

be suspended during rain and inclement weather, or when unsatisfactory field conditions are encountered unless otherwise directed by the ENGINEER. At all times during construction, the CONTRACTOR shall maintain proper drainage in the construction area and shall take all measures necessary for erosion and sediment control.

1. Excavation work shall be done in all kinds of soils.
2. This scope includes the excavation of column footing, tie beam, and removal of materials within the staked - out line of the building.
3. The Contractor shall furnish all the necessary labor, place and maintain all support and shoring as maybe required for the excavation, including the removal/pumping of storm/waste water from the excavation.
4. The Contractor shall take every precaution to protect existing utility services from damage during construction operations. If damage occurs, the Institution shall be notified immediately and repairs shall be made promptly at the Contractor's expense. All repair works shall be satisfactory to the Engineer and the Institution. When interruptions of existing utilities occur, temporary service shall be provided as approved by the Engineer and Owner of the utility.
5. The Contractor shall provide a working space allowance of 0.5 m each face of the structural element (for footing, wall footings and tie beams) for an excavation of 1.0 m depth and .8m for 2.0 m depth of excavation, respectively.

#### VIII. Backfilling and Gravel Bedding

This Item shall consist of backfilling & gravel bedding per this specification and in conformity with the lines, grades, and dimensions shown on the plans or established by the Engineer.

1. Excavated areas around structures shall be backfilled with free-draining granular material approved by the Engineer and placed in horizontal layers not over 150 mm in thickness, to the level of the original ground surface. Each layer shall be moistened or dried as required and thoroughly compacted with mechanical tampers at 90% MDD.
2. All excavated materials, so far as suitable, shall be utilized as backfill or embankment. The surplus materials shall be disposed of in such a manner as not to obstruct the stream or otherwise impair the efficiency or appearance of the structure. No excavated materials shall be deposited at any time that may endanger the partly finished structure.
3. This scope includes utilization of excavated material and an additional volume of suitable backfilling materials for embankment up to the finish grade line.
4. The concrete strength of column and reinforced concrete walls must be attained up to its considerable strength before backfilling and compaction is done on-site.
5. Gravel bedding must have a minimum compacted thickness of 150mm.
6. The finished grade line of the structure must refer to the finished roadway as per standard construction practice.
7. No footing shall rest on fill.
8. Contractor to provide for de-watering of excavations from either surface water, groundwater, or seepage.
9. The Contractor shall include backfilling and compaction works at 1.0m offset distance (outside) from the perimeter of the building at 90% MDD.

### PART B. PLAIN AND REINFORCED CONCRETE WORKS

#### IX. Forms and Falseworks

This Item shall consist of designing, constructing, and removing forms and falsework to temporarily support, concrete, girders, and other structural elements until the structure is completed to the point it can support itself.



### Formwork

The material 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 material. 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.

### Falsework

The material to be used in the falsework construction shall be of the quantity and quality necessary to withstand the stresses imposed; it may be timber or steel or a combination of both. The workmanship shall be of such quality that the falsework will support the loads imposed on it without excessive settlement or take-up beyond as shown on the falsework drawings.

1. Shop drawings for forms and false works shall be submitted by the Contractor to the PMO approval before fabrication/ installation.
2. Submission of shop drawings to the PMO for evaluation/ approval shall be submitted 7 days before fabrication/ installation.
3. The Contractor shall submit a detailed calculation of scaffolds if it can withstand the imposed loads due to the self-weight of the structural element, construction loads, and impact loads.
4. Formworks shall be coated with non-staining mineral oil or non-staining form coating compound (form oil) in all contact surfaces with concrete before rebar installation and closure of forms.
5. Provide formworks with clean-out openings to permit inspection and removal of debris.
6. The Contractor shall remove debris before concrete casting.
7. Forms submerged in water shall be watertight.
8. Use  $\frac{3}{4}$ " thk. Phenolic Board – construction form.
9. Scaffoldings/ Staging and Steel Form Rental is included in this scope.
10. All forms and scaffolds used by the Contractor during construction, completion, or repair of the said project shall be turned over to the Administration after the construction except for the Personal Steel Forms and scaffolds (H-Frame).

### X. Reinforcing Steel Bars

This item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required per standard specifications and in conformity with the requirements shown on the plans or as directed by the Engineer.

1. The Reinforcing Steel Bars shall conform to the latest specification of the ACI and the National Structural Code of the Philippines with a minimum grade equivalent to Grade 40 (276 MPa) unless otherwise specified or as directed by the Engineer.
2. Shop drawings/ Rebar cutting list shall be submitted by the Contractor for PMC approval before rebar fabrication and installation.
3. Submission of shop drawings/Rebar Cutting list for evaluation/ approval shall be submitted 7 days before rebar fabrication.
4. All cut off points of RSB in all tie beams, suspended beams, and girder must be observed as specified on plans and as per approved design and as per standard construction practices and methodology.

5. Reinforcing Steel bars shall undergo material testing for strength verification.
6. The Contractor shall submit to the TPC and PMC a mill certificate of reinforcing steel bars for yield strength verification and its content.
7. Steel bars shall not be coated with form oil.
8. Standard hooks, Splicing, and Development length shall be observed on site.
9. All Hooks for stirrup/lateral ties and main reinforcement shall be seismic hooks.
10. This scope includes all reinforcing bars required for reinforced concrete works including other items where it is necessary as per plan and specifications.

#### XI. Structural Concrete

This item shall consist of furnishing, placing, and finishing concrete in all structures except pavements per this Specification and conforming to the lines, grades, and dimensions shown on the plans. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixture when specified, and water mixed in the proportions specified or approved by the Engineer.

1. Structural concrete must attain a minimum compressive strength  $f_c' = 21.0$  MPa (3000 Psi) at 28 days and as per structural specification.
2. Use clean fine aggregates & crushed gravel (maximum 19mmØ) as per plan and structural specification for Structural members. The use of uncrushed gravel is prohibited.
3. Concrete pouring of columns shall be terminated anywhere within the upper thirds of the column clear height.
4. Proper concrete sampling and testing shall be done on-site as per specifications.
5. Proper concrete curing must be observed on site.
6. Lean concrete must be provided for column footings with a minimum thickness of 50mm.
7. Proper concrete pouring methodology shall be observed on-site to avoid the segregation of aggregates.
8. Structural Concrete shall attain its acceptable strength before Stripping/Dismantling of bottom forms.
9. This scope also includes the construction of foundation, column footings, columns, reinforced concrete walls, and other items necessary as per plan and specifications.

### PART C. ARCHITECTURAL FINISHES & OTHER CIVIL WORKS

#### XII. Greenhouse Framing (Incl. Nursery Cover)

This Item shall consist provision of greenhouse framing including nursery cover, materials, labor tools, and equipment required in undertaking the proper installation as shown on the plans in accordance with this specification listed below.

1. Structural framing covered with green shade net
  - 100mmØ Sch.40 Steel Pipe
  - 75mmØ Sch.40 Steel Pipe
  - 50mmØ Sch.40 Steel Pipe
  - 12mm thk. Steel Plate