

## 1 GENERAL

### 1.01 RELATED SECTIONS

- .1 CAST-IN-PLACE CONCRETE: Section 03 30 00
- .2 CONCRETE REINFORCING: Section 03 20 00

### 1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
  - .3 CSA O121-M1978(R2003), Douglas Fir Plywood.
  - .4 CSA O151-04, Canadian Softwood Plywood.
  - .5 CSA O153-M1980(R2003), Poplar Plywood.
  - .6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.
  - .7 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.
  - .8 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
  - .9 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada
- .2 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

### 1.03 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings for formwork and falsework.
- .3 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3 for formwork drawings.
- .4 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

### 1.04 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
  - .1 Place materials defined as hazardous or toxic in designated containers.
  - .2 Divert wood materials from landfill to a recycling/composting facility as approved by Departmental Representative.
  - .3 Divert plastic materials from landfill to a recycling facility as approved by Departmental Representative.

- .4 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Formwork materials:
  - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-0121, CAN/CSA-086, CSA 0437 Series, and CSA-0153.
  - .2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.
  - .3 Rigid insulation board: to CAN/ULC-S701.
- .2 Form ties:
  - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
  - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
  - .3 Plywood: medium density overlay conforming to CAN/CSA-0325.0.
- .3 Form release agent: non-toxic, biodegradable, low VOC.
- .4 Falsework materials: to CSA-S269.1.

## 3 EXECUTION

### 3.01 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .3 Fabricate and erect falsework in accordance with CSA S269.1.
- .4 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .5 Do not place shores and mud sills on frozen ground.
- .6 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .7 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels

indicated within tolerances required by CSA-A23.1/A23.2.

- .8 Align form joints and make watertight.
  - .1 Keep form joints to minimum.
- .9 Use 25 mm chamfer strips on external corners and 25 mm fillets at interior corners, joints, unless specified otherwise.
- .10 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
  - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .11 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND  
RESHORING

- .1 Remove formwork when concrete has reached 70 % of its design strength.
- .2 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

**END OF SECTION**

## 1 GENERAL

### 1.01 RELATED REQUIREMENTS

- .1 CONCRETE FORMING AND ACCESSORIES: Section 03 10 00.
- .2 CAST-IN-PLACE CONCRETE: Section 03 30 00.

### 1.02 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
  - .1 No measurement will be made under this Section.
    - .1 Include reinforcement costs in items of concrete work in Section 03 30 00 - Cast-In-Place Concrete.

### 1.03 REFERENCES

- .1 American Concrete Institute (ACI)
  - .1 SP-66-04, ACI Detailing Manual 2004.
    - .1 ACI 315-99, Details and Detailing of Concrete Reinforcement.
    - .2 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
- .2 ASTM International
  - .1 ASTM A 82/A 82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- .3 CSA International
  - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CSA-A23.3-04, Design of Concrete Structures.
  - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
- .4 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

### 1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice and ACI 315.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in New Brunswick.
    - .1 Indicate placing of reinforcement and:
      - .1 Bar bending details.
      - .2 Lists.
      - .3 Quantities of reinforcement.

- .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
- .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
- .2 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.
  - .1 Provide type A tension lap splices unless otherwise indicated.

### 1.05 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
- .2 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel.

### 1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .2 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .3 Cold-drawn annealed steel wire ties: to ASTM A 82/A 82M.
- .4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .5 Plain round bars: to CSA-G40.20/G40.21.

### 2.02 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2, ACI 315 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
  - .1 ACI 315R unless indicated otherwise.
- .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

### 2.03 SOURCE QUALITY CONTROL

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

## 3 EXECUTION

### 3.01 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

### 3.02 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Use plain round bars as slip dowels in concrete.
  - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
  - .2 When paint is dry, apply thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.

### 3.03 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**END OF SECTION**

## 1 GENERAL

### 1.01 RELATED REQUIREMENTS

- .1 CONCRETE FORMING AND ACCESSORIES: Section 03 10 00.
- .2 CONCRETE REINFORCING: Section 03 20 00.

### 1.02 PRICE AND PAYEMENT PROCEDURES

- .1 Supply and installation of the concrete retaining wall complete with reinforcing steel installation shall be measured as a lump sum item.
  - .1 Excavation and disposal shall be included in the work.
  - .2 Demolition and disposal shall be included in the work.
  - .3 Concrete sidewalk shall be paid under section 32 16 15.

### 1.03 REFERENCES

- .1 ASTM International
  - .1 ASTM A 185/A 185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .2 CSA International
  - .1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .3 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

### 1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
  - .1 Submit placing drawings prepared in accordance with plans to clearly show size, shape, location and necessary details of reinforcing.
  - .2 Submit drawings showing formwork and falsework design to: CSA A23.1/A23.2.
  - .3 Submit drawings stamped and signed by professional engineer registered or licensed in New Brunswick.
- .3 At least 4 weeks prior to beginning Work, inform Departmental Representative of source of fly ash.
  - .1 Do not change source of fly ash without written approval of

Departmental Representative.

- .4 Provide inspection results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .5 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 for concrete to be delivered to site of Work and discharged after batching.

#### **1.05 QUALITY ASSURANCE**

- .1 Provide to Departmental Representative, 4 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
  - .1 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements.

#### **1.06 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
    - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
    - .2 Deviations to be submitted for review by the Departmental Representative.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

### **2 PRODUCTS**

#### **2.01 DESIGN CRITERIA**

- .1 Alternative 1 - Prescription: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

#### **2.02 PERFORMANCE CRITERIA**

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by [Departmental Representative] [DCC Representative] [Consultant] and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

#### **2.03 MATERIALS**

- .1 Cement: to CSA A3001, Type GU.

- .2 Supplementary cementing materials: with minimum 20% fly ash replacement, by mass of total cementitious materials to CSA A3001.
- .3 Water: to CSA A23.1/A23.2.
- .4 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.
- .5 Other concrete materials: to CSA A23.1/A23.2.

## **2.04 MIXES**

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
  - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
  - .2 Provide concrete mix to meet following hard state requirements:
    - .1 Durability and class of exposure: C-1.
    - .2 Compressive strength at 28 age: 35 MPa minimum.
    - .3 Aggregate size 25 mm maximum.
  - .3 Concrete supplier's certification.
  - .4 Provide quality management plan to ensure verification of concrete quality to specified performance.

## **3 EXECUTION**

### **3.01 PREPARATION**

- .1 Provide Departmental Representative 24 hours notice before each concrete pour.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application of concrete finishes.

### **3.02 INSTALLATION/ APPLICATION**

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
- .2 Sleeves and inserts:
  - .1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required

- .2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by Departmental Representative .

### 3.03 FINISHES

- .1 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1/A23.2.
- .2 Pavements, walks, curbs and exposed site concrete:
  - .1 Screed to plane surfaces and use magnesium floats.
  - .2 Provide round edges and joint spacings using standard tools.
  - .3 Trowel smooth.

### 3.04 CURING

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

### 3.05 SEALING APPLICATION

- .1 After curing is complete, apply poly-siloxane resin blend sealer at 4 m<sup>2</sup> /L.

### 3.06 SITE TOLERANCES

- .1 Concrete floor slab finishing tolerance to CSA A23.1/A23.2.

### 3.07 FIELD QUALITY CONTROL

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative.

### 3.08 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate cleaning area for tools to limit water use and runoff.
- .4 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Divert unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
  - .2 Provide appropriate area on job site where concrete trucks and be safely washed.
  - .3 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.
  - .4 Do not dispose of unused admixtures and additive materials into sewer

---

REPAIRS TO ASPHALT	CAST-IN-PLACE CONCRETE	SECTION 03 30 00
PARKING LOTS & DRIVEWAYS	FOR RETAINING WALL	PAGE 5
SHEDIAC PSPC		
SHEDIAC, NB R.054895.001		2014-12-30

---

systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

**END OF SECTION**

---

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 35 29 – Health and Safety Requirements.
- .3        Section 01 35 43 – Environmental Procedures.
- .4        Section 01 74 11 - Cleaning.
- .5        Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.2                REFERENCES**

- .1        ASTM International
  - .1        ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .2        ASTM D260-86(2001), Standard Specification for Boiled Linseed Oil.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3        CSA International
  - .1        CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2        CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .3        CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

**1.4                QUALITY ASSURANCE**

- .1        Provide to Departmental Representative, 2 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
- .2        Owner will employ materials testing consultant to verify compliance of cast-in-place concrete. Notify Departmental Representative 48 hours prior to concrete pouring. This verification by the Owner does not relieve the contractor from its own quality control.
- .3        Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 – Health and Safety Requirements.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
    - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
    - .2 Deviations to be submitted for review by the Departmental Representative.
  - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Cement: to CSA A3001, Type GU.
- .2 Water: to CSA A23.1/A23.2.
- .3 Reinforcing bars: to CAN/CSA-G30.18, Grade 400 (if required).
- .4 Welded steel wire fabric: to ASTM A185 (if required).
- .5 Premoulded joint filler:
  - .1 Bituminous impregnated fibreboard: to ASTM D1751.
- .6 Joint sealer/filler: grey to CAN/CGSB-19.24, Type 1, Class B.
- .7 Other concrete materials: to CSA A23.1/A23.2.

### **2.2 MIXES**

- .1 Ensure materials used in concrete mix have been submitted for testing and meet requirements of CSA A23.1.
  - .1 Class of exposure: C-1.
  - .2 Aggregate: normal-density to CAN/CSA-A23.1.
  - .3 Admixtures: to CAN/CSA-A23.1.
  - .4 Maximum W/CM ratio: 0.45.
  - .5 Air content category range: 5% to 8%.
  - .6 Slump: at time and point of discharge 30 to 80 mm.
  - .7 Minimum specified compressive strength at 28 days: 32 Mpa.

---

**Part 3 Execution**

**3.1 PREPARATION**

- .1 Provide Consultant 24 hours notice before each concrete pour.
- .2 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .3 Protect previous Work from staining.
- .4 Clean and remove stains prior to application of concrete finishes.

**3.2 INSTALLATION/APPLICATION**

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

**3.3 FINISHES**

- .1 Formed surfaces exposed to view: in accordance with CSA A23.1/A23.2.
- .2 Pavements, walks, curbs and exposed site concrete:
  - .1 Screed to plane surfaces and use aluminum, magnesium or wood floats.
  - .2 Provide round edges and joint spacings using standard tools.
  - .3 Trowel smooth to provide lightly brushed non-slip finish.

**3.4 CONTROL JOINTS**

- .1 Cut control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.

**3.5 EXPANSION AND ISOLATION JOINTS**

- .1 Install premoulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

**3.6 CURING**

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

**3.7 SEALING APPLICATION**

- .1 After curing is complete, apply two even coats of linseed oil mixture to clean dry surfaces, each at 8 m<sup>2</sup>/L. Allow first coat to dry before applying second coat.

**3.8 FIELD QUALITY CONTROL**

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated by Owner.

**3.9 CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 Environmental Procedures.
- .4 Waste Management: separate waste materials for reuse, recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Provide appropriate area on job site where concrete trucks and be safely washed.
  - .2 Divert unused concrete materials from landfill to local quarry or facility after receipt approval from Departmental Representative.
  - .3 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of approval from Departmental Representative.
  - .4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

**END OF SECTION**