

## PART 1 - GENERAL

### 1.1 CONCRETE PROCEDURES

- .1 The content of the Work encompassed within this Division of the specifications shall be in accordance with the National Building Code, 1995 & MBC 98, C.S.A. Standard CAN3-A23.1-94 and CAN3-A23.2-94 all provincial safety codes and municipal bylaws.

### 1.2 COLD WEATHER CONCRETING PROCEDURES:

This section applies whenever the outdoor temperature drops below 5 degrees C. Follow requirements as outlined in ACI (most current edition)

- .1 All concrete shall be supplied, heated, to the forms, at a temperature not greater than 25 C, when mixed and shall be at least 18 C when placed. Protect against freezing by the use of enclosures and heating units for the period shown below. The use of non - vented heaters will not be permitted. Calcium chloride additives shall not be used.
- .2 Enclosures shall be heated to a temperature of 18 C for a period of at least 24 hours before pouring concrete and after pouring shall be kept heated to 15 C for 4 days.
- .3 In no case shall the basement or crawl space temperature drop below 4 C during cold weather construction.

### 1.3 TESTING PROCEDURES

- .1 The The City shall engage an approved independent testing and inspection laboratory to perform concrete tests.
- .2 Tests shall be in accordance with C.S.A. Specification CAN3-A23.2-94. Samples shall be taken and handled only by the inspection firm. At least three cylinder tests shall be taken from each concrete pour or from each 115 cubic metres of concrete, whichever is less. One cylinder shall be tested at the age of seven days and the remaining two at the age of twenty-eight days.

### 1.4 SITE LAYOUT

- .1 The General Contractor shall be responsible for complete Site layout, pile staking, excavation layout, and setting of all geodetic elevations of various building components as indicated on the drawings.

### 1.5 EXCAVATION AND BACKFILL

- .1 Strip off and store on Site, in a location approved by the Contract Administrator, reuseable topsoil material.
- .2 Excavate to elevations and dimensions required by the Work, to clean lines, allowing not less than 450 mm clear of grade beams, etc. Make excavation at the natural angle of repose of soil material.
- .3 Make bearing areas level, free of soft loose, and organic material.
- .4 Maintain water-free excavations.
- .5 Where necessary, brace and shore to withhold earth banks properly in position until permanent Work has been completed, inspected, and approved for backfill.
- .6 Over-excavations shall be filled as follows:
  - .1 Bearing areas - not less than 7MPa concrete

- .2 Non-bearing areas - clean earth or gravel unless otherwise noted.
- .7 Notify the Contract Administrator when Work is ready for inspection. No backfilling against foundation walls shall be done until the Contract Administrator has approved same, and all Work below grade including drains, sewers, weeping drains, waterproofing and damproofing have been inspected and approved.
- .8 No backfill shall be placed until first floor beams, slabs and/or joists are in place.
- .9 All fill shall be clean earth. No frozen material shall be used.
- .10 Rocks, blocks or concrete and masonry materials no greater in size than 0.03 m<sup>3</sup>, but no debris, may be used for fill if well distributed in the earth. Such materials shall not be placed against foundation walls or within 450 mm of the top of subgrade level.
- .11 Remove construction debris and rubbish from excavation before backfilling.
- .12 Place earth fill in layers not exceeding 300 mm in depth, compacted to prevent future settlement, to required elevations.
- .13 Avoid damage to the walls and to any damproofing or waterproofing.

1.6 CONCRETE REINFORCEMENT: Refer to Structural drawings for additional specifications.

- .1 Unless otherwise specified herein or called for on drawings, this section of Work shall conform to C.S.A. Specification CAN3-A23.3-94, Code for the Design of Concrete Structures for Buildings.
- .2 Reinforcing steel shall be fabricated in accordance with ACI Standard 315-74.
- .3 Bar reinforcing steel shall be deformed intermediate grade new billet steel or high strength new billet steel in accordance with C.S.A. Specification CAN CSA - G30.18 400 MPA - M92 (R1998). Except for stirrups which may be 300 MPA.
- .4 Reinforcing bars shall be free from flaws, cracks or other defects of rolling, shall be true to size and shape and shall be free of loose scales of rust, dirt, grease or other destroyers of bond. Bars shall be bent cold and accurately shaped to required detail.
- .5 All the necessary accessories for the proper spacing, support and fastening of reinforcement shall be included.
- .6 Steel reinforcement shall be accurately positioned and rigidly held in place prior to placing concrete.
- .7 All reinforcing steel shall be thoroughly leaned of loose rust, mill scale, and other foreign coating liable to reduce or destroy the bond to concrete.
- .8 Concrete cover to main reinforcing steel shall be 50 mm (minimum).

1.7 CONCRETE MATERIALS

- .1 All structural concrete shall meet following specifications.

Concrete	Cement	28 Day Strength	Max. Aggregate	Air	Slump	Steel Cover
Belled Piles	50	32 MPa	20 mm	5-8%	80 +/- 30 mm	75 mm
Grade Beams	10	30 MPa	20mm	5-8%	80 +/- 30mm	50 mm
Interior Slabs	10	30 MPa	20 mm	5-8%	80 +/- 30mm	40 mm

- .2 All form ties shall be of the snap back variety, such that when removed, no metal shall be within 19 mm of any finished concrete surface.
- .3 Walls and beams not continuously supported shall have bottoms formed with 150 mm poly wrapped shearmat.
- .4 All concrete in contact with soil and not protected by dampproofing to be made with sulphate resistant cement.
- .5 All concrete shall be delivered to the job by an approved transit-mix company. Job mixed concrete shall not be used.
- .6 Anchor bolts shall be supplied and set by the concrete Contractor. Refer to architectural and structural drawings for size and locations. Each anchor bolt shall be supplied c/w flat washers and

## 1.8 CONCRETE PLACEMENT

- .1 The Contractor shall notify the Contract Administrator at least two full days in advance of closing the formwork and placing of concrete, for inspection of the formwork and reinforcing steel as well as all inserts. For the inspection of the wall reinforcing, interior forms shall be left open. Prior to pouring of concrete the Contractor shall submit in writing to the Contract Administrator that all precautions have been taken, arrangements made, formwork and steel properly and securely placed, and that all inserts relating to all trades have been accurately located. Deficiencies shall be rectified to the satisfaction of the Contract Administrator prior to placing concrete.
- .2 Notify the appointed concrete testing laboratory in order that personnel may be present when concreting begins to carry out concrete tests.
- .3 Forms shall be thoroughly oiled or wetted before placing concrete. Forms shall not be wetted during freezing weather.
- .4 Concrete shall be placed in the forms with care and in a continuous operation. In no case shall the wet concrete be allowed to fall freely from a height in excess of 1.5 metres. Where the forms are of a depth greater than 1.5 metres or in heavily reinforced areas placing shall be done by means of "elephant trunks" or other approved aids. Concrete shall be placed in horizontal layers at a rate which will ensure satisfactory compaction, without forming voids or honeycombing.
- .5 Concrete in walls, piers, or columns shall be poured at a rate of not more than 2.5 metres per hour in 0.5 metres lifts. Where it is necessary to pour walls, columns and supporting beams and slabs monolithically, intervals of four hours shall elapse between the vertical pour and the horizontal pour to ensure that the slump and compaction of the vertical pour is complete. A cement sand slurry shall be deposited in the base of all columns before concrete is placed. A minimum of .03 m<sup>3</sup> of this slurry shall be used per column.
- .6 All concrete shall be thoroughly compacted during placing by means of hand-tamping and vibrating, to ensure a dense homogenous structure of close bond with reinforcing and smooth form surfaces.

## 1.9 CONSTRUCTION JOINTS

- .1 The location of construction joints shall be approved by the Contract Administrator.
- .2 All construction joints shall be cleaned before pouring new concrete.

#### 1.10 HONEYCOMBING

- .1 The Contractor shall do no repair Work to honeycombing until all surfaces have been inspected by Contract Administrator and approval given for such Work.
- .2 The Contract Administrator shall, at his discretion, condemn any Work which shows signs of serious honeycombing. The Contractor shall remove and replace any such condemned Work at no cost to the The City.
- .3 Where mild honeycombing has occurred, and the Contract Administrator approves, the Contractor shall chip out all areas of honeycombing until sound concrete is exposed. The edges of these areas must be chipped so that they are at right angles to the surface. Areas shall then be wire brushed, thoroughly wetted and covered with a thin coat of neat cement mortar. Immediately following this, the areas shall be patched with retempered stiff mortar of sand. Retempering shall be accomplished by mixing and remixing for about 20 minutes before using. Mortar shall be packed as tightly as possible and the surface struck off slightly above the surrounding surface. The patch shall then be finished with a wood float flush with the surrounding surface and cured for not less than five (5) days.

#### 1.11 CONCRETE SLAB FINISHES

- .1 Slabs to receive resilient flooring materials or to remain exposed shall receive a monolithic steel trowel finish. Trowelling shall not be started until the moisture film and shine have disappeared from the surface and the concrete has set enough to prevent an excess of fine material and water being Worked to the surface. Steel trowels shall be vigorously used at an angle of 45 degrees, under pressure until the final trowelling produces a hard dense surface, free of defects marring its appearance. This Work shall be done by experienced concrete finishing personnel.
- .2 Exterior slabs, sidewalks and ramps for wheeled traffic shall be given a broom finish with grooves running perpendicular to traffic flow, using a 900 mm concrete broom.

#### 1.12 INSERTS, EMBEDDED PARTS AND OPENINGS

- .1 The concrete Contractor shall accurately locate and set in place items which are to be cast directly into concrete. Install all components straight, level and plumb, ensure items are not disturbed during concrete placement.

#### 1.13 CONCRETE CURING

- .1 Concrete curing and protection shall be in accordance with C.S.A. CAN3-A23.1-94.
- .2 All exposed surfaces of concrete shall be prevented from drying out for seven days after placing. Surfaces shall be kept damp by application of water or by the use of forming curing compounds, where no additional finish or topping is required.

#### 1.14 SAWCUT CONCRETE CONTROL JOINTS

- .1 Within 24 hours of finishing troweling slab sawcut slab into equal panels, refer to "Foundation Slab Plan" for location of sawcuts.
- .2 Sawcuts are to be minimum of 20 mm deep x 3mm wide
- .3 Sawcuts are to be cleaned of all accumulated debris and caulked with appropriate type of caulking prior to installation of finished flooring materials.

**END OF SECTION**