

M1 SERVICE CONNECTIONS

Service connections shall be in accordance with Standard Drawing (MS14).

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. Details are illustrated in the Engineering Standards.

The Consulting Engineer shall avoid providing storm and sanitary service connections underneath residential driveways.

M1.1 Storm Service Connections

All storm sewers shall conform to the requirements of the Canadian Standards Association and ASTM Standards.

Only one service connection is permitted per residential lot and ICI / condominium block.

For multiple ICI / condominium blocks which may subdivide into different ownerships / corporations, additional service connections may be permitted. These are subject to approval based on the following development applications:

- Site Plan
- Consent / severance application / draft plan of condominium

More than one service connection may be permitted for ICI / condominium block on a case-by-case basis and must be accepted by the Director of Engineering in writing.

Foundation drains shall be connected to the storm service connection.

Residential

Storm connections for single and double residential units shall be installed with a minimum 125 mm and 150 mm diameters SDR 28 PVC, respectively, at 2.0% minimum grade. Double connections may be acceptable in residential areas where all other utilities can be accommodated and where the difference in the two connecting basement elevations does not exceed 600 mm.

Storm service connections shall be provided between the storm sewer and the streetline as outlined below. Storm connections shall have a minimum of 2.50 m cover at the streetline. If connections have less than 2.50 m cover at the streetline, it may be necessary to raise the basement elevations to accommodate the connections. Risers shall be used when the obvert depth of the main sewer exceeds 4.50 m. The riser connection shall not exceed 3.0 m in depth.

Service connections shall be terminated with accepted test tee at the property line, or alternatively, at a maximum of 1.5 m inside the lot, if approved by the City. It should be noted however, that a plumbing permit and inspection shall be required from the Building Department for construction within the lot.

Roof drainage shall discharge onto the ground surface via splash pads unless otherwise accepted by Director of Engineering.

Service connections shall be located in conformance with City's Standards.

Institutional, Commercial, Industrial and Other Non-residential Uses

Storm connections for Institutional, Commercial, Industrial and other non-residential uses shall be a minimum 200 mm diameter at 2.0% minimum grade.

If the diameter of the service connection sewer is more than half the diameter of the main storm sewer, a maintenance hole must be installed on the main sewer at the intersection of a service connection.

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Storm sewer connections shall be designed to accommodate surface, roof and weeping tile drainage. An inspection maintenance hole shall be installed adjacent to the streetline within private property.

Joints and Bedding

Joints and Bedding for connections shall be equivalent to joints and bedding as specified for storm sewers.

In general, sewer bedding shall be as per OPSD-802.010 for flexible pipes unless otherwise specified by the Geotechnical Engineer. The class of pipe shall be selected to suit this bedding detail.

Connections of Services to Main Sewer

The manufacture of service tees at the main sewer shall be as follows:

- For main storm sewers sizes 600 mm or smaller, pre-fabricated tees from the plant shall be utilized.
- For main storm sewer sizes 675 mm to 900 mm, tees shall be manufactured or cored in the field on top of the trench with the proper saddles or inserts, and shall be inspected by the Consulting Engineer prior to installation.
- For main storm sewer sizes 975 mm and larger, tees shall be manufactured in the trench with proper saddles or inserts, and shall be inspected by the Consulting Engineer prior to installation.

In the cases above, the storm sewer shall be drilled at site or scribed at the plant rather than breaking through the pipe wall on-site.

The 50 mm x 100 mm wooden markers placed from the invert of the service to 600 mm above ground level shall be placed at the ends of each residential connection (at the streetline).

The top 600 mm of the markers shall be painted white.

PVC storm service connections shall be white.

Zero Lot Line Developments

All zero lot line developments shall provide drops within the basement foundation to accommodate the property line maintenance holes with min. 300 mm off-set.

Abandon of Storm Service Connections

Storm service connections shall be abandoned by capping the service connection at the property line, disconnecting and capping the service connection at the storm sewer main, and capping the tee at the sewer main. The abandoned service connection shall be grouted, and evidence shall be provided to the City.

Evidence of abandonment shall include a complete CCTV video file and a written report of the sewer main. Photographs of good quality shall be provided for the abandoned service connection at the property line.

Storm service connection maintenance holes at the property line shall be abandoned by removing the top 1.0 m of the maintenance hole and filling the remaining maintenance hole with sand. For maintenance holes under the municipal ROW, U-fill shall be used to fill the maintenance hole.

M1.2 Sanitary Service Connections

All sanitary sewers shall conform to the requirements of the Canadian Standards Association and ASTM Standards.

Only one service connection is permitted per residential lot and ICI / condominium block.

Section M - Service Connections

For multiple ICI / condominium blocks which may subdivide into different ownerships / corporations, additional service connections may be permitted. These are subject to approval based on the following development applications:

- Site Plan
- Consent / severance application / draft plan of condominium

More than one service connection may be permitted for ICI / condominium block on a case-by-case basis and must be accepted by the Director of Engineering in writing.

Residential

A 125 mm diameter single sanitary SDR 28 PVC connection shall be installed at a 2.0% minimum grade for each residential unit. Refer to Standard Drawings for details.

In general, sewer bedding shall be as per OPSD-802.010 for flexible pipes unless otherwise specified by the Geotechnical Engineer. The class of pipe shall be selected to suit this bedding detail.

Sanitary service connections shall be provided between the sanitary sewer and the streetline as outlined below. Sanitary connections shall have a minimum of 2.75 m cover at the streetline. If connections have less cover, it may be necessary to raise basement elevations to accommodate connections.

Service connections shall be terminated at the property line or optionally, 1.5 m inside the lot. It should be noted however, that a plumbing permit and inspection shall be required from the Building Department for construction within the lot.

Service connections shall be located in conformance with City's Standards.

Institutional, Commercial, Industrial and Other Non-residential Uses

Service connections for institutional, commercial, industrial and other non-residential land uses shall be sized in accordance with the "Code and Guide to Part 7 (Plumbing) of the Ontario Building Code". Service connections shall be a minimum of 200 mm in diameter with a minimum grade of 2.0%. Inspection maintenance holes shall be installed adjacent to the streetline on private property. The service connection invert shall be match, or be higher than, the main sewer obvert.

If the diameter of the service connection sewer is more than half the diameter of the main sanitary sewer, a maintenance hole must be installed on the main sewer at the intersection of a service connection.

Other Unit Types

For other unit types, the type of service connection shall be accepted by the Director of Engineering. Consulting Engineers shall be responsible for sizing service connections in accordance with the Code and Guide to Part 7 (Plumbing) of the Ontario Building Code. Service connections shall be a minimum of 125 mm in diameter.

General

- The 50 mm x 100 mm wood markers shall be placed adjacent to the invert of each service connection. Markers shall extend 0.60 m above the ground. The exposed end shall be painted green.
- Service connections shall be connected to the sanitary sewer by means of a manufactured tee.
- Minimum low flow velocity = 0.6 m/s.
- Roof drains and foundation drains shall not be connected to the sanitary sewer system.
- PVC sanitary service connections shall be green.

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- All service connections for new developments shall be made with pre-manufactured tees and wyes. Service connections including tees and wyes shall conform to CSA B 182.1 and B 182.2.
- PVC pipe with maximum dimension ratio of 28 (SDR-28) shall be used.

Abandon of Sanitary Service Connections

Sanitary service connections shall be abandoned by capping the service connection at the property line, disconnecting and capping the service connection at the sanitary sewer main, and capping the tee at the sewer main. The abandoned service connection shall be grouted, and evidence shall be provided to the City.

Evidence of abandonment shall include a complete CCTV video file and a written report of the sewer main. Photographs of good quality shall be provided for the abandoned service connection at the property line.

Sanitary service connection maintenance holes at the property line shall be abandoned by removing the top 1.0 m of the maintenance hole and filling the remaining maintenance hole with sand. For maintenance holes under the municipal ROW, U-fill shall be used to fill the maintenance hole.

Zero Lot Line Developments

All zero lot line developments shall provide drops within the basement foundation to accommodate the property line maintenance holes with min. 300 mm off-set.

M1.3 Water Service Connections

Water service connections shall not be allowed on 450 mm diameter or larger watermain, unless accepted by the Director of Engineering.

Water service connections shall be in accordance with the City's Standards.

Only single service connections are permitted per lot/block. Dual service connections shall be provided only for looping purpose to ensure supply redundancy.

For multiple ICI/Condominium blocks which will split into different ownerships, additional service connections may be permitted subject to detail approval based on submission of the following applications:

- Application to the Planning Department for dividing the land parcel into different ownership within the subject site.
- Application for Site Plan approval.

Residential

Water service connections shall be minimum 19 mm diameter except when the length of the connection from the main to the building setback exceeds 30 m, then the minimum size shall be 25 mm diameter.

Water service connections for lots with a sprinkler system must be in accordance with the Ontario Building Code.

Water service Connections shall be installed at a depth of 1.75 m at the streetline and shall be offset within the ROW at 0.10 m from the streetline.

Water service connections shall be terminated at the streetline for each unit.

Waterboxes shall be installed on the street side of the streetline. Waterboxes shall not be located in the sidewalk.

Water service connections shall be placed as indicated on the Standard Drawings.

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Water service connections shall not be located under a driveway.

Minimum separation between the water service connections and sewer connections shall be 2.5 m.

Water service connections shall be located at a minimum of 0.5 m from the property line.

Water box shall be located a minimum 0.3m clearance from the driveway

In addition to the above requirements for the water service connection for residential, the following conditions need to be satisfied for **Residential originally serviced on well system and converting to municipal water system**:

- Well shall be abandoned and decommissioned in accordance with the latest MECP regulations.
- The original well connection shall be fully and properly disconnected from the building, as per the building Code requirements.
- Arrangements shall be made through the City of Markham's Waterworks Department to follow for the installation of a water meter.
- A RP (reduced pressure principle) type backflow prevention device, as approved by the City of Markham's Building Department (Plumbing Inspector), shall be installed after the water meter if there is no proof of proper decommission and abandon of the well system at the time of connecting to the municipal water system.
- All disconnection and plumbing works shall be fully inspected and approved by the City of Markham Building Department (Plumbing Inspector) and Waterworks Department prior to authorization of any water turn-on requests.

Institutional, Commercial, Industrial and Other Non-residential Uses

Water service connections shall be provided to all institutional, commercial, industrial and other non-residential land uses. Service connections shall include a domestic line and a fire line sized in accordance with the latest edition of the Code and Guide to Part 7 (Plumbing) of the Ontario Building Code and City's Standards.

Mainstops

All domestic water service connections shall have mainstops installed at the watermain equal to the water service connection diameter and in accordance with the Waterworks Material Specification (Annex 3).

Valves, Curb Stops and Boxes

The 19 mm and 25 mm diameter curb stops to be ball valve type.

All service connections below 100 mm diameter shall have curb stops and boxes installed at an accepted location.

Valves for service connections 100 mm diameter and greater shall be anchored to the tee on the watermain and valve boxes installed at an accepted location.

Blow-off for water service connections 100 mm to 300 mm in size shall be a 25 mm copper pipe connection, complete with service box and rod, with copper pipe blow-off into top section of valve box.

All services 100 mm diameter or greater shall be constructed with isolation valve at the main and control shut off valve at the property line.

No service connections shall be made to watermains greater than 450 mm diameter.

Water service connections shall not become operational until documentation, including acceptance of laboratory test results from an accredited laboratory, are provided to the Director of Engineering, verifying that the water system pipes on the private property have been chlorinated, flushed and pressure tested according to City and MECP requirements.

Refer to Standard Drawing for details.

General

The 50 mm x 100 mm wood markers shall be placed adjacent to the invert of each service connection. Markers shall extend 0.60 m above the ground. The exposed end shall be painted blue.

Abandon / Removal of Water Service Connections

Water service connections shall be abandoned as follows:

- For water service connections up to 38 mm, the shut-off valve for the old water service connection shall be turned off. The copper pipe shall be cut to a minimum of 10 cm after the valve at the main and be crimped closed. The cap rod and the associated sleeve shall be removed at the property line.
- For water service connections of 50 mm and larger, the pipe shall not be removed, but abandoned by grouting and capping on both ends. The old valve and box at property line shall be removed.

For cases where the removal of the water service connections are required (for 50 mm and larger), the water service connections shall be plugged/capped at the main and the service connections shall be removed from the ground, including the removal of the curb box at the property line. The Applicant shall notify the City's Municipal Inspections Section a minimum of 48 hours prior to the time when the abandonment / removal of water service connection is scheduled. The City's Municipal Inspections will arrange for Environmental Services staff to be on site. If Environmental Services staff cannot attend, photos showing the disconnection shall be provided to the City's Municipal Inspections for proof of abandonment / removal.

Zero Lot Line Developments

All zero lot line developments shall provide drops within the basement foundation to accommodate the property line valve boxes with min. 300 mm off-set.

M1.4 Infill Residential Redevelopment

Existing service connections can only be reused if the owner/proponent satisfies and complies with the following requirements:

1. Storm Service Connections:

- a) Comply with the City's latest Design Criteria and meet all current City Standards and Specifications. The existing municipal sewer connection shall be free of any structural or operational defects as determined by and at the sole discretion of the Director of Engineering, and shall have no record of any sewer backups or any other recorded operational deficiencies.
- b) Before demolishing the existing building, the owner/proponent shall perform a CCTV inspection from the cleanout inside the building to determine whether the condition of the existing service lateral within the City's Right-of-Way is acceptable for reuse.
- c) Verify by an Engineer / OLS and indicate on the Engineering Drawings that the existing storm service lateral elevation at the property line can service the proposed basement by gravity. The Engineering Drawings must show the elevation of both the existing service lateral at property line and the underside of the footing verified by an Engineer / OLS.
- d) If the designed basement elevation is too low to be serviced by gravity from the building to the mainline storm sewer, a sump pump is required to be installed in the basement to drain the foundation drain to the existing storm service lateral (provided the existing storm service lateral satisfies 1a, 1b, and 1c above).

2. Sanitary Service Connections:

- a) Comply with the City's latest Design Criteria and meet all current City Standards and Specifications. The existing municipal sewer connection shall be free of any structural or operational defects as determined by and at the sole discretion of the Director of Engineering, and shall have no record of any sewer backups or any other recorded operational deficiencies.
- b) Before demolishing the existing building, the owner/proponent shall perform a CCTV inspection from the cleanout inside the building to determine whether the condition of the existing service lateral within the City's Right-of-Way is acceptable for reuse.
- c) Verify by an Engineer / OLS and indicate on the Engineering Drawings that the existing sanitary service lateral elevation at the property line can service the proposed basement by gravity. The Engineering Drawings must show the elevation of both the existing service lateral at property line and the underside of the footing verified by an Engineer / OLS.
- d) If the designed basement elevation is too low to be serviced by gravity from the building to the mainline sanitary sewer, the following design options shall be considered:
 - i) Pump the main floor and basement using a grinder pump, to the sanitary service lateral (provided the existing sanitary service lateral satisfies 2a, 2b, and 2c above).
 - ii) Drain the main floor by gravity to the sanitary service lateral (provided the existing sanitary service lateral satisfies 2a, 2b, and 2c above) and pump the basement by a grinder pump.

Note that: pumping via grinder pump is only permitted where a gravity outlet to the main sewer cannot be achieved.

3. Water Service Connections:

- a) Comply with the City's latest design criteria.
- b) Provide calculations from a Professional Engineer based on the proposed house fixture unit water demand to demonstrate that the existing service connection can provide adequate supply and pressure to the development in accordance with the methodology per AWWA M22, as amended to the satisfaction of the Director of Engineering.
- c) Verify with the City's existing hydraulic characteristic at the site to ensure any existing hydraulic issue(s) will be addressed in the servicing design.

Any non-compliant existing service connections must be disconnected and abandoned in accordance to the City's Design Criteria (see Section M) and new service connections install for the developments.

For the road restoration requirements of the construction trenches, follow the "Backfill and Road Restoration Details" (Section F) of the "Municipal Inspection and Construction Guidelines".

For all residential infill developments with proposed water service connections, provide a detailed hydraulic calculation from a Professional Engineer, in accordance with the methodology per AWWA M22, as amended, to the satisfaction of the Director of Engineering.