Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 20 00 - Concrete Reinforcing.

.2 Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

.1 Canadian Standards Association International (CSA).

.1 CSA-A23.1-09/A23.2-09. Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA-O86-09 CONSOLIDATION. Engineering design in wood.

.3 CSA-O121-08 (R2013). Douglas Fir Plywood.

.4 CSA-O141-05 (R2009). Softwood Lumber.

.5 CSA-B111-1974 (R2003). Wire Nails, Spikes and Staples.

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00.

.2 Clearly indicate method and schedule of construction, materials, arrangement of joints, ties, shores, braces, liners, and locations of temporary embedded parts. Give proposed strengths of concrete at time of stripping forms.

Part 2 Products

2.1 MATERIALS

.1 Formwork lumber: plywood and wood formwork materials to CSA-O121 and CSA-O86.1.

.1 Exposed surfaces: new, square-edged, flat, smooth surfaced panels, free of holes, surface markings or other defects.

.2 Concealed surfaces: square edged, T & G lumber, plywood or other material, suitable to retain concrete without leakage or distortion.

.3 Plywood: Douglas Fir, to CSA-O121, solid one side or medium density overlaid one side grade. High density overlaid grade for architectural concrete. Sound undamaged sheets with clean, true edges.

.4 Lumber: to CSA-O141.

.5 Tubular column forms: round, spirally wound laminated fibre forms, internally treated with release material. Spiral pattern not to show in hardened

concrete.

.2 Nails, spikes, staples: galvanized, to CSA-B111.

.3 Form release agent: non-staining, chemically active release agent containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing set of film of concrete in contact with form.

.4 Joint tape: non-staining, impermeable, self-release type.

.5 Form Ties: use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surfaces.

Part 3 Execution

3.1 ERECTION

.1 Do concrete formwork to CSA-A23.1 except where specified otherwise.

.2 Verify lines, levels and column centres before proceeding with formwork and ensure dimensions agree with drawings.

.3 Construct forms to produce finished concrete conforming to the shape, dimensions, locations and levels shown on the drawings within the tolerances required by CSA-A23.1.

.4 Obtain Departmental Representative's consent for use of earth forms. Hand trim sides and bottoms and remove loose earth before placing concrete.

.5 Align form joints and make watertight. Keep form joints to a minimum.

.6 Use 20mm chamfer strips on exposed corners of beams, columns, walls and curbs, unless otherwise specified.

.7 Form chases, slots, openings, drips, recesses, expansion and control joints as detailed.

.8 Set anchors, ties, bolts, nailers, templates, cast-in hardware and shelf angles, steel connection units or other inserts into forms and secure against displacement during concreting.

.9 Re-use of formwork subject to requirements of CSA-A23.1.

.10 Use new formwork for concrete surfaces which will be exposed to view.

.11 Leave formwork in place for 3 days for walls and piers unless otherwise instructed.

End of Section

Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 10 00 - Concrete Formwork

.2 Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCES

.1 Canadian Standards Association International (CSA).

.1 CSA-A23.1-09/A23.2-09. Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A23.3-04(R2010). Design of Concrete Structures for Buildings.

.3 CSA-G30.3-M1983(R1998). Cold Drawn Steel Wire for Concrete Reinforcement.

.4 CSA-G30.5-M1983(R1998). Welded Steel Wire Fabric for Concrete Reinforcement.

.5 CSA-G30.18-09. Carbon steel bars for concrete reinforcement.

.6 CSA-W186-M1990 (R2012). Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of steel supplied, showing physical and chemical analysis.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00.

.2 Prepare drawings in accordance with "Reinforcing Steel Manual of Standard Practice".

Part 2 Products

2.1 MATERIALS

.1 Reinforcing bars: billet steel, grade 400, deformed bars to CSA-G30.18.

.2 Welded steel wire fabric: to CSA-G30.5. Provide in flat sheets only.

.3 Chairs, bolsters, bar supports, spacers: adequate for strength and support of

reinforcing construction conditions.

.4 Use chairs with plastic coated feet where slab and beam soffits will be exposed.

2.2 FABRICATION

.1 Fabricate reinforcing to CSA-A23.1.

.2 Fabricate to tolerances specified by "Reinforcing Steel Manual of Standard Practice".

.3 Acquire Departmental Representative's review of locations of reinforcement splices other than shown on steel placing drawings.

Part 3 Execution

3.1 PLACING REINFORCEMENT

.1 Do reinforcing work in accordance with CSA-A23.1 and welding of reinforcing with CSA-W186, except where indicated otherwise.

.2 Detail reinforcing to "Reinforcing Steel Manual of Standard Practice", by Reinforcing Steel Institute of Canada.

.3 Conform to National Building Code, 2010.

.4 Maximum chair spacing: 10M - 600mm. 15M - 1200mm.

.5 Obtain Departmental Representative's review of reinforcing steel and position before placing concrete.

.6 Clean reinforcing before placing concrete.

.7 Ensure welded wire fabric is adequately supported at centre of slab (or where indicated) during concrete placing.

End of Section

Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 10 00 - Concrete Formwork.

.2 Section 03 20 00 - Concrete Reinforcement.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM).

.1 ASTM C260/C260M-10a. Standard Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C494/C494M-13. Standard Specification for Chemical Admixtures for Concrete.

.3 ASTM C1017/C1017M-07. Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.4 ASTM D1751-04(2008). Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.2 Canadian Standards Association International (CSA).

.1 CSA-A23.1-09/A23.2-09. Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A3000-08. Cementitious materials compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

Part 2 Products

2.1 MATERIALS

.1 Portland cement: to CAN/CSA-A3000, Type GU.

.2 Water, fine aggregates, normal density coarse aggregates: to CSA-A23.1.

.3 Air entraining admixture: to ASTM C260.

.4 Chemical admixtures: to ASTM C494.

.5 Pozzolanic mineral admixtures: to ASTM C1017.

.6 Superplasticizing admixtures: to ASTM C494.

.7 Non-shrink grout: premixed compound consisting of non-metallic aggregate,

cement, water reducing and plasticizing agents, of pouring consistency, capable of developing minimum compressive strength of 50 MPa at 28 days.

.8 Dry Pack: compound consisting of non-metallic aggregate, cement and sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 35 MPa at 28 days.

.9 Premoulded joint filler: Bituminous impregnated fiber board: to ASTM D1751.

2.2 CONCRETE MIXES

.1 Proportion normal density concrete to CSA-A23.1, Clause 4.3, to give the following properties:

LOCATION	28 DAY STRENGTH	SLUMP *	CLASS OF EXPOSURE
Slabs on grade	32 MPa	75	C-2
Pier Footings	35 MPa	75	C-1
Fence Posts, Curbs & Walks	32 MPa	50	C-2

*Obtain these slumps with aid of specified water reducing agent.

.2 Provide certification that plant, equipment, and all materials to be used in concrete comply with requirements of CSA-A23.1.

.3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA-A23.1, Clause 4.4.5.

.4 Obtain Departmental Representative's consent before using chemical admixtures.

.5 Use of calcium chloride not permitted.

Part 3 Execution

3.1 WORKMANSHIP

.1 Do cast-in-place concrete work in accordance with CSA-A23.1, and testing in accordance with CSA-A23.2, except where specified otherwise.

.2 Ensure that reinforcement and inserts are not disturbed during concrete placement.

.3 Prior to placing of concrete in adverse weather, obtain Departmental Representative's review of proposed method for protection during placing and curing.

.4 Maintain accurate records of poured concrete items to indicate date, location of pour quality, air temperature and test samples taken.

3.2 INSERTS

.1 Obtain Departmental Representative's review of conduit routing in slabs prior to placing of concrete.

3.3 GROUTING

.1 Grout underside of steel column and beam bearing plates with non-shrink type grout to manufacturer's instructions, which results in 100% contact over grouted area.

3.4 FINISHING

.1 Finish concrete to CSA-A23.1.

.2 Rub exposed sharp edges of concrete walls, columns and beams with carborundum to produce 3mm radius edges unless otherwise detailed.

3.5 DEFECTIVE CONCRETE

.1 Remove defective concrete, blemishes and embedded debris and repair as approved by Departmental Representative.

3.6 INSPECTION AND TESTING

.1 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative, in accordance with CSA-A23.1, Clause 4.4.

.2 Costs of tests will be paid as per 01 45 00 – Quality Control.

.3 Ship prepaid 3 test cylinders from each 60 cubic meters (max.) of concrete placed to designated testing laboratory.

.4 Prepare one additional test cylinder during cold weather concreting. Cure cylinder on job site under same conditions as concrete it represents.

3.7 WINTER PROTECTION

.1 Carry out winter concreting in strict accordance with CSA-A23.1, Clause 7.4 and Section 01 00 10 General Instructions.

.2 Do not use unvented heaters.

.3 Remove and replace damaged concrete at no cost to Crown.

3.8 HOT WEATHER PROTECTION

.1 Carry out hot weather concreting in accordance with CSA-A23.1, Clauses 5.2 and 7.4, including use of approved moisture retention film, if applicable.

END OF SECTION