

Part 1 General**1.1 SECTION INCLUDES**

- .1 Materials and installation for constructing new precast and cast-in-place manholes and catch basins.

1.2 RELATED SECTIONS

- .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM C139-99, Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 - .2 ASTM C618-00, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
 - .3 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³)(600 kN-m/m³)).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-98(April 2001), Cementitious Materials Compendium. Includes:
 - .1 CAN/CSA-A5-98, Portland Cement.
 - .2 CAN/CSA-A8-98, Masonry Cement.
 - .3 CAN/CSA-A23.5-98, Supplementary Cementing Materials.
 - .2 CSA-A23.1/A23.2-00(June 2001), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .3 CSA-A165 Series-94(R2000), CSA Standards on Concrete Masonry Units.
 - .4 CAN/CSA-G30.18-M92(R1998), Billet Steel Bars for Concrete Reinforcement.
- .4 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD)
 - .1 OPSS 407-November 2013, Construction Specification For Maintenance Hole, Catch Basin, Ditch Inlet And Valve Chambers.
 - .2 OPSS 1301 – November 2007 – Material Specification for Cementing Materials
 - .3 OPSS 1351 – April 2010 – Material Specification for Precast Reinforced Concrete Components for Maintenance Holes, Catch Basins, Ditch Inlets, And Valve Chambers
 - .4 OPSS 1850 – April 2013 – Material Specification for Frames, Grates, Covers, and Gratings
 - .5 OPSD 401.030 – November 2013 – Cast Iron, Square Frame with Circular Watertight Cover for Maintenance Holes
 - .6 OPSD 701.021 – November 2014 Rev 4 – Maintenance Hole Benching and Pipe Opening Alternatives

- .7 OPSD 705.010 – November 2014 Rev 3 – Precast Concrete Catch Basin
- .8 OPSD 708.020 – November 2011 Rev 3 – Support for Pipe at Catch Basin or Maintenance Hole

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 0 00 10 – General Instructions.
- .2 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.

Part 2 Products

2.1 MATERIALS

- .1 Refer to section 01 00 10 General instructions for a complete list of materials to be supplied by the crown.
- .2 Transition Chambers: 600x600 precast catch basins as per OPSS 407 and OPSD 705.010.
- .3 Joints: to be made watertight using rubber Gaskets where pipe is at a right angle to the structure wall, otherwise use cement mortar.
- .4 Mortar:
 - .1 Masonry Cement: to CAN/CSA-A3000-A8.
- .5 Adjusting rings: to OPSS 1351.
- .6 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: sand blasted or cleaned and ground to eliminate surface imperfections.
 - .4 Manhole and Transition Chamber frames and covers: cover cast without perforations complete with two 25 mm square lifting holes to OPSD 401.030.
- .7 Granular bedding and backfill: in accordance with Section 31 23 33.01 Excavating, trenching, and backfilling and the following requirements:
 - .1 Minimum of 300mm of Granular “A” around all sides of structure.
 - .2 Place and compact 300mm of Granular “A” as per Section 32 11 23 Aggregate Base Course for bedding.
- .8 Plywood:
 - .1 Refer to section 07 21 13 – Board Insulation.

Part 3 Execution

3.1 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.

- .2 Obtain approval of Departmental Representative before installing manholes or transition chambers.

3.2 INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .2 Dewater excavation to approval of Departmental Representative and remove soft and foreign material before placing concrete base.
- .3 Precast units:
 - .1 Make each successive joint watertight with Departmental Representative approved rubber ring gaskets only.
 - .2 Plug lifting holes with concrete plugs set in cement mortar or mastic compound.
- .4 Compact granular backfill to 95% maximum density to ASTM D698.
- .5 Installing units in existing systems:
 - .1 Where new unit is to be installed in existing run of pipe, ensure full support of existing pipe during installation, carefully remove that portion of existing pipe to dimensions required and install new unit as specified.
 - .2 Make joints watertight between new unit and existing pipe.
- .6 Set frame and cover to required elevation. Parge and make smooth and watertight.
- .7 Install plywood and insulation under cover of chamber in accordance with Section 07 21 13 – Board Insulation.
- .8 Place frame and cover on top section to elevation as indicated. If adjustment required use concrete ring.
- .9 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Section 32 11 23 - Aggregates: Base Course.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C76M-10a, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
 - .2 ASTM C443M-07, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
 - .3 ASTM D3034-08, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- .2 CSA International
 - .1 CSA A3000-08, Cementitious Materials Compendium.
 - .2 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.
 - .3 CSA B1800-11, Thermoplastic Non-pressure Pipe Compendium.
 - .1 CSA B182.1-11, Plastic Drain and Sewer Pipe and Pipe Fittings.
 - .2 CSA B182.11-11, Standard Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .4 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD)
 - .1 OPSS 409 – November 2013, Construction Specification for Closed Circuit Television Inspection of Pipelines.
 - .2 OPSS.MUNI 410 – November 2015, Construction Specification For Pipe Installation in Open Cut.

1.3 SCHEDULING

- .1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.
- .2 Submit schedule of expected construction staging for approval and adhere to approved schedule. Interruptions shall be kept to weekends only and shall be approved by Department Representative. During interruptions, alternative means of transfer of generated sewage are to be provided by way of pumper trucks, etc.

- .3 Notify Departmental Representative and building manager 24 hours minimum in advance of any change in service conditions.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.
- .2 Submit manufacturer's test data and certification at least 2 weeks prior to commencing work.
- .3 Certification to be marked on pipe.

1.5 DEFINITIONS

- .1 A pipe section is defined as length of pipe between successive transition chambers and/or manholes.
- .2 Transition chamber is defined as a precast concrete structure acting as an access location and pivot point for sewage services.

Part 2 Products

2.1 PLASTIC PIPE

- .1 Type PSM Poly Vinyl Chloride (PVC): to ASTM D3034, CAN/CSA-B1800/B182.4
 - .1 Locked-in gasket and integral bell system.
 - .2 Nominal lengths: 6 m.
 - .3 Standard Dimensional Ratio (SDR): 35.

2.2 PIPE BEDDING AND SURROUND MATERIALS

- .1 Bedding material:
 - .1 300mm thick as defined in Section 32 11 23 – Aggregate Base Course .
- .2 Surround material:
 - .1 To 300mm above pipe as defined in Section 32 11 23 – Aggregate Base Course

2.3 BACKFILL MATERIAL

- .1 Landscaped Areas: Trenches below landscaped areas should be backfilled with Approved Native Material as defined in section 31 23 33.01 – Excavating, Trenching, and Backfilling.
- .2 Paved Areas: Trenches below paved areas should be backfilled with Select Subgrade Material (SSM) Fill as defined in section 31 23 33.01 – Excavating, Trenching and Backfilling. Backfill material used between the bottom of subgrade to a depth of 1.2m below subgrade must be Approved Native Backfill as defined in section 31 23 33.01.

2.4 INSULATION

- .1 Refer to section 07 21 13 – Board Insulation.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sewer pipe installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.
- .2 Clean and dry pipes and fittings before installation.
- .3 Obtain Departmental Representative's approval of pipes and fittings prior to installation.

3.3 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Do not allow contents of any sewer or sewer connection to flow into trench.
- .3 Protect trench from contents of sewer or sewer connection.
- .4 Trench alignment and depth require approval of Departmental Representative prior to placing bedding material and pipe.

3.4 GRANULAR BEDDING

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding materials in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
 - .1 Do not use blocks when bedding pipe.
- .4 Shape transverse depressions as required to suit joints.

- .5 Compact each layer full width of bed to at least 98% standard proctor maximum dry density.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material.

3.5 INSTALLATION

- .1 Lay and join pipes in accordance with manufacturer's recommendations and to approval of Departmental Representative.
- .2 Handle pipe using methods approved by Departmental Representative.
 - .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 invert smooth and free of sags or high points. 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 Joint deflection permitted within limits recommended by pipe manufacturer.
- .6 Water to flow through pipe during construction, only as 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 Pipe jointing:
 - .1 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .2 Align pipes before joining.
 - .3 Maintain pipe joints free from mud, silt, gravel and foreign material.
 - .4 Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to be removed, cleaned and lubricated and replaced before joining is attempted.
 - .5 Complete each joint before laying next length of pipe.
 - .6 Minimize joint deflection after joint has been made to avoid joint damage.
 - .7 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
- .10 When stoppage of Work occurs, block pipes as directed by Departmental Representative to prevent creep during down time.
- .11 Plug lifting holes with pre-fabricated plugs approved by Departmental Representative, set in shrinkage compensating grout.

- .12 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.
- .13 Make watertight connections to manholes and transition chambers using rubber gaskets or approved equivalent.
- .14 Use prefabricated saddles or field connections approved by Departmental Representative, for connecting pipes to existing sewer pipes.
 - .1 Joints to be structurally sound and watertight.

3.6 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.
 - .1 Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
- .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 98 % standard proctor maximum dry density.
- .6 Compact each layer from mid height of pipe to underside of backfill to at least 98 % standard proctor maximum dry density.
- .7 When field test results are acceptable to Departmental Representative, place surround material at pipe joints.

3.7 INSULATION

- .1 Install insulation as required in accordance with section 07 21 13 – Board Insulation.

3.8 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .3 Compact backfill to at least 98 % standard proctor maximum dry density.

3.9 FIELD 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 Repair visible leaks.
- .5 Television and photographic inspections:
 - .1 Carry out inspection of installed piping by closed circuit television as per OPSS 409 as well as per City of Ottawa special provision F-4090 "Cleaning and Televising of Sewers".
 - .2 Prior to the granting of Substantial Completion, the contractor shall be required to clean out and perform a T.V. inspection for the complete length of sewers constructed. Since it is important to establish the value of "known defects" as described in the Construction Lien Act the certification of substantial performance shall not be granted prior to receiving the T.V. inspection reports.
 - .3 Notify Departmental Representative at least 24 hours prior to commencement of the T.V. inspection and the contractor shall ensure that representatives from the Departmental Representative are available to monitor and approve all phases of the T.V. inspection.
 - .4 The contractor shall supply two (2) copies of the video report of the T.V. inspection including:
 - .1 A written report giving a list of all service connections identifying transition chamber connections with a picture and description of deficiencies only (with video tape footages listed in the report for easy cross-reference).
 - .2 The distance the camera is in the pipe shall be provided continuously throughout the tape. This description is to be done using the manhole numbers listed on the design drawings.
 - .5 All deficiencies of the system will be repaired or replaced by the contractor at no extra cost to this contract.

END OF SECTION