

**Amendment to OPSS 407 (Nov 2015) –
Construction Specification for
New Maintenance Hole, Catch Basin, Ditch Inlet,
and Valve Chamber Installation**

OPSS 407.07 CONSTRUCTION

Section 407.07 of OPSS 407 is amended by the addition of the following clause:

OPSS 407.07.26 Installation of Catch Basin

The work shall include the installation of the catch basin lead to the catch basin.

OPSS 407.09 MEASUREMENT FOR PAYMENT

Section 407.09 of OPSS 407 is amended by the addition of the following clause:

OPSS 407.09.01.03 New Frame and Covers

For measurement purposes, a count shall be made of the number of new frame and covers installed.

OPSS 407.09 BASIS OF PAYMENT

Section 407.10 of OPSS 407 is amended by the addition of the following subsection:

OPSS 407.10.02 New Frame and Covers – Item

Payment at the Contract Price for the above tender item shall be full compensation for all labour, Equipment and Material to do the Work. No separate payment shall be made for utility adjustments when new frame and covers are installed.



**CONSTRUCTION SPECIFICATION FOR NEW
MAINTENANCE HOLE, CATCH BASIN, DITCH INLET,
AND VALVE CHAMBER INSTALLATION**

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407.01	SCOPE
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This specification covers the requirements for the installation of maintenance holes, catch basins, ditch inlets, and valve chambers.

407.01.01 Specification Significance and Use

This specification has been developed for use in provincial- and municipal-oriented Contracts. The administration, testing, and payment policies, procedures, and practices reflected in this specification correspond to those used by many municipalities and the Ontario Ministry of Transportation.

Use of this specification or any other specification shall be according to the Contract Documents.

407.01.02 Appendices Significance and Use

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

407.02 REFERENCES

When the Contract Documents indicate that provincial-oriented specifications shall be used and there is a provincial-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.PROV, unless use of a municipal-oriented specification is specified in the Contract Documents. When there is not a corresponding provincial-oriented specification, the references below shall be considered to be to the OPSS listed, unless use of a municipal-oriented specification is specified in the Contract Documents.

When the Contract Documents indicate that municipal-oriented specifications shall be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Construction

OPSS 353	Concrete Curb and Gutter Systems
OPSS 402	Excavating, Backfilling, and Compacting for Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers
OPSS 404	Support Systems
OPSS 408	Adjusting or Rebuilding Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers
OPSS 490	Site Preparation for Pipelines, Utilities, and Associated Structures
OPSS 491	Preservation, Protection, and Reconstruction of Existing Facilities
OPSS 492	Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures
OPSS 510	Removal
OPSS 517	Dewatering of Pipeline, Utility, and Associated Structure Excavation
OPSS 904	Concrete Structures
OPSS 920	Deck Joint Assemblies, Preformed Seals, Joint Fillers, Joint Seals, Joint Sealing Compounds, and Waterstops - Structures

Ontario Provincial Standard Specifications, Material

OPSS 1004	Aggregates - Miscellaneous
OPSS 1301	Cementing Materials
OPSS 1302	Water
OPSS 1350	Concrete - Materials and Production
OPSS 1351	Precast Reinforced Concrete Components for Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers
OPSS 1440	Steel Reinforcement for Concrete
OPSS 1850	Frames, Grates, Covers, and Gratings
OPSS 1853	Rubber Adjustment Units for Maintenance Holes, Catch Basins, and Valve Chambers
OPSS 1854	High Density Polyethylene (HDPE) and Expanded Polystyrene (EPS) Adjustment Units for Maintenance Holes, Catch Basins, and Valve Chambers

Canadian General Standards Board (CGSB)

1.181-99	Ready-Mixed Organic Zinc-Rich Coating
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ASTM International

C 923M-08	Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
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407.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Adjustment Units means circular and rectangular units used between the structure and the frame to adjust the elevation of the frame for grates and covers.

Structure means cast-in-place and precast maintenance holes, catch basins, ditch inlets, and valve chambers.

407.04 DESIGN AND SUBMISSION REQUIREMENTS

407.04.01 Submission Requirements

The Contract Administrator shall be notified in writing a minimum of 10 Days prior to precast components for structures being delivered to the site of the works giving the following information:

- a) Name of the company that shall be supplying the materials.
- b) The schedule for the delivery of each component to the site of the works.

407.05 MATERIALS

407.05.01 Concrete

Concrete for cast-in-place structures shall be according to OPSS 1350 with a nominal minimum 28-Day compressive strength of 30 MPa.

407.05.02 Steel Reinforcement

Steel bar reinforcement, bar mats, and wire fabric for cast-in-place structures shall be according to OPSS 1440.

407.05.03 Precast Concrete Components for Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers

Precast units shall be according to OPSS 1351 and as specified in the Contract Documents.

407.05.04 Steps and Ladders

Steps shall be according to OPSS 1351 and as specified in the Contract Documents.

Ladders shall be as specified in the Contract Documents.

407.05.05 Adjustment Units

Precast concrete adjustment units shall be according to OPSS 1351.

Rubber adjustment units shall be according to OPSS 1853.

High density polyethylene (HDPE) and expanded polystyrene (EPS) adjustment units shall be according to OPSS 1854.

407.05.06 Mortar and Grout

Mortar shall consist of a mixture of one part Portland cement according to OPSS 1301 and three parts mortar sand according to OPSS 1004, wetted with sufficient water to make the mixture plastic. Water shall be according to OPSS 1302.

Grout shall consist of a mixture of one part Portland cement according to OPSS 1301 and two parts mortar sand according to OPSS 1004, wetted with sufficient water to make the mixture plastic. Water shall be according to OPSS 1302.

407.05.07 Frames With Covers or Grates

Frames with covers or grates shall be according to OPSS 1850 and as specified in the Contract Documents.

407.05.08 Aluminum Safety Platforms

Aluminum safety platforms shall be according to OPSS 1351 and as specified in the Contract Documents.

407.05.09 Joint Seal Systems

Joint seal systems for precast concrete structures shall be according to OPSS 1351.

407.05.10 Zinc Rich Paint

Zinc rich paint shall be according to CAN/CGSB 1.181.

407.05.11 Resilient Connectors

Resilient connectors between pipes and structures shall be according to ASTM C 923M.

407.07 CONSTRUCTION

407.07.01 General

Structures of the type specified in the Contract Documents shall be installed on undisturbed and competent foundations at the locations and to the elevations specified in the Contract Documents and shall be constructed plumb and true to alignment.

The top of structures shall be installed below the final grade to allow for the placement of adjustment units to facilitate the placement of the top of the frame with grate or cover to the final grade.

407.07.02 Restrictions

The following restrictions shall apply:

- a) Precast concrete maintenance hole tees may be used only when the mainline pipe sewer is concrete.
- b) Precast concrete maintenance hole tees may not be used when a change in pipe size, longitudinal grade, or direction is required.

407.07.03 Site Preparation

Site preparation shall be according to OPSS 490.

407.07.04 Preservation and Protection of Existing Facilities

Preservation and protection of existing facilities shall be according to OPSS 491.

407.07.05 Protection Against Floatation

Damage to the structure due to floatation shall be prevented during construction and until completion of the work.

407.07.06 Cold Weather Work

All work shall be protected from freezing. Structures shall not be installed on frozen ground.

407.07.07 Transporting, Unloading, Storing, and Handling

Manufacturer's recommendations for transporting, unloading, storing, and handling shall be followed.

Materials that are unsound or damaged shall be rejected.

407.07.08 Excavating, Backfilling, and Compacting

Excavating, backfilling, and compacting for the installation of structures shall be according to OPSS 402.

407.07.09 Support Systems

Support systems shall be according to OPSS 404.

407.07.10 Dewatering

Dewatering shall be according to OPSS 517.

407.07.11 Cast-In-Place Structures

Concrete placement shall be according to OPSS 904.

All inside wall protuberances shall be removed once the forms are stripped.

407.07.12 Precast Structures

Precast or mono bases shall be placed level. Subsequent sections complete with joint seal systems shall be installed according to the manufacturer's recommendations. Joint seal systems for special site conditions (infiltration/exfiltration) shall be as specified in Contract Documents.

Adjustment of the structure shall be carried out by lifting the affected sections free of the excavation, re-leveling the base, if necessary, and re-installing the sections. Damaged sections and gaskets shall be replaced.

Lift holes shall be plugged with mortar.

407.07.13 Installation of Inlet and Outlet Pipes Into Concrete Structures

Inlet and outlet pipes shall be securely set into the structure's concrete base or walls using grout or approved pipe connectors so that the structure is watertight.

One of the following connections shall be provided where a pipe connects to a structure:

- a) A flexible pipe joint shall be provided within 300 mm of the outside face of the structure for flexible and rigid pipe.
- b) A concrete cradle to the first joint for rigid pipe.
- c) A resilient connector (i.e., a flexible, watertight connector) in the structure opening for flexible and rigid pipe.
- d) A special approved structure designed for pipe support.

Installation of pipe connectors shall be according to the manufacturer's recommendations.

All pipes, except in valve chambers, shall be flush with the inside walls of the structure.

When specified in the Contract Documents, cast iron or medium density polyethylene goss traps shall be placed at the outlet pipe of the catch basin.

When a subdrain is specified in the Contract Documents, the opening for the connection of the subdrain outlet shall be formed by coring. The subdrain outlet pipe shall be sealed into place using non-shrink grout. A 50 mm diameter weep hole shall be cored into the same wall as the subdrain connection and at the same invert elevation.

407.07.14 Benching and Channelling

When specified in the Contract Documents, the inside concrete bottom of the structures shall be benched and channelled to accommodate the pipe.

Where benching is hand finished, it shall have a wood float finish and channelling shall have a steel trowel finish. Channelling shall be smooth and flush with adjacent pipe inverts.

407.07.15 Installation of Adjustment Units

Installation of adjustment units shall be according to OPSS 408.

407.07.16 Installation of Frames with Grates or Covers

When precast concrete adjustment units are used, frames with grates or covers shall be set in a full bed of mortar on the precast concrete adjustment units.

When HDPE or EPS adjustment units are used, frames with grates or covers shall be installed and sealed according to the HDPE or EPS adjustment unit manufacturer's instructions.

When rubber adjustment units are used, frames with grates or covers shall be set firmly in place on the rubber adjustment unit by laying a continuous strip of butyl tape on the top surface of the rubber adjustment units and on the bottom of the frame.

Ditch inlet grates shall be installed as specified in the Contract Documents.

Installation of frames with grates or covers which lie within the flow lines of a curb and gutter system shall be according to OPSS 353.

407.07.17 Installation of Aluminum Safety Platforms

Aluminum safety platforms shall be installed as specified in the Contract Documents.

407.07.18 Installation of Extension Stems and Boxes for Valve Chambers

Extension stems and boxes shall be installed as specified in the Contract Documents.

Caps for valve boxes shall be installed flush with the final grade. Guides for the valve extension stems shall be securely anchored to the valve chamber.

407.07.19 Installation of Ladders and Steps

Ladders shall be installed as specified in the Contract Documents.

Steps shall be installed according to OPSS 1351. Steps shall be accurately set in the forms and supported to prevent their displacement if they are being cast-in-place during the placing of concrete for the structure.

407.07.20 Installation of Frost Straps

Frost straps shall be installed as specified in the Contract Documents.

407.07.21 Valve Chamber Insulation

Insulation for the roof, wall, or access way of the valve chamber shall be installed as specified in the Contract Documents.

407.07.22 Catch Basin Apron

Curb and gutter with concrete aprons on existing catch basins shall be constructed at the locations as specified in the Contract Documents.

The work shall include, but not be limited to, the following:

- a) Remove existing curb and gutter and existing pavement by saw cutting to the limits shown in the Contract Documents.
- b) Disposal of all materials designated for removal shall be according to OPSS 510.
- c) Construction of concrete curb and gutter shall be according to OPSS 353.
- d) Adjustment of frame and grate to suit final pavement elevations shall be according to OPSS 408.
- e) Placement of concrete for concrete apron shall be according to OPSS 904.
- f) Concrete for curb and gutter and apron shall be poured in place as one structure.
- g) Placement of hot-poured rubberized asphalt joint sealing compound and joint filler in construction joints shall be according to OPSS 920.
- h) The horizontal limits of the concrete apron to fit local conditions.

407.07.23 Clean Out of Structures

During the progress of the work and until completion and acceptance of the work, structures shall be kept clean and free of all foreign material.

407.07.24 Site Restoration

Site restoration shall be according to OPSS 492.

407.07.25 Leakage Test

Sanitary sewer maintenance holes and storm sewer maintenance holes shall be tested for leakage when specified in the Contract Documents. Leakage shall not exceed a rate of 3 litres per hour per metre of head above the lowest pipe invert in the maintenance hole.

The test shall be performed by plugging all pipe openings in the maintenance hole and filling the maintenance hole with water. After one hour has elapsed, the distance the surface of the water has dropped shall be measured and the leakage determined by calculating the volume of that portion of the maintenance hole formerly occupied by the water.

Maintenance holes failing the initial test shall have the leaks repaired and be re-tested until the leakage is below the allowable limit.

There shall be no visible infiltration.

407.07.26 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

407.09 MEASUREMENT FOR PAYMENT

407.09.01 Actual Measurement

407.09.01.01 Maintenance Holes, Catch Basins, Apron, Ditch Inlets, and Valve Chambers

For measurement purposes, a count shall be made of the number of structures installed and adjusted.

407.09.01.02 Maintenance Hole Leakage Testing

For measurement purposes, a count shall be made of the number of maintenance holes passing the leakage test.

407.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

407.10 BASIS OF PAYMENT

- 407.10.01 Maintenance Holes, “type, size” - Item**
- Catch Basins “type, size” - Item**
- Ditch Inlets “size” - Item**
- Valve Chambers “size” - Item**
- Maintenance Hole Leakage Testing - Item**
- Catch Basin Apron - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

The horizontal limits of the concrete apron to fit local conditions shall be at no additional cost to the Owner.

When the Owner raises or lowers the depth of a maintenance hole by up to and including 150 mm, it shall not constitute a Change in the Work and adjustment shall not be made to the payment. Where the depth of a maintenance hole is raised or lowered by more than 150 mm, this shall then constitute a Change in the Work for the full extent of the change from the original grade.

**Appendix 407-A, November 2015
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS**

Note: This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

Designer Action/Considerations

The designer may consider including soil boring data, a geotechnical report, a subsurface report, and/or a soils report in the Contract Documents.

The designer should specify the following in the Contract Documents:

- Material requirements for:
 - Precast units. (407.05.03)
 - Steps and ladders. (407.05.04)
 - Frames with covers or grates. (407.05.07)
 - Aluminum safety platforms. (407.05.08)
- Structure type, location, and elevation. (407.07.01)
- Type and location of goss traps. (407.07.13)
- Subdrains. (407.07.13)
- Benching. (407.07.14)
- Installation of:
 - Ditch inlet grates. (407.07.16)
 - Aluminum safety platforms. (407.07.17)
 - Extension stems and boxes. (407.07.18)
 - Ladders and steps. (407.07.19)
 - Frost straps. (407.07.20)
 - Valve chamber insulation. (407.07.21)
 - Curb and gutter with concrete aprons. (407.07.22)

The Contractor may use any of the connections shown in subsection 407.07.13 d). If a specific connection is required, it shall be specified in the Contract Documents.

Designer should determine if leakage testing for storm and sanitary sewer maintenance holes is required. If it is required, it shall be specified in the Contract Documents. Ground water conditions shall determine the type of test required and shall be specified in the Contract Documents. Alternative leakage test method(s) can be considered such as air or CCTV inspection. (407.07.25)

The tender item description for Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers should include reference to one or more of the attributes shown (i.e., type of structure or size of structure, to be complete). (407.10.01)

Appendix 407-A

The tender item description for Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers should include reference to one or more of the attributes shown (i.e., type of structure or size of structure, to be complete). (407.10.01)

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Related Ontario Provincial Standard Drawings

OPSD 400.001	Hoisting Hook Rib for Cast Iron Frames for Catch Basins, Maintenance Holes, and Valve Chambers
OPSD 400.010 to 400.120	Cast Iron Catch Basin Frames With Grates
OPSD 401.010 to 401.060	Cast Iron Maintenance Hole Frames With Covers
OPSD 402.010 to 402.021	Cast Iron Valve Chamber Frames With Covers
OPSD 403.010	Galvanized Steel Honey Comb Grating for Ditch Inlets
OPSD 404.010 to 404.022	Aluminum Safety Platforms
OPSD 405.010 to 405.020	Maintenance Hole Steps
OPSD 610.010 to 610.030	Catch Basin Frame With Grate Installation
OPSD 701.010 to 701.015	Precast Concrete Maintenance Holes, 1,200 to 3,600 mm in Diameter
OPSD 701.021	Maintenance Hole Benching and Pipe Opening Details
OPSD 701.030 to 701.081	Precast Concrete Maintenance Hole Components, 1,200 to 3,600 mm in Diameter
OPSD 701.100	Frost Strap Installation
OPSD 702.040 to 702.050	Precast Concrete Ditch Inlet Maintenance Hole
OPSD 703.011 to 703.015	Precast Concrete Single Inlet Flat Cap, 1,500 to 3,600 mm in Diameter
OPSD 703.021 to 703.024	Precast Concrete Twin Inlet Flat Cap, 1,500 to 3,000 mm in Diameter
OPSD 704.010 to 704.012	Maintenance Hole, Catch Basin, and Valve Chamber Adjustment Units
OPSD 705.001 to 705.002	Concrete Catch Basin Apron
OPSD 705.010 to 705.020	Precast Concrete Catch Basins
OPSD 705.030 to 705.040	Precast Concrete Ditch Inlets
OPSD 706.010 to 706.041	Precast Concrete Ditch Inlets Types A and B with 1,500 to 3,000 mm Diameter Flat Cap
OPSD 707.010	Precast Maintenance Hole Manufactured Tee
OPSD 708.020	Support for Pipe at Catch Basin or Maintenance Hole
OPSD 1100.010	Cast-In-Place Chamber for Valves Up to 350 mm Diameter
OPSD 1101.010	Precast Valve Chamber 1,200 mm and 1,500 mm Diameter
OPSD 1101.020	Valve Operator

