

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 31 23 10 - Excavation, Trenching and Backfilling.
- .2 Section 32 11 23 - Aggregate Base Course.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials (ASTM International)
  - .1 ASTM A48/A48M-03, Standard Specification for Gray Iron Castings.
  - .2 ASTM C478-08, Specification for Precast Reinforced Concrete Manhole Sections.
  - .3 ASTM D698-07e1, 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 Ontario Provincial Standard Drawings (OPSD)
  - .1 OPSD 400.020 (November 2013) – Cast Iron, Square Frame With Square Flat Grate for Catch Basins, Herring Bone Openings.
  - .2 OPSD 704.010 (November 2009) – Precast Concrete Adjustment Units for Maintenance Holes, Catch Basins, and Valve Chambers.
  - .3 OPSD 704.011 (November 2008) – High Density Polyethylene Adjustment Units for Maintenance Holes, Catch Basins, and Valve Chambers.
  - .4 OPSD 705.020 (November 2014) – Precast Concrete Twin Inlet Catch Basin 600 x 1450mm.
  - .5 OPSD 708.030 (November 2011) – Catch Basin Connection for Flexible Main Pipe Sewer.
- .3 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 404 –November 2010, Construction Specification for Maintenance Hole, Catch Basin, Ditch Inlet, and Valve Chamber Installation.
  - .2 OPSS 1351-November 2010, Material Specification For Precast Reinforced Concrete Components for Maintenance Holes, Catch Basin, Ditch Inlet And Valve Chambers.
  - .3 OPSS 1853-November 2007, Material Specification For Rubber Adjustment Units for Maintenance Holes, Catch Basin, Ditch Inlet And Valve Chambers.
  - .4 OPSS 1854-April 2014, Material Specification For High Density Polyethylene Adjustment Units for Maintenance Holes, Catch Basin, Ditch Inlet And Valve Chambers.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Precast Concrete Twin Inlet Catch Basin 600 x 1450mm. basin units: to ASTM C478 and OPSD 705.020, complete with 600mm deep sump.
  - .1 Adjusting rings: to ASTM C478 and OPSD 704.010 or OPSD 704.011.
  - .2 Frames, gratings, covers to dimensions as indicated and following requirements:
    - .1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
    - .2 Gray iron castings: to ASTM A48/A48M, strength class 30B.
    - .3 Castings: coated with two applications of asphalt varnish.
    - .4 Catch basin frames and covers:
      - .1 Within gutters: to OPSD 400.030.
      - .2 Elsewhere: to OPSD 400.020.
  - .3 Components: to ASTM C478M and OPSS 1351.
  - .4 Adjusting rings: to ASTM C478, OPSD 704.010 or OPSD 704.011, OPSS 1853 and OPSS 1854.
- .2 Granular bedding : Granular base material in accordance with Section 32 11 23 - Aggregate Base Course

**Part 3 Execution**

**3.1 EXCAVATION AND BACKFILL**

- .1 Excavate and backfill in accordance with Section 31 23 10 - Excavating Trenching and Backfilling and as indicated.
- .2 Obtain approval of Departmental Representative before installing, manholes.

**3.2 INSTALLATION**

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade, in accordance with OPSS 407. Maximum relative difference between specified invert elevations not to exceed 10mm.
- .2 Complete units as pipe laying progresses.
- .3 Set precast concrete base on 150 mm minimum of granular bedding material compacted to 100% maximum density to ASTM D698.
- .4 Precast units:
  - .1 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
  - .2 Compact granular backfill to 95% maximum density to ASTM D698.
  - .3 Place frame and cover on top section to elevation as indicated. If adjustment required use concrete ring.

- .4 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.
- .5 Refer to OPSD 708.020 and OPSD 708.030.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 31 23 10 - Excavating, Trenching and Backfilling.
- .2 Section 32 11 23 - Aggregate Base Course.
- .3 Section 33 05 14 – Manholes and Catch Basin Structures.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft<sup>4</sup>-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- .2 Canadian Standards Association (CSA International)
  - .1 CSA B1800-02, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
    - .1 CSA B182.1-02, Plastic Drain and Sewer Pipe and Pipe Fittings.
    - .2 CSA B182.2-02, PVC Sewer Pipe and Fittings (PSM Type).
    - .3 CSA B182.11-02, Recommended Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.
- .3 Ontario Provincial Standard Drawings (OPSD)
  - .1 OPSD 708.030 (November 2011) – Catch Basin Connection for Flexible Main Pipe Sewer.
- .4 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 409-November 2013 – Construction Specification For Closed-Circuit Television Inspection of Pipelines
  - .2 OPSS 1840 (April 2011) – Material Specification For Non-Pressure Polyethylene Plastic Products.
- .5 City of Ottawa Special Provisions
  - .1 S.P. No. F4090 – Cleaning and Televising of Sewers.

**1.3 SUBMITTALS**

- .1 Submit product literature for storm sewer pipe and culverts in accordance with Section 01 00 10 – General Instructions.
- .2 Certification to be marked on pipe.

## **Part 2 Products**

### **2.1 OPEN CUT PIPE**

- .1 For pipe diameters up to and including 450mm diameter:
  - .1 Plastic Pipe:
    - .1 Type PSM Polyvinyl Chloride (PVC): to CSA-B182.2.
    - .2 Standard Dimensional Ratio (SDR): 35.
    - .3 Locked-in gasket and integral bell system.
    - .4 Nominal lengths: 4 m.

### **2.2 PIPE BEDDING AND SURROUND MATERIAL OPEN CUT**

- .1 Granular base material: refer to Section 32 11 23 – Aggregate Base Course.

### **2.3 BACKFILL MATERIAL OPEN CUT**

- .1 Type 1 Fill: in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.

### **3.2 OPEN CUT TRENCH INSTALLATION**

- .1 Trenching
  - .1 Do trenching Work in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.
  - .2 Do not allow contents of sewer or sewer connection to flow into trench.
  - .3 Trench alignment and depth to approval of Departmental Representative prior to placing bedding material and pipe.
- .2 Granular Bedding
  - .1 Place bedding in unfrozen condition.
  - .2 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth as indicated up to spring line of pipe.
  - .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
    - .1 Do not use blocks when bedding pipes.
  - .4 Shape transverse depressions as required suiting joints.
  - .5 Compact each layer full width of bed to at least 95 % maximum density to ASTM D698.
  - .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material.

- .7 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 10 - Excavating Trenching and Backfilling.

.3 Pipe Installation

- .1 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Departmental Representative.
- .2 Handle pipe-using methods approved by pipe manufacture.
  - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .3 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points.
  - .1 Maximum allowable variation from indicated pipe invert elevations as measured at the manholes and catch basins not to exceed 10mm.
  - .2 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
- .4 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .5 Do not exceed maximum joint deflection recommended by pipe manufacturer.
- .6 Do not allow water to flow through pipes during construction except as may be permitted by Departmental Representative.
- .7 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .8 Install plastic pipe and fittings in accordance with CSA B182.11.
- .9 Joints:
  - .1 Plastic pipe:
    - .1 Gaskets integral with pipe.
    - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
    - .3 Align pipes before joining.
    - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material. Lubricate gaskets before jointing is attempted.
    - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Do not install pipes with damaged or disturbed gaskets.
    - .6 Complete each joint before laying next length of pipe.
    - .7 Minimize joint deflection after joint has been made to avoid joint damage.
    - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
- .10 When any stoppage of Work occurs, restrain pipes, to prevent "creep" during down time.
- .11 Cut pipes as required for special inserts, fittings or closure pieces, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

- .12 Make watertight connections to manholes and catch basins.
  - .13 Use prefabricated saddles for connecting pipes to sewer pipes.
    - .1 Joints to be structurally sound and watertight.
      - .1 Catch basin connection to concrete pipe: to OPSD 708.10.
      - .2 Catch basin connection to plastic pipe: to OPSD 708.030.
  - .14 Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.
- .4 Pipe Surround
- .1 Place surround material in unfrozen condition.
  - .2 Upon completion of pipe laying, and after Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.
  - .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thicknesses as indicated.
    - .1 Do not dump material within 1 m of pipe.
  - .4 Place layers uniformly and simultaneously on each side of pipe.
  - .5 Compact each layer from pipe invert to mid height of pipe to at least 95 % maximum density to ASTM D698.
  - .6 Compact each layer from mid height of pipe to underside of backfill to at least 90 % maximum density to ASTM D698.
- .5 Backfill
- .1 Place backfill material in unfrozen condition.
  - .2 Place backfill material, above pipe surround, in accordance with Section 31 23 10 Excavating, Trenching and Backfilling, up to grades as indicated.

### **3.3 TESTING**

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 When directed by Departmental Representative, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
- .3 Remove foreign material from sewers and related appurtenances by flushing with water.
- .4 Television and photographic inspections:
  - .1 Carry out closed circuit television (CCTV) of installed sewers in accordance with the technical requirements of OPSS 409 and S.P. No. F4090.
  - .2 Submit one copy of CCTV inspection report to Departmental Representative for review. CCTV inspection report will be used by Departmental Representative in assessing acceptance of installed works.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED SECTIONS**

- .1        Section 31 23 10 - Excavating Trenching and Backfilling.

**1.2               REFERENCES**

- .1        Ontario Provincial Standard Specifications (OPSS)
  - .1        OPSS 1840 (November 2006) – Material Specification For Non-Pressure Polyethylene Plastic Products.

**1.3               SUBMITTALS**

- .1        Submit samples in accordance with Section 01 00 10 – General Instructions.
- .2        Certification to be marked on pipe.

**Part 2            Products**

**2.1               MATERIALS**

- .1        Subdrains:
  - .1        100mm and 150mm diameter high density polyethylene tubing perforated with filter sock to OPSS 840.
  - .2        210 kPa stiffness.
- .2        Pipe bedding and surround material in accordance with Section 32 11 19 – Granular Sub-Base

**Part 3            Execution**

**3.1               TRENCHING**

- .1        Do trenching and backfilling in accordance with Section 31 23 10 - Excavating Trenching and Backfilling.
- .2        Place bedding after approval of trench by Departmental Representative.

**3.2               BEDDING**

- .1        Place 150 mm layer of bedding material as indicated.

**3.3               INSTALLATION OF PIPE SUB-DRAINS**

- .1        Lay pipe drains on prepared bed, true to line and grade with inverts smooth and free of sags or high points.
- .2        Begin laying at outlet and proceed in upstream direction.



- .3 Make joints tight in accordance with manufacturer's instructions.
- .4 Make watertight connections to new manholes and catch basins where indicated.
- .5 Plug open upstream ends of pipes with caps.
- .6 Surround pipe with pipe bedding and surround material as indicated.
- .7 Backfill remainder of trench to Section 31 23 10 - Excavating Trenching and Backfilling as indicated.
- .8 Do not place bedding surround and backfill materials in frozen condition.
- .9 Protect sub-drains against flotation during installation.

**END OF SECTION**