PART 1 GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Measure precast elements in units supplied, delivered, stored and erected.

.2 Precast elements measured as individual units, will include cost, supply, delivery, storage and erection of bearing assemblies, anchor bolts, removal and patching of erection devices, transverse connections, and field grouting of joints between precast units.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM A 775-07b /A 775M-07B, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

.2 ASTM D 412-06a, Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.

.3 ASTM D 2240-05 (2010), Standard Test Method for Rubber Property - Durometer Hardness.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.

.2 CAN/CGSB-1.181-99, Ready Mixed Organic Zinc-Rich Coating.

.3 CAN/CGSB-51.20-M87, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

.2 CAN3-A23.4-04, Precast Concrete - Materials and Construction.

.3 CSA-A251-00 (R2005), Qualification Code for Manufacturers of Architectural and Structural Precast Concrete.

.4 CSA-G30.15-M1983 (R1991) (R1998), Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

.5 CAN/CSA-G30.18-09, Billet-Steel Bars for Concrete Reinforcement.

.6 CAN/CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.7 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.8 CSA-G279-M1982 (R1998), Steel for Prestressed Concrete Tendons.

.9 CSA-W47.1-03 (R2008), Certification of Companies for Fusion Welding for Steel Structures.

.10 CSA-W48.1-M1991 (R1998), Carbon Steel Covered Electrodes for Shielded Metal Arc Welding.

.11 CSA-W59-03 (R2008), Welded Steel Construction (Metal Arc Welding).

.12 CSA-W186-M1990 (R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 DESIGN REQUIREMENTS

.1 Design precast elements to CAN3-A23.3 and CAN3-A23.4 to carry handling stresses.

.2 Design precast elements to carry loads specified by Departmental Representative or as indicated, in accordance with National Building Code of Canada (NBC) and other applicable codes.

.3 Carry out vibration analysis and test if and as required by Departmental Representative.

.4 Design connections/attachments of precast elements to load/forces specified by Departmental Representative.

.5 Submit 3 copies of detailed calculations and design drawings for typical precast elements and connections to C Departmental Representative for review and approval 4 weeks prior to manufacture.

1.4 PERFORMANCE REQUIREMENTS

.1 Tolerance of precast elements to CAN3-A23.4, Section 10.

.2 Length of precast elements not to vary from design length by more than plus or minus 3 mm.

.3 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 5 mm.

.4 Deviations from straight lines not to exceed 5 mm in 500 m.

.5 Precast elements not to vary by more than plus or minus 5 mm from true overall cross sectional shape as measured by difference in diagonal dimensions.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures, and in accordance with CAN3-A23.3 and CAN3-A23.4.

.2 Include the following items:

.1 Design calculations for items designed by manufacturer.

.2 Details of pre-stressed and non-pre-stressed members, reinforcement and their connections.

.3 Camber.

.4 Finishing schedules.

.5 Methods of handling and erection.

.6 Openings, sleeves, inserts and related reinforcement.

.3 Ensure each drawing submitted bears stamp and signature of qualified professional engineer registered or licensed in province of Alberta, Canada.

1.6 QUALIFICATIONS

.1 Precast concrete elements to be fabricated and erected by manufacturing plant certified by Canadian Standards Association in appropriate categories according to CSA-A251.

.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.

.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.

.4 Welding companies certified to CSA-W47.1.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and the Waste Management Plan.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Cement, aggregates, water, admixtures: to CAN/CSA-A23.1 and CAN3-A23.4.

.2 Reinforcing steel: to CAN/CSA-G30.18, epoxy coated.

.3 Pre-stressing steel tendons and bars: to CAN/CSA-S6 and CSA-G279.

.4 Welded wire fabric: to CSA-G30.15.

.5 Hardware and miscellaneous materials: to CAN/CSA-A23.1.

.6 Forms: to CAN3-A23.4.

.7 Anchors and supports: to CAN/CSA G40.21-04 Type 300 W galvanized after fabrication.

.8 Welding materials: to CSA-W48.1.

.9 Welding electrodes: to CSA-W48.1 and certified by Canadian Welding Bureau.

.10 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m^2 to CAN/CSA-G164.

.11 Epoxy coating: to ASTM A 775/A 775M.

.12 Steel primer: to CAN/CGSB-1.40.

.13 Zinc-rich primer: to CAN/CGSB-1.181.

.14 Tanks are to be supplied with lockable lids and access points.

2.2 MIXES

.1 Concrete.

.1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1, to give following properties:

.1 Cement: use Type 50 Portland cement.

.2 Concrete mixes and materials: to CAN/CSA-B66 and CAN/CSA-A23.1/A23.2.

2.3 MANUFACTURED UNITS

.1 Manufacture units in accordance with CAN3-A23.4, and CSA-A251.

.2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit which will not be exposed.

.3 Provide hardware suitable for handling elements.

.4 Galvanize anchors and steel embedment after fabrication and touch up with zinc-rich primer after welding.

2.4 SOURCE QUALITY CONTROL

.1 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CAN3-A23.4 and CSA-A251, CSA-G279.

.2 Provide records from in-house quality control programme based upon plant certification requirements to Departmental Representative for inspection and review.

.3 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

.4 Precast plants should keep complete records of supply source of concrete material, steel reinforcement, pre-stressing steel and provide to Departmental Representative for review upon request.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Do precast concrete work in accordance with CAN3-A23.4 and CAN3-A23.3 CAN/CSA-S6.

.2 Do excavation work in accordance with Section 31 23 33.01 (Excavation, Trenching and Backfilling). Remove any large rocks or frozen lumps of clay on the excavated area.

.3 Place approximately 150mm of 20mm washed pea gravel bedding on undisturbed soil base, on the areas where the concrete tanks are to be installed.

.4 Set tank base into the prepared excavation level, clean groove of tank with wire brush, dust then dry with torch if needed.

.5 Set tape provided into groove and overlap rolls by 100mm. Set top sections, lining up edges carefully prior to setting down. Joints are to be waterproofed.

.6 Commence backfill around the completed tank with excavated earth. Mound backfill to allow for settling of soil. Do not compact or otherwise tamp backfilled areas (around and at the top of the tank) as this could cause possible damage on the tanks and void manufacturer's warranty. Standard settling is the preferred method of compaction.

.7 Ensure external connections to the tanks are protected from possible shearing and breaking.

.8 Allow 24 hours for tank to settle prior to use.

3.2 CLEANING

.1 Obtain approval of cleaning methods from Departmental Representative before cleaning soiled precast concrete surfaces.

.2 Clean field welds with wire brush and touch-up galvanized finish with zinc-rich primer.

3.3 LEAKAGE TESTING

.1 Conduct 24 hour leakage test on tank in presence of Department Representative after backfilling. Fill tank and allow to stand for 24 hours prior to starting the 24 hour leakage test. Allowable leakage is zero.

3.4 RESTORATION

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Replace topsoil and commence grading as directed by Departmental Representative.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Clean and reinstate areas affected by Work as directed by Departmental Representative.

END OF SECTION