Extension Office, University Avenue, Juna Subdivision,
Matina, Davao City, Davao del Sur

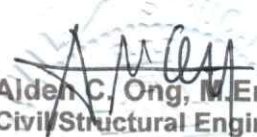


Proposed Architectural As-built & Assessment of SEC Davao Building

Matina, Davao City

Technical Specifications - Architectural

JULY 2024


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DIVISION 01 00 00
SECTION 01 00 00
GENERAL REQUIREMENTS

1. GENERAL

1.1 Equivalency of Standards and Codes

Whenever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition, or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national or relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified, will be accepted subject to the Architect's prior review and written consent. Differences between the standards specified and the proposed alternative standards shall be fully described in writing by the Contractor, and submitted to the Owner's Representative at least 28 days prior to the date when the Contractor desires to use them for the Owner's Representative consent. In the event the Owner's Representative determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the documents.

1.2 The Standard Specifications

The Standard Specifications applicable to this Contract shall be the Republic of the Philippines, Department of Public Works and Highways (DPWH) "Standard Specifications" for Highways, Bridges and Airports (Volume II) 2013 or latest edition and orders of the department. "Item" herein refers to the item number with the Standard Specifications.

1.3 Special Specifications

To supplement the Standard Specifications, reference should be made to the attached Special Specifications for the special item of works and the Environmental Special Specifications.

1.4 Other Generally-Accepted Principles and Practices in Architecture

2. DEFINITION OF TERMS

The generally-accepted principles and practices in Architecture are hereby adopted in so far as they do not run in conflict with established specifications.

Whenever the following terms are used in these specifications, the intent and meaning shall be interpreted as follows:

ASTM

The American Society for Testing and Materials

CONTRACT

The written agreement covering the works to be performed. The Contract shall include, but is not limited to: The Contract Agreement, the Conditions of Contract, the Contract Specifications, drawings, plans and other legal requirements as may be required.

CONTRACTOR

The party or parties on whose behalf the Bid was submitted including its or their respective permitted assignees and where the Contractor comprises more than one party and the context so requires, each and every such party.

PROJECT SITE

The project site refers to the whole road network including related structures within the vicinity.

ENGINEER/PROJECT-IN-CHARGE

Any person, firm or company appointed by the Securities and Exchange Commission (SEC), to perform the duties set out in the Conditions of Contract.

MATERIALS

Any substance specified or required for use in the construction of the Contract work.

NIC

Not included in the Contract.

PLANS

The official drawings or exact reproductions which show the location, character, dimensions and details of works to be done.

WORK

The furnishing of all labor, materials, tools, equipment and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the Contract.

SPECIFICATIONS

The meaning as identified on the Contract conditions and requirements.

3. REVISED CONSTRUCTION SAFETY GUIDELINES FOR THE IMPLEMENTATION OF INFRASTRUCTURE PROJECTS DURING THE COVID-19 PUBLIC HEALTH CRISIS, REPEALING DEPARTMENT ORDER NO. 35, SERIES OF 2020.

For additional Definition of Terms and interpretations, please refer to clauses applicable in the Conditions of Contract.

Pursuant to the Revised Omnibus Guidelines on the Implementation of Community Quarantine in the Philippines dated 15 May 2020 (Revised Omnibus Guidelines"), which granted authority to this department to issue Construction Safety Guidelines for allowed government and private construction projects in areas under Enhanced Community Quarantine, Modified Enhanced Community Quarantine, General Community Quarantine, and Modified General Community Quarantine, the

Department Order No. 35, Series of 202, and the therein attached Construction Safety Guidelines for the implementation of Infrastructure Projects During the COVID-19 Public Health Crisis are hereby and the Revised Construction Safety Guidelines for the implementation of Infrastructure Projects During the COVID-19 Public Health Crisis is hereby issued accordingly.

3.1 CONSTRUCTION SAFETY GUIDELINES

A. PRIOR TO DEPLOYMENT

1. Any person below twenty-one 21 years old, those who are sixty 60 years old and above, those with immune deficiencies, co-morbidities, or other health risks, and pregnant women, including those who reside with the aforementioned, shall not be part of the workforce for construction projects except as may be allowed under the Revised Omnibus Guidelines issued by the IATF.
2. Construction personnel shall undergo quarantine for fourteen 14 days prior to deployment or in the alternative, the employee may undergo any available Food and Drug Administration (approved COVID 19 test, as may be prescribed by the Department of Health (and be retested as the need arises In this regard, consultation with medical doctors (duly accredited by DOH, if possible) prior to the conduct of COVID 19 test shall be made Further, COVID 19 test procedures and return to work policies of the contractors should comply with DOH Circular No 2020 0160 dated 31 March 2020 Department Memorandum No. 2020 0220 dated 11 May 2020 and other pertinent issuances of the DOH on the matter.
3. The concessionaires, contractors, subcontractors, and suppliers shall provide for their personnel/workers the necessary welfare facilities and amenities, such as employees' quarters for board and lodging, ensuring compliance with social distancing, proper hygiene, etc.
4. Concessionaires, contractors, and subcontractors shall ensure that their projects are in compliance with DOLE D O No. 13 Series of 1998 and the DTI and DOLE Interim Guidelines on Workplace Prevention and Control of COVID 19 Contractors shall provide their personnel and workers continuous supply of vitamins, particularly vitamin C, other over the counter medicines, quarantine facilities, and oxygen tanks for emergency purposes.
5. Concessionaires, contractors, and subcontractors shall provide disinfection facilities at their respective project sites in compliance with pertinent DOH and IATF Guidelines, to be placed at strategic locations to ensure the safety and welfare of all personnel.
6. Proper information dissemination regarding COVID 19 construction protocols, on top of existing construction safety practices, shall be conducted by Safety Officers to all personnel.

B. DURING DEPLOYMENT

1. Conduct an inventory of works for the construction sequencing to be followed and undertaken to uphold the required social distancing. Break times shall be conducted in a staggered manner.

2. Employees shall be housed in their respective quarters for the entire duration of the project covered by the ECQ, MECQ, GCQ, and MGCQ. In case there is a need to leave the said quarters during the project duration, "Prior to Deployment" procedures shall be conducted at every instance of re-entry.
3. Errands to be conducted outside the construction site premises shall be kept to a minimum. Number of personnel running errands shall be limited and shall be properly disinfected and closely monitored for symptoms within fourteen (14) days upon re-entry.
4. Field offices, employees' quarters, and other common areas shall be regularly maintained, including the daily disinfection of such facilities.
5. Adequate food, safe/potable drinking water, disinfectants, and hand soaps shall be made available by the concessionaires, contractors, subcontractors, and suppliers to their in-house personnel.
6. Daily monitoring of the pre and post-work health conditions of workers shall be undertaken by the concessionaires, contractors, subcontractors, and suppliers, including but not limited to temperature, health, and exposure monitoring, as preventive measures. Personnel with manifestations or symptoms relative to COVID-19 shall be immediately isolated and quarantined for fourteen (14) days and if necessary, brought to the nearest DOH COVID-19 treatment facility under strict confidentiality and privacy. Proper protocols in accordance with the DTI and DOLE Interim Guidelines on Workplace Prevention and Control of COVID-19 shall likewise be strictly observed.
7. Work activities shall be strictly monitored daily by the Safety Officer on site to ensure compliance with safety standards and quarantine protocols.
8. There shall be a full-time Safety Engineer/Officer assigned at the site who shall strictly monitor work activities. Said Safety Engineer/Officer shall ensure strict compliance with DOLE D.O. No. 13, Series of 1998 and the DTI and DOLE Interim Guidelines on Workplace Prevention and Control of COVID-19 with regard to the wearing of additional personal protective equipment (PPE) required such as, but not limited to, face masks, safety glasses/goggles, face shields, and long sleeve T-shirts, and other measures to contain the spread of COVID-19 in the workplace, as provided in these Guidelines spread of COVID-19 in the workplace, as provided in these Guidelines.
9. For off-site employees' quarters, transport service, duly disinfected before and after use, shall be provided, and social distancing shall likewise be observed therein at all times in accordance with DOTr guidelines.
10. Sharing of construction and office equipment is discouraged. However, if necessary, the shared equipment must be disinfected in between transfers amongst personnel.
11. All material and equipment delivery and disposal shall be conducted by a specific team of personnel on an isolated loading/unloading zone while limiting contact with the delivery/disposal personnel. All material and/or equipment entering the construction site shall be duly disinfected as much as possible. Non-essential personnel, visitors, and the general public shall be restricted to enter the construction site, employees' quarters, and field offices. Otherwise, all personnel

entering the construction site premises on a temporary basis (e.g. delivery truck drivers, inspectors, etc.) shall be properly logged and checked for symptoms. Gatherings, liquors, and/or merry-making are strictly prohibited within the construction site premises.

12. Clustered and staggered deployment of employees within the construction site shall be observed to minimize personnel contact and for easier contact tracing.
13. Proper waste disposal shall be provided for infectious waste such as PPEs and other waste products coming from outside the construction premises

3.2 MONITORING and ENFORCEMENT

Violation of any provision of this Revised Construction Safety Guidelines shall be subject to the following penalties, without prejudice to the imposition of additional administrative sanctions as the internal rules of CSPC may provide and/or further criminal action that may be filed against such erring concessionaires, contractors, sub-contractors, and suppliers, as may be provided by applicable laws:

1. It is understood that the QP referred in these Guidelines shall cover transit of personnel from (MGCQ, GCQ, MECQ area to ECQ area, and vice versa, and (an area not under community quarantine to a MGCQ, GCQ, MECQ, ECQ area, and vice versa.
2. For monitoring purposes, personal records and health report of all personnel necessary for contact tracing shall be submitted as the case may be by the concessionaires, contractors, subcontractors and suppliers to the Libertad Building and shall be resubmitted and updated monthly, or as the need arises (Copies of the monitoring forms are attached hereto as Annexes "B" and "C".
5. The allowed government and private construction projects are subject to the visitatorial and enforcement powers of the province of Cebu Safety Department (Occupational Health and Safety Division in order to ensure compliance with the provisions on maximum allowable operational capacity in establishments as well as minimum health standards and protocols in accordance with Section 8 (4) of the Revised Omnibus Guidelines.

3.3 PENALTIES

Violation of any provision of this Revised Construction Safety Guidelines shall be subject to the following penalties, without prejudice to the imposition of additional administrative sanctions as the internal rules of the province of Davao may provide and/or further criminal action that may be filed against such erring concessionaires, contractors, sub-contractors, and suppliers, as may be provided by applicable laws:

1. Termination of contract for breach thereof resulting to default pursuant to Item III(A)(2)(c)(i), Annex I of the Implementing Rules and Regulations of Republic Act No 9184 in relation to Section 37.2.3 of the same, which provides that bidding documents requiring bidders to know and be familiar with all existing laws, decrees, ordinances, acts, and regulations.
2. Contract termination/rescission under Section 12.21(b) of the Implementing Rules and Regulations of Republic Act No. 6957, as amended by Republic Act No. 7718 (BOT Law);

3. Referral/ to the Philippine Contractors Accreditation Board of any such violation by the contractor/sub-contractor, which shall constitute as prima facie case of construction malpractice of grave consequence due to negligence, incompetence, or malpractice contemplated under DOLE D.O. No. 13, Series of 1998 and DPWH D.O. No. 56, Series of 2005 in relation to Republic Act No. 4566 (Contractors' License Law);
4. Cancellation/Revocation of Building Permit
5. Institution of criminal action under Republic Act 11469(Bayanihan to Heal as One Act)

* END OF SECTION *

**DIVISION 01
SECTION 01 10 00
SUMMARY OF WORKS**

1.1 GENERAL INTENTION

General. It is declared and acknowledged intention and meaning to provide and secure the construction of the complete and ready for use. The building shall have architectural, structural, plumbing and sanitary engineering provisions.

1.2 SCOPE OF WORK

The work shall consist of the entire fabrication, furnishing, delivery and installation, complete in all details, at the subject premises and all work materials, tools, equipment and technical operations incidental to the proper completion of the project, except those portions of the work which are expressly stated to be done by others or as supplied by the Owner. All works shall be in accordance with the governing Codes and Regulation and with the specifications, except those where same shall conflict with such Codes, etc., which latter shall govern. The requirements with regards to materials and appliances necessary to complete installation of the work specified herein and indicated in the drawings shall be executed to the best construction practices and as per Manufacturer's instructions.

1.2.1 Structural/Civil Works

The Civil Works shall include entry platform, ramps, steps, drainage and sanitary systems, electrical and electronic/communication service connection systems, earth fillings, embankments, grading and demolition as indicated in the drawings. The Structural system shall be reinforced concrete and steel framing, renewable materials such as wood and pre-cast concrete. The design shall also include the following:

- A. Provision for building structural system including excavation, backfill, grading and compacting works.
- B. Establishment of structural members as designed for on-grade and suspended slabs, columns, beams, shear wall and supports.
- C. Concrete and Masonry works, reinforcement, grouting and wall construction.
- D. Structural steel, metal fabrications and trims, wall guard, railings, partitions and enclosures.

1.2.2 Architectural Works

Architectural Works shall include the following provisions complete for the construction of building requirements in accordance to Specifications, Contract Drawings and applicable Codes and Standards:

- A. Rough and finish carpentry, architectural wood applications for counters, paneling and sheathing.
- B. Thermal and Moisture protection including roof material and

installations, building insulation, waterproofing and treatments.

- C. Doors and window, with security and protective treatments, complete with framing and hardware for intended uses as required.
- D. Ceiling, Wall and Floor Finishes for interior and exterior applications; painting works, stonework, cladding and accentuations as required.
- E. Building and interior signage.
- F. Toilet compartment and accessories.
- G. Built-in millworks; Rostrum table and seats, Court branch public seats

1.2.3 Plumbing and Sanitary Works

Work included herein shall consist of furnishing all labor, tools, equipment, appliances, and materials necessary for complete installation, testing and operation of the plumbing and sanitary system composed of:

- A. Soil, waste, vent piping and storm drainage system interconnecting the existing sanitary sewers and appurtenances.
- B. Water distribution and supply pipes to the equipment, fixtures and hose bibs.
- C. Plumbing fixtures, trims, and accessories.
- D. Domestic pumps and accessories.
- E. Septic Tank – Anaerobic Baffled Reactor
- F. Rain Water Collection System
- G. Any and all other works involved in providing the complete plumbing system in accordance with the requirements of all applicable laws of the Philippines and all codes and ordinances of the governing agency.

1.2.4 Mechanical Works

- A. Fire Protection - Work included in this specification shall consist of, but not necessary limited to the following items:
 - 1. Arrange for, obtain and bear the cost of necessary permits, bonds and for the automatic sprinkler work.
 - 2. Furnish and install sprinkler system to the entire building as shown in the drawing. System to include all pipes, hanger, sway braces, sprinkler heads, control valves, drain valves, alarms, alarm bells, water flow switches and control valve monitor switches, sprinkler supervisory control panel, fire pump, jockey pump, drives and controllers and necessary accessories, fire hose cabinets and accessories, pressure relief valve and other valves.
 - 3. Furnish and install fire department connections located where shown on the drawings.
 - 4. Testing of all piping work and necessary cleaning of fire protection work.

5. Furnish shop drawings and certificates of inspection.
 6. Cutting, patching and removing from the jobsites all rubbish and debris resulting from the fire protection work.
 7. Fire extinguisher shall be furnished by the contractor based on the local Fire Department requirements as specified, i.e., fire extinguisher requirements at the different areas and floors.
- B. Mechanical Works - Air conditioning and ventilating equipment including all related incidental items for the complete installation and operation of the air conditioning and ventilating system of the project above.
1. Variable Refrigerant Flow System (VRF)
 2. Direct Expansion Type Air Conditioning System
 3. Fans and Ventilation Equipment
 4. Ductworks, Duct Materials, hangers and support.
 5. Refrigerant Piping and Drain Piping.
 6. Piping Identification and Insulation
 7. Controls, Fire stopping and Dampers Controls
 8. Testing, Adjusting and Balancing operations for mechanical system installation
 9. Exhaust and Ventilating System shall be combination of ceiling cassette type and wall mounted industrial type propeller fan

1.2.5 Electrical Works

Electrical Scope of Work shall include but not limited to the following principal items:

- A. Test, supply and install low voltage switchgear, including all necessary intelligence unit and all interconnecting cables, cable support and connectors
- B. Furnish and install all civil work items related to the electrical installation including concrete pedestal, concrete encasement of conduits, hand holes, equipment pads, trench, metering equipment pedestal, etc.
- C. Test, supply and install brand new Standby Generator Set including all necessary accessories.
- D. Termination of all feeders at Low Voltage Switchgear inclusive of wires and cables and the necessary cable connectors.
- E. Furnish and install all power system feeders, branch circuits and equipment inclusive of all conduits, fittings, wirings and accessories and the termination of the same.
- F. Furnish and install all exterior and interior lighting and power wirings

including conduits, boxes, gutters, fittings, wiring accessories, and terminations.

- G. Furnish and install all wiring devices as shown on the plans.
- H. Furnish and install lighting equipment, fixtures and power outlets, switches based on the requirements indicated in the specification and as shown on plans.
- I. Furnish and install all auxiliary equipment inclusive of all conduits, fittings, wirings and accessories and the termination of the same to complete the job.
- J. Furnish and install complete Grounding System as shown in the plans.
- K. Provide necessary civil and electrical requirements for transformer, concrete pedestal and conduits. Distribution Transformers and other HV equipment shall be by Contractor.
- L. Furnish and install panel boards, bus bars, disconnect switches and protective devices as shown on plans and drawings
- M. Provision of Lightning Arrester.
- N. Complete testing and commissioning of all supplied equipment and installed electrical system
- O. Application of electrical power service connections including preparation of all necessary plans, forms and related documents, payment of government fees and charges, and coordination with power company and other authorities or persons involved in the procedures.
- P. If anything has been omitted of any item of work, materials, usually furnished which are necessary for the completion of the electrical works as outline herein before, then such items must be and hereby included in this section of work.

1.2.6 Electronics and Communication Engineering Works

Electronics and communications system shall consist of the following provisions for the conduits, fittings, wirings, equipment and accessories of the auxiliary system complete:

- A. Building Management System
- B. Structured Cabling – Local Area Network
- C. Telephone, Auxiliary and CATV
- D. Public Address and Background Music
- E. CCTV and Security Surveillance System
- F. Fire Detection and Alarm system

Any item, material, labors not specifically included herein but are deemed necessary component for the execution of the works cited, such item must be included without additional time and cost component.

END OF SECTION

DIVISION 01 00 00
SECTION 01 71 13
MOBILIZATION

PART 1 GENERAL

Mobilization shall consist of preparatory work and operations, including, but not limited to preparing Project schedules and equipment and materials submittal documents; attending preconstruction meetings; those actions necessary for the movement of personnel, equipment, supplies and incidentals to the Project site; providing and furnishing an engineer's field office as described in the General Provisions, establishing of all other facilities necessary for work on the Project; and for all other work and operations which must be performed or costs incurred prior to beginning work on the various site improvements called for in the contract documents.

1.1 MOBILIZATION PHASE

Work shall not begin until the items under mobilization have been completed, the construction schedule approved and the Construction Notice to Proceed has been issued. The mobilization phase shall begin immediately upon receipt of the Mobilization Notice to Proceed. The Contractor is solely responsible for delays in Project resulting directly or indirectly from late submissions or resubmission of submittals.

1.2 PRIORITY SUBMITTALS

1.3.1 Priority submittals shall be made within the first ten (10) working days of the Mobilization phase. Notice to Proceed with construction phases will not be issued until the following priority submittals have been provided to and approved by the Architect/Engineer:

- a. Project Construction Schedule
- b. Storm Drain Pipes and Structures
- c. Materials Pre-qualification Submittals
- d. Safety Plan Compliance Document

1.3 SUBMITTALS

1.3.1 General: All materials and equipment used to construct the Project shall be submitted to the Architects for approval prior to ordering the materials or equipment. Submittals shall include reference to applicable specification section(s). Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear precise and thorough manner. Original catalog sheet is preferred. Photocopies are acceptable provided they are of good quality and legible. Any deviations or substitutions from specifications shall be identified, in writing at the time submittals are made.

Clearly and boldly mark each copy to identify pertinent products or models applicable to this Project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Marking shall be boldly and clearly made with arrows or circles.

The data submitted shall be sufficient, in the opinion of the Architect, to determine compliance with the plans and specifications. The Contractor's submittal shall be neatly bound in a properly sized 3-ring binder, tabbed by specification sections. *The Architect reserves the right to reject any and all equipment, materials or procedures, which, in the architect's opinion do not meet the system design and the standards and codes specified.*

- 1.3.2** Submit a plan of the proposed layout of the construction site, including fences, roads, parking, buildings, staging, and storage areas, within seven days after the effective date of the Notice to Proceed.

1.4 METHOD OF MEASUREMENT AND PAYMENT

- 1.4.1** Mobilization will be measured as lump sum item.

1.5 BASIS OF PAYMENT

The contract lump sum price paid for Mobilization will include full compensation for all labor, materials, tools, equipment and incidentals and for doing all the work involved in Mobilization as specified herein.

Payments made for Mobilization will be excluded from consideration in determining compensation under changed quantities.

Note: D.O. No. 22 Series of 2015 Revised Guidelines in the Preparation of Approved Budget for Contract (ABC) stated that "Mobilization and demobilization shall be treated as a separate pay item. It shall be computed based on the equipment requirements of the project stipulated in the proposal and contract booklet. In no case shall mobilization and demobilization exceed 1% of Estimated Direct Cost (EDC) of civil works items."

1.6 DELIVERY

Delivery to the jobsite of construction tools, equipment, plant, temporary buildings, materials, and supplies shall be accomplished in conformance with local governing ordinances and regulations.

1.7 TOOLS AND SUPPLIES

- 1.7.1** Provide construction tools, equipment, materials, and supplies of the types and quantities necessary to facilitate the timely execution of the Work.

- 1.7.2** Provide personnel, products, construction materials, equipment, tools, and supplies at the jobsite at the time they are scheduled to be installed or utilized.

1.8 DEMOBILIZATION

Upon completion of the Work, remove construction tools, apparatus, equipment mobile units and buildings, unused materials and supplies, plant, and personnel from the jobsite. Restore all areas utilized for mobilization to their original, natural state or, when called for in the Contract Documents, complete such areas indicated.

PART 2 PRODUCTS - not applicable

PART 3 EXECUTION – not applicable

* END OF SECTION *

DIVISION 01 00 00
SECTION 01 58 13
PROJECT BILLBOARD / SIGNAGE

A. Description

This item shall consist of furnishing, installing and maintaining during the duration of the project, the project information signboard of the type specified in accordance with this Specifications and the details as shown in the drawings. Location for signboard shall be identified by the Project-in-Charge or the authorized representative of the Securities and Exchange Commission(SEC).

The Project Billboard/Signboard shall be acrylic signboard that must be suitably framed for outdoor display at the project location and shall be posted as soon as the award has been made.

The architectural design concepts, technical specification & suggested details for the manufacturing of the signage. Detailed designing, construction, fabrication, assembling including painting, finishing, cladding electrical work etc. should be carried out by the vendor and shall conform in all respects to high standards of design, engineering & workmanship.

The drawing given with the tender for different signage elements is indicative. The detailed fabrication drawing, shop drawing, mock ups, Flex materials cladding / fixing details, design to fit size should be developed by the vendor and submitted to the designer for approval.

The vendor shall develop the prototype for each category as per the approved drawing, graphic detail and submit to the designer for approval. Prototype should be offered for inspection and approval complete in all respects including fabrication of frame/structure, painting, electrical work, cladding, graphic application, including testing and functioning of the sign complete in all respects.

Detailed assessments and provision should be made for ease of internal & external maintenance

B. Material Requirements

- a) All signage covered under this specification shall be good for installation and operation in Matina, Davao City.
- b) All signage, except where specified as indoor, shall be good for outdoor installation without any shade/cover/protection.
- c) All illuminated signs shall be suitable for operation from dusk to dawn everyday throughout the year.
- d) All outdoor signages should be designed to withstand all climatic conditions.
- e) LED lights of required wattage and numbers shall be placed in such a manner to achieve uniform lighting of the signage (min one LED light (4ft) size per 4 sqft area). It shall be ensured that no dark patches, hot spots, shadows and light leaks appear when the lights are turned on.
- f) The design of signage shall facilitate easy maintenance & re-lamping. The maintenance doors/panels should remain water/dust tight during normal usage.

C. Construction Requirements

1. Location

The project information signs shall be installed at the area designated by the Project-in-Charge.

2. Installation of Sign Panel

The sign panel shall be erected in accordance with the details shown on the drawings. Any chipping or bending of the sign panel shall be considered as sufficient cause to require replacement of the panel at the expense of the Contractor.

D. Method of Measurement and Basis of Payment

The accepted quantity, the number of set of signboard provided, shall be paid for at the contract unit price for item Project Billboard/Signboard which price and payment shall constitute full compensation for furnishing and placing all materials including all labor, utilization of tools and equipment and incidentals necessary to complete the work.

*** END OF SECTION ***

DIVISION 01 00 00
SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

1.2 SUMMARY

1.2.1 Section includes requirements for temporary utilities, support facilities and security and protection facilities.

1.2.2 Temporary Facilities shall include but not limited to the following:

- a. Temporary water service and distribution.
- b. Temporary electric power and lighting services.
- c. Temporary heating, cooling and ventilation.
- d. Temporary telephone and service data.
- e. Temporary facilities including drinking water.
- f. Storm and sanitary sewer.
- g. Storm water pollution control.

1.2.3 Support facilities include but shall not be limited to the following:

- a. Field Office – General Contractor
- b. Storage and Fabrication sheds.
- c. Dewatering facilities and drains.
- d. Temporary enclosure.
- e. Temporary stairs, lifts and hoists.
- f. Temporary project identification signs.
- g. Temporary exterior lighting.
- h. Collection and disposal of waste and clearing.
- i. Temporary environmental controls.
- j. Temporary barracks for on-site laborers/man power.

1.2.4 Security and protection facilities include, but not limited to the following:

- a. Temporary fire protection.
- b. Security for site and agency.
- c. Barricades, warning signs and lights.
- d. Enclosure fence.
- e. Environmental protection and traffic ways.

1.3 USE CHARGES

Installation and removal of and use charges for temporary facilities shall be included in the General Conditions cost unless otherwise indicated. Allow other entities to use temporary

services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of the project, testing agencies, and authorities having jurisdictions. Hoisting equipment and permanent elevators are exempted from this provision.

- a. Sewer Service: General Contractor will pay sewer-service use charges for sewer usage by all entities for construction operations.
- b. Water Service: General Contractor will pay water-service use charges for water used by all entities for construction operations.
- c. Electric Power Service: General Contractor will pay electric-power-service use charges for electricity used by all entities for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- 1.4.1 Site Plan: The contractor shall submit shop drawings showing temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- 1.4.2 Implementation and Termination Schedule: Within twenty-one (21) days of the date established for commencement of the Work, the contractor shall submit a schedule indicating implementation and termination of each temporary utility.
- 1.4.3 Fire Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate contractor personnel responsible for management of fire-prevention program.
- 1.4.4 Moisture Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - a. Describe delivery, handling and storage provisions for materials subject to water absorption or water damage.
 - b. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed work, and replacing water-damage work.
 - c. Indicating sequencing of work that requires water, such as sprayed fire-resistive materials, plastering and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- 1.4.5 Dust and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust and HVAC control measures proposed for use, proposed locations and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate.

1.5 QUALITY ASSURANCE

- 1.5.1 Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - a. Building and fire code requirements.
 - b. Health and safety regulations.
 - c. Utility company regulations.
 - d. Police, fire department, and rescue squad rules.
 - e. Environmental protection regulations.

1.5.2 Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alteration, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA 200 "Recommended Practice for Installing and Maintaining Temporary Electric Power at Construction Sites."

1.5.3 Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."

1.5.4 Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

1.6.1 Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, the Owner's Representative will direct the change over from use of temporary service to use of permanent service.

1.6.2 Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General: Provide new materials. If acceptable to the Architect, the General Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

2.1.2 Lumber and Plywood: Comply with requirements in Division 06 Section 06 10 00 "Rough Carpentry."

2.1.3 For signs and directory boards, provide 3/4-inch exterior grade, Grade A-B Fir plywood. Mount sign on preservative treated Fir posts.

a. Project sign shall be 4' x 8' painted and supported on 4-inch x 4-inch posts, of a design to be provided by the Owner via the Project Architect.

b. Vision Barriers: Provide minimum 1/2-inch thick exterior plywood.

c. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch thick exterior plywood.

2.1.4 Paint: Comply with requirements of Division 09 Section 099100 "Painting."

a. For sign and directory boards applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer unless otherwise indicated.

- 2.1.5 Tarpaulins: Provide waterproof, fire-resistant, tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- 2.1.6 Water: Provide potable water approved by local health authorities.
- 2.1.7 Enclosure Fencing: Provide G.A. 26 pre-painted roofing sheets for walls with 100mm diameters G.I. pipe for columns/post coated with water-based epoxy paint.

2.2 EQUIPMENTS

- 2.2.1 General: Provide new equipment. If acceptable to the Architect, the Construction Manager may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
 - a. The General Contractor shall furnish tools, apparatus and appliances, hoists and/or cranes and power for same, scaffolding, runways, ladders, temporary supports and bracing and similar work or material necessary to insure convenience and safety in the execution of the Contract except where this is otherwise specified in any Specification Section. All such items shall meet the approval of the Owner but responsibility for design, strength and safety shall remain with the General Contractor. All such items shall comply with local regulations and applicable codes, statutes, rules and regulations, including compliance with the requirements of the Accident Prevention in the Construction under the Labor Code of the Philippines.
 - b. Staging, exterior and interior, required for the execution of this Contract, shall be furnished, erected, relocated if necessary and removed by the General Contractor. Staging shall be maintained in a safe condition without charge to and for the use of all trades as needed.
- 2.2.2 Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge and backflow preventers.
- 2.2.3 Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- 2.2.4 Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- 2.2.5 Lamps and Light Fixtures: Provide general service CFL/Fluorescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures when exposed to moisture.
- 2.2.6 Temporary Field Offices: Provide prefabricated or mobile units with lockable entrances, operable windows, and serviceable finishes. Provide air-conditioned units on foundations adequate for normal loading.
- 2.2.7 Temporary Toilet Units: The Owner will allow the toilets located in [submit shop drawings for approval of location] for General Contractor's use. If others are needed, provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

2.2.9 Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

- a. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

2.3 TEMPORARY FACILITIES MATERIALS SPECIFICATION

2.3.1 Temporary Field Office

- 2.3.1.1 Container Van** - Shall be 20 ft. x 8ft x 8.6ft container van, elevated from existing natural grade line @ 300mm height (minimum).
- 2.3.1.2 Windows** – Shall be 6mm thick clear annealed sliding glass windows on a tubular type aluminum framing complete with hardware and accessories.
- 2.3.1.3 Doors** – Shall be 800mm x 2100mm steel doors complete with door knob, hardware and accessories.
- 2.3.1.4 Flooring** – Shall be 1.5mm thick x 300mm x 300mm asbestos-free vinyl composition tile made of organic vinyl resins, plasticizers and additives as binders and natural limestone as fillers.
- 2.3.1.5 Ceiling** – Shall be 12mm-13mm thick recessed edge, sag resistant plasterboard, coated with plain, matte finish 100% water-based acrylic latex paint with excellent hiding, durability and dirt pick-up resistance on a light steel framing system. Provide 50mm thick fiberglass insulation.
- 2.3.1.6 Wall** – Shall be G.I. steel plate wall (container van wall) coated with water-based acrylic epoxy paint finish.
- 2.3.1.7 Air Conditioning System** - Shall be 1Hp, 11,000 BTU/H, wall mounted of quiet operation type, complete with thermostatic controls, vibration isolators and other standard accessories.
- 2.3.1.8 Lighting Fixtures** - Shall be 3 sets of 1-36 watts T-8 daylight linear fluorescent lamp, electronic ballast and lamp holder, energy saving type.

2.3.2 Temporary Toilet Facilities

- 2.3.1.1 Windows** - Shall be 6mm thick clear annealed jalousie glass windows on aluminum framing complete with hardware and accessories.
- 2.3.1.2 Doors** - Shall be 600mm x 2100mm polyvinyl chloride PVC doors with bottom louvers complete with door knob, hardware and accessories.
- 2.3.1.3 Flooring** – Shall be 7mm thick x 200mm x 200mm ceramic tiles with medium resistance to abrasion.
- 2.3.1.4 Ceiling** - 12mm-13mm thick recessed edge, sag and moisture resistant plasterboard, coated with plain, matte finish 100% water-based acrylic latex paint with excellent hiding, durability and dirt pick-up resistance on a light steel framing system.
- 2.3.1.5 Wall** – Shall be 150mm thick CHB interior cement plaster finish coated semi-gloss latex paint.
- 2.3.1.6 Roofing** – Shall be gauge 24, corrugated G.I. roofing sheet.

2.3.1.7 Lighting Fixture – Shall be surface mounted 15 watts CFL bulb with ungrounded receptacle.

2.3.1.8 Toilet Fixtures

- a. *Water Closet* - Shall be vitreous porcelain, floor mounted, closed-coupled elongated front single flush button type water closet with seat cover, pre-installed tank fittings and two-bolt caps, complete with anti-bacterial technology fittings and accessories.
- b. *Urinal* - Shall be white vitreous china, washout flush action wall hung urinal with flushing rim extending from wall, back inlet, push button flush valve and widened sides, complete with fittings and accessories.
- c. *Lavatory* - Shall be white vitreous porcelain wall mounted wash basin, regular color, complete with chrome plated brass P-trap, angle valve pop-up drain and faucet.
- d. *Floor Drain* - Shall be 100mm x 100mm Polished Stainless Steel with lift-up cover.

PART 3 EXECUTION

3.1 INSTALLATION

- 3.1.1 Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- 3.1.2 Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- 3.1.3 Storm Water Pollution Control:
 - a. Assume responsibility for storm water pollution control; conform to the permit requirements.
 - b. Conform to the Storm Water Pollution Control Plan included in the Contract Documents or use another plan, prepared at the General Contractor's expense, which has been approved by the Owner and the Local Building officer.
 - c. Sign and cause to be signed by each appropriate subcontractor, the Certification Statement required by the General Permit.
 - d. Provide, maintain, and monitor a rain gauge on the site; monitoring shall include maintaining a log of the readings. The rain gauge shall remain the property of the General Contractor.

3.2 TEMPORARY UTILITY INSTALLATION

- 3.2.1 General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
 - a. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - b. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

- c. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.

3.2.2 Temporary Water Service and Distribution:

- a. Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

Sterilization: Sterilize temporary water piping prior to use.

- b. Water for construction purposes may be taken from the existing service. The General Contractor shall provide connections, approved backflow prevention device, meter and pipe to the water main or nearest hydrant, subject to the approval of the Owner. Upon completion of work, the General Contractor shall remove the temporary connections and backfill if necessary. If new water service is installed before construction is complete, the new system may be used provided it is returned to the Owner in as-new condition. The General Contractor shall pay for the water used, as metered.
- c. Connect to existing facilities, through an approved backflow prevention device; extend branch piping with outlets so that water is available by use of hoses. The General Contractor shall not waste water or use faulty equipment. The General Contractor shall provide, at his own expense, all connections, extensions and other apparatus required for use of such services. Upon completion of the Contract, the General Contractor shall disconnect temporary extensions and return utility to its original condition.

3.2.3 Temporary Electric Power and Lighting Services:

- a. Power and lighting may be taken from the power company's nearest pole with temporary poles, if needed, to extend the line to project. If permanent power lines have been installed before beginning project, then temporary lines can be brought in from the last pole.
- b. Provide service required for construction with branch wiring and distribution boxes located to provide power and lighting by construction-type extension cords. Meter shall be provided and installed by the General Contractor.
- c. The General Contractor shall pay all costs of temporary power and light.
- d. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- e. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

3.2.4 Temporary Telephone Service and Data:

Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first aid station. General Contractor shall provide telephone service in his office. It is preferred that the General Contractor use a

cellular phone. Basic service and local calls will be paid for by the General Contractor. Toll calls will be paid for by the respective users.

- a. Separate Telephone Lines: Provide additional telephone lines for the following:

Where an office has more than two (2) occupants, install a telephone for each additional occupant or pair of occupants.

Provide dedicated telephone lines for a separate fax machine.

- b. At each telephone, post a list of important telephone numbers.

3.2.5 Temporary Sanitary Facilities, Including Drinking Water:

Temporary sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

- a. Provide toilet tissue, wash basins with water, soap and paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material. The General Contractor shall maintain the facilities in a sanitary condition.

- b. Toilets: Use of pit-type privies will not be permitted. Provide separate facilities for male and female personnel.

3.2.6 Storm and Sanitary Sewer:

If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully.

- a. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
- b. Connect temporary sewers to the municipal system, as directed by sewer department officials.
- c. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

- 3.2.7. Storm Water Pollution Control:** Provide earthen embankments and similar barriers in and around excavations and sub-grade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 SUPPORT FACILITIES INSTALLATION

3.3.1 General: Locate field offices, storage sheds, and other temporary construction and support facilities in designated area as shown on the Contract Documents. The location of the trailers on the Drawings is diagrammatic in nature. Final placement of the trailers is to be approved by the Owner's Representative.

- a. Maintain support facilities until Final Completion. Remove prior to Final Completion with permission from the Owner.

Field Offices: Provide insulated, weather tight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep all

offices clean and orderly, sweep weekly and remove rubbish on a daily basis. Furnish and equip offices as follows:

- 3.3.2** The General Contractor shall provide an office for their own use and a method to contact them by e-mail and telephone at any point and time.
- 3.3.3** General Contractor Provided Field Offices/Equipment: The General Contractor shall provide an office for their own use and a method to contact them by e-mail and telephone at any point and time. The General contractor shall supply the Owner's Representative and the Owner office or trailer with a water cooler for hot and cold water.
- 3.3.4** Storage and Fabrication Sheds:
- Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on-site.
- a. Storage sheds for tools, materials and equipment shall be weather tight with heat, lighting and ventilation for products requiring controlled conditions.
 - b. Remove temporary materials, equipment services and construction before Substantial Completion.
 - c. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to specified or original condition.
- 3.3.5** Temporary Roads and Paving:
- a. Provide paving for pedestrian access and parking for field office.
 - b. Coordinate temporary paving development with sub-grade grading, compaction, installation and stabilization of sub-base and installation of base and finish courses of permanent paving.
 - c. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.
 - d. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.
- 3.3.6** Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 31 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.
- 3.3.7** Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

- a. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25-sq ft or less with plywood or similar materials.
- b. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
- c. Where temporary enclosure exceeds 100-sq ft in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.

3.3.8 Temporary Lifts, Hoists and Elevator Use:

- a. Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- b. Refer to Division 14 Sections for elevators.

3.3.9 Temporary Project Identification Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

3.3.10 Project Sign: Engage an experienced sign painter to apply graphics. Comply with details to be furnished by the Owner's Representative.

- a. Temporary Tripod Frame: For groundbreaking ceremonies only, provide a temporary tripod for the sign illustrated and described below. Make the tripod of 12 ft long 2" x 4"s (Stud Grade), beveled and bolted at the top. Provide approximately 5-ft between legs at grade. Provide a 6-ft long, 2" x 4" seat for the sign; locate 5-ft above grade and nail in place. Nail sign at four (4) places where edges intersect tripod legs. Drive a 24" long, pointed 2" x 4" stake into the earth next to each leg and nail to legs.
- b. Project Sign: The General Contractor shall contact the Owner's Representative for the proper wording for the project sign.

3.3.11 Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.

3.3.12 Collection and Disposal of Waste and Cleaning:

- a. Collect waste within the contract limit line from construction areas daily. Provide separate containers for proper waste recycling. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80° degrees F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- b. Maintain areas under General Contractor control free of waste materials, debris and rubbish. Maintain in a clean and orderly condition.
- c. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces before closing the space.

- d. Periodically clean interior areas before start of surface finishing and continue cleaning on an as-needed basis.
- e. Control cleaning operations so that dust and other particulates will not adhere to wet or newly coated surfaces.

3.3.13 Temporary Environmental Controls: Construction Manager is to provide the following controls.

- a. Rodent and Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be free of pests and their residues at materials.
- b. Dust Control (construction and demolition).
- c. Noise Control.
- d. Erosion and Sediment Control.
- e. Pollution Control.
- f. Traffic Control.

3.3.14 Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

3.4 SECURITY PROTECTION AND FACILITIES INSTALLATION

3.4.1 Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Owner.

3.4.2 Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."

- a. Provide and locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
- b. Store combustible materials in containers in fire-safe locations.
- c. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
- d. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- e. The General Contractor, during construction, shall be responsible for loss or damage by fire to the work of the Contract until completion. Any fire used within the structure for working purposes shall be extinguished when not in use. Bitumen or tar shall be melted on the ground only. No flammable material shall

be stored in the structure in excess of amounts allowed by the authorities. No gasoline shall be stored in or close to the building at any time. The General Contractor shall assign a responsible employee to be in charge of fire protection measures.

- f. If an EPDM or other single-ply roof is included in the work that requires cleaning of mating surfaces of laps with gasoline, limit amount of gasoline on roof to two (2) gallons which shall be in UL listed containers. Also provide one 30 B:C fire extinguisher within 75 feet of any point on the roof.

3.4.3 Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

3.4.4 Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.

- a. Provide covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.
- b. Provide temporary, insulated, weather tight closures at openings to the exterior to provide acceptable working conditions and protection for materials, to allow for temporary heating and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.
- c. Barriers and enclosures shall be in conformance with code requirements. Do not block egress from occupied buildings unless necessary to further the work of the Contract. In this case, secure the Owners approval of an alternate egress plan.

3.4.5 Enclosure Fences: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated on the Construction Documents, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.

3.4.6 Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Provide keys to the Owner's Representative.

- a. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

3.4.7 Protection:

- a. Protect buildings, equipment, furnishings, grounds and plantings from damage. Any damage shall be repaired or otherwise made good at no expense to the Owner.

- b. Provide protective coverings and barricades to prevent damage. The General Contractor shall be held responsible for, and must make good at his own expense, any water or other type of damage due to improper coverings. Protect the public and building personnel from injury.
- c. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- d. Provide protective coverings for walls, projections, jambs, sills and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects and storage. Prohibit traffic and storage on waterproofed and roofed surfaces and on lawn and landscaped areas.
- e. Provide temporary partitions and ceilings to separate work areas from Agency-occupied areas to prevent penetration of dust and moisture into Agency-occupied areas and equipment. Erect framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

3.4.8 Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result.

3.5 OPERATION, TERMINATION AND REMOVAL

3.5.1 Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

3.5.2 Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

- a. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a twenty-four (24) hour basis where required to achieve indicated results and to avoid possibility of damage.
- b. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

3.5.3 Termination and Removal: Unless the Architect/OR requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

- a. Materials and facilities that constitute temporary facilities are the General Contractor's property. The Owner reserves the right to take possession of project identification signs.
- b. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and

other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.

- c. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:

Replace air filters and clean inside of ductwork and housings.

Replace significantly worn parts and parts subject to unusual operating conditions.

Replace lamps burned out or noticeably dimmed by hours of use.

* END OF SECTION *

**DIVISION 01 00 00
SECTION 01 52 16
FIRST AID FACILITIES**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification sections, apply to work of this section.

1.2 GENERAL REQUIREMENTS

1.2.1 The Contractor shall:

- a. Provide at the site and make available to all workers a complete First-Aid kit with medical supplies for the temporary treatment of minor injuries and equipment necessary to render first aid.
- b. Post at contractor's job site the emergency telephone numbers for doctor, hospital, ambulance service, police and fire fighting services.
- c. Maintain on-site complete information regarding First-Aid procedures including, without being limited to, cardio-pulmonary resuscitation and poison control treatments. Material Safety Data Sheets for all products on-site shall be available for inspection and use in emergencies and copies shall be sent to the Project Inspector prior to the products being delivered to the site.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

* END OF SECTION *

DIVISION 01 00 00
SECTION 01 54 23
TEMPORARY SCAFFOLDINGS AND PLATFORMS

PART 1 GENERAL

1.1 FALL PROTECTION

The General Contractor shall be aware that while under contract, they will be governed by the Labor Code of the Philippines under the Department of Labor and Employment (DOLE) together with its Occupational Safety and Health Standards and policies. Whereas Fall Protection system, where a person who works from an unguarded structure that is 8 ft. (2.4meters) above the nearest safe level, the employer shall provide a fall protection system. This system shall be provided by the General Contractor.

1.2 DESIGN

- 1.2.1 All fall protection systems shall be properly engineered and all drawings shall bear stamp of a Professional Engineer.
- 1.2.2 Drawing and a written description of the fall protection system shall be submitted to the Professional within two weeks of award of tender.
- 1.2.3 The anchor of a fall protection system shall be capable of withstanding a force of 17.8 kN (4,000lbs).
- 1.2.4 A person shall be prevented from being subject to a peak fall arrest force greater than 8 kN (1800lbs) and from falling freely for more than 1.2m (4 ft.).
- 1.2.5 Fall protection equipment shall be inspected before each use.
- 1.2.6 Scaffolds shall be designed taking into account the distribution of live loads, dead loads and wind loads.

1.3 TEMPORARY SCAFFOLDINGS

- 1.3.1 Every scaffold shall be of good construction of sound materials and strength for the purpose for which it is intended.
- 1.3.2 All materials and parts of scaffold not in use or intended for re-use shall be kept under good condition and separate from other materials unsuitable for scaffolds.
- 1.3.3 At heights over 20 meters, structural metals should be used designed by a structural engineer and duly approved by the appropriate authority;
- 1.3.4 Structural steel when used as load bearing members of scaffolding shall be distressed at welded or bent joints and design construction approved by the proper authority.

1.4 PLATFORM, RUNWAYS, RAMPS AND STAIRS

- 1.4.1 All working platforms, runways and ramps from which workers are liable to fall a distance of more than 2 m (6ft.) shall be:
 - a. For platform with minimum width of 70 cm the runways and ramp shall be 45cm and if runways are used for the passage of materials, the width shall not be less than 70 cm.
 - b. Provided with strong guard rails up to a height of 91cm above the working surface and toe boards of at least 20 cm in height.

- 1.4.2** The following shall be the minimum width of platform for various types of scaffolds:
- a. When platform is not more than 2m above the ground floor: for painters, decorators and similar types of workers, 30 cm; for all types of workers and tools 50cm.
 - b. When platform is more than 2m above the ground or floor: for men, tools and materials 1m; for men, tools, materials and vehicle 1.5m.
- 1.4.3** Every platform, runway, ramp or stairs shall be kept free from any obstruction, materials, rubbish and projecting nails. When they become slippery due to the nature of work, steps shall be taken by way of sanding, cleaning or by any other means to roughen the surface.
- 1.4.4** Supporting members used in the construction of platforms, runways, ramp and stairs shall be securely fastened and braced. The supporting members shall be placed in a firm and rigid foundation to prevent lateral displacement.
- 1.4.5** The uniformly distributed minimum design load of platform, runway, ramp or stair shall be 650 kg./sq.m. (133 lbs./sq. ft.). The stress due to concentrated loads at any point in the floor shall not exceed those caused by the uniformly distributed load used in the design. Planking used shall not be less than 3 cm. thick.
- 1.4.6** A scaffold platform shall not project beyond its end support to a distance exceeding four (4) times the thickness of the plank, unless secured to prevent tipping.
- 1.4.7** All planks, platforms, runways and ramps shall be fixed and supported to prevent sagging and moving.
- 1.4.8** Slope of runway or ramp shall not exceed 2 in 3.
- 1.4.9** When the slope of runway or ramp requires additional foothold using stepping laths they shall have: a minimum section 5 x 8 cm placed at maximum intervals of 46 cm on centers; Extend to the full width of the runway or ramp except that they may be interrupted over a width of not more than 10 cm to facilitate the passage of barrows.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 H-Frame Scaffolds

Shall be made up of standard gauge 1 ¼" BI pipe schedule 20 local, all frames use gravity lock system for cross braces. Stacking pins shall be locked in. The h-frame shall have a height of 1.7m and width of 1.2m, with cross brace length of 2m. One set scaffold shall consist of 2 pcs h-frame, 2 pcs cross brace and 2 pcs stack pin.

2.1.2 Platform

Shall be made up of steel matting and angle bar, with length of 1.5m and width of 0.4m and uses a hook type connection. The steel matting provides slip resistant and prevents ponding water.

2.1.3 Caster Wheel

Shall be made up of 3/8-inch-thick steel plate with a customized brake pad.

2.1.4 Telescopic U-head

Shall be a combination of telescopic and adjustable; The pipe used shall be BI schedule 40 local with holes at 100mm interval for height adjustment. The U-tip shall have an adjustable screw for minor adjustments and leveling.

2.1.5 Shoring Jack

Shall be made up of BI pipe schedule 40 local which conforms to ASTM specification; The effective height shall be 3.5 meters and base plate shall be 100 by 100 mm.

2.1.6 Base Jack

Shall be 1 1/4" diameters shaft with length of 400mm that adds stability on loose surface and stop sinking. It can also be used to level the h-frame on uneven ground.

2.1.7 Scaffold Ladder

Shall be made up of BI schedule 40 local and steel matting; It shall be inclined at 45 degrees and has seven wide steps for easy climbing and access.

PART 3 EXECUTION

3.1 MAINTENANCE OF SCAFFOLDS

3.1.1 All scaffolds shall be properly maintained and every part shall be kept, fixed and secured in position to prevent displacement.

3.1.2 No partly dismantled scaffold shall be used unless it is rendered stable, strong safe for the purpose.

3.1.3 Scaffoldings left standing for four months shall not be used until damaged members are replaced and the whole structure returned to its original strength.

3.2 DISMANTLING AND RELOCATION

3.2.1 When the scaffolding and fall arrest platforms have served their purpose, they shall be carefully dismantled and removed by the contractor.

3.2.2 The contractor will not be permitted to dismantle and relocate any scaffolding until such time that:

- a. Inspector or his representative has conducted an inspection of the installed work;
- b. Deficiencies have been corrected by the Contractor;
- c. Issuances in writing of a "release order" to permit the commencement of the dismantling and relocation of the scaffolding.

3.2.3 The design of the scaffolding shall ensure that it can be removed safely with damage to the permanent structure.

3.2.4 All materials associated with the fall arrest shall remain the property of the Contractor.

*** END OF SECTION ***

DIVISION 01 00 00
SECTION 01 56 26
TEMPORARY FENCING

PART 1 GENERAL

- 1.1** Install temporary fencing in conformance with the City of Davao and local codes and requirements. Provide vehicular access gate along the access road. Obtain and pay for required applications, permits and inspections.

1.2 REFERENCES

- 1.2.1** American Society for Testing and Materials (ASTM)
- a. C94 Ready Mix concrete
 - b. F626 Fence Fittings
 - c. F900 Industrial and Commercial Swing Gates
 - d. F1083 Pipe, steel, Hot-dipped Zinc-coated (Galvanized) Welded for Fence Structures.
 - e. ASTM-A-792, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
- 1.2.2** UL, Underwriters Laboratory

1.3 DESIGN REQUIREMENTS

- 1.3.1** Structural Engineer shall design footing and structure for gates. Post for gates shall remain level and plumb for a period of four years with repeated opening and closing of gates every day. Top of gate post shall not deflect more than ½ inch.

1.4 SUBMITTALS

- 1.4.1** Product data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles and finishes for a G.I. sheet fences and gate.
- a. Fence and gate posts, rails and fittings.
 - b. Accessories
 - c. Gate and Hardware
 - d. Gate operators, including operating instructions.
 - e. Manufacturer's certifications that complies with the specification.
- 1.4.2** Shop Drawings: Include plans, elevations, sections, details and attachments to other work; show accessories, hardware, gate operation and operational clearance.
- 1.4.3** Certification that fence alignment meets requirements of contract documents.

1.5 QUALITY ASSURANCE

- 1.5.1** Engineer: Drawings and associated calculations required for structural design shall bear seal and signature of professional engineer registered in the country in which Project is located and is under his direct supervision. Maintain calculations on file and submit to Resident Engineer if requested.
- 1.5.2** Manufacturer: Fence, gates and accessories shall be products of manufacturer regularly engaged in manufacturing items of type specified.

PART 2 PRODUCTS

2.1 MATERIALS

- 2.1.1 General:** Materials shall conform to ASTM F1083 and ASTM A392 ferrous metals, zinc-coated; and detailed specifications forming the various parts thereto; and other requirements specified herein. Zinc-coated metal members after fabrication shall be reasonably free from excessive roughness, blisters and sal-ammoniac spots.
- 2.1.2 Steel Roofing Sheets for fence:** Shall be 0.50mm thick, gauge 26, 19mm x 1090mm nominal width x 900mm effective coverage pre-painted G.I. roofing sheet made from alloy coating aluminum and zinc which comprises of 55% aluminum, 43.4% zinc and 1.6% silicon coated with 18-20microns regular modified polyester with epoxy primer.
- 2.1.3 Post and Gates for Fencing and Gate:** Shall be ASTM F1083 and ASTM F1184, Grade SK-40A, round zinc coated steel. Dimensions and weights shall conform to the tables in the ASTM specification. Provide post braces and truss rods for each gate, corner pull or end post. Provide truss rods with turnbuckles or other equivalent provisions for adjustment.
- 2.1.4 Concrete:** ASTM C94/C94M, using 19mm maximum size aggregate and having minimum compressive strength of 25 mPa (3000 psig) at 28 days. Non-shrinking grout shall consist of one part Portland Cement to three parts clean, well-graded sand, non-shrinking grout additive and the minimum amount of water to produce a workable mix.
- 2.1.5 Reinforcing:** Provide where indicated; as specified by Professional Engineer.
- 2.1.6 Accessories:** Accessories as necessary for a complete installation including but not limited to the following:
- Cap, rail and braces ends, wire ties or clips, braces and tension bands, tension bars truss rods and miscellaneous accessories conforming to ASTM F626.

2.2 Access and Parking

Limited parking on site permitted; locations, areas and quantities as directed by the contracting officer.

PART 3 EXECUTION

3.1 INSTALLATION

- 3.1.1 Construction Fence:** Provide 2,400mm high (minimum) corrugate sheet fence with gates erected around the property line of the project site. All fencing shall be erected along the perimeter of the property with vehicular gate facing the access road and providing a setback of 610mm along the access road on the inside of all sidewalks to ensure public use of the sidewalks is not affected and any repairs and/or upgrade to the existing sidewalks can be made by the municipality. No fence post, vehicular gate shall be placed on any portion of a public sidewalk or any location that would potentially present a tripping or safety hazard or impede public access and use of any sidewalk. The Contractor shall survey the intended perimeter location of temporary fence line route and make all installation adjustments as required to ensure safe and unimpeded public access on all sidewalks.
- Provide "no trespassing" signs to meet the standard construction requirements.
 - Fence Gates: Gates shall be kept locked by the Contractor at all times. Provide commercial grade padlocks for each vehicular gate installed. All locks

shall be keyed the same, and the contractor shall provide a 3 duplicate copy of keys to the Owner.

3.1.2 Provide services of a Registered Professional Land Surveyor or Registered Civil Engineer to stake out and certify the fence alignment to meet the requirements indicated.

3.1.3 Fence posts shall be properly embedded in a concrete footing to ensure structural support for the corrugated sheet fence. Install fence posts in accordance with ASTM F 567 and ASTM F1184.

3.2 SETTING

3.2.1 Install post plumb and in alignment. Set post in footings as described above. Thoroughly compact concrete so as it to be free of voids and finished in a slope or dome to divert water running down the post away from the footing. Straight runs between braced posts shall not exceed 500 feet. Cure concrete and grout a minimum of 72 hours before any further work by the manufacturer and as shown.

3.3 POST CAPS

3.3.1 Fit all exposed ends of posts with caps. Provide caps that fit snugly and are weather tight. Where to rail is used, provide caps to accommodate the top rail. Install post caps as recommended by the manufacturer and as shown.

3.4 ACCESSORIES

3.4.1 Supply accessories post braces, truss rods and miscellaneous accessories as required and recommended by the manufacturer, to accommodate the installation of a complete fence with fabric that is taut and attached properly to posts, rails and tension wire.

3.5 GATE INSTALLATION

3.5.1 Install gates according to manufacturer's written instructions plumb, level and secure for full opening without interference. Set keepers, and other accessories into concrete as required by the manufacturer. Adjust hardware for smooth operation and lubricate where necessary. Attach hardware using tamper-resistant or concealed means.

3.6 CLEAN-UP AND MATERIAL MOVING

3.6.1 The Contractor and his Sub-Contractors shall do their own clean-up move materials that are in the way of construction and repair and replace damage they do.

3.6.2 If the above work is not accomplished in a reasonable length of time, the Owner will employ services to do the required work. Cost of the work will be charged to the contractor. After all subcontractors have debris removing during construction in compliance with the above, remaining clean up shall be performed by the Contractor.

3.6.3 Contractor shall do all cleaning of fish surfaces relative to their work prior to acceptance of their work.

* END OF SECTION *

DIVISION 02 00 00
SECTION 02 20 00
SITE WORK

PART 1 GENERAL

1.1 SCOPE OF WORK

- 1.1.1 This Section specifies the labor, materials, equipment, and incidentals required for the demolition, relocation, and/or storage of all building materials, equipment, and accessories to be removed within the site as shown on the drawings and as specified herein.
- 1.1.2 There may be existing and active storm water, wastewater, water, and other facilities on site as indicated on the existing floor plans. It is essential that these facilities, when encountered, remain intact and in service during the proposed demolition. Consequently, the Contractor shall be responsible for the protection of these facilities and shall diligently direct all his activities toward maintaining continuous operation of the existing facilities and minimizing operational inconvenience.
- 1.1.3 Demolition generally includes:
 - a. Complete demolition and removal of manholes, valve vaults, wet wells, piping, and mechanical and electrical equipment related to the Work as specified herein.
 - b. Complete demolition and removal of all above and below ground structures, concrete slabs and foundations, vaults, and underground utilities (water, wastewater, electrical, etc.) as specified herein.
- 1.1.4 The Contractor shall examine the various Drawings, visit the site, determine the extent of the Work, the extent of work affected therein, and all conditions under which he is required to perform the various operations.
- 1.1.5 The Contractor shall fill and compact all voids left by the removal of pipe, structures, etc. with materials described herein to a grade that will provide for positive drainage of the disturbed area to drain run-off in direction consistent with the surrounding area. The Contractor shall provide all fill materials to the site as needed. Compaction of fill shall match the compaction of adjacent undisturbed material.

1.2 MATERIAL OWNERSHIP

Cleared/salvage materials, except for stripped topsoil or other materials indicated to remain Owner's property, shall be removed from project site to a designated site/location within as approved and directed by the Owner.

1.3 QUALITY ASSURANCE

- 1.3.1** Permits and Licenses: Contractor shall obtain all necessary permits (Demolition Permit) and licenses for performing the work and shall furnish a copy of same to the owner prior to commencing the Work. The Contractor shall comply with the requirements of the permits. *(if required by the local government only)*
- 1.3.2** Notices: Contractor shall issue written notices of planned demolition to companies or local authorities owning utility conduit, wires, or pipes running to or through the project site.
- 1.3.3** Utility Services: Contractor shall notify utility companies or local authorities furnishing gas, water, electrical, telephone, or sewer service to remove any equipment in the structures to be demolished and to remove, disconnect, cap, or plug their services to facilitate demolition.

1.4 SHOP DRAWINGS AND SUBMITTALS

- 1.4.1** Submit to the Department of the Building Official for their approval, copies of proposed demolition procedure of the existing structure specified below prior to the start of Work. Include in the schedule the coordination of shut-off, capping, and continuation of utility service as required. *(if required by the local government only)*
- 1.4.2** Provide a detailed sequence of demolition and removal work to ensure the uninterrupted progress of the building's operations.
- 1.4.3** Before commencing demolition work, all structure relocation, bypassing, capping, or modifications necessary will be completed. Actual work will not begin until the Building Official has inspected and approved the prerequisite work and authorized commencement of the demolition work.
- 1.4.4** The above procedure must be followed for each individual demolition operation.

1.5 SITE CONDITIONS

- 1.5.1** Prior to demolition, the Contractor shall obtain written verification from the utility owner(s) that the existing utilities, including storm water, wastewater, and/or water facilities, are not operational and are ready for demolition.
- 1.5.2** The building official assumes no responsibility for the actual condition of the structures to be demolished or relocated.
- 1.5.3** Conditions existing at the time of inspection for bidding purposes will be maintained by the owner insofar as practicable. However, variations within each site may occur prior to the start of demolition work.
- 1.5.4** No additional payment will be made for pumping or other difficulties encountered due to water.
- 1.5.5** Certain information regarding the reputed presence, size, character and location of existing underground structures, pipes and conduit. There is no certainty of the accuracy of this information, and the location of underground structures shown may be inaccurate and other obstructions than those shown may be encountered. The Contractor hereby distinctly agrees that the owner is not responsible for the correctness or sufficiency of the information given;

that in no event is this information to be considered as a part of the Contract; that he shall have no claim for delay or extra compensation on account of incorrectness of information regarding obstructions either revealed or not revealed by the Drawings; and that he shall have no claim for relief from any obligation or responsibility under this Contract in case the location, size, or character of any pipe or other underground structure is not as indicated on the Drawings, or in case any pipe or other underground structure is encountered that is not shown on the Drawings.

1.6 RESTRICTIONS

- 1.6.1** No building, tank or structure, or any part thereof, shall be demolished until an application has been filed by the Contractor with the Department of Building Official and a permit issued if a permit is required. The fee for this permit shall be the Contractor's responsibility. Demolition shall be in accordance with applicable provisions of the Building Code of the Philippines.
- 1.6.2** No explosives shall be used at any time during the demolition. No burning of combustible material will be allowed.
- 1.6.3** Contractor shall notify the Owner prior to beginning any demolition work.

1.7 DISPOSAL OF MATERIALS

- 1.7.1** The Contractor shall promptly remove all other materials from the site to a designated location within Cebu City, approved and directed by the Owner.
- 1.7.2** All salvage materials shall be stored on a location given by the Owner and shall remain as property of the Owner.
- 1.7.3** The on-site storage of removed items is prohibited by the Owner.

1.8 TRAFFIC AND ACCESS

- 1.8.1** Conduct work to ensure minimum interference with on-site and off-site roads, streets, sidewalks, and occupied or used facilities.
- 1.8.2** Special attention is directed towards maintaining safe and convenient access to the existing facilities remaining in operation by plant personnel and plant associated vehicles, including trucks and delivery vehicles.
- 1.8.3** Do not close or obstruct streets, sidewalks, or other occupied or used facilities without permission from the Building Official. Provide alternate routes around closed or obstructed traffic in access ways.

1.9 PROTECTION

Conduct operations to minimize damage by falling debris or other causes to adjacent buildings, structures, roadways, other facilities, and persons. Provide interior and

exterior shoring, bracing, or support to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain.

2.0 DAMAGE

Promptly repair damage caused to adjacent facilities by demolition operations as directed by the Owner at no cost to the Owner.

2.1 UTILITIES

2.1.1 Maintain existing utilities as directed by the Owner to remain in service and protect against damage during demolition operations.

2.1.2 Do not interrupt existing utilities serving occupied or operational facilities, except when authorized by Owner. Provide temporary services during interruptions to existing utilities as acceptable to the Owner.

2.1.3 The Contractor shall cooperate with the Owner to shut off utilities serving structures of the existing facilities as required by demolition operations.

2.1.4 The Contractor shall be solely responsible for making all necessary arrangements and for performing any necessary work involved in connection with the interruption of all public and private utilities or services.

2.1.5 All utilities being abandoned shall be terminated at the service mains in conformance with the requirement of the utility companies or the city owning or controlling them.

2.2 EXTERMINATION

If required, before starting demolition, the Contractor shall employ a certified rodent and vermin exterminator and treat the facilities in accordance with governing health laws and regulations. Any rodents, insects, or other vermin appearing before or during the demolition shall be killed or otherwise prevented from leaving the immediate vicinity of the demolition work.

2.3 POLLUTION CONTROL

2.3.1 For pollution control, use water sprinkling, temporary enclosures, and other suitable methods as necessary to limit the amount of dust rising and scattering in the air to the lowest level of air pollution practical for the conditions of work. The Contractor shall comply with the governing regulations.

2.3.2 Clean adjacent structures and improvements of all dust and debris caused by demolition operations as directed by the Owner. Return areas to conditions existing prior to the start of Work.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTIONS

3.1 SEQUENCE OF WORK

The sequence of demolition and relocation of existing facilities shall be in accordance with the approved critical path schedule.

3.2 REMOVAL OF EXISTING PROCESS EQUIPMENT, PIPING, AND APPURTENANCES

Equipment to be retained by the Owner will be designated for retention by the Owner prior to bidding. Subject to the constraints of maintaining existing facilities in operation, all other process equipment, non-buried valving and piping, and appurtenances shall be removed from the site.

3.3 DEMOLITION PROCEDURES

The Contractor shall adhere to the following demolition procedures as referenced on the Drawings:

3.3.1 TO BE DEMOLISHED: Demolition shall be the breaking up, cutting, filling of any holes resulting, final grading of the area, performing any other operations required, and the removal from the site of all structures and equipment (structures, substructures, floor slabs, equipment, tanks, pipes, fittings, electrical systems, light poles, wiring, underground conduits and wiring, isolated slabs, and sidewalks). All pieces of concrete, metal, and any other demolished material shall be removed to a depth of at least 5-feet below existing grade. Broken pieces of concrete may be size reduced by an on-site crusher, but in any event must be removed from the project site.

Before commencing structural demolition, remove all mechanical, electrical, piping, and miscellaneous appurtenances. Completely remove the structure by thoroughly breaking up concrete into pieces no more than 2-feet across the largest dimension.

3.3.2 TO BE REMOVED: The existing structure and equipment shall be completely removed from the site with all associated connecting piping or electrical service. The item shall be taken whole or in parts to be stored on a specific location within the site as directed by the Owner.

3.3.3 PIPING TO BE REMOVED: Pipe (and conduit) shall be drained and the contents properly disposed. The pipe (or conduit) shall then be completely removed from the site, including fittings, valves, and other in-line devices. Connections to existing piping to remain shall be plugged by mechanical means (M.J. plugs, tie-rods, or thrust blocks).

- 3.3.4 PIPING TO BE ABANDONED:** Piping (or conduit) shall be left in place. All such piping shall be drained and the contents properly disposed. The pipe (or conduit) shall then be filled with grout (flowable fill) and each end of the pipe (or conduit) shall be plugged using a concrete plug in a manner acceptable to the Owner.
- 3.3.5 TO BE PROTECTED:** The utility service, fence, structure, tree, or device so designated shall be temporarily protected during the prosecution of the demolition work.
- 3.3.6 TO REMAIN:** The designated facilities shall remain intact and in service during the prosecution of the demolition work.
- 3.3.7 DEWATERING OF EXISTING PROCESS UNITS AND DISPOSAL OF RESIDUE**

The Contractor shall notify the Owner prior to beginning the dewatering work on any existing process units which contain wastewater, grit, or sludge. The Contractor, at his own expense, shall remove the entire contents of each structure and store it to a designated location given by the Owner. The proper transport and site storage of all residues shall remain the responsibility of the Contractor.

* END OF SECTION *

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SCOPE OF WORK

This section shall include the following:

- 1.1.1 Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- 1.1.2 Form accessories.
- 1.1.3 Form stripping.

1.2 RELATED REQUIREMENTS

- 1.2.1 Section 03 2000 - Concrete Reinforcing.
- 1.2.2 Section 03 3000 - Cast-in-Place Concrete.

1.3 REFERENCES

The following standards form part of these specifications to the extent referenced, in accordance to the requirements under General Conditions of the Contract Documents and Manufacturer's instructions:

- 1.3.1 ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- 1.3.2 ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute; 2010.
- 1.3.3 DPWH Standard Specification for Building, Ports and harbor, Flood Control and drainage structures and Water supply systems. Volume III (1995).
- 1.3.4 Department Order 50: Series of 2006 - DPWH Standard Specifications for Forms and False works, Item 414

1.4 SUBMITTALS

1.4.1 Submit the following in accordance with the General Conditions of Contract and requirements specified herein:

A. Product Data and Information:

- 1. Manufacturer's Data and Specifications: Submit printed manufacturer's data and specifications for each item used on this project.

B. Shop Drawings:

- 1. Formwork
- 2. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
- 3. Means of leakage prevention for concrete exposed to view in finished construction.

4. Sequence and timing of erection and stripping, assumed compressive strength at time of stripping, height of lift, and height of drop during placement.
 5. Vertical, horizontal, and special loads according to ACI 347, and camber diagrams when applicable.
 6. Notes to formwork erector showing size and location of conduits and piping embedded in concrete according to ACI 318.
 7. Procedure and schedule for removal of formworks.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- 1.5.1 Deliver prefabricated forms and installation instructions in manufacturer's packaging.
- 1.5.2 Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.
- 1.5.3 Protect plastic foam products from damage and exposure to sunlight.

PART 2 PRODUCTS

2.1 FORMWORKS: GENERAL

- 2.1.1 Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- 2.1.2 Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- 2.1.3 Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

Formworks: Materials Requirements

The materials used for smooth form finish shall be plywood, tempered concrete-form-grade hardboard, metal, plastic, paper or other acceptable materials capable of producing the desired finish for form-facing materials. Form-facing materials shall produce a smooth, uniform texture on the concrete. Form-facing materials with raised grain, torn surfaces, worn edges, patches, dents, or other defects that will impair the texture of concrete surfaces shall not be permitted. No form-facing material shall be specified for rough form finish.

2.2 FORMWORKS ACCESSORIES

Formwork accessories that are partially or wholly embedded in concrete, including ties and hangers shall be commercially manufactured. The use of non-fabricated wire form ties shall not be permitted. Where indicated in the Contract, use form ties with integral water barrier plates in walls.

2.3 FORMWORKS RELEASE AGENTS

Commercially manufactured formwork release agents shall be used to prevent formwork absorption of moisture, prevent bond with concrete, and hot stain the concrete surfaces.

Capable of releasing forms from hardened concrete without staining or discolouring concrete or forming bug holes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

PART 3 EXECUTION

3.1 EXAMINATION

Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 ERECTION – FORMWORKS

3.2.1 Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

3.2.2 Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

3.2.3 Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

3.3 APPLICATION OF FORM – RELEASE AGENT

Apply form release agent on formwork in accordance with manufacturer's recommendations.

3.4 FORM REMOVAL

Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

END OF SECTION

SECTION 03 15 00

CONCRETE ACCESSORIES

PART 1 GENERAL

1.1 SCOPE OF WORK

This section shall include requirements for providing concrete accessories shown and specified herein such as water stops, dovetail anchor slots, cast-in-place reglets, inserts, joint filler, preformed joint seal, joint sealant and neoprene pads.

1.2 REFERENCES

The following standards form part of these specifications to the extent referenced, in accordance to the requirements under General Conditions of the Contract Documents and Manufacturer's instructions:

- 1.2.1 AASHTO - Standard Specifications for Highway Bridges
- 1.2.2 ASTM A 240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- 1.2.3 ASTM A 536 - Standard Specifications for Ductile-Iron Castings
- 1.2.4 ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
- 1.2.5 ASTM D 2240 - Standard Test Method for Rubber Property - Durometer Hardness
- 1.2.6 ASTM D 3545 - Standard Test Methods for Alcohol Content and Purity of Acetate testers by Gas Chromatography
- 1.2.7 ASTM D 3575 - Standard Test Methods for Flexible Cellular Materials Made from Olefin Polymers.

1.3 SUBMITTALS

- 1.3.1 Submit the following in accordance with the General Conditions of Contract and requirements specified herein:

- A. Product Data and Information:

- 1. Manufacturer's Data and Specifications: Submit printed manufacturer's data and specifications for each item used on this project.
 - 2. Samples: Provide one sample of each item used.

- B. Joint Sealant and Preformed Joint Seal: Indicate special procedures, surface preparation and perimeter conditions requiring special attention. Submit certified material records indicating approval for use with potable water.

1.4 DELIVERY, STORAGE AND HANDLING

- 1.4.1 Deliver materials in factory sealed and labeled packaging.
- 1.4.2 Handle all products and materials as specified in Manufacturer's standard procedures and instructions.
- 1.4.3 Store products in factory package to protect from oil, dirt, and prolonged ultraviolet exposure.
Cover materials to protect from moisture that may cause premature swelling.

PART 2 PRODUCTS

- 2.1 **Water stops:** Provide water stops made of extruded polyvinyl chloride meeting the requirements and standards unless otherwise shown.
 - 2.1.1 Unless otherwise shown, use water stops for construction joints which are flat, at least 150mm wide, and not less than 10mm at the thinnest section. Provide these water stops with ribbed longitudinal strips.
 - 2.1.2 Provide stainless steel water stops where shown or specified. Fabricate stainless steel water stops from ASTM A 240 Type 316, gauge 20 stainless steel, conforming to the dimensions and profiles shown. Prefabricate and miter corners and intersections for all stainless steel water stops. Make only butt joints in the field.
 - 2.1.3 Rubber Water stops: Provide rubber water stops where shown or specified.
 - 2.1.4 Provide rubber water stops of either the moulded or extruded type, fabricated from a high grade tread type compound, either SBR or natural rubber, conforming to standards.
 - 2.1.5 Provide water stops for construction joints at least 150mm wide and 10mm thick and with solid end bulbs 20mm in diameter.
 - 2.1.6 Provide water stops for expansion joints 225 inches wide and 10mm thick and with solid end bulbs 25mm in diameter and a hollow center bulb 38mm in diameter with a 20mm diameter center cavity.
- Note:** Refer to structural drawings for requirements.
- 2.2 **Expansion Joint Filler:** Use joint filler for all expansion joints. Provide a closed cell polyethylene or PVC joint filler of the thickness shown.
- 2.3 **Joint Sealant Requirements:** Finish expansion joints with a joint sealant where shown or specified.
 - 2.3.1 Joint sealant materials may be either a single component urethane compound meeting the requirements or a two component urethane compound meeting the requirements, except as modified in this specification.
 - 2.3.2 Provide the urethane sealant of 100 percent polymer, non-extended, containing no solvent, lime, or coal tar. Color as per Architect's approved sample. Conform sealant properties to the following:

Property	Value	Test Method
Maximum final cure	3 days	--
Minimum tensile strength	140 to 200 psi	ASTM D 412
Minimum elongation	400%	ASTM D 412
Modulus at 100% elongation	40-60 psi	ASTM D 412
Shore A hardness	25-40	ASTM D 2240
Solid content	98-100%	--
Minimum recovery	80-90%	

2.3.3 Provide primer as recommended by the manufacturer of the sealant, subject to approval.

2.3.4 Provide fillers and backup materials in contact with sealant which are non - impregnated and free from asphalt, creosote, oil or extractable plasticizers. Use a backup material of a closed cell polyethylene foam rod with a diameter larger than the joint width.

2.3.5 Preformed Joint Seal: Provide a preformed joint seal where shown or specified.

A. Provide joint material which is resilient, non-extrudable, impermeable, closed-cell, cross linked, ethylene vinyl acetate, low density, polyethylene ecopolymer, nitrogen blown material which is ultraviolet light, weather and wear resistant, and which is concrete beige in color. Conform material properties with the following:

Property	Value	Test Method
Density, pcf	2.8 to 3.4	ASTM D 3575 Suffix: W, Method A
Water Absorption total immersion 3 months	0.02% by volume	ASTM D 3575 Suffix: L
Tensile Strength	125 psi	ASTM D 3575 Suffix: T
Elongation before breaking	255%	ASTM D 3575 Suffix: T
Working Temperature	-94 to 160F--	

2.4 Neoprene Pads:

Use neoprene pads as shown or required where slabs or beams must be prevented from bonding to footings, walls, columns or other rigid parts of the structure.

2.4.1 Use neoprene pads of a structural grade meeting the requirements of AASHTO, Section 25, Division 2.

2.4.2 Do not use neoprene pads thinner than 6mm.

2.5 Wedge Inserts:

Make wedge inserts for 15mm and 19mm bolts of ductile iron conforming to ASTM A 536.

2.6 Dovetail Anchors:

Provide dovetail anchors of one of the following types:

- 2.6.1** Dovetail anchors having a 5mmx25mmx12mm stainless steel dovetail section with 3/16-inch diameter stainless steel wire.
- 2.6.2** Dovetail anchor slots of gauge 24 galvanized steel 25mmx25mmx15mm throat. Fill anchor slots.

2.7 Flashing Reglets:

Provide flashing reglets of gauge 24 galvanized steel foam filled reglets.

PART 3 EXECUTION

- 3.1** All installations shall conform to Manufacturer's instructions and applicable codes and standards.

3.2 Waterstops:

The material, design and location of water stop in joints shall be as indicated in the plans. Each piece of pre-molded waterstop shall be of maximum practicable length in order that the number of end joints will be held to a minimum.

3.2.1 Assembly of Extruded Waterstops:

Prefabricate corners and intersections for all waterstops. Make only butt joints in the field. Miter and assemble corners and intersections with approved equipment, as described for field joints.

- A.** Make field joints by cutting the ends of the sections to be spliced so they will form a smooth even butt joint. Heat the cut ends with the splicing tool until the plastic melts. Press the two ends together until the plastic cools. Do splicing in a way that limits damage to the continuity of the ribbed strips.
- B.** Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 Inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.

3.2.2 Prefabricated Stainless Steel Waterstops:

Prefabricate corners and intersections for all stainless steel waterstops. Make only butt joints in the field. Miter and weld corners and intersections.

- A.** Provide field joints having a nominal 1-inch lap joint, with the exposed edge welded or brazed on each side.
- B.** Make field joints with PVC waterstops as shown.
- C.** At expansion joints, seal the base of the expansion section of the waterstop with at least one layer of 2-inch wide duct tape.

- D. Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.

3.2.3 Splices: Use splices made in the manufacturer's plant where possible for rubber waterstops.

- A. Use a preformed rubber union or fitting and splicing cement as recommended by the manufacturer when splices are made.
- B. Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.

3.3 Construction Joints:

Joints not shown on plans shall be so made and located at least impair the strength of the structure and shall be approved by the Structural Engineer. In general, they shall be located near the quarter spans of slabs, beams and girder unless a beam intersects in a girder at this point, in which case the joint in the girder shall be offset a distance equal to twice the width of the beam. Joints in walls and columns shall be at the underside of floors, slabs, beams, girders and at the tops of footings or floor slab. Beams, girder, brackets column capitalize haunches and drop panels shall be placed at the same time as slabs. Joint shall be perpendicular to main reinforcements. All reinforcements shall be continued across joints. Keys and inclined dowels shall be provided as directed by the Structural Engineer. The surface of the concrete at all joints shall be thoroughly cleaned and all laitance removed prior to placing adjoining concrete.

3.4 Joint Filler Placement:

Place joint filler for expansion joints against the completed portion of the work before the concrete for the next section is placed.

- 3.4.1 Fasten the filler to the hardened concrete with a compatible adhesive in accordance with manufacturer's instructions. Extend the filler through the thickness of the wall or slab and make it flush with the finished surface, except where a preformed joint seal or joint sealant is shown.

- 3.4.2 In joints having a waterstop, fit the filler accurately on each side of the waterstop to prevent the intrusion of concrete.

3.5 Preparation of 2-Component Sealants:

Mix 2-component joint sealant using a slotted paddle and slow speed mixer for 5 to 8 minutes, continually working paddle from top to bottom until the sealant color is uniform. Scrape down the side of the container and paddle blade several times during the mixing operation to ensure uniform mixing.

- 3.5.1 Properly prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free

- of all oil, grease, wax, waterproofing compounds or form release materials prior to the application of primer and sealant.
- 3.5.2** Prime all concrete joint surfaces and all surfaces exposed to water prior to sealing, with no exceptions. Prime all other surfaces as recommended by the manufacturer of the sealant. Provide the prime as recommended by the manufacturer of the sealant, subject to approval. Apply the primer by either brushing or spraying on the joint surfaces. Apply and install the sealant within 2 to 24 hours after the application of primer.
- 3.5.3** For horizontal joints, install the sealant by pouring directly from a suitable shaped can or by flowing from a bulk-loading gun.
- 3.5.4** Fill vertical joints from a gun, starting from the bottom, to avoid bridging and the formation of air voids.
- 3.5.5** Fill overhead joints from a gun, by laying a bead along each side of the joint and then filling the middle. Immediately after installation, tool in the sealant in order to establish firm contact with joint surfaces and to provide a smooth sealant surface. Tool in accordance with the manufacturer's instructions.
- 3.5.6** Control joint depth with the use of joint fillers and backup materials. Make joint widths and sealant depths as shown. Do not exceed 12mm for sealant depth.
- 3.6 Preformed Joint Seal Surface Preparation:** Properly prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free of all oil, grease, wax, water-proofing compounds or form release materials.
- 3.6.1** Blast clean or saw cut all existing concrete surfaces to expose a clean bare concrete surface. Allow new concrete to be well cured, and attain a minimum of 80 percent of the specified strength before installing sealant.
- 3.6.2** Apply bonding adhesive, as recommended by the manufacturer to the concrete surfaces in strict compliance with the manufacturer's recommendations. Install the joint material under a compression of 25 percent and in one continuous operation, in accordance with manufacturer's recommendations. Do all splices and directional changes using heat welding method as recommended by the manufacturer.
- 3.7 Unbonded Joints:**
Use unbonded horizontal joints as shown or required where slabs of beams must be prevented from bonding to footings, walls, columns or other rigid parts of the structure. Prevent bonding by use of structural grade neoprene pads placed over the bearing surface of the footing, wall or other supporting part of the structure so as to isolate it from the new concrete being placed.
- 3.8 Placing embedded items:**
Expansion joint material, waterstop and other embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts and anchor slots shall be filled temporarily with readily available material to prevent the entry of concrete into the voids.
- 3.9 Other embedded items:**
All sleeves, inserts, anchors and embedded items required for adjoining worked or for its support shall be placed prior to concreting.

3.10 Encasing Inserts:

Encase wedge inserts, flashing reglets and dovetail anchor slots in the concrete as shown. Take special care to place and maintain them to the proper lines and grades and to compact concrete thoroughly around them to prevent the passage of water. Set these items before placing concrete and thoroughly brace them to prevent movement during the progress of the work. Provide dovetail anchor slots spaced not more than 16 inches apart for all concrete walls faced with masonry.

END OF SECTION

SECTION 03 20 00 CONCRETE REINFORCING

PART 1 GENERAL

1.1 SCOPE OF WORK

The work to be undertaken under this section shall comprise the furnishing of all labor, materials, equipment, plant and other facilities and the satisfactory performance of all reinforcing steel for use in reinforced concrete necessary to complete work indicated on the drawings and the General Conditions of the Contract Documents, as specified herein.

1.2 REFERENCES

The following standards form part of this specification to the extent referenced in accordance to the Contract general provisions:

- 1.2.1** ACI318 Building Code Requirements for Reinforced Concrete.
- 1.2.2** ACI 315 Manual Standard Practice for Detailing Reinforced Concrete Structures.
- 1.2.3** ACI SP-66 American Concrete Institute – Detailing Manual.
- 1.2.4** ANSI/ASTM A82 Cold Drawn Steel Wire for Concrete Reinforcement.
- 1.2.5** ANSI/ASTM A184 Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
- 1.2.6** ANSI/ASTM A185 Welded Steel Wire Fabric for Concrete Reinforcement.
- 1.2.7** ANSI/ASTM A496 Deformed Steel Wire Fabric for Concrete Reinforcement.
- 1.2.8** ANSI/ASTM A497 Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- 1.2.9** ANSI/AWS D1.4 Structural Welding Code for Reinforcing Steel.
- 1.2.10** ANSI/AWS D12.1 Reinforcing Steel Welding Code.
- 1.2.11** ASTM A615 Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- 1.2.12** ASTM A704 Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
- 1.2.13** ASTM A706 Low-Alloy Steel Deformed Bars for Reinforcement.
- 1.2.14** AWS D12.1 Welding Reinforcement Steel, Metal Insects and Connections in Reinforced Concrete Construction.
- 1.2.15** CRSI Concrete Reinforcing Steel Institute Manual of Practice.
- 1.2.16** CRSI 63 Recommended Practice for Placing Reinforcing Bars.
- 1.2.17** CRSI 65 Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.
- 1.2.15** ACI 318 Building Code Requirements for Structural Concrete and Commentary
- 1.2.16** ACI 301 Specifications for Structural Concrete for Buildings

1.3 QUALITY ASSURANCE

- 1.3.1** Comply with quality assurance requirements under General Conditions of the Contract Documents and Manufacturer's instructions.
- 1.3.2** Perform work in accordance to ACI 318 and ACI 301.

- 1.3.3 Mill test certificates for supplied reinforcements, indicating physical and chemical analysis.

1.4 SUBMITTALS

- 1.4.1 **General:** All submittals for approval as indicated herein shall be in accordance to the provisions under General Conditions of the Contract Documents.
- 1.4.2 **Product Data:** Submit for splice devices and bar supports.
 - A. Certified Mill Test Reports
 - B. Welder qualification
- 1.4.3 Shop drawings showing fabrication dimensions and locations for placing of reinforcing steel and accessories shall be submitted for approval by the Structural Engineer. Approval shall be obtained before fabrication. Details of concrete reinforcement accessories not covered herein shall be in accordance with "Manual Standard Practice for Detailing Reinforced Concrete Structures," ACI 315.

1.5 DELIVERY, STORAGE AND HANDLING

Comply with the provisions under the General Conditions of the Contract Documents. Store and maintain reinforcing steel and bar supports to prevent rusting, contamination or bending.

1.6 COORDINATION

- 1.6.1 Coordinate Work with the Contract general provisions.
- 1.6.2 Coordinate with placement of formwork, formed openings and other trades.

PART 2 PRODUCTS

- 2.1 All reinforcement shall be weldable deformed bars, new and free from rust, oil, defect, grease or kinks. They shall conform to the latest revision of ASTM A615 "SPECIFICATION FOR BILLET STEEL FOR CONCRETE REINFORCEMENT."
- 2.2 For Ø 12 bars or small, use grade 40 of $F_y = 280 \text{ Mpa}$ (40,000 psi) and for bars greater than Ø12, use grade 60 with $F_y = 414 \text{ Mpa}$ (60,000 psi)
- 2.3 Welded wire fabric for concrete reinforcement shall conform to ASTM A185 "SPECIFICATIONS FOR WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT."
- 2.4 Tie Wire: Minimum gauge 16 annealed type.
- 2.5 Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- 2.6 Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

PART 3 EXECUTION

- 3.1** Welding: When required or approved, welding of reinforcing steel shall conform to "REINFORCING STEEL WELDING CODE, AWS D12.1. No welding shall be done at the bend in a bar welding of crossing bars (tack welding) shall not be permitted except as authorized or directed by the Structural Engineer. The ASTM Specifications shall be supplemented by requirements assuming satisfactory weldability by this procedure.
- 3.2** Fabricating and Placing Tolerances: Bars used for concrete reinforcement shall meet the following requirements for fabricating tolerances:
- | | | | | |
|--------------|--|---|-------|----|
| 3.2.1 | Sheared length | - | ±25 | mm |
| 3.2.2 | Depth of truss bars | - | 0,-12 | mm |
| 3.2.3 | Overall dimensions of stirrups, ties and spirals | - | ± 12 | mm |
| 3.2.4 | All other bend | - | ± 12 | mm |
| 3.2.5 | Bars shall be placed to the following tolerances: | | | |
| | A. Clear distance to formed surfaces | - | ± 6 | mm |
| | B. Minimum Spacing between bars | - | + 6 | mm |
| | C. Top bars in slabs and beams | | | |
| | 1. Members 200 mm deep or less | - | +6 | mm |
| | 2. Members more than 200mm but not over 600 mm deeps | - | +12 | mm |
| | 3. Members more than 600 mm deep | - | + 20 | mm |
| | 4. Crosswise of members: spaced evenly within 50 mm. | | | |
| | 5. Lengthwise of members | - | ± 50 | mm |
- 3.2.6** Bars maybe moved as necessary to avoid interface with other reinforcing steel conducts or embedded items. If bars are moved more than one bar, it shall be subject to approval by the Structural Engineer.
- 3.3** **Placing:** Minimum concrete protective covering for reinforcement shall be as follows:
- | | | |
|--------------|---|---------|
| 3.3.1 | Concrete deposited against ground- | 75mm |
| 3.3.2 | Formed surfaces exposed to weather or in contact with ground. | |
| | A. Bars $\geq \phi 20$ | - 50 mm |
| | B. Bars $< \phi 20$ | - 35 mm |
| 3.3.3 | Interior surfaces | |
| | A. Beams, girder and columns | - 35 mm |
| | B. Slab and walls | - 20 mm |
- 3.4** All reinforcement shall be supported and fastened together to prevent displacement, construction loads or the placing of concrete beyond the tolerances specified herein. On ground, where necessary, supporting blocks maybe used. Over formwork, concrete, metal, or other approved bars chairs and spacers shall be used.
- 3.5** Vertical bars in columns shall be offset at least one bar diameter at lap splices. To ensure proper placement, templates shall be furnished for all column. All splices not

shown in the plans shall be subject to approval by the Structural Engineer. Mechanical connectors for reinforcing bars may be used subject to approval of the Structural Engineer.

- 3.6 Unless permitted by the Structural Engineer reinforcement shall not be bent after being embedded in hardened concrete.

****END OF SECTION****

SECTION 03 22 13

GALVANIZED WELDED WIRE REINFORCING

PART 1 GENERAL

1.1 SCOPE OF WORK

This section shall include all materials, labor, equipment, tools and services for the furnishing and installation of welded wire reinforcement and accessories as specified herein, in the Drawings and in accordance to the Contract Documents and applicable Codes and Standards.

1.2 REFERENCES

Comply with quality assurance requirements under General Conditions of the Contract Documents and Manufacturer's instructions. Reference the following standards as applicable:

1.2.1 American Concrete Institute, ACI

- A. ACI 318 - Building Code Requirements for Structural Concrete

1.2.2 American Society for Testing and Materials (ASTM)

- A. ASTM A82 - Standard Specifications for Steel Wire, Plain, for Concrete Reinforcement
- B. ASTM A123 - Standard Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- C. ASTM A185 - Standard Specifications for Steel Welded Wire Reinforcement, Plain, for Concrete
- D. ASTM A496 - Standard Specifications for Steel Wire Reinforcement, Deformed, for Concrete
- E. ASTM A497 - Standard Specifications for Welded Wire Reinforcement, Deformed, for Concrete
- F. ASTM A525 - Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
- G. ASTM A641/A641M-03 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

1.2.3 International Building Code, IBC, Chapter 19 Concrete

1.2.4 Concrete Reinforcing Steel Institute, CRSI, Manual of Standard Practice

1.2.5 Wire Reinforcement Institute, WRI, Manual of Standard Practice

1.3 DEFINITIONS

1.3.1 Welded Wire Reinforcement - Welded Wire Reinforcement (WWR) designates a material composed of cold-worked steel wire, fabricated into sheets by the process of electric resistance welding.

1.3.2 Wire Size - Individual wire size designations are based on the cross-sectional area of a given wire. The "W" and "D" number represents the cross-sectional area of the wire multiplied by 100. The "W" represents a plain wire and the "D"

represents a deformed wire. A D10 wire would indicate a deformed wire of 64.52 square millimeters (0.10 square inch).

- 1.3.3 Wire Spacing - The centerline-to-centerline distance between parallel wires.
- 1.3.4 Sheet Width - Center to center distance between outside longitudinal wires. This dimension does not include side overhangs.
- 1.3.5 Sheet Length - Tip to tip dimension of longitudinal wires (the length dimension always includes end overhangs).
- 1.3.6 Side Overhang - Extension of transverse wires beyond centerline of outside longitudinal wires (side overhangs are not included in the sheet width dimension).
- 1.3.7 Overall Width - Tip to tip dimension of transverse wires (this dimension is the sheet width plus both side overhangs).
- 1.3.8 End Overhangs - Extension of longitudinal wires beyond centerline of first and last transverse wires (end overhangs are included in the sheet length dimension).

1.4 SUBMITTALS

1.4.1 General:

All submittals for approval as indicated herein shall be in accordance to the provisions under General Conditions of the Contract Documents.

1.4.2 Product Data:

Submit product data for welded wire reinforcement, accessory, and other manufactured product indicated.

1.4.3 Shop drawings

For fabrication, bending, and placement of welded wire reinforcement, and additional reinforcing bars as required.

1.4.4 Material certificates

Signed by manufacturer and Contractor certifying that each material complies with requirements established by this specification.

1.5 QUALITY ASSURANCE

1.5.1 Comply with quality assurance requirements under General Conditions of the Contract Documents and Manufacturer's instructions.

1.5.2 Materials shall conform to governing ASTM specifications.

1.5.3 Welded Wire Reinforcement Tolerances

- A. Sheet Width: The permissible variation shall not exceed $\pm 12\text{mm}$, center-to-center distance between outside longitudinal wires.
- B. Overall Width: The permissible variation shall not exceed $\pm 25\text{mm}$ of the overall width (tip-to-tip length of transverse wire).
- C. Sheet Length: The overall length may vary by $\pm 25\text{mm}$ or 1% whichever is greater.
- D. Side Overhang: The permissible variation shall not exceed $\pm 12\text{mm}$.
- E. Deformed Wire Weight: The weight of any deformed wire is $\pm 6\%$.
- F. Plain Wire Diameter: The allowable variation in diameter of plain wire is as follows:

Wire Size	Diameter Variation
Smaller than W5.0	$\pm 0.076\text{ mm}$

W5.0 to W12.0	± 0.102 mm
W12.1 to W20.0	± 0.152 mm
Over W20	± 0.203 mm

- 1.5.4 Prior to placement of concrete, all welded wire reinforcement shall be free of contaminants that may adversely affect or reduce bond, such as oil or grease. Material will be accepted as being satisfactory without cleaning or brushing provided the dimensions, cross sectional area, and tensile properties of the reinforcement meet the requirements of these specifications.
- 1.5.5 Prior to placement of concrete, the Engineer shall inspect all reinforcing materials before and/or after installation to ensure compliance with the Contract Documents. All concrete placed in violation of these provisions shall be rejected and removed.
- 1.5.6 The Owner can conduct additional tests on the welded wire reinforcement to assure compliance with these specifications. Noncompliance demonstrated by these tests shall be cause for rejection of the material represented by the test samples.

1.6 DELIVERY, STORAGE AND HANDLING

- 1.6.1 Comply with product delivery requirements under General Conditions of the Contract Documents and Manufacturer's instructions.
- 1.6.2 Welded wire reinforcement shall be shipped in bundles, tagged and marked in accordance with the Manufacturer's instructions and standard practices.
- 1.6.3 Deliver welded wire reinforcement to project in undamaged condition. Lift welded wire reinforcement using a crane, forklift, or other lifting equipment.
 - A. Loading and unloading material with a crane requires lifting eyes. Lifting eyes are lengths of wire passing completely through to the underside of the bundle and brought back up to the top and twisted around 3 to 4 times to form an eye. Lifting eyes are located in the bundle to limit deflecting and bending in the center of the bundle. Typically, there are four lifting eyes per bundle located along the outside edge of the sheet.
 - B. Loading and unloading material with a forklift requires the welded wire reinforcement to be supported by dunnage.
- 1.6.4 Store welded wire reinforcement in a protected area to limit the potential for injury and surface deterioration caused by prolonged exposure to conditions that accelerate the oxidation of steel.
- 1.6.5 Store welded wire reinforcement accessories to prevent corrosion and accumulation of dirt and oil.
- 1.6.6 Protect reinforcement, ties, and metal accessories from permanent distortion and store them off the ground.

PART 2 PRODUCTS

2.1 Plain Welded Wire Reinforcement: ASTM A185, and as follows:

- 2.1.2 Yield Strength: Provide minimum yield strength of 75,000 psi (515 MPa).

- 2.1.2 Wire Spacing and Size: Provide wire spacing and size, as calculated to maintain the specified area of steel as indicated on the contract drawings.
- 2.1.3 Wire used in the manufacturing of welded wire reinforcement shall conform to ASTM A82.
- 2.1.4 Welded Wire Reinforcement shall be furnished in flat sheets or fabricated into bent sheets as indicated in the contract documents.

2.2 Deformed Welded Wire Reinforcement: ASTM A497, and as follows:

- 2.2.1 Yield Strength: Provide minimum yield strength of 80,000 psi (550 MPa).
- 2.2.2 Wire Spacing and Size: Provide wire spacing and size, as calculated to maintain the specified area of steel as indicated on the contract drawings.
- 2.2.3 Wire used in the manufacturing of welded wire reinforcement shall conform to ASTM A496.
- 2.2.4 Welded Wire Reinforcement shall be furnished in flat sheets or fabricated into bent sheets as indicated in the contract documents.

2.3 Supports

- 2.3.1 **Plastic or Wire Chairs, Bolsters, Bar Supports, Spacers:** Sized and shaped for strength and support of reinforcement during concrete placement and construction loading conditions as required and as required and as per Structural Engineer's approval.
 - A. Metal bolsters or chairs which bear against the forms for exposed surfaces shall be equipped with snug fitting, high density, polyethylene tips which provide 12mm minimum clearance between the metal and any exposed surface.
 - B. For galvanized reinforcing, chair and bar supports shall be hot-dipped galvanized, after fabrication, in accordance with ASTM A123.
 - C. Spacing of slab bolster rows and high chair rows for deck slabs shall be as noted in Wire Reinforcement Institute's "Manual of Standard Practice" and "TF 702, Supporting Welded Wire Reinforcement" unless otherwise directed by the Engineer.
- 2.3.2 **Concrete Blocks:** Concrete blocks shall have a minimum bearing area of 50mmx50mm and equal in quality to the concrete specified. Concrete blocks can be used for supporting welded wire reinforcement in footings and slab-on-grades.

2.4 Other Reinforcement

- 2.4.1 **Steel Reinforcing Bars:** Reinforcing bars shall consist of deformed bars meeting the requirements of ASTM A615, Grade 60.
- 2.4.2 **Dowel Bars:** Dowel bars shall be round steel bars meeting the requirements of ASTM A36.
- 2.4.3 **Tie Wire:** Shall be 16-gauge G.I. wire conforming to ASTM A641.

2.5 Galvanizing for welded wire reinforcement shall be in accordance with ASTM A525.

PART 3 EXECUTION

3.1 Examination

- 3.1.1** Examine conditions for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of welded wire reinforcement.
- 3.1.2** Examine rough-in and built-in construction to verify actual locations of concrete penetrations prior to installation.
- 3.1.3** Do not proceed until unsatisfactory conditions have been corrected.

3.2 Preparation

- 3.2.1** Clean all reinforcement by removing mud, oil, or other materials that will adversely affect or reduce bond at the time concrete is placed. Reinforcement with rust and/or mill scale will be accepted, provided the dimensions and weights, including heights or depth of deformations, are not less than required by the ASTM specification covering this reinforcement in this Specification.
- 3.2.2** Prior to placing welded wire reinforcement, remove laitance, loose materials, and anything that would prevent or hinder the installation of welded wire reinforcement.

3.3 Installation

- 3.3.1** Place supports to secure welded wire reinforcement against displacement caused by construction loads or placing of concrete. Concrete blocks shall be used for supporting welded wire reinforcement in footings and slab-on-grades. For other concrete work, metal or plastic supports, hangers, or spacers maybe used. Layers of welded wire reinforcement shall be separated by chairs or bolsters. Stones, wood blocks, brick chips, etc., shall not be used to support reinforcement.
- 3.3.2** Place welded wire reinforcement to obtain at least minimum coverage for concrete protection.
- 3.3.3** Do not displace or damage vapor barrier.
- 3.3.4** Accommodate placement of formed openings.
- 3.3.5** Welded wire reinforcement sheets shall have side lap and end laps as called for on the shop drawings. Laps shall be calculated in accordance with ACI 318 code.
- 3.3.6** Tie any added rebar with annealed iron wire of not less than gauge 16 or suitable clips. Wire ties shall be cut back so that no metal is within 25mm of the surface when the concrete is exposed to view.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SCOPE OF WORK

The work to be undertaken under this section shall comprise the furnishing of all labor, materials, equipment, plant and other facilities and the satisfactory performance necessary to complete all cast-in-place concrete placement operations for slabs on grade, slabs on fill, structural building frame, and other concrete components indicated on the drawings and specifications conforming to the Contract Documents provisions. Unless otherwise indicated on the drawings or specified herein, all concrete work shall be done in accordance with the "SPECIFICATIONS FOR CONCRETE AND REINFORCED CONCRETE" as adopted by the National Structural Codes for Buildings, latest edition, and the current American Concrete Institute's "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI-318-89) insofar as they do not conflict, or are not inconsistent with the specified provisions herein.

1.2 REFERENCES

Comply with quality assurance requirements under General Conditions of the Contract Documents and Manufacturer's instructions. Reference the following standards as applicable:

1.2.1.	American Concrete Institute, ACI 301 - 99	Specifications for Structural Concrete
1.2.2.	ACI 347	Recommended Practice for Concrete Formwork
1.2.3.	ACI 304	Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete
1.2.4.	ACI 318	Building Code Requirements for Reinforced Concrete
1.2.5.	ACI SP66	American Concrete Institute – Detailing Manual
1.2.6.	ACI 305R	Hot Weather Concreting
1.2.7.	ACI 306R	Cold Weather Concreting
1.2.8.	ACI 211.1	Selecting Proportions for Normal, Heavyweight and Mass Concrete
1.2.9.	ACI 211.2	Selecting Proportions for Structural Lightweight Concrete
1.2.10.	ACI 302.1R-96	Concrete Floor and Slab Construction
1.2.11.	CRSI –	Concrete Reinforcing Steel Institute – Manual of Practice, CRSI 63 Recommended Practice for Placing Reinforcing Bars.
1.2.12	CRSI 65	Recommended Practice for Placing Bar Supports; Specifications and Nomenclature.

1.2.13.	ASTM A185	American Society for Testing Materials - Welded Steel Wire Fabric for Concrete Reinforcement.
1.2.14.	ASTM A615	Deformed and Plain Billet Steel for Concrete Reinforcement.
1.2.15.	ASTM C33	Concrete Aggregates.
1.2.16.	ASTM C330	Light Weight Aggregates for Structural Concrete.
1.2.17.	ASTM C94	Ready Mixed Concrete.
1.2.18.	ASTM C150	Portland Cement
1.2.19.	ASTM C260	Air-entraining Admixtures for Concrete.
1.2.20.	ASTM C309	Liquid Membrane-Forming Compounds for Curing Concrete.
1.2.21.	ASTM D2103	Polyethylene Film and Sheeting.
1.2.22.	FS TT-C-800	Curing Compounds, Concrete for New and Existing Surfaces.
1.2.23.	ASTM D1751	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
1.2.24.	ASTM D1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
1.2.25.	ASTM D994	Preformed Expansion Joint Filler for Concrete (Bituminous Type).
1.2.26.	ASTM C494	Chemical Admixtures for Concrete.
1.2.27.	ASTM E1155	Test Method for Determining Floor Flatness and Levelness using the F Number
1.2.28.		American Welding Society, AWS D1.4 – Structural Welding Code for Reinforcing Steel
1.2.29.		Department of Works and Highway, DPWH; Standard Specifications, Volume II, 2004

1.3 SUBMITTALS

- 1.3.1 General: All submittals for approval as indicated herein shall be in accordance to the provisions under General Conditions of the Contract Documents.
- 1.3.2 Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.
- 1.3.3 Provide mix designs as required herein and include laboratory test reports of trial strength and shrinkage tests. Furnish and deliver samples of cement and aggregates as selected by the Engineer for testing and analysis. Submit for the Engineer's approval the laboratory, ready-mix plant and concrete technologist that the Contractor intends to engage to design the concrete mixes.
- 1.3.4 Submit a delivery ticket with each batch of concrete delivered to the site in accordance with the requirements of ASTM C94.
- 1.3.5 Shop Drawings: Indicate reinforcement sizes, spacings, locations and quantities of reinforcing steel and wire fabric, bending and cutting schedules, splicing, and supporting and spacing devices. Include concrete placement schedule, method, sequence, quantities, location, and boundaries

- 1.3.6 Provide data on joint devices, expansion and control joint materials, attachment accessories, admixtures, curing and sealing materials. Submit drawings showing proposed locations of control joints in slab-on-grade, where not shown on Drawings.

1.4 DESIGN REQUIREMENTS

- 1.4.1 Comply with the construction notes and standard details as indicated in Structural Drawing, first page of the drawing, for the design provisions. Use high strength concrete for areas as designated in the construction notes, except, concrete works for slab on grade, curbs and as indicated on Drawings and notes.
- 1.4.2 Design and construct formwork, shoring and bracing to conform to Code requirements; resultant concrete to conform to required shape, line and dimension.
- 1.4.3 Provide expansion joints, control joints, construction joints, and isolation joints to prevent uncontrolled stress cracks in the structure and according to the latest engineering standards.

1.5 QUALITY ASSURANCE

- 1.5.1 Comply with quality assurance requirements under General Conditions of the Contract Documents and Manufacturer's instructions. Perform work in accordance with ACI301 and applicable referenced documents.
- 1.5.2 The Contractor shall select a qualified concrete supplier capable of meeting project requirements as specified herein. Concrete supplier shall hold a valid certificate of conformance for concrete production facilities Philippine Concrete Industry Association and/or American Concrete Institute, ACI-RP.
- 1.5.3 Acquire cement and aggregate from same source for all work.
- 1.5.4 Conform to ACI 305R or ACI 306R when concreting during hot or cold weather, as appropriate.
- 1.5.5 Provide continuous on-site monitoring by a qualified inspection agency during all phases of construction. Inspection agency shall provide written reports of all inspections. Inspections shall be in conformance with the provisions of the Contract Documents.

1.6 DELIVERY, STORAGE AND HANDLING

- 1.6.1 Cement shall be stored in weather tight buildings, bins, or silos which will exclude moisture and contaminants.
- 1.6.2 Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of like aggregates. To ensure that this condition is met, any test for determining conformance to requirements for cleanliness and grading shall be performed on samples secured from the aggregates at the point of batching.
- 1.6.3 Natural or manufactured sand shall be allowed to drain until it had reached relatively uniform moisture content before it is used.

- 1.6.4** Admixture shall be stored in such a manner as to avoid contamination evaporation, or danger. For those used in the form of suspension or non-stable solutions, agitating equipment shall be provided to assure thorough distribution of the ingredients. Liquid admixture shall be protected from freezing and from temperature changes which would adversely affect their characteristics.

PART 2 PRODUCTS

2.1 Cement.

Portland cement shall conform to the "SPECIFICATIONS FOR PORTLAND CEMENT" (ASTM C150 Latest Revision) for Type I Portland Cement.

2.2 Admixture.

Admixture to be used in concrete, when required or permitted shall conform to the "SPECIFICATIONS FOR CHEMICALS ADMIXTURES FOR CONCRETE" (ASTM C494) for water-reducing, retarding and accelerating admixture or to the SPECIFICATIONS FOR FLY ASH AND RAW OR CALCINED NATURAL POZZOLANS FOR USE IN PORTLAND CEMENT (ASTM C618) for Pozzolanic admixtures.

2.3 Concrete Aggregates.

Concrete aggregates shall be well-graded, clean, hard particles of gravel, or crushed rock conforming to the "SPECIFICATIONS FOR CONCRETE AGGREGATES" (ASTM C33 Latest Revision).

2.4 Water.

Mixing water for concrete shall be clean and free from injurious amount of oil, acids, alkali, organic materials or other substances that maybe deleterious to concrete or steel.

2.5 Reinforcement.

Shall be in accordance with Section 032000.

2.6 Accessories.

Shall be in accordance with Section 031500.

PART 3 EXECUTION

3.1 Proportioning

3.1.1 General.

Concrete for all parts of the work shall be of the specified quality capable of being placed without excessive segregation.

3.1.2 Strength.

The specified compressive strength of the concrete for each portion of the structure shall be as tabulated on S-1 of the Structural Drawings.

3.1.3 Durability.