

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 33 36 00 - Utility Septic Tanks

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A1064/A1064M-14, Standard Specification for Carbon Steel wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - .2 ASTM A775/A775M-07b (2014), Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
 - .3 ASTM C260-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-2014, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-A23.3-04 (R2010), Design of Concrete Structures.
 - .3 CSA-A23.4-09 (R2014), Precast Concrete - Materials and Construction.
 - .4 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001-13, Cementitious Materials for Use in Concrete.
 - .5 CSA-W186-M1990(R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 DESIGN REQUIREMENTS

- .1 Design precast elements to CSA-A23.3 and CSA-A23.4 to carry handling stresses.
- .2 Design precast elements to carry loads specified by Departmental Representative as indicated in accordance with applicable codes.
- .3 Carry out vibration analysis if and as required by Departmental Representative.
- .4 Design connections/attachments of precast elements to load/forces specified by Departmental Representative.
- .5 Provide detailed calculations and design drawings for typical precast elements and connections as described in PART 1 - SUBMITTALS.

1.4 PERFORMANCE REQUIREMENTS

- .1 Tolerance of precast elements to CSA-A23.4.
- .2 Length of precast elements not to vary from design length by more than plus or minus 50 mm.
- .3 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 50 mm.

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings and include following items:
 - .1 Design calculations for items designed by manufacturer.

- .2 Details of prestressed and non-prestressed members, reinforcement and their connections.
 - .3 Camber.
 - .4 Finishing schedules.
 - .5 Methods of handling and erection.
 - .6 Openings, sleeves, inserts and related reinforcement.
- .3 Submit 2 copies of detailed calculations and design drawings for typical precast elements and connections for review by Departmental Representative 2 weeks prior to manufacture.
- .4 Shop Drawings: submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Ontario, Canada.

1.6 QUALITY ASSURANCE

- .1 Quality Control Plan: submit written report, as described in PART 3 - VERIFICATION, to Departmental Representative verifying compliance that concrete provided meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.7 QUALIFICATIONS

- .1 Fabricate and erect precast concrete elements by manufacturing plant certified in appropriate categories according to CSA-A23.4
- .2 Precast concrete manufacturer to be certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting tender and to specifically verify as part of tender that plant is currently certified in appropriate categories, Structural, Prestressed, Architectural.
- .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 until warranty expires.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle and store precast/prestressed units according to manufacturer's instructions.
- .2 Protect unit corners from contacting earth to prevent from staining.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling, in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.9 WARRANTY

- .1 Contractor warrants that precast element will not spall or show visible evidence of corrosion of embedded steel and cracking, except for normal hairline shrinkage cracks, in accordance with General Conditions.

Part 2 Products

2.1 MATERIALS

- .1 Cement to CAN/CSA-A3001, Type GU.
- .2 Water: to CSA-A23.1/A23.2.
- .3 Reinforcing steel: to CAN/CSA-G30.18, epoxy coated.

- .4 Prestressing steel tendons and bars: to CAN/CSA-S6.
- .5 Welded wire fabric: to ASTM A185/A185M.
- .6 Hardware and miscellaneous materials: to CSA-A23.1/A23.2.
- .7 Forms: to CSA-A23.4.
- .8 Anchors and supports: to CAN/CSA-G40.21 Type 300 W epoxy coated.
- .9 Welding materials: to CSA W48.
- .10 Welding electrodes: to CSA W48 certified by Canadian Welding Bureau.
- .11 Epoxy coating: to ASTM A775/A775M.
- .12 Air entrainment admixtures: to ASTM C260.
- .13 Insulation: extruded polystyrene to CAN/ULC-S701.

2.2 MIXES

- .1 Concrete:
 - .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria in accordance with CAN/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: A-3.
 - .2 Intended application: septic tanks and pump chamber.
 - .3 Volume stability: acceptable volume change due to shrinkage, creep and freeze thaw cycle.
 - .3 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .4 Concrete supplier's certification.

2.3 MANUFACTURED UNITS

- .1 Manufacture units in accordance with CSA-A23.4.
- .2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit not be exposed.
- .3 Provide hardware suitable for handling elements.

2.4 FINISHES

- .1 Finish units to standard grade to CSA-A23.4.

2.5 SOURCE QUALITY CONTROL

- .1 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CSA-A23.4.
- .2 Provide records from in-house quality control programme based upon plant certification requirements to Departmental Representative for inspection and review.

- .3 Precast plants should 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 Do precast concrete work in accordance with CSA-A23.4 and CSA-A23.3.
- .2 Erect precast elements within allowable tolerances as specified.
- .3 Non-cumulative erection tolerances in accordance with CSA-A23-4.
- .4 Set elevations and alignment between units to within allowable tolerances before connecting units.
- .5 Fasten precast units in place as indicated on approved shop drawings.

3.2 VERIFICATION

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established in Part 2 - Products, by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

3.3 CLEANING

- .1 Use cleaning methods as reviewed by Departmental Representative before cleaning soiled precast concrete surfaces.

END OF SECTION