

Construction Administrative Inspection Specification for Watermain Installation in Open Cut

441.01 SCOPE

This CAIS covers the construction administration and inspection requirements for the installation of watermains, service connections, and associated appurtenances in open cut as specified in OPSS 441, April 2026.

441.02 REFERENCES

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

Ontario Provincial Standard Specifications, Construction:

OPSS 441 Watermain Installation in Open Cut

Construction Administration and Inspection Specifications (CAIS):

- CAIS 206 Grading
- CAIS 401 Trenching, Backfilling, and Compacting
- CAIS 404 Support Systems
- CAIS 490 Site Preparation for Pipeline, Utilities, and Associated Structures
- CAIS 491 Preservation, Protection, and Reconstruction of Existing Facilities
- CAIS 492 Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures
- CAIS 493 Temporary Potable Water Supply Services
- CAIS 510 Removal
- CAIS 517 Dewatering and Temporary Flow Passage Systems
- CAIS 539 Temporary Protection Systems
- CAIS 1004 Aggregates - Miscellaneous
- CAIS 1301 Cementing Materials
- CAIS 1302 Water
- CAIS 1350 Concrete - Materials and Production
- CAIS 1842 Pressure Polyethylene Pipe Products

441.03 DEFINITIONS

For the purpose of this CAIS, the definitions shall be as specified in OPSS 441.

441.04 DESIGN AND SUBMISSION REQUIREMENTS

Administrative Activities:

1	-	Check that all manufacturer’s instructions and recommendations are submitted prior to commencing of the work as listed in OPSS 441.04.	25%
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441.05 MATERIALS

441.05.01 General

Inspection Activities:

1	-	Check that all materials for watermains are NSF/ANSI/CAN 61 compliant.	25%
2	-	Check that all pipes are correct size, type and class.	25%
3	-	Check if fittings are suitable and compatible with the pipe material and class.	25%

441.05.04 Concrete

As specified in CAIS 1350.

Inspection Activities:

1		Check that concrete has nominal minimum 28-Day compressive strength of 20 MPa.	25%
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441.05.10 Mortar

Mortar sand as specified in CAIS 1004.

Portland cement as specified in CAIS 1301.

Water as specified in CAIS 1302.

441.05.11 Polyethylene Pipe

As specified in CAIS 1842.

441.05.12 Polyvinyl Chloride Pipe

441.05.12.01 General

Inspection Activities:

1	-	Check that the fittings for PVC and PVCO pipe are either gray iron, ductile iron, blue injection moulded polyvinyl chloride or blue prefabricated polyvinyl chloride.	25%
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441.05.17 Valves

441.05.17.01 General

Inspection Activities:

1		Check that the valves open in a counter clockwise direction.	25%
2		Verify the type and the size of valves as specified in OPSS 441	25%

441.06 EQUIPMENT – Not Used

441.07 CONSTRUCTION

441.07.01 General

Inspection Activities:

1		Check that all pipes, connections and appurtenances are kept clean and free of foreign material during progress of Work.	25%
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441.07.02 Site Preparation

As specified in CAIS 490.

441.07.03 Removals

As specified in CAIS 510.

441.07.04 Preservation and Protection of Existing Facilities

As specified in CAIS 491.

441.07.05 Cold Weather Work

Inspection Activities:

1		Check that work is protected from freezing.	25%
2		Check that pipe and bedding material are not placed on frozen ground.	25%

441.07.06 Transporting, Unloading, Storing, and Handling Pipe

Inspection Activities:

1		Check that pipes, fittings and gaskets are not damaged.	25%
2		Check that pipes greater than 600 mm diameter have end covers and tamper evident seal on bell end.	25%
3		Check that pipes delivered to the construction site with damaged or missing end covers are not accepted.	25%

4		Check that transporting, unloading, storing, and handling of pipe is according to the manufacturer's recommendations.	25%
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441.07.07 Excavation

As specified in CAIS 401.

Inspection Activities:

1		Check that excavations are free of water at all times.	25%
2	M	Check that alignment and designed widths are adhered to as loading on pipe is partially dependent on trench widths.	25%

441.07.08 Support Systems

As specified in CAIS 404.

Inspection Activities:

1	M	Check that erosion and sediment control schemes are in place and functioning. If the control measures are not functioning or are insufficient the Contractor must be requested to review and take action.	25%
2	-	Check that specified bedding is used and constructed in accordance with contract requirements.	25%

441.07.09 Dewatering

As specified in CAIS 517.

441.07.10 Temporary Protection Systems

As specified in CAIS 539.

441.07.11 Temporary Potable Water Supply Services

As specified in CAIS 493.

441.07.12 Pipe Installation

Inspection Activities:

1	-	Check that the installation of pipe is as specified in OPSS 441.07.13	25%
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441.07.13 Jointing

441.07.13.01 General

Inspection Activities:

1	-	Check that joints and all connections are as specified in OPSS 441.07.14.01	25%
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441.07.14 Cutting of Pipe

Inspection Activities:

1	-	Check that pipe interior is cleaned, and end cover is replaced.	25%
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441.07.15 Change in Line and Grade

Inspection Activities:

1	-	Check that fabricated bends are used when changes in line and grade are required as specified in OPSS 441.07.17	25%
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441.07.16 Installation of Valves and Fittings

441.07.16.01 General

Inspection Activities:

1	-	Check that types and location of installation of valves and fittings are as specified in Contract Documents.	25%
2		Check that valves and connecting pipe are aligned accurately and supported as specified in the Contract Documents.	25%
3	-	Check valves and fittings are cleaned prior to installation.	25%

441.07.16.02 Air Release and Air/Vacuum Valves

Inspection Activities:

1	-	Verify the locations of air/vacuum valves as specified in the Contract Documents.	25%
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441.07.17 Installation of Hydrant Sets

Inspection Activities:

1	-	Check the installation of hydrant sets.	25%
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2	-	Check the locations of hydrants as specified in the Contract Documents.	25%
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441.07.18 Installation of Service Connections

Inspection Activities:

1	-	Check the installation of service connections.	25%
2	-	Check the locations and size of service connections as specified in the Contract Documents.	25%

441.07.19 Shutting Down or Charging Mains

Inspection Activities:

1	-	Check that the watermains are not shut down, charged or valves operated without permission.	25%
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441.07.20 Connections to Existing Watermains

Inspection Activities:

1	-	Check that watermain is placed in trench to depth as specified in the contract for frost penetration.	25%
2	-	Observe all connections made to existing watermains.	25%

441.07.21 Thrust Restraints

Inspection Activities:

1	-	Check that connections, caps and bends are restrained.	25%
2	-	Check that concrete is placed against undisturbed soil.	25%
3	-	Check that joints and couplings are concrete-free.	25%

441.07.22 Backfilling and Compacting

As specified in CAIS 401.

Inspection Activities:

1	M	Check that backfill materials are as specified in the Contract Documents and the required compaction checks are made.	25%
2	-	Check that backfill is brought up evenly on both sides of the pipe at the same time.	25%

3	-	Check that appropriate equipment is used for compaction until the specified depth of cover over the pipe is achieved.	25%
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441.07.23 Material Sampling and Testing

441.07.23.01 Hydrostatic Testing

Inspection Activities:

1	M	Observe all appropriate testing for approvals.	25%
2	-	Check test pressure of 1035 kPa.	25%

441.07.24 Flushing and Disinfecting Watermains

Inspection Activities:

1	M	Check that watermains are flushed and disinfected as specified.	25%
2	M	Check the sampling and testing for chlorine residual as specified.	25%
3	M	Approve the system prior to operation.	25%

441.07.25 Site Restoration

As specified in CAIS 492.

441.07.26 Management of Excess Material

Inspection Activities:

1	-	Check all chlorinated water is disposed of safely.	25%
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441.08 QUALITY ASSURANCE

Inspection Activities:

1	-	Check that acceptance is according to this specification, including satisfactory completion of all hydrostatic testing.	25%
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441.09 MEASUREMENT FOR PAYMENT

Administrative Activities:

1	-	Measurement for payment shall be as specified in OPSS 441.	-
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441.10 BASIS FOR PAYMENT

Administrative Activities:

1	-	Basis of payment shall be as specified in OPSS 441.	-
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441.10.02 Elevation Adjustment

Administrative Activities:

1	-	Check that when requested by the Owner change in invert elevation exceeding 150 mm, it is administered as a Change in the Work.	-
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WARRANT: Always with OPSS 441, Construction Specification for Watermain Installation in Open Cut