CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 General Requirements

1. Supplementary Conditions, General Conditions, General Requirements, shall govern Work of this Section.

1.2 Related Work

.1	All Division 1	Specification Sections
.2	Section 02233	Granular Base
.3	Section 02311	Site Grading
.4	Section 03100	Concrete Formwork
.5	Section 03200	Concrete Reinforcement
.6	Section 03300	Cast-In-Place Concrete

1.3 Description

.1 Before commencing of Work, review with the Consultant, sampling program for Work performed under this Section.

.2 Schedule Work to allow sufficient time and access for Consultant to carry out sampling program during regular Working hours.

1.4 Quality Assurance

.1 Reference Standards: The following reference standards shall govern Work in this Section, except where they are in conflict with requirements imposed by this specification, in which case the latter shall govern. Standards referenced in the Canadian Standards Association (CSA) Standard CAN3-A23.1 apply but are not repeated in the following list:

.1 CSA Standard A23.1-M77, Concrete Materials and Methods or Concrete Construction.

.2 CSA Standard A23.3-M84, Design of Concrete Structures for Buildings.

.3 CSA Standard G30.5-M1983, Welded Steel Wire Fabric for Concrete Reinforcement.

.4 CSA Standard G30.18-M1992, Billet Steel Bars for Concrete Reinforcement.

1.5 Submittals

.1 **Shop Drawings:**

.1 Submit shop drawings stamped and certified by a

Professional Engineer licensed in the Province of Ontario.

.2 Submit placing drawings and bars lists sufficiently detailed and dimensioned, with complete information necessary for fabrication of reinforcement and placing of bars and accessories.

.3 Show height of support chairs. For vertical reinforcement, show dimension from bar to concrete surface.

.4 Show location of splice joints, all reinforcement to be continuous.

.5 Prior to submission to the Consultant, the Contractor shall review all shop drawings. By this review, the Contractor represents to have determined and verified all field measurements, site conditions, materials, and similar data and to have checked and coordinate each shop drawing with the requirements or the Work and of the contract documents. The Contractor's review of each shop drawing will be indicated by stamp, date and signature of an authorized and qualified person.

.6 At the time of submission, the Contractor shall advise the Consultant in writing of any deviations in shop drawings from the requirements of the Contract Documents.

.7 The Consultant will review and return shop drawings in accordance with the agreed schedule. The Consultant's review will be for conformity to design concept and for general arrangements only and shall not relieve the Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of Contract Documents.

.8 The Contractor shall make changes in shop drawings which the Consultant may require consistent with Contract Documents and resubmit unless otherwise directed by the Consultant. When resubmitting the Contractor shall notify the Consultant in writing of any revisions other than those requested by the Consultants.

.9 Do not commence fabrication of reinforcement before drawings have been reviewed and the Consultant comments incorporated on drawings issued to fabrication shop.

.2 **As-Built Drawings:**

.1 Mark on a complete set of final reproducible drawings any

changes, additions or deletions that occur during the construction as a result of the Contractor's Work, change orders, or for any other reasons.

.2 For all shop drawings marked "Reviewed as Noted" or "Revise and Resubmit", update and submit a record set of these drawings at the completion of the structural Work. Ensure that these drawings reflect the changes and are coordinated with the final reproducible drawings as noted above.

1.6 Delivery, Storage and Handling

.1 Deliver, store and handle reinforcement and accessories in a manner that prevents contamination which reduces bond, and damage to fabricated forms.

.2 Protect reinforcement from rust, dirt, grease, from oil and other bond breaking substances.

PART 2 PRODUCTS

2.1 Materials

.1 Reinforcing Steel: Canadian manufactured deformed steel to CSA Standards of G30 Series, 400 MPa min. yield strength, CAN/CSA-G30.18, unless otherwise indicated, and to the material specification shown on the drawings. For deformed steel manufactured outside Canada, provide test data from a Canadian Testing Laboratory proving that each size and grade of reinforcement proposed meets specification requirements.

.2 Welded Steel Wire Fabric: Conforming to ASTM A185/A185M, 152mm x152mm, 6/6 to CSAG 30.5 in flatsheets **not rolls.**

.3 Cold-drawn annealed steel wire ties to ASTM-A497/A497M.

.4 Chairs, bolsters, bar supports, spacers to CSA-A23.1/A23.2.

.5 Glass Fiber Reinforced Concrete: High density concrete made of ASTM C 150 Portland cement, crushed stone, silica sand, and polymers reinforced with continuous filament glass fiber and structural reinforcing as stated on drawings.

.6 Epoxy Coating for Reinforcement (where specified). An electronic application of epoxy protective coating conforming to requirements of OPSS 1442 and 1443.

.7 Plain round bars: CSA-G40.20/G40.21.

PART 3 EXECUTION

3.1 Fabrication of Concrete and Masonry Reinforcement

.1 Fabricate reinforcement in accordance with CSA A23.1/A23.2 and the RSIC Manual of Standard Practice, in fabricating shop, unless otherwise approved.

.2 Replace bars which develop cracks or splits.

3.2 Placing of Concrete Reinforcement

.1 Set anchors bolts, wall dowels, etc., prior to concreting with wooden templates or other approved means.

.2 Do not drive or force reinforcement into fresh concrete.

.3 Secure reinforcement in columns, walls, slabs and curbs using sufficient spacers on each face to maintain the requisite distance between reinforcement and column or wall face and so that vertical bars are plumb.

.4 Provide splices only where indicated on the drawing.

.5 Coordinate placement of reinforcement with placement of servicing lines, equipment and materials.

3.3 Field Bending

.1 Do not field bend reinforcement except where indicated or authorized in writing by Consultant.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars which develop cracks or splits.

3.4 Epoxy Coated Reinforcement

.1 Provide epoxy coated reinforcement where shown on the drawings.

.2 All systems for handling, transporting and storing coated bars shall be such that the coating shall not be damaged. Prevent bar to bar abrasion and excessive sagging. Do not drop and drag bars. Store on suitable non-metallic supports.

.3 During and after the installation of the bars into their location in the deck, repair all damaged portions of the coating with patching material conforming to OPSS 1443. Any damaged accessories shall also be repaired.

.4 Repair all damaged areas of the coated reinforcing steel and metallic accessories in accordance with Clause 12 of ASTM A775, before any rusting occurs. The Consultant may require that damaged bars be replaced instead of being repaired. If infrequent and small damaged areas do rust, completely remove the rust by an approved method before the areas are repaired.

3.5 Welded Wire Fabric

.1 Lap ends and sides of fabric not less than 300mm (12”).

3.6 Quality Control

.1 Provide a system of quality control to ensure that the minimum standards specified herein are attained.

.2 Bring to the attention of the Consultant any defects in the Work or departures from the Contract Documents which may occur during construction. The Consultant will decide upon corrective action and give recommendations in writing.

.3 The Consultant’s general review during construction, inspection and testing by Independent Inspection and Testing Companies reporting to the Consultant are both undertaken to inform the Owner of the Contractor’s performance and shall in no way augment the Contractor’s quality control or relieve the Contractor of contractual responsibility.

3.7 Notification

.1 Prior to commencing significant segments of the Work, give the Consultant and Independent Inspection and Testing Companies appropriate notification so as to afford them reasonable opportunity to review the Work. Failure to meet this requirement may be cause for the Consultant to classify the Work as defective.

3.8 Inspection and Testing

.1 The Consultant will appoint the Independent Inspection and Testing Company to make inspections or perform tests as the Consultants directs at the Contractors expense. The Independent Inspection and Testing Company shall be responsible only to the Consultant, and

shall make only such inspections or tests as the Consultant may direct.

.2 If defects are revealed, the Consultant, at the Contractor's expense, may require additional inspection or testing to ascertain the full extent of the defect.

3.9 Defective Materials and Work

.1 Where evidence exists that defective Work has occurred or that Work has been carried out incorporating defective materials, the Consultant may have tests, inspections or surveys performed, analytical calculations of structural strength made, and the like, in order to help determine whether the Work must be replaced. Tests, inspections or surveys or calculations carried out under these circumstances will be made at the Contractor's expense, regardless of their results, which may be such that, in the Consultant's opinion, cause undue delay or give results not representative of the rejected material in place. In this case, the tests shall be acceptable.

.2 Where applicable, all testing shall be conducted in accordance with requirements of the Ontario Building Code, except where this would, in the Consultant's opinion, cause undue delay or give results not representative of the rejected material in place. In this case, the results shall be conducted in accordance with standards given by the Consultant.

.3 Materials or Work which fails to meet specified requirements may be rejected by the Consultant whenever found at any time prior to final acceptance of the Work regardless or previous inspection. If rejected, defective materials or Work shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

3.10 Adjusting and Cleaning.

.1 Adjust and secure reinforcement in correct position immediately before concrete is placed.

.2 Remove contaminants which lessen the bond between the concrete and reinforcement.

END OF SECTION - 03200