PART 1 – GENERAL

1.1 Related Sections

.1 Section 31 23 10 - Excavating and Backfilling

.2 Section 31 24 13 – Rough Grading

1.2 References

.1 American Society for Testing and Materials (ASTM).

.2 ASTM C14-15, Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.

.3 ASTM C76-15, Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

.4 ASTM C117-13, Standard Test Method for Material Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.

.5 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.6 ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.

.7 ASTM C443-12, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

.8 ASTM D698-12e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.9 Canadian Standards Association (CSA).

.10 CSA B182.6 and B182.8 for Corrugated Polyethylene Sewer Pipe.

.11 CSA B182.1 and B182.2 for PVC Sewer Pipe, SDR=35.

.12 CAN/CSA-A257 Series-M92, Standards for Concrete Pipe.

.13 Canadian General Standards Board (CGSB).

.14 CAN/CGSB-8.1-88, Sieves Testing, Woven Wire.

.15 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.

1.3 Samples

.1 Submit samples in accordance with Section 01 33 00- Submissions/Shop Drawings.

.2 Inform Department Representative at least 4 weeks prior to commencing work, of proposed source of bedding materials and provide access for sampling.

1.4 Material Certification

.1 Submit manufacturer's test data and certification at least four weeks prior to commencing work.

.2 Certification to be marked on pipe.

1.5 Delivery, Storage and Handling

.1 Contractor to deliver, store and handle materials in accordance with Product Requirements or TPW standards.

1.6 Waste Management and Disposal

.1 Separate and recycle waste materials as indicated by Department Representative.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS

2.1 Pipe

.1 Reinforced concrete pipe: to CAN/CSA-A257 diameter and strength classification as indicated.

.2 All pipe to be rubber gasketed to CAN/CSA-A257 ASTM C 443M.

.3Reinforced concrete footings: Pre cast reinforced concrete footings by pipe manufacturer.

2.2 Granular Bedding and Backfill

.1 Granular bedding and backfill material to Section 31 05 17 - Aggregates: General and following requirements:

.1 Crushed pit run or screened stone, or sand.

PART 3 - EXECUTION

3.1 Trenching

.1 Do trenching work in accordance with Section 31 23 10 - Excavating and Backfilling

.2 Obtain Department Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.2 Bedding

.1 Dewater excavation, as necessary, to allow placement of culvert bedding in the dry.

.2 Place minimum thickness of 200 mm of approved granular material on bottom of excavation and compact to minimum 98% maximum density to ASTM D698.

.3 Shape bedding to fit lower segment of pipe exterior so that width of at least 25% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Department Representative, free from sags or high points.

.4 Place bedding in unfrozen condition.

3.3 Laying Concrete Pipe Culverts

.1 Begin at downstream end of culvert with flanged end of first pipe section facing upstream

.2 Ensure barrel of each pipe is in contact with shaped bed throughout its length

.3 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.4 Backfilling

.1 Place backfill material, approved by Department Representative, in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.

.2 Compact each layer to 95% maximum density to ASTM D698 taking special care to obtain required density under haunches.

.3 Protect installed culvert with minimum 600 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 1:2.

.4 Place backfill in unfrozen condition.

END