

PART 1 GENERAL**1.1 RELATED REQUIREMENTS**

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

1.2 REFERENCES

- .1 City of Ottawa Special Provisions
 - .1 F-4411 Watermain Construction by Open Cut.
 - .2 F-4412 Watermain Pipe.
 - .3 F-4417 Relocations, Blankings and Connections to Existing Watermains.
 - .4 F-4492 Thrust Restraint of Watermains and Fittings.
- .2 City of Ottawa Standard Drawings
 - .1 W17 Standard Trench Detail.
 - .2 W25.3 Concrete Thrust Blocks for PVC and DI Pipe 400mm and Under.
 - .3 W25.4 Thrust Block Dimension Tables for PVC and DI Pipe 400mm and Under.
 - .4 W25.5 Restraining and Retaining Rings for PVC and DI Pipe 400mm and Under.
 - .5 W25.6 Tables of Restrained Lengths for PVC and DI Pipe 400mm and Under.
- .3 Ontario Provincial Standard Specification (OPSS):
 - .1 OPSS.MUNI 441 (November 2016), Watermain Installation in Open Cut.
 - .2 OPSS.MUNI 1010 (November 2013), Aggregates – Base, Subbase, Select Subgrade, and Backfill Material.
 - .3 OPSS.MUNI 1359 (November 2016) Unshrinkable Backfill.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide marked up record drawings, including surveyed locations or work, details of pipe and fittings, maintenance and operating instructions.
 - .1 Include top of pipe and horizontal location of fittings and type.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.

1.5 SCHEDULING OF WORK

- .1 Schedule Work to minimize interruptions to existing services and hydrants.

SITE WATER UTILITY DISTRIBUTION PIPING

- .2 Notify fire department of any planned or accidental interruption of water supply to hydrants.
- .3 Provide "Out of Service" sign on hydrant not in use.

PART 2 PRODUCTS**2.1 WATER MAIN PRODUCTS AND APPURTENANCES**

- .1 All products used for water main and water service work shall be on the approved materials list of the City of Ottawa. All restraining mechanisms to have stainless steel hardware.

2.2 BEDDING, COVER AND BACKFILL MATERIAL

- .1 Bedding and cover material to be OPSS.MUNI 1010 Granular A. Backfill material to meet requirements of Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Pressure grout material shall be according to OPSS.MUNI 1359 for unshrinkable fill, with a 28 day compressive strength in the range of 0.4 to 0.7 MPa.

PART 3 EXECUTION**3.1 PREPARATION**

- .1 Submit information, material and design data to Departmental Representative for thrust restraint systems at proposed water main end cap a minimum of 5 working days in advance of work. Thrust restraint systems shall be in accordance with the requirements listed in City of Ottawa S.P. F-4492 –Thrust Restraint of Watermains and Fittings.
- .2 Clean all materials of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Departmental Representative.
 - .2 Remove defective materials from site as directed by Departmental Representative.

3.2 ABANDONMENT

- .1 Contact Departmental Representative to arrange for shutdown of water service.
- .2 Excavate to expose water main. Support and protect water main remaining in place to prevent movement.
- .3 Cut and remove sections of existing water main to allow for installation of end caps.
- .4 Cap end of section of water main remaining in service. Install restraining/retaining rings and thrust block/anchors.

SITE WATER UTILITY DISTRIBUTION PIPING

- .5 Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket, and maintain concentricity until gasket is properly positioned.
- .6 Avoid displacing gasket or contaminating with dirt or other foreign material.
 - .1 Remove disturbed or contaminated gaskets.
 - .2 Clean, lubricate and replace before jointing is attempted again.
- .7 Minimize deflection after joint has been made.
- .8 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
- .9 Ensure completed joints are restrained.
- .10 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
- .11 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.
- .12 Do not utilize frozen bedding or backfill.

3.3 BACKFILL

- .1 Place backfill material, above pipe cover, in uniform layers not exceeding 300 mm compacted thickness up to final grade of backfill material.
- .2 Do not place backfill in frozen condition.
- .3 Under paving and walks, compact backfill to at least 98% corrected maximum dry density. In other areas, compact to at least 95% corrected maximum dry density.

3.4 SURFACE RESTORATION

- .1 After installing and backfilling over water mains, restore surface to original condition or to condition required for other subsequent work as directed by Departmental Representative.

END OF SECTION

PART 1 GENERAL**1.1 RELATED REQUIREMENTS**

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

1.2 REFERENCES

- .1 Canadian Standards Association (CSA):
 - .1 CSA B1800-15, Thermoplastic Nonpressure Piping Compendium - B1800 Series (Consists of B181.0, B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7 B182.8, B182.11, B182.13 and B182.14).
- .2 Ontario Provincial Standard Specifications
 - .1 OPSS.MUNI 410, (November 2015) Pipe Sewer Installation in Open Cut.
 - .2 OPSS.MUNI 1010 (November 2013), Aggregates – Base, Subbase, Select Subgrade and Backfill Material.
 - .3 OPSS.MUNI 1359 (November 2016), Unshrinkable Backfill.
 - .4 OPSS 1841 (November 2015), Non-Pressure Polyvinyl Chloride (PVC) Pipe Products.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding, cover and sewer materials and provide access for sampling of bedding materials.
- .2 Certification to be marked on pipe.

PART 2 PRODUCTS**2.1 PIPE CAPS**

- .1 Type PSM Poly Vinyl Chloride (PVC) fittings: to CSA-B182.2.

2.2 PIPE BEDDING AND SURROUND MATERIAL

- .1 Granular material in accordance with OPSS.MUNI 1010, Granular A.

2.3 BACKFILL MATERIAL

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

PART 3 EXECUTION**3.1 PREPARATION**

- .1 Clean new fittings and pipe ends on which caps are to be placed of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.

3.2 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Do not allow contents of sewer to flow into trench.
- .3 Excavate to expose areas of sanitary sewer to be cut and capped, and sections to be removed.

3.3 GRANULAR BEDDING

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness at capped ends of abandoned pipe. Depth of bedding to conform with the requirements of Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .3 Shape transverse depressions as required to suit joints.
- .4 Compact each layer full width of bed to at least 95 % corrected maximum dry density.

3.4 INSTALLATION

- .1 Lay and join fittings to pipe in accordance with manufacturer's recommendations and to approval of Departmental Representative.
- .2 Install plastic pipe and fittings in accordance with CSA B182.11.
- .3 Joints:
 - .1 Install gaskets as recommended by manufacturer.
 - .2 Maintain joints free from mud, silt, gravel and other foreign material.
 - .3 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gaskets; clean, lubricate and replace before joining is attempted.
 - .4 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.

PUBLIC SANITARY UTILITY SEWERAGE PIPING

- .4 When any stoppage of Work occurs, restrain pipes to prevent "creep" during down time.
- .5 Cut pipes as required for 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.
- .6 Make watertight connections for caps.
- .7 Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.5 ABANDONED PIPE REMOVAL

- .1 Remove and dispose of sanitary sewer sections designated for removal offsite.
- .2 Backfill trench in accordance with Paragraph 3.7. Existing granular bedding and cover material may be left in place.

3.6 SURROUND

- .1 Place surround material in unfrozen condition at capped pipe locations.
- .2 Upon completion of cap placement, and after Departmental Representative has inspected area, surround and cover pipes and fittings.
- .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 95 % corrected maximum dry density.
- .6 Compact each layer from mid height of pipe to underside of backfill to at least 95 % corrected maximum dry density.

3.7 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround, in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.
- .3 Compact backfill to at least 95% corrected maximum dry density.

3.8 ABANDONMENT

- .1 Cap abandoned sanitary sewers in locations indicated. Cap material to be

designed for, and be compatible with pipe material.

END OF SECTION

STORM UTILITY DRAINAGE PIPING**PART 1 GENERAL****1.1 RELATED REQUIREMENTS**

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

1.2 REFERENCES

- .1 Canadian Standards Association (CSA):
 - .1 CSA B1800-15, Thermoplastic Nonpressure Piping Compendium - B1800 Series (Consists of B181.0, B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7 B182.8, B182.11, B182.13 and B182.14).
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 - .3 OPSS.MUNI 1359 (November 2016), Unshrinkable Backfill.
 - .4 OPSS 1841 (November 2015), Non-Pressure Polyvinyl Chloride (PVC) Pipe Products.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding, cover and sewer materials and provide access for sampling of bedding materials.
- .2 Certification to be marked on pipe.

PART 2 PRODUCTS**2.1 PIPE CAPS**

- .1 Type PSM Poly Vinyl Chloride (PVC) fittings: to CSA-B182.2.

2.2 PIPE BEDDING AND SURROUND MATERIAL

- .1 Granular material in accordance with OPSS.MUNI 1010, Granular A.

2.3 BACKFILL MATERIAL

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

STORM UTILITY DRAINAGE PIPING**PART 3 EXECUTION****3.1 PREPARATION**

- .1 Clean new fittings and pipe ends on which caps are to be placed of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.

3.2 TRENCHING

- .2 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Do not allow contents of sewer to flow into trench.
- .4 Excavate to expose areas of storm sewer to be cut and capped, and sections to be removed.

3.3 GRANULAR BEDDING

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness at capped ends of abandoned pipe. Depth of bedding to conform with the requirements of Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .3 Shape transverse depressions as required to suit joints.
- .4 Compact each layer full width of bed to at least 95 % corrected maximum dry density.

3.4 INSTALLATION

- .1 Lay and join fittings to pipe in accordance with manufacturer's recommendations and to approval of Departmental Representative.
- .2 Install plastic pipe and fittings in accordance with CSA B182.11.
- .3 Joints:
 - .1 Install gaskets as recommended by manufacturer.
 - .2 Maintain joints free from mud, silt, gravel and other foreign material.
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 - .4 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.

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- .4 When any stoppage of Work occurs, restrain pipes to prevent "creep" during down time.
- .5 Cut pipes as required for 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.
- .6 Make watertight connections for caps.
- .7 Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.5 ABANDONED PIPE REMOVAL

- .1 Remove and dispose of storm sewer sections designated for removal offsite.
- .2 Backfill trench in accordance with Paragraph 3.7. Existing granular bedding and cover material may be left in place.

3.6 SURROUND

- .1 Place surround material in unfrozen condition at capped pipe locations.
- .2 Upon completion of cap placement, and after Departmental Representative has inspected area, surround and cover pipes and fittings.
- .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 95 % corrected maximum dry density.
- .6 Compact each layer from mid height of pipe to underside of backfill to at least 95 % corrected maximum dry density.

3.7 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround, in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.
- .3 Compact backfill to at least 95% corrected maximum dry density.

3.8 ABANDONMENT

- .1 Cap abandoned storm sewers in locations indicated. Cap material to be designed

STORM UTILITY DRAINAGE PIPING

for, and be compatible with pipe material.

END OF SECTION