Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for pipe culverts.

1.2 RELATED SECTIONS

.1 Section 33 41 23 - Sanitary Sewer Lagoon

.2 Section 01 74 11 - Cleaning

.3 Section 31 05 17 - Aggregate Materials.

1.3 MEASUREMENT PROCEDURES

.1 Measure supply and installation of pipe culvert including excavation and backfill in metres in place for each size, type and class of pipe.

1.4 REFERENCES

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

.2 Canadian Standards Association (CSA International)

.1 CSA-G401-07 (R2013), Corrugated Steel Pipe Products.

1.5 SUBMITTALS

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Inform Engineer at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.

.3 Submit to Engineer for testing, at least 4 weeks prior to beginning Work, following samples of materials proposed for use.

.4 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.

.5 Certification to be marked on pipe.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Divert unused metal materials from landfill to metal recycling facility as approved by Engineer.

.3 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 CORRUGATED STEEL PIPE

.1 Corrugated steel pipe: to CSA-G401.

.2 Water-tight cut-off collars: as indicated.

.3 Prefabricated end sections: as indicated.

.4 Corrugated fluming: to CSA-G401.

2.2 GRANULAR BEDDING AND BACKFILL

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

Part 3 Execution

3.1 TRENCHING

.1 Obtain Engineer'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 dry condition.

.2 Place minimum thickness of 200 mm of approved granular material on bottom of excavation and compact to minimum 95% maximum density to ASTM D698.

.3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Engineer, free from sags or high points.

.4 Place bedding in unfrozen condition.

3.3 LAYING CORRUGATED STEEL PIPE CULVERTS

.1 Begin pipe placing at downstream end.

.2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.

.3 Lay pipe with outside circumferential laps facing upstream and longitudinal laps or seams at side or quarter points.

.4 Lay paved invert or partially lined pipe with longitudinal centre line of paved segment coinciding with flow line.

.5 Do not allow water to flow through pipes during construction except as permitted by Engineer.

3.4 JOINTS: CORRUGATED STEEL CULVERTS

.1 Corrugated steel pipe:

.1 Match corrugations or indentations of coupler with pipe sections before tightening.

.2 Tap couplers firmly as they are being tightened, to take up slack and ensure snug fit.

.3 Insert and tighten bolts.

.4 Repair spots where damage has occurred to spelter coating by applying two coats of asphalt paint approved by Engineer.

3.5 BACKFILLING

.1 Backfill around and over culverts as indicated or as directed by Engineer.

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

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

.4 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.

.5 Place backfill in unfrozen condition.

3.6 FLUMING

.1 Assemble and install fluming as indicated.

.2 Set top edges of fluming flush with side slope.

Part 4 Measurement

4.1 MEASUREMENT

.1 Supply, delivery and installation of pipe culverts shall be measured by the linear metre culvert installed.

.2 All measurement by the Engineer shall be final.

END OF SECTION