City of Winnipeg **Excavation/Backfill and Grading for Structures** **Section 02315**
Bid Opportunity 293-2008

PART 1 - GENERAL

1.1 General Requirements
.1 Refer to, General Requirements
.2 All Contract documents form an integral part of this section.

1.2 Requirements
.1 Provide all labour, materials, methods, equipment, and included accessories to complete the excavation/backfill, including but not necessarily limited to the following:
.1 Excavation for utilities, grade beams, pits, and pile caps as indicated.
.2 Excavation in preparation for concrete floor slabs and pads as indicated.
.3 Backfill for utilities, grade beams, pits, pile caps, slabs, pads etc. as indicated.
.4 Preparation of all final grades as indicated.
.5 Remove all surplus materials from the site.
.6 Provide any general demolition and removal as required by the Work.

1.3 Codes/Standards
.1 Obtain all applicable permits and approvals as required by the Work.

1.4 Protection of Existing
.1 Prior to commencing excavation, verify the location, depths and status of features existing utilities with the appropriate utility authorities. Maintain and protect same for damage during the course of the Work.

1.5 Excavation
.1 Excavate to elevations and dimensions indicated for installation, construction and inspection of Work indicated.
.2 Earth bottoms of excavations to be dry, undisturbed, level, free of loose or organic matter.

1.6 Backfilling
.1 Areas to be backfilled shall be free from debris, snow, ice, water or frozen ground. Backfill material shall also be free of these properties.
.2 Do not backfill against cast-in-place concrete within 2 days of placing, backfill simultaneously each side of walls and beams to equalize soil pressures.
.3 Granular shall be as indicated as is.
.4 Compact backfill to 95% STD Proctor density in 8" maximum lifts of granular material.
.5 The base beneath void form and the concrete slab to be firm and of sufficient density to support dead load on concrete and construction load.
.6 Backfill to finished elevations as indicated on the drawings.

1.7 Grading
.1 Complete the final grading work to levels indicated for the placement of final surface finishes.
.2 Grades and slopes shall be installed as indicated to within 5% of design levels.

1.8 Materials
.1 Apply water proofing membrane as indicated on the details and specified in the general note.
.2 Granular fill, clean, natural sand and gravel material, free from silt, clay, loam friable or soluble materials and vegetable matter graded with the following limits:

Sieve Size (Tyler)	Per Cent Passing
1 ½"	(25) 100
# 4	25-80
# 50	15-40
# 200	7-10

City of Winnipeg **Foundation and Underslab Drainage** **Section 02317**
Bid Opportunity 293-2008

PART 1 - GENERAL

1.1 Related Work .1 Excavating, backfilling and grading Section 02315

PART 2 - PRODUCTS

2.1 Materials
.1 Course filter aggregate: to CAN3-A23.1, Table 3, Group 1, ¾" to 3/16".
.2 Refer to mechanical for all pipe and fitting specifications.

PART 3 - EXECUTION

3.1 Installation
.1 Ensure graded sub grade conforms with required pattern before placing filter bed material.
.2 Ensure improper slopes, unstable areas, areas requiring additional compaction or other unsatisfactory conditions are corrected to approval of Contract Administrator.
.3 Begin installation of foundation drainage after deficiencies have been corrected.
.4 Pipe bedding: cut trenches in compacted sub-base and place 4" thickness minimum of course filter aggregate and compact to elevations required to achieve drainage slope.
.5 Pipe laying:
.1 Ensure pipe interior and coupling surfaces are clean before laying.
.2 Lay perforated pipe to minimum slope of 1:100.
.3 Do not use shims to establish pipe slope.
.4 Use fittings recommended by manufacturer.
.5 Install end plugs at ends of collector drain.
.6 Protect pipe ends from damage and ingress of foreign material.
.7 Connect to existing perimeter foundation drainage system of existing building.
.8 Filter bed backfill:
.1 Place filter bed backfill after pipe installation is approved by Contract Administrator.
.2 Place minimum of 6" thickness course filter aggregate on each side of perforated pipe and minimum of 12" thickness coarse filter aggregate over perforated pipe.
.3 Place filter bed by hand in 6" lifts. Avoid crushing flexible pipe during backfill operations. Consolidate by hand tamping lightly. Prevent displacement of pipe tubing.

City of Winnipeg **Cast-in-Place Concrete Piles** **Section 02319**
Bid Opportunity 293-2008

PART 1 - GENERAL

1.1 Related Work .1 Cast-in-Place-Concrete Section 03300
Specified Elsewhere .2 Concrete Reinforcement Section 03200

1.2 Examination
.1 Visit site to determine existing conditions and requirements for protection of adjacent work, and accept site and existing work as it exists at time of commencement of work. Verify all dimensions at the site.

1.3 Pile Layout
.1 Pile layout shall be verified together with General Contractor for accurate locations prior to pile work. Any errors shall be reported to Contract Administrator and corrected.

1.4 Inspection & Testing
.1 Notify Contract Administrator and secure approval before placing reinforcing steel and concrete. Issue at least 24 hours notice to Contractor Administrator, where inspection will be required.
.2 Concrete tests will be required in accordance with CSA Standard A-23.1. Ensure that samples are taken and handled only by qualified agency approved by Contract Administrator. If concrete at 28 days is less than required strength, provide whatever additional foundation is required, as directed, to satisfactorily support load at same point without additional cost to the contract.

1.5 Protection
.1 Protect steel reinforcing set into concrete piles.
.2 Provide frost protection for concrete to CSA A23.1

PART 2 - PRODUCTS

2.1 Materials
.1 Reinforcing steel: All reinforcing in the piles shall have a minimum yield point as shown in section 3200. Size of all reinforcing shall be as shown on drawings.
.2 Concrete: In accordance with CSA Standard A-23.1. Strength at 28 days as shown on drawings, concrete to be well vibrated full height of pile. Type 50 Sulphate Resistant cement shall be used in all piles. No admixture containing calcium chloride shall be used.

PART 3 - EXECUTION

3.1 Location
.1 Install within 25mm of exact centres set out, less than 2% out of plumb alignment and 25mm in elevation. Report to Contract Administrator if these measures are not met so that an alternate support technique may be devised.

3.2 Boring
.1 Machine bore piles to depth required, circular and full diameter noted. Remove stones (up to 300mm greatest dimension), boulders over 300mm and rock in whole or in part, before boring and clean hole to ensure that machine auger has reached required depth.
.2 Sleeves shall be placed through any soil that may slough during drilling and placing of the concrete.
.3 Fill holes with concrete the same day that holes are bored.
.4 Place covers over all pile holes right after drilling and leave in place till pile is poured to keep deleterious materials out of hole.

3.3 Placing Concrete and Steel
.1 Securely fasten reinforcing steel and anchor bolts during concrete placement.
.2 Bring top of each unit up to level, roughen surface at elevation shown on plans, and form proper seating for structural work it is intended to support. Each unit shall be vibrated with approved mechanical vibrator.
.3 Provide dowels for connection to grade beams. Secure in position until concrete is set.
.4 Placing methods of concrete shall be approved by Contract Administrator.

3.4 Safety Precautions
.1 Conform to the latest regulations of the "Manitoba Building Code" and provide all necessary safety equipment as required there under, and notify the local authorities as required by law.
.2 Conform to the Manitoba Workplace Safety Regulations having jurisdiction over safety precautions pertaining to this Work.

City of Winnipeg **Concrete Formwork** **Section 03100**
Bid Opportunity 293-2008

PART 1 - GENERAL

1.1 Related Work .1 Concrete Reinforcement: Section 03200
Specified Elsewhere .2 Cast-in-place concrete: Section 03300

1.2 Reference Standards
.1 Do concrete formwork to CAN3-A23-1, except where indicated otherwise.

1.3 Concrete Work Layout
.1 Report any inconsistencies in the piling layout to the Contract Administrator prior to pouring concrete in related areas.

PART 2 - PRODUCTS

2.1 Materials
.1 Formwork lumber: plywood and wood formwork materials to CAN3-A23.1-77.
.2 Form release agent: chemically active release agents 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.
.3 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surface.

PART 3 - EXECUTION

3.1- Erection
.1 Verify lines, levels and pile centres before proceeding with formwork and ensure dimensions agree with drawings.
.2 Construct forms to produce finished concrete conforming to the shape, dimensions, locations and levels shown on the drawings within the tolerances required by CAN3-A23.1.
.3 Obtain Contract Administrator's permission before framing openings in concrete slab not detailed in drawings.
.4 Obtain Contract Administrator's permission approval for use of earth forms.
.5 Hand-trim sides and bottoms and remove loose earth from forms before placing concrete.
.6 Align form joints and make watertight. Keep form joints to minimum.
.7 Form chases, slots, openings, drips, recesses, expansion and control joints as detailed.
.8 Leave formwork in place for the following minimum periods of time after placing concrete.
.1 Three days for slab.
.9 Re-use of formwork subject to requirements of CAN3-A23.1. Clause 11.9.

City of Winnipeg **Concrete Reinforcement** **Section 03200**
Bid Opportunity 293-2008

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 billet steel bars conforming to CSA G30.18 Plain finish.

2.2 Accessory
.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
Piles 50mm
.4 Maintain alignment as follows:
Item Coverage
Slabs 5mm
Piles 10mm
.5 Do not disturb or damage vapour barrier while placing reinforcing steel.

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.

City of Winnipeg **Cast-in-Place Concrete** **Section 03300**
Bid Opportunity 293-2008

PART 1 - GENERAL

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

1.2 Related Work
.1 Concrete Reinforcement: Section 03200
.2 Concrete Finishing: Section 03350

1.3 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.

TABLE A

Mix Type	Portion of Structure	Air Content	Max. Allowable Slump (mm) Max/Min MPa	Min. Compressive Strength at 28 days
.1	slabs	3%	3 1/2"	30
.2	piles	5%	4"	30

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.

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.

City of Winnipeg **Concrete Finishing** **Section 03350**
Bid Opportunity 293-2008

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 A23.1-94, 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 staining.

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 Contract Administrator 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.

Original Sealed by
D.W. Charleson, P, Eng.

F.A. Roberts & Associates Ltd.
Certificate of Authorization
No. 1191
Province of Manitoba

NO.	REVISIONS	BY	DATE
A	ISSUED FOR TENDER & PERMIT	JC	MAY 3/08

F.A. Roberts & Associates
Engineering Consultants

CLIENT CITY OF WINNIPEG
PROJECT SHAUGHNESSY PARK WADING POOL
LOCATION WINNIPEG, MANITOBA
DRAWING TITLE SPECIFICATIONS

DSN/DWN BY: JC DATE: APR.08
CHECKED BY: JAK DATE:
DWG NO. S-2
REVISED A