

## S-2 MAINTENANCE HOLES AND CATCHBASINS

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#### **2.01 SCOPE OF WORK**

This specification covers the requirements for the new construction rebuilding, adjusting, and breaking into maintenance and catchbasins, in conformity with the contract drawings or directions of the City Engineer.

#### **2.02 REFERENCES**

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

- S-1 Sewers
- S-4 Granular Base and Aggregates
- S-9 Concrete
- S-17 Steel Reinforcement
- S-24 Unshrinkable Backfill
- AS-301
- AS-302
- AS-303
- AS-304A
- AS-305
- AS-309

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- AS-310A
- AS-314
- AS-527
- OPSD 701.021

## **2.03 MATERIALS**

The contractor shall supply all materials in accordance with this specification and the contract documents, unless specified by the City Engineer.

### **2.03.01 CONCRETE**

All concrete shall meet the requirements of City of Windsor Standard Specifications S-9 Concrete unless otherwise specified and pre-approved by the City Engineer.

### **2.03.02 FRAMES, GRATES AND COVERS**

Frames, grates, and covers shall conform to the requirements of the City of Windsor Standard Engineering Drawings (AS-301, AS-302, AS-304A).

### **2.03.03 GRANULAR MATERIAL**

Granular material for bedding and backfill to be Granular 'A' unless otherwise approved by the City Engineer.

### **2.03.04 UNSHRINKABLE BACKFILL**

Unshrinkable fill material used for backfill as per City of Windsor Standard Specifications S-24 Unshrinkable backfill.

### **2.03.05 MAINTENANCE HOLE STEPS**

Maintenance hole steps shall conform to the requirements of City of Windsor Standard Engineering Drawings (AS-305).

### **2.03.06 PRECAST REINFORCED CONCRETE CATCHBASIN AND MAINTENANCE HOLE COMPONENTS**

Precast units shall be supplied in accordance with City Windsor Engineering Drawings (AS-303 AS-309, AS314, AS-315).

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**2.03.07 STEEL REINFORCING**

Steel bar reinforcement shall be hard grade deformed bars and shall comply with City of Windsor Standard Specifications S-17 Reinforcing Steel.

**2.04 CONSTRUCTION**

**2.04.01 EXCAVATION**

Maintenance holes or catchbasins of the type specified shall be excavated for and constructed to conform to the requirements of the contract drawings and shall be located at the points and elevations required on the contract drawings or as directed by the City Engineer. Structures shall not be placed or constructed on an unsuitable foundation as maybe determined by the City Engineer. Any unsuitable material shall be excavated and the resulting excavation shall be backfilled and compacted to obtain an approved foundation.

**2.04.02 GRANULAR BEDDING AND BACKFILL**

Once the maintenance hole or catchbasin is constructed, the excavation surrounding the exterior of the unit shall be filled with granular material or unshrinkable fill to a minimum thickness of 300 mm around all sides of the unit. The granular material shall be deposited in layers so that when compacted, each layer shall not exceed 300mm in depth. Care shall be exercised in compacting the granular material to assure the structure is not disturbed. Approved hand compaction equipment shall be used to consolidate the material where necessary. Granular material for bedding and backfill shall be compacted to 100% of the maximum Standard Proctor dry density.

Excavated materials which cannot be incorporated in the work shall be disposed by the contractor outside the contract limits.

**2.04.03 CAST IN PLACE CONSTRUCTION**

The Contractor shall form and pour the specified unit plumb and true to alignment and grade. Once forms have been stripped, the Contractor shall remove all inside wall protuberances.

**2.04.04 PRECAST CONSTRUCTION**

The precast unit shall be placed plumb and true to alignment and grade.

Precast bases shall be set to the specified grade, shall be level, and shall have uniform overall contact with the underlying bedding.

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Any adjustment of the unit for plumb, alignment, and grade shall be carried out by lifting the unit free of excavation, levelling the base, and replacing the unit to proper alignment and grade.

**2.04.04(a) Doghouse Maintenance Hole**

When a precast doghouse maintenance hole is specified, the doghouse is to be installed straddling the existing sewer and a concrete slab poured as per AS-559. Once the slab has cured, the contractor can break into the sewer, ensuring the sewer remains free of debris.

**2.04.05 JOINTS**

Joints are to have a watertight seal as per the manufactures specification.

**2.04.06 INSTALLATION OF INLET AND OUTLET PIPES**

All connection holes in new, precast structures shall be cored or cast in place by the manufacturer. Any modifications to the OPSD 701.021 shall require the submission of detailed shop drawings for approval by the City Engineer. One hole for a 200/250mm connection and one hole for a 150mm sub drain shall be the maximum permitted in any one side of a structure without the approval of the City Engineer.

Pipe placed in the walls for inlet or outlet connections shall extend through the wall a sufficient distance to allow for connections; shall be trimmed flush with the inside wall; and shall be securely and neatly grouted into place. The inlet and outlet pipe shall be supported with Class "A" bedding to the first pipe joint as per AS-310A and AS-314.

Watertight connections of PVC pipes shall be made to structures by means of KOR-N-SEAL boots, A.C. couplings or manufacturer supplied sanded bells, as approved by the City Engineer. A flexible joint must be provided within 0.3m of the outside of the structure wall.

Watertight connections of HDPE pipes shall be made to structures by carefully grouting and filling the void between the pipe and structure with a non-shrinking, fast-setting hydraulic cement product or by the use of a flexible water stop or other resilient connector approved by the City Engineer. A flexible joint shall be provided within 0.3m of the outside of the structure wall.

When catchbasins are being installed in locations that permit the use of existing catchbasin leads, the first 1 metre of catchbasin lead measured along its centre line, shall be replaced and covered by this specification.

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**2.04.07 INSTALLATION OF FRAMES, GRATES OR COVERS**

**2.04.07(a) General**

Frames, grates, or covers shall be set in a full mortar bed and adjusted to the required elevation. Mortar shall be composed of one part Portland cement and two parts masonry sand wetted with only sufficient water to make the mixture plastic. A minimum of 1 adjustment unit is required, with the total adjustment height unit to not exceed 450mm.

**2.04.07(b) Maintenance Holes**

If the maintenance hole frame and cover is to be located in a hard surfaced area, the grade of the frame and cover shall match the finished designed grading of the hard surface in all the directions, and be set to a minimum of +/- 5mm of the finished or temporary hard surface grade. The flat cap or riser section should be to be orientated to the satisfaction of the City Engineer.

When concrete adjustment units are used to set the frame and cover at the required position and elevation, the first adjustment unit shall be laid in a full bed of mortar. Successive units shall be laid plumb to the first unit and sealed according to the manufacturer's recommendations. The frame shall be set in a full bed of mortar.

When High Density Polyethylene (HDPE) adjustment units are used, they shall be installed and sealed strictly according to the manufacturer's instructions.

If the maintenance hole frame and cover is to be located in a concrete pavement area, the maintenance hole shall be fitted with a self-adjusting or Auto Stable maintenance hole frame and cover (AS-533) subject to the approval of the City Engineer.

**2.04.07(c) Catchbasins**

When concrete adjustment units are used to set the frame with grate at the required position and elevation, the first adjustment unit shall be laid in a full bed of mortar. Any successive units shall be laid plumb to the first unit and sealed according to the manufacturer's recommendations. The frame shall be set in a full bed of mortar.

When High Density Polyethylene (HDPE) adjustment units are used, they shall be installed and sealed strictly according to the manufacturer's instructions. A filter cloth wrap of the top 100mm of the catch basin and all the adjustment units in place shall be mandatory.

**2.04.08 INTERNAL DROP STRUCTURE**

If a drop structure is required by the City Engineer, it shall comply with City of Windsor Standard Specifications S-1 Sewers.

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**2.04.09 MAINTENANCE**

During the progress of the work and until the completion and final acceptance, maintenance holes and catchbasins shall be kept clean and free of all foreign materials.

**2.05 ADJUSTMENT OF MAINTENANCE HOLES AND CATCHBASINS**

**2.05.01 GENERAL**

The work to be carried out shall include change of elevation of any of the above structures, regardless of type or size. Adjustment of maintenance holes or catchbasins will apply where the top of the structure is to be lowered or raised 300 mm or less.

Prior to adjustment, the existing frame and grate or cover shall be carefully removed and salvaged. Once a maintenance hole or catchbasin has been adjusted or rebuilt, the salvaged frame and grate or cover shall be set to the correct elevation in a full mortar bed on the adjusted structure. If in the opinion of the City Engineer, the frame and cover or grate is not salvageable, the material shall be returned to 1531 Crawford Yard and alternative material will be supplied.

Where cast in place units are to be raised, the top surfaces of all existing walls shall be roughened before the walls are extended upwards.

Where required on the contract drawings or when the City Engineer directs additional maintenance hole steps shall be installed in the adjusted unit.

Where asphalt or concrete pavement must be removed to adjust or rebuild a structure the edges of such pavement shall be neatly cut to give a minimum clearance of 300mm to the outside of the flange.

All construction debris resulting from adjustment or rebuilding of maintenance holes or catchbasins shall be removed at the contractor's expense.

**2.05.02 CAST IN PLACE UNITS**

Where the top is to be lowered the concrete shall be carefully removed to the required elevation.

**2.06 BREAKING INTO MAINTENANCE HOLES AND CATCHBASINS**

Under this item, the Contractor shall carefully sawcut or core the openings that are required in the walls of any of the above-mentioned structures and securely and neatly grout in the required pipes, duct banks, or sleeves as directed by the City Engineer.

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## **2.07 MEASUREMENT FOR PAYMENT**

### **2.07.01 MAINTENANCE HOLES**

Sewer maintenance holes, unless specified otherwise, shall be on a per item basis, and shall include all labour and material components required to construct the maintenance holes. An extra or credit to the tendered price shall only be considered if there is a 300mm or more difference between the as-built depth to invert and the design depth to invert.

### **2.07.02 CATCHBASINS**

Catchbasins, unless specified otherwise, shall be on a lump per item basis and shall include all labour and material components required to construct the catchbasin.

### **2.07.03 BREAKING INTO EXISTING MAINTENANCE HOLES**

Breaking into existing maintenance holes shall be measured on per item basis.

## **2.08 BASIS OF PAYMENT**

### **2.08.01 MAINTENANCE HOLES**

Payment of maintenance holes at the contract per item prices for the various parts comprising maintenance holes shall be full compensation for all work required by this specification and shown on the contract drawings to provide complete maintenance.

Without in anyway limiting the foregoing, the work shall include the supply of all materials, all excavations, disposal of all surplus materials, the placing and compaction of granular materials, the construction of all cast in place concrete work, the installation of precast units including base, riser sections, transitional sections (where required), adjustment rings, the construction of all masonry work including benching, the installation of frame and cover, aluminum ladder rungs and all other miscellaneous metal works, all required surface restoration and all other work necessary to complete the structure in accordance with the contract requirements. Included in the lump sum price shall be the shop drawing of the maintenance hole showing the orientation, dimensions and transitional sections for any size maintenance hole.

### **2.08.02 CATCHBASINS**

Payment at the contract price shall be full compensation for; supplying all materials, for all excavation, for the disposal of all surplus excavated materials, for the placing and compaction of granular bedding and backfill for the construction or installation of the

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cast in place or precast unit, 1 metre of big 'O' pipe on either side of catchbasin and connection into subdrain, for the installation and adjustment of the frame and cover, installation of asphalt or concrete box-out as specified around the frame and cover, for the installation of up to a maximum of 1 metre of catchbasin lead when connecting to existing catchbasin leads, and all other work necessary to complete the structure in accordance with the contract requirements.

**2.08.03      ADJUSTMENTS OF MAINTENANCE HOLES AND CATCHBASINS**

Payment at the contract price shall be full compensation, regardless of size or type, for the removal and disposal of asphalt or concrete pavement where required, for all necessary excavation, removal and disposal of concrete in structure, for supplying, handling, placing and compaction of materials; and for all other work necessary for the satisfactory completion of the work, except for the removal and replacement of asphalt of concrete curb and gutter, which work shall be paid at the contract unit price for the items concerned.

**2.08.04      BREAKING INTO MAINTENANCE HOLES AND CATCHBASINS**

Payment shall be made at the contract unit price per opening and shall be fully compensation for providing opening and grouting in pipes for all pipes.