

PART 1 - GENERAL

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| <u>1.1 Related Sections</u>       | .1 | Section 32 11 16 Granular Sub-Base.  |
|                                   | .2 | Section 32 11 23 Granular Base.  |
| <u>1.2 Measurement Procedures</u> | .1 | <u>Concrete Pipe Culvert</u> : The supply and installation of the concrete pipe culvert and bedding will be measured as a lump sum pay item.   |
|                                   | .2 | Trenching for culvert: Include cost of trenching for culvert in Section 02 41 13 Site Work Preparation and Removal.  |
| <u>1.3 References</u>             | .1 | ASTM International   |
|                                   | .1 | ASTM C 117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.   |
|                                   | .2 | ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.  |
|                                   | .3 | ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> )).                   |
|                                   | .2 | Canadian General Standards Board (CGSB)  |
|                                   | .1 | CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.   |
|                                   | .3 | CSA International  |
|                                   | .1 | CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.  |
| <u>1.4 Submittals</u>             | .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures.   |
|                                   | .2 | Product Data:  |
|                                   | .1 | Submit manufacturer's instructions, printed product literature and data sheets for pipes and include product characteristics, performance criteria, physical size, finish and limitations. |

- .3 Samples:
  - .1 Inform Departmental Representative at least 4 weeks before beginning Work, of proposed source of bedding materials and provide access for sampling.
- .4 Certification: to be marked on pipe.
- .5 Test and Evaluation Reports:
  - .1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.
- 1.5 Delivery, Storage and Handling
  - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
  - .2 Storage and Handling Requirements:
    - .1 Store materials in accordance with manufacturer's recommendations.
    - .2 Store and protect pipes from damage.
    - .3 Replace defective or damaged materials with new.

## PART 2 - PRODUCTS

- 2.1 Materials
  - .1 Reinforced concrete pipe: to CSA A257, 900 mm nominal inside diameter.
    - .1 Acceptable manufacturers:
      - .1 Shaw Precast Solutions.
      - .2 Lafarge.
      - .3 Strescon Limited.
  - .2 Rubber gaskets for joints: to CSA A257.
  - .3 Granular backfill material to Section 32 11 16 Granular Sub-Base.
  - .4 Granular bedding for pipe to Section 32 11 23 Granular Base.

PART 3 - EXECUTION

- 3.1 Trenching
- .1 Do trenching work in accordance with Section 31 23 10 - Excavation, Trenching and Backfilling.
  - .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material.
- 3.2 Bedding
- .1 Place 150 mm minimum thickness of approved granular material on bottom of excavation and compact to 95% minimum of maximum density to ASTM D 698.
  - .2 Shape bedding to fit lower segment of pipe exterior so that width of at least 35% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
  - .3 Place bedding in unfrozen condition.
- 3.3 Laying Pipe
- .1 Install pipe as per manufacturer's recommendations.
  - .2 Ensure barrel of each pipe is in contact with shaped bed throughout its length.
  - .3 Allow water to flow through pipes during construction only as permitted by Departmental Representative.
- 3.4 Joints
- .1 Rubber gasket joints:
    - .1 Install in accordance with manufacturer's written recommendations.
    - .2 Ensure that tapered ends are fully entered into flanged ends.
- 3.5 Backfilling
- .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
  - .2 Place granular backfill material 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 D 698 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.
  - .1 During construction, width of fill, at its top, to be at least twice diameter of pipe and with slopes not steeper than 1:2.
- .5 Place backfill in unfrozen condition.