Concrete Reinforcement

PART 1 - GENERAL

1.1 Work Included
.1 Reinforcing steel, for cast-in-place concrete, complete with tie wire.
.2 Support chairs, bolsters, bar supports spacers for reinforcing.
.3 Supplemental rebar in floor slab removal and replacement areas.

1.2 Related Work
.1 Cast-in-Place Concrete Piles: Section 02319
.2 Concrete formwork Section 03100
.3 Cast-in-Place Concrete Section 03300

1.3 Reference Standards
.1 CAN3-A23.2 - "Code for the Design of Concrete Structures in Buildings".
.2 CSA G30.5 - " Welded Steel Wire Fabric for Concrete Reinforcement".
.3 CAN/CSA G30.18 - "Billet Steel Bars for Concrete Reinforcement".
.4 ACI 315 - American Concrete Institute - "Manual for Standard Practice".
.5 CSA-A23, A23.2 - "Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete".

1.4 Quality Assurance
.1 Perform concrete reinforcing work in accordance with CSA A23.3 and ACI Detailing Manual 315.
.2 Perform welding in accordance with CSA W186.

1.5 Test Reports
.1 Upon request, provide Contract Administrator with certified copy of mill test report of steel supplied, showing physical and chemical analysis.

1.6 Shop Drawings
.1 Submit shop drawings clearly indicating bar sizes, spacing, location and quantities of reinforcement, splice locations, mesh, chairs, spacers and hangers with identifying code marks to permit correct placement without reference to structural drawings: to ACI 315.
.2 Detail placement of reinforcing where special conditions occur.
.3 Reproductions of structural drawings will not be permitted for use as shop drawings.

1.73 Delivery and Storage
.1 Deliver, handle and store reinforcement in a manner to prevent damage and contamination.

PART 2 - PRODUCTS

2.1 Reinforcing Materials
.1 Reinforcing steel 400 Mpa yield grade deformed epoxy coated billet steel bars conforming to CSA G30.18.

2.2 Accessory Materials
.1 Tie Wire: Minimum 18 gauge, annealed type or patented system Materials approved by Consultant.
.2 Chairs, Bolsters, Bar Supports, Spacers: Adequately sized and shaped for strength and support of reinforcing during construction conditions.

PART 3 - EXECUTION

3.1 Examination
.1 Before starting this Work, examine work done by others which affects this Work.
.2 Rectify all conditions which would prejudice proper installation of this Work.
.3 Commencement of work implies acceptance of existing conditions.

3.2 Installation
.1 Place reinforcing steel in accordance with drawings and CSA A23.3.
.2 Adequately support reinforcing, and secure against displacement within tolerances permitted.
.3 Place reinforcing steel to provide concrete cover as follows:

Item	Coverage
Slabs	20mm

.4 Maintain alignment as follows:

Item	Coverage
Slabs	5mm

3.3 Cleaning
.1 Remove all loose scale, loose rust and other deleterious matter from surfaces of reinforcing.

3.4 Inspection
.1 Notify Contract Administrator when placement of reinforcing is complete so that an inspection may be made.

Cast-in-Place Concrete

PART 1 - GENERAL

1.1 Work Included
.1 All plain and reinforced cast-in-place concrete shown on Drawings.
.2 Setting anchors, inserts, frames, sleeves and other items supplied by other Sections.
.3 Repairing concrete imperfections.

1.2 Quality Assurance
.1 Cast-in-place concrete to conform to CSA A23.1.

PART 2 - PRODUCTS

2.5 Concrete Materials
.1 Cement: Symbol 10 Normal Portland.
.2 Cement: Type 50 Sulphate Resistant for cast-in-place piling.
.3 Fine Aggregate: conforming to Clause 5.3, CSA A23.1.
.4 Coarse Aggregate: conforming to Clause 5.4, CSA A23.1 Group I.
.5 Water: clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious material.
.6 Materials are to be obtained from the same source of supply or manufacturer for the duration of the project. All exposed concrete is to be of a consistent colour.

2.2 Admixtures
.1 Air Entrainment: conforming to CSA A266.1
.2 Pozzolanic Mineral: conforming to CSA A266.3
.3 All concrete to be plant mix in accordance with Table A.
.4 Xypex Admix C-500, 2% by weight of concrete (For Pool Slab and curb only)

TABLE A

Mix Type	Portion of Structure
C-1	Pool slab & curb (with Xypex Admix C-500)
C-1	Deck Slab (without Xypex Admix)

PART 3 - EXECUTION

3.1 Examination
.1 Before starting this Work, examine work done by others which affects this work.
.2 Rectify all conditions which would prejudice proper completion of this Work.
.3 Commencement of work implies acceptance of existing conditions.

3.2 Placing Concrete
.1 Place concrete in accordance with lines and levels indicated on drawings and in accordance with requirements of CSA-A23.1.
.2 Notify Contract Administrator minimum 48 hours prior to commencement of concreting operations to allow for inspection.
.3 Notify all trades sufficiently in advance to ensure provision is made for openings, inserts and fasteners.
.4 Maintain accurate records of poured concrete items. Record date, location of pour, quantity, air temperature and test samples taken. Provide Contract Administrator with this information upon request.
.5 Ensure reinforcement, inserts, and embedded parts are not disturbed during concrete placement.
.6 Ensure all anchors, seats, plates and all other items to be cast into concrete are placed, held securely and will not cause undue hardship in placing concrete. Rectify same and proceed with work.
.7 No water may be added after the initial introduction of mixing water for the batch.
.8 Maintain concrete cover around reinforcing as indicated on the drawings.
.9 Conveying equipment shall not impart harmful shock or vibration to fresh concrete, or cause misalignment of forms. All conveying and placing equipment shall be kept clean of hardened concrete, and foreign materials at all times.Carts, wheelbarrows, etc., shall not be run directly over reinforcing casting over concrete removed for trenching.
.10 Concrete shall be placed in its final position as soon as possible after mixing and must be in place with 1.5 h after the water has been added to the dry materials. Any concrete more than 1.5 h since mixing cement and water, or having a partial set before placing shall not be used.
.11 Any concrete that splashes or otherwise coats reinforcing which is not be cast with 2 h shall be cleaned off.
.12 Pour concrete continuously between predetermined construction and control joints. Do not "break" or Interrupt successive pours such that "cold" joints occur.
.13 The vertical height of free fall of concrete shall not exceed 1500mm (5'-0"). For greater falls, concrete shall be deposited by chute or spout to prevent segregation of material.
.14 The use of high-frequency internal vibrators is mandatory for all concrete work on this job and the use of such shall strictly conform to CSA-A23.1, Section 19.
.15 Fill all waterproofing notches and sawcuts with a 2 part urethane sealant material . Acceptable product: Ecolastic II.

3.3 Screeding
.1 Screed slabs level, maintaining surface flatness of maximum 6mm in 3mm (1/4" in 10'-0").

3.4 Concrete Curing
.1 After concrete has sufficiently set, its exposed surfaces shall be kept continuously moist for a period of at least 7 days after placing in accordance with Section 0335. Forms on vertical surfaces shall remain in position for at least 4 days, unless otherwise protected from rapid drying. Concrete shall be protected from harmful effects of mechanical shock or injurious substances.

Concrete Finishing

PART 1 - GENERAL

1.1 Related Work
.1 Cast-in-place concrete Section 03300

1.2 Reference Standards
.1 Do concrete floor finishing to CSA A23. Current Edition except where specified otherwise.
.2 Concrete curing shall comply with CSA A23.1-94, except where specified otherwise.

PART 2 - PRODUCTS

2.1 Materials
.1 Curing: Use clean, potable water which shall not contain impurities which would cause stalning.

PART 3 - EXECUTION

3.1 Workmanship
.1 All concrete surfaces shall be finished by a specialty concrete finishing contractor.
.2 The size of finishing crews shall be planned with due regard for the effects of concrete.
.3 Finish shall be light broom finish to be approved by Contract Administrator after review of sample per 3. 2.1.
.4 Sealer to be spread over infill concrete.
.5 All finishing and sealing of concrete is incidental to the unit prices bid.

3.2 Sampling
.1 Prepare a 900 mm X 900 mm sample piece specified for review by the Contract Administrator prior to pouring of concrete pavement. The Contractor will be required to reconstruct the slab if the specified finish does not meet the approval of the Contract Administrator. Upon approval of the sample slab finish, this sample shall be utilized as the minimum standard of acceptance for the contract work as determined by the Contract Administrator. Work that does not meet these requirements may be rejected. Following completion of the concrete work, the slab shall be removed and disposed of off-site by the Contractor. All costs in connection with this Work shall be incidental to the prices bid.

3.3 Drains
.1 In areas where floor drains are installed, grade the entire floor surface (or as indicated on plans) towards the drain.
.2 Floors to be level around walls and have a minimum 5mm/m uniform pitch to drains, unless indicated otherwise.
.3 The slope shall be such that water on all areas of the floor surface will drain by gravity, without leaving pools or puddles on the floor surface.

3.4 Plain Floor Finish
.1 Spread and vibrate concrete to force coarse aggregate into concrete mix and then screed.
.2 Float surface with wood or metal floats, or with power finishing machine, and bring surface to true grade.
.3 Steel trowel in accordance with CSA A 23.1. Trowel to level, even surface, to within 6mm tolerance when measured in any direction using a 3m straight edge.
.4 Continue steel trowelling to produce smooth burnished surface.
.5 Sprinkling of dry cement, or dry cement and sand mixture over concrete surface is not acceptable.
.6 Wet Curing: wet cure exposed concrete floors using burlap sheeting over entire floor area, weighted down and taped on all edges for total coverage of wetted down concrete, and keep in place and maintain dampness a minimum of seven days.

3.5 Vertical Surface Finish
.1 Use a mixture of sand, Portland cement and bonding agent.
.2 Apply by burlap sack or rubber float in a swirl finish, to provide a uniform finish, minimum 3mm (1/8") thick.
.3 Apply at all exposed exterior grade beams and foundation walls unless another finish is specified.

Field Quality Control

PART 1 - GENERAL

1.1 Related Work
.1 Cast-in-place concrete Section 03300

1.2 Reference Standards
.1 Inspection and testing of concrete and concrete material will be carried out by a Testing Laboratory designated by Contract Administrator in accordance with CAN/CSA-A23.1/A 23.2. and be paid for by City of Winnipeg.
2. Contractor will be advised on schedule and frequency of testing and will be required to advise Contract Administrator 72 hours ahead of test required.

PART 2 - EXECUTION

.1 Contractor to provide free access to all portions of work and cooperate with inspection agency.
.2 Concrete cylinder test:
.1 Make at least one set of 3 cylinders for each day's concreting or for each 34 cubic meters of concete placed, for each type of concrete mix.
.2 Take cylinders at point of deposit of concrete.
.3 For each test: slump and air content will be taken and 3 standard cylinders will be prepared and cured under laboratory conditions.
.4 One cylinder from each test will be broken at 7 days and remaining cylinders at 28 days.
.5 When temperatures are below 5° C, prepare one additional field cured cylinder to verify that adequate strength is attained.
.6 When either air or slump measurements are not with in specified limits, reject concrete load. Undertake testing of subsequent concrete load to ensure conformance to specifications.
.7 Deliver test results directly from test laboratory to Contract Administrator.
.3 Inspection or testing by Contractor will not augment or replace Contractor quality control not relieve him of his contractual responsibilities.
.4 If any tests reveal concrete does not meeting specifications, Contract Administrator may enforce one or more remedial procedures such as:
.1 Change in mix design.
.2 Change in concrete supplier.
.3 Additional testing by coring or impact hammer.
.4 replacement of work.
.5 Other procedures as necessary.
.4 Pay cost of remedial work to make concrete meet specifications.

PROVINCE OF MANITOBA
JULIEN LAVERGNE
DEC. 23, 2011
REGISTERED PROFESSIONAL ENGINEER

APEGM
Certificate of Authorization
Lavergne Draward & Associates Inc.
No. 1912 Date: DEC. 23, 2011

No.	Description	Date (m/d/y)	Drawn	Checked
1	ISSUED FOR TENDER	12/23/12	AG	JL

Revisions/Issuance (Read Up)

Designed By	Drawn By	Checked By	Approved By
JL	AG	JL	JL

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Client
CITY OF WINNIPEG

Project Title
KING EDWARD PARK WADING POOL REPLACEMENT
709 MANHATTAN AVE. WINNIPEG, MB.
Bid Opportunity Number: 1010-2011

Sheet Title
STRUCTURAL SPECIFICATIONS

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