

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction.
 - .2 CSA-A23.1-09/A23.2-09, Test Methods and Standard Practices for Concrete.
 - .3 CSA-A23.3-04(R2010), Design of Concrete Structures.
 - .4 CSA-A23.4-09, Precast Concrete-Materials and Construction.
 - .5 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel.
 - .6 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .7 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel.
- .2 National Building Code of Canada, 2010.
- .3 Design Precast concrete units to withstand applicable temperature, wind, live, dead, and seismic loads in accordance with the noted codes and standards. Submit all design calculations to the Engineer for review prior to commencement of manufacture.
- .4 Steel Door Institute:
 - .1 SDI-100(2003), Recommended Specifications for Standard Steel Doors and Frames.

1.2 MEASUREMENT AND
PAYMENT

- .1 Pump stations including all base buildings and precast building elements and including all excavation, earthworks, bedding, structural, architectural, electrical and mechanical components, as well as steel crane beams/runways, but excluding process and instrumentation components, shall be paid according to Lot Price.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00.
 - .2 Shop Drawings: submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Ontario, Canada and specialized in precast concrete design. Shop drawings will include:
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1.3 SUBMITTALS
(Cont'd)

- .2 (Cont'd)
 - .1 Location of each unit in completed structure.
 - .2 Reinforcing and prestressing details.
 - .3 Mix design and admixtures (if any).
 - .4 Connection and anchorage details.
 - .5 Type of finish and location.
 - .6 Lifting hooks and handling points.
 - .7 Sequence of erection.
 - .8 Special handling instructions or structural bracing requirements.
- .3 Include with shop drawings all design data and full set of calculations, certified by a registered Professional Engineer of Ontario, showing that forces indicated on the drawings and in the specifications are obtainable.
- .4 Design precast concrete units in accordance with the requirements of CSA-A23.3.
- .5 The checking and approval of shop drawings by the Engineer does not relieve the Contractor from the full responsibility for the successful completion of the work contained in this section.

1.4 QUALIFICATIONS

- .1 Fabricate and erect precast concrete elements by manufacturing plant certified in appropriate category.
 - .2 Precast concrete manufacturer and erectors to be certified in accordance with the Canadian Precast/Prestressed Concrete Institute (CPCI) Certification Program.
 - .3 Only precast elements fabricated in such certified plants to be acceptable to Departmental Representative and plant certification to be maintained for duration of fabrication, erection, and until warranty expires.
 - .4 Precast concrete manufacturer to be certified to Canadian Precast/Prestressed Concrete Institute (CPCI) Certification Program.
 - .5 Manufacturer must meet the requirements of CSA A23.4, including Appendices A and B, together PCI MNL-116 and 117 and CPCI certification requirements.
 - .6 Welding companies certified to CSA-W47.1
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<u>1.5 DELIVERY, STORAGE AND HANDLING</u>	.1	Deliver, handle and store precast/prestressed units according to manufacturer's written instructions.
	.2	Waste Management and Disposal: .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.
<u>1.6 WARRANTY</u>	.1	Contractor warrants that precast elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with Section 01 45 00, for 60 months.
<u>PART 2 - PRODUCTS</u>		
<u>2.1 PRE-CAST CONCRETE BUILDINGS</u>	.1	Refer to drawings for the dimensions and location of building.
<u>2.2 CONCRETE MIXES</u>	.1	Conform to requirements of standards specified herein. Concrete shall have a minimum 28 day strength of 30 MPa.
<u>2.3 REINFORCING STEEL</u>	.1	Reinforcing steel shall be grade 400 deformed bars to CSA G30.18.
<u>2.4 REINFORCING FIBRE</u>	.1	Fibrillated polypropylene fibre, Fibermesh, or equal @ 1.0 kg per cubic metre, or equal.
<u>2.5 POST TENSIONING STRANDS</u>	.1	13 mm diameter, 1870 MPa ultimate tensile strength, 7 wire strand, plastic sheathed. Post tension roof by single continuous tendon. Tendons shall be greased and enclosed within a plastic sheath.
<u>2.6 PANEL CONNECTIONS</u>	.1	Securely fasten panels with 6 mm minimum thick steel brackets. Steel to be hot rolled carbon complying with CSA G40.21, grade 300W.

2.6 PANEL
CONNECTIONS
(Cont'd)

- .2 All fasteners to be 12 mm diameter bolts or larger.

2.7 FINISHES

- .1 All precast concrete surfaces to be treated with a non-yellowing acrylic concrete curing and sealing compound intended for decorative concrete.
- .2 Interior wall surfaces to be insulated to RS1 2.64 with rigid Styrofoam insulation.
- .3 Interior roof surfaces to be insulated to RS1 3.52 with rigid Styrofoam insulation.
- .4 Cover insulation with 0.4 mm corrugated pre-finished metal panels on Unistrut framing. Colour of pre-finished metal panels to be selected by the Departmental Representative from the manufacturer's standard colours.
- .5 Exterior finishes to be neutral colour split face block. Colour to be selected by the Departmental Representative from the manufacturer's standard colours.

2.8 STEEL DOORS AND
FRAMES

- .1 Doors and Door Frames to be supplied by building manufacturer.
- .2 Comply with Steel Door Institute, "Recommended Specifications Steel Doors and Frames" (SDI-100) and as specified.
- .3 Manufacturers to be a member of the Canadian Steel Door and Frame Manufacturer's Association.
- .4 Refer to drawings for size and quantity of doors. All doors shall be 1.2 mm metal doors with lockseam construction and honeycomb insulation or equal. Apply two coats of Alkyd Enamel to doors. Colour of paint to be selected by Departmental Representative.
- .5 Door frame shall be 1.5 mm gauge wipe coat galvanized and painted with two coats of Alkyd Enamel. Colour of paint to be selected by Departmental Representative.
- .6 Additional door hardware as follows:
 - .1 3 Hinges: A5133 x 114 x 102 x NRP x 630.
 - .2 1 Panic Device: Type 1, LC, Function 05.
 - .3 1 Threshold: A37100.

2.8 STEEL DOORS AND .6
FRAMES
(Cont'd)

- (Cont'd)
.3 1 Cylinder: E19241.
.4 1 Door Sweep: R3B434.
.5 1 Kickplate: Stainless steel satin finish.

2.9 LOUVERS

- .1 Contractor to design, supply, and install louvers in accordance with mechanical and to the satisfaction of Departmental Representative. Provide shop drawings to Departmental Representative for approval prior to installation.

2.10 FABRICATION
AND MANUFACTURE

- .1 Use a pitched/sloped roof in accordance with the contract drawings, with built-in drip edges.
.2 Co-ordinate all connections and openings with other trades and interface the details for completion of the project.
.3 Galvanize all exposed cast-in steel plates, anchors, steel crane beams/runways, bearing plates, etc.
.4 Touch up all welds with zinc primer after welding.
.5 Prevent bi-metallic contact at connecting members.

2.11 SOURCE QUALITY
CONTROL

- .1 Provide records from in-house quality control programme based upon plant certification requirements to Departmental Representative for inspection and review.
.2 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.
.3 Precast plants shall keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Departmental Representative for review upon request.

PART 3 - EXECUTION

3.1 ERECTION

- .1 Erect precast elements within allowable tolerances as specified.
- .2 Install units per manufacturer's specifications.
- .3 Joints between units to be treated/constructed per manufacturer's specifications such as grouting, filtercloth, etc.
- .4 Install miscellaneous accessories as noted.
- .5 All joints between panels shall be caulked on exterior and interior surfaces with high quality grade polyurethane base elastomeric sealant, limestone colour to match concrete finish.