



**ONTARIO  
PROVINCIAL  
STANDARD  
SPECIFICATION**

**OPSS.MUNI 416  
NOVEMBER 2023**  
(Formerly OPSS 416, November 2013)

**Note: The MUNI implemented in November 2023 replaces OPSS 416 COMMON, November 2013 with no technical content changes.**

**CONSTRUCTION SPECIFICATION FOR  
PIPELINE AND UTILITY INSTALLATION BY JACKING AND BORING**

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**416.01 SCOPE**

This specification covers the requirements for the installation of pipeline, which shall be used as carrier pipe or casing pipe, by jacking and boring method, and includes removal of material by either manual or mechanical means.

**416.01.01 Specification Significance and Use**

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

Use of this specification or any other specification shall be as specified in the Contract Documents.

#### **416.01.02 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.

#### **416.02 REFERENCES**

When the Contract Documents indicate that municipal-oriented specifications are to 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 517 Dewatering of Pipeline, Utility, and Associated Structure Excavation

##### **Ontario Provincial Standard Specifications, Material**

OPSS 1802 Smooth Walled Steel Pipe

OPSS 1820 Circular and Elliptical Concrete Pipe

##### **American Water Works Association (AWWA)**

C206-03 Field Welding of Steel Water Pipe

#### **416.03 DEFINITIONS**

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

**Carrier Pipe** means a final pipe in direct contact with the material being conveyed.

**Certificate of Conformance** means a document issued by the Quality Verification Engineer confirming that the specified components of the Work are in general conformance with the requirements of the Contract Documents.

**Pipeline** means to include sewers, culverts, watermains, and forcemains.

**Quality Verification Engineer (QVE)** means an Engineer retained by the Contractor for the duration of construction, qualified to provide the services specified in the Contract Documents.

## **416.04 DESIGN AND SUBMISSION REQUIREMENTS**

### **416.04.01 Submission Requirements**

When any of the following information is not specified in the Contract Documents, it shall be submitted to the Contract Administrator for review a minimum of 14 Days prior to commencing jacking and boring operations:

- a) Work area layout.
- b) Work schedule.
- c) Access shaft or pit design details.
- d) Jacking and boring procedure.
- e) Face support and other temporary support details.
- f) Material and Equipment.
- g) Settlement monitoring plan.
- h) Excavation and dewatering plan.
- i) Method for the removal of boulders and cobbles.
- j) Grouting operation.
- k) Testing and monitoring plan.

The access shaft or pit details shall bear the seal and signature of an Engineer.

## **416.05 MATERIALS**

### **416.05.01 Casing Pipe**

The casing pipe shall be concrete or steel pipe as specified in the Contract Documents.

Concrete pipe shall be according to OPSS 1820.

Steel pipe shall be according to OPSS 1802 with welded joints.

## **416.07 CONSTRUCTION**

### **416.07.01 General**

An individual with previous experience in jacking and boring shall supervise the work at all times.

#### **416.07.02 Method of Jacking and Boring Procedure**

The jacking and boring procedure to be used shall be submitted to the Contract Administrator prior to commencing the work and shall be subject to the following limitations:

- a) Hydraulically operated jacks of adequate number and capacity shall be provided to ensure smooth and uniform advancement without over-stressing of the pipe.
- b) A jacking head or collar shall be provided to transfer and distribute jacking pressure uniformly over the entire end bearing area of the pipe.
- c) The casing pipe shall be fully supported in the jacking pit at the lines and grades as specified in the Contract Documents.
- d) The jacking and boring procedure shall be compatible with the subsurface and groundwater conditions at the site.

#### **416.07.03 Construction Shafts**

Construction shafts shall be provided at the locations specified in the Contract Documents or according to the Contractor's submission.

Shafts shall be maintained in a drained condition.

A secure fence shall be installed around the perimeter of the access shaft or pit area with gates and truck entrances. The fence shall be removed upon completion of the work.

#### **416.07.04 Dewatering**

Dewatering shall be according to OPSS 517.

#### **416.07.05 Pipeline Installation**

The pipeline shall be installed to the lines, grades, and tolerances as specified in the Contract Documents.

When steel pipe is used as a carrier pipe, welding of pipe joints shall be according to AWWA C206.

When steel pipe is used solely as a casing pipe, the welds shall be sufficient to support the jacking forces of the pipeline installation.

The work area shall be kept sufficiently dry at all times to permit work to be performed in a safe and satisfactory manner.

The space between the casing pipe and the excavation shall be filled according to the Contractor's submission on grouting operations.

The space between the casing pipe and the carrier pipe shall be filled according to the Contractor's submission on grouting operations.

#### **416.07.06 Removal of Boulders and Cobbles**

Methods for the removal of boulders and cobbles shall be as detailed in the Contractor's submission. The Contract Administrator shall be informed immediately of any obstructions encountered.

**416.07.07 Cathodic Protection**

When specified in the Contract Documents, cathodic protection on the casing pipe shall be provided.

**416.07.08 Testing and Monitoring**

Testing and monitoring shall be as specified in the Contract Documents or in accordance to the Contractor's submission.

**416.07.09 Certificate of Conformance**

A completed Certificate of Conformance shall be submitted to the Contract Administrator upon completion of the work. The Qualification Verification Engineer shall affix their seal and signature to the completed Certificate of Conformance confirming that the following are in general conformance with the requirements of the Contract Documents:

- a) Work
- b) Material and installations
- c) Inspection, testing, and test results

**416.07.10 Management of Excess Material**

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

**416.09 MEASUREMENT FOR PAYMENT**

**416.09.01 Actual Measurement**

**416.09.01.01 Jacking and Boring**

Measurement of jacking and boring shall be by length in metres along the centreline of the casing pipe from the start to the end of the installed pipe.

**416.09.02 Plan Quantity Measurement**

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

**416.10 BASIS OF PAYMENT**

**416.10.01 Jacking and Boring - 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.

The removal of boulders having a volume in excess of 0.5 cubic metres shall be paid for as extra work.

## **Appendix 416-A, November 2023 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**

This specification was written to encompass the requirements for the construction of pipelines and or casings by the jacking and boring method. The primary application includes the construction of pipelines, and drainage conduits under highways, urban roads, and railway crossings.

Engineering design based on geotechnical pre-design information is essential to the use of this specification for jacking and boring projects.

The experience of the jacking and boring Contractor is of prime importance. The designer may recommend prequalification of bidders.

The designer should specify the following in the Contract Documents:

- The size and type of pipeline material to be used for the pipeline installation. This should include the required yield strength of steel pipe or the appropriate class or reinforcement of concrete pipe. (416.05.01)
- Lines and grades for casing pipe. (416.07.02)
- The construction shaft locations. This may include the access shaft to initiate the jacking and boring, and if required, the access shafts at both ends of the jacking. Also, the requirement for temporary shafts and whether they shall be removed or remain in place for other portions of the work. (416.07.03)
- The lines, grades, and tolerances required for the jacking and boring project. (416.07.05)
- The method of testing and monitoring the product installation. (416.07.08)

The designer should determine if the following is required and, if so, specify it in the Contract Documents:

- Cathodic protection of steel pipe or casing and the details thereof. (416.07.07)

The designer may wish to consider including a process for the grouting operation between the casing pipe and the carrier pipe, taking into account the high grout pressures that may occur.

The designer may wish to consider including a process regarding payment for failed jacking and boring attempts in the Contract Documents.

The designer may wish to specify a process and payment criteria to deal with rock obstructions that are encountered with jacking installation.

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**

No information provided here.