

REQUEST FOR QUOTATION

May 19, 2023

**SUBJECT: Request for Quotation (RFQ)
Robert St. and Elm Ave. Lift Station Emergency By-Pass System**

The City of Temiskaming Shores is seeking a quotation to procure and install an emergency by-pass pump, piping (and all associated appurtenances), concrete slab, and fencing located at the Robert St. and Elm Ave. lift station in Temiskaming Shores.

All work shall be completed as per the scope of work, specifications and drawings attached.

Quotation Submissions

Quotations are to be submitted by **June 16, 2023 at 2:00pm**, to Chad Chenette and Bradley Legault via e-mail at chad.chenette@exp.com and bradley.legault@exp.com using the template for unit prices provided in this RFQ. Bids will be opened at **2:15pm** at the EXP New Liskeard Office (310 Whitewood Ave). A Teams Meeting will be held for those bidders not able to attend in person. Please contact an authorized person to request an invite to the Teams Meeting.

Background

During periods of high rain fall the Robert and Elm pumping station begins surcharging. This leads to sewer back-ups in residents homes. In order to avoid sewer back-ups it has been proposed to add an emergency by-pass pump adjacent to the pumping station. The emergency pump will only be used as needed during intense periods of rain when surcharging and sewer backups are imminent. The pumped sewage water will be released to an adjacent low lying area approximately 8-10m away from the pumping station.

The proposed system is currently under an Environmental Compliance Approval (ECA) Amendment review. Please be advised that construction cannot begin until the ECA has been approved. At this time it is unknown when an approval will be received.

Scope of Work

The City of Temiskaming Shores is requesting a quote from Contractors to procure, install, and commission an emergency by-pass pump, piping (and all associated appurtenances), concrete slab, and fencing as shown in the drawing. All work shall be completed as per the drawing and specifications attached to this RFQ.

Communications

Communication (including clarification required from a technical perspective and/or from a purchasing perspective,) between EXP and Contractors must be in written format via email or fax. To facilitate comprehensive responses, Contractors are encouraged to email their questions as soon as possible to the Authorized Persons below. No verbal instructions or verbal information to Suppliers will be binding on EXP.

Authorized persons for this Request for Quotation are:

Name: Chad Chenette

Title: Project Manager

Phone Number: 705-545-0678

E-mail: chad.chenette@exp.com

Address: 310 Whitewood Ave West, New
Liskeard ON, P0J 1P0

Name: Bradley Legault

Title: Mechanical Coordinator

Phone Number: 705-648-3614

E-mail: bradley.legault@exp.com

Address: 885 Regent Street, Sudbury, ON, P3E
5M4

Forms Attached:

1. Summary of Prices
2. Construction Drawings
3. Specifications

SUMMARY OF PRICES

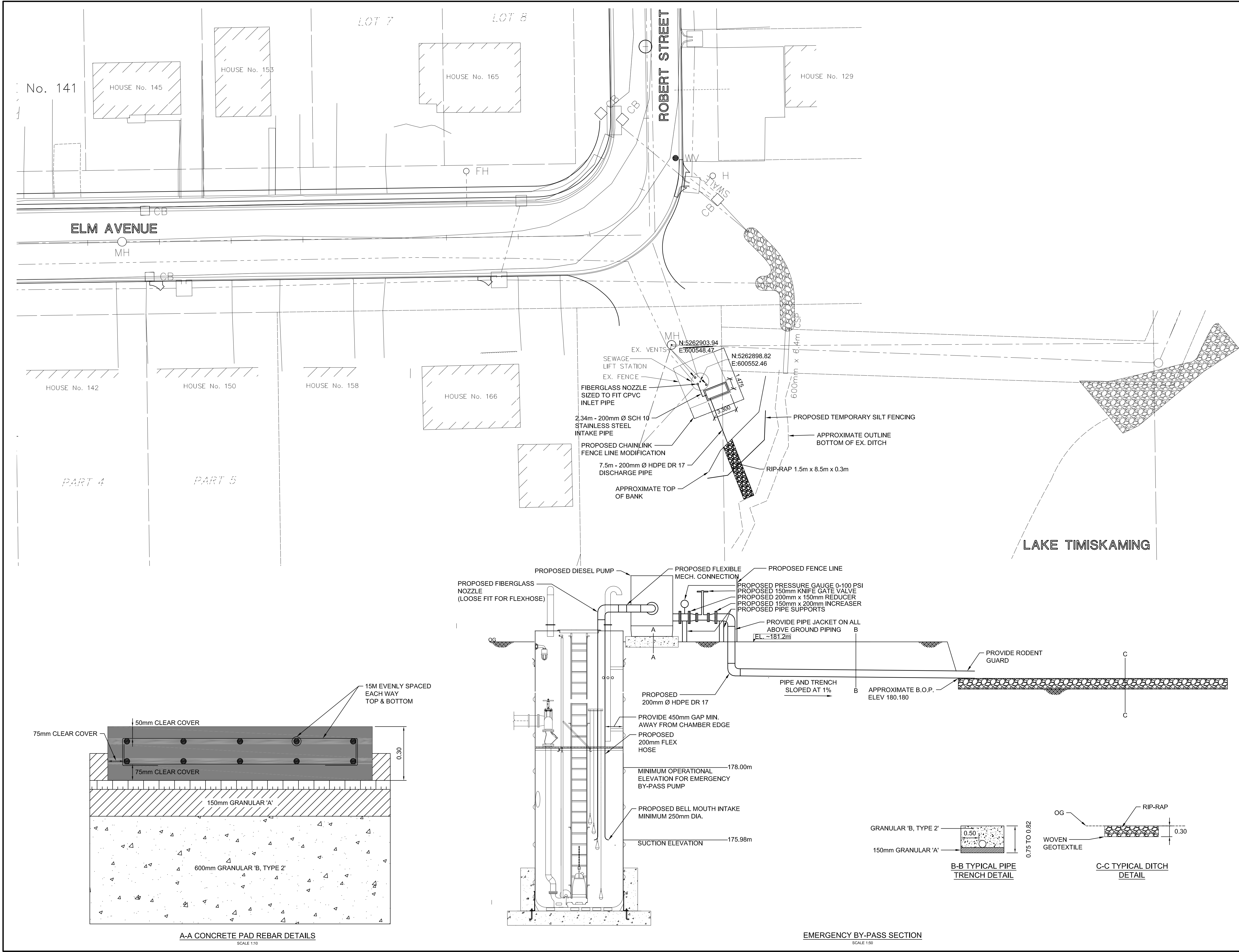
SECTION 1 – CONSTRUCTION WORK

The proponent shall complete the divisional pricing table below in its entirety. Where no value is inserted on any given line, the Bidder shall be deemed to have included the amount for the applicable division in the total lump sum price.

SCHEDULE OF ITEMS AND PRICES
Part A - General and Contract Requirements

| Item No. | Spec. No. | Item | Unit | Quantity | Unit Price | Amount |
|------------------------|--|----------------------------------|------|----------|------------|--------|
| 1 | | Mobilization/Demobilization | L.S. | 100% | | |
| 2 | OPSS.MUNI 410 Nov 18'; OPSS MUNI 1842 Nov 20' | Pipe, Valves and Appurtenances | L.S. | 100% | | |
| 3 | | Concrete Pad | L.S. | 100% | | |
| 4 | | Pump Procurement, Installation | L.S. | 100% | | |
| 5 | | Fencing Removal and Installation | L.S. | 100% | | |
| 6 | | Commissioning | L.S. | 100% | | |
| <i>SUBTOTAL</i> | | | | | \$ _____ | +HST |

5/10/2023 10:15:26 AM S:\ENGINEERING\PROJECTS\ELM\01701012\01701012-ROBERT & ELM BY-PASS PUMP\PROJECT E\ELM\01701012-ROBERT & ELM BY-PASS PUMP\DRAWING\01701012 SITE PLAN.CAD\DWG



ORIENTATION

PLAN ONLY (APPROXIMATE)

CAUTION: DO NOT SCALE DRAWINGS.
THIS REPRODUCTION MAY BE AT A SIZE DIFFERENT THAN ORIGINALLY DRAWN. EXP ASSUMES NO RESPONSIBILITY FOR INCORRECT SCALING. UNAUTHORIZED REPRODUCTION OR REUSE IS STRICTLY PROHIBITED. NOT PUBLISHED - ALL RIGHTS RESERVED. EXP EXPRESSLY DISCLAIMS RESPONSIBILITY ARISING FROM UNAUTHORIZED USE OF THESE DRAWINGS AND NOTES. AUTHORIZATION MUST BE IN WRITING.

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DIMENSIONS NOTES:
1. ALL DIMENSIONS ARE IN METERS (m) UNLESS NOTED OTHERWISE.

1. CONTRACTOR TO SUPPLY (1) EMERGENCY BYPASS PUMP WITH THE FOLLOWING DESCRIPTION:

MODEL CD225M SILENCE
GODWIN DRI-PRIME CRITICALLY SILENCED
SOUND ATTENUATED ENCLOSURE
200mm (8") 150# FLANGE SUCTION AND DISCHARGE
JOHN DEERE 4045HFC04 FT4 99HP DIESEL
INCLUDES PRIME GUARD ENGINE CONTROLLER

2. CONTRACTOR TO SUPPLY (1) FLOAT SET WITH FOLLOWING DESCRIPTION:

PRIME GUARD FLOAT SET W/65' MECHANICAL FLOATS

3. COMMISSIONING AND TESTING OF PUMP TO BE INCLUDED IN THE LUMP SUM PRICE.

4. 28-DAY STRENGTH OF CONCRETE TO BE 35MPA.

5. SHOP DRAWINGS TO BE SUBMITTED BY CONTRACTOR TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PROCUREMENT OF MATERIAL.

SCALE 1:250 (PLAN)

| No. | DATE (Y/M/D) | REVISION | BY |
|-----|--------------|------------------------------|-----|
| 2 | 23/05/19 | RE-ISSUED FOR TENDER | CAC |
| 1 | 23/05/12 | ISSUED FOR CLI-ECA AMENDMENT | CAC |

CLIENT
THE CITY OF TEMISKAMING SHORES

PROJECT TITLE
ROBERT & ELM EMERGENCY BY-PASS PUMP

PROJECT No.
NWL-01701012

DRAWING TITLE
ROBERT & ELM EMERGENCY BY-PASS PUMP LAYOUT

| DESIGNED | SCALE |
|----------|--------------|
| NJD/CAC | AS INDICATED |

| DRAWN | PLAN No. |
|-------|----------|
| CAC | 017-1102 |

| CHECKED | DRAWING No. |
|---------|-------------|
| CAC | C13 |

EXP Services Inc.
1-1-705-647-4311 | 1-1-705-647-3111
310 Whitewood Ave. W.
New Liskeard, ON P0J 1P0
Canada
www.exp.com



CONSTRUCTION SPECIFICATION FOR TRENCHING, BACKFILLING, AND COMPACTING

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401.01 SCOPE

This specification covers the requirements for excavating, backfilling, and compacting trenches for the installation of pipe, end sections, and associated appurtenances.

401.01.01 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 according to the Contract Documents.

401.01.02 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.

401.02 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 206 | Grading |
| OPSS 403 | Rock Excavation for Pipelines, Utilities, and Associated Structures in Open Cut |
| OPSS 404 | Support Systems |
| OPSS 412 | Sewage Forcemain Installation in Open Cut |
| OPSS 441 | Watermain Installation in Open Cut |
| OPSS 490 | Site Preparation for Pipelines, Utilities, and Associated Structures |
| OPSS 491 | Preservation, Protection, and Reconstruction of Existing Facilities |
| OPSS 492 | Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures |
| OPSS 501 | Compacting |
| OPSS 510 | Removal |
| OPSS 517 | Dewatering for Excavations |
| OPSS 539 | Temporary Protection Systems |
| OPSS 902 | Excavating and Backfilling - Structures |

Ontario Provincial Standard Specifications, Material

| | |
|-----------|--|
| OPSS 1010 | Aggregates - Base, Subbase, Select Subgrade, and Backfill Material |
| OPSS 1359 | Unshrinkable Backfill |

Provincial Statute

| | |
|----------------|-----------------------|
| O. Reg. 213/91 | Construction Projects |
|----------------|-----------------------|

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

Associated Appurtenances means as defined in OPSS 412 and OPSS 441.

Backfilling means the operation of filling the trench with bedding, cover, and backfill material or embedment and backfill material.

Backfill Material means fill material used above the embedment or cover material and below the lower of the subgrade or finished grade or the original ground.

Bedding Class means a classification system that defines the depth of the bedding material.

Bedding Material means material as it relates to rigid pipe, from the bottom of the trench to the bottom of the cover.

Cover Material means the material placed from the top of the bedding to the bottom of the backfill for rigid pipe.

Deleterious Material means materials from the recycling stream other than glass, ceramic, reclaimed asphalt pavement, and reclaimed concrete materials that includes but is not limited to the following: wood, clay brick, clay tile, plastic, gypsum, gypsum plaster, and wallboard.

Embedment Material means material as it relates to flexible pipe, from the bottom of the trench to the bottom of the backfill.

Excavation, Earth and Rock means the excavation classified as earth and rock according to OPSS 206.

Extra Excavation means all excavation ordered in writing by the Contract Administrator beyond excavation as specified in the Contract Documents.

Flexible Pipe means pipe that can deflect 2% or more without cracking such as polyvinyl chloride, polyethylene, or steel pipe.

Imported Material means material obtained from a source other than the Working Area.

Native Material means the material removed to form an excavation within the Working Area for return to the same or other excavation.

Pipe means sanitary or storm pipe sewers, watermains, forcemains, pipe culverts, and subdrains.

Rigid Pipe means pipe that cannot deflect more than 2% without cracking such as concrete pipe.

Trench means as defined in O. Reg 213/91.

Trenching means the earth or rock excavation required to construct a trench in which to install pipes and their associated appurtenances.

Trench Width means the horizontal distance between the trench walls as measured at the bedding grade.

Unshrinkable Fill means as defined in OPSS 1359.

401.05 MATERIALS

401.05.01 Bedding Material and Embedment Material

Bedding and embedment materials shall be one of the following, or as specified in the Contract Documents:

- a) Granular A.
- b) Granular B, Type I, II, or III, with 100% passing the 26.5 mm sieve.
- c) Unshrinkable fill.

401.05.02 Cover Material

Cover material shall be one of the following, or as specified in the Contract Documents:

- a) Granular A.
- b) Granular B, Type I, II, or III, with 100% passing the 26.5 mm sieve.

401.05.03 Granular Material

Granular material shall be according to OPSS 1010.

401.05.04 Backfill Material

401.05.04.01 General

Backfill material shall be one of the following, or as specified in the Contract Documents:

- a) Granular A.
- b) Granular B, Type I, II, or III.
- c) Unshrinkable fill.
- d) Native material.

401.05.04.02 Native and Imported Material

Only native and imported material approved by the Contract Administrator shall be used. All material shall be free from frozen lumps, cinders, ashes, organic matter, rocks and boulders over 150 mm in any dimension, and other deleterious material.

401.05.05 Unshrinkable Fill

Unshrinkable fill shall be according to OPSS 1359.

401.07 CONSTRUCTION

401.07.01 General

Trenches shall be stable and dry, unless designated by the Contract Administrator as subaqueous Work.

401.07.02 Site Preparation

Site preparation shall be according to OPSS 490.

401.07.03 Preservation and Protection of Existing Facilities

Preservation and protection of existing facilities shall be according to OPSS 491.

401.07.04 Removals

Removals shall be according to OPSS 510.

401.07.05 Dewatering

Dewatering shall be according to OPSS 517 for placement of pipe or to OPSS 902 for placement of structures.

401.07.06 Support Systems

Support systems shall be according to OPSS 404.

401.07.07 Temporary Protection Systems

The construction of all temporary protection systems shall be according to OPSS 539. When the stability, safety, or function of an existing roadway, railway, other works, or proposed works may be impaired due to the method of operation, appropriate protection shall be provided. Protection may include sheathing, shoring, and the driving of piles, when necessary.

401.07.08 Removal of Frozen Ground

Written permission shall be obtained from the Contract Administrator prior to starting any excavation in frozen ground. The method used for removal of frozen ground shall not cause damage to adjacent structures or Utilities.

401.07.09 Trenching

Trenches shall be excavated to the lines, grades, and dimensions specified in the Contract Documents. The width of the trench at the bottom shall not exceed the width at the top.

Trenching for pipe culverts shall include the excavation for frost tapers and end sections.

No more than 15 m of trench shall be open in advance of the completed pipe system.

The Contract Administrator shall be notified immediately if the bottom of the trench appears to give an unsuitable foundation.

When installing rigid pipe, if the trench is excavated wider than the allowable width without authorization, the Contract Administrator may require the use of a stronger pipe or a higher bedding class or both.

If the trench depth is excavated beyond the limits of the required excavation without the Contract Administrator's authorization, granular material shall be placed and compacted in the trench to reinstate the required trench limits prior to backfilling the trench as specified in the Contract Documents. Alternatively, another structurally accepted design shall be provided by adjusting the limits of the excavation prior to backfilling.

Rock excavation for trenches shall be according to OPSS 403.

401.07.10 Backfilling and Compacting

401.07.10.01 General

Allowable deflection in diameter of flexible pipe during cover and backfill operations shall be as per manufacturer's recommendations.

Compacting of embedment, bedding, cover, and backfill materials during pipe installation shall be according to OPSS 501.

Prior to allowing the movement of any construction equipment or vehicular traffic over the buried infrastructure, the depth of backfill shall be sufficient enough to protect the buried infrastructure from damage.

401.07.10.02 Embedment

Placement of embedment material shall be as described in the Bedding and Cover clauses.

401.07.10.03 Bedding

Pipe bedding shall be of the class as specified in the Contract Documents.

The surface upon which the pipe is to be laid shall be true to grade and alignment.

The pipe bedding shall be shaped to the dimensions specified in the Contract Documents. When bell and spigot pipe is to be laid, recesses shall be shaped to receive the bells.

Bedding material placed in the haunches shall be compacted prior to continued placement of cover material.

Bedding material shall be placed in uniform layers not exceeding 200 mm in thickness, loose measurement, and each layer shall be compacted according to OPSS 501 before a subsequent layer is placed.

Bedding material shall be placed on each side of the pipe and shall be completed simultaneously. At no time shall the levels on each side differ by more than the 200 mm uncompacted layer.

401.07.10.04 Cover

Cover material shall be placed so that damage to or movement of the pipe is avoided.

Cover material shall be placed in uniform layers not exceeding 200 mm in thickness, loose measurement, and each layer shall be compacted according to OPSS 501 before a subsequent layer is placed.

Cover material shall be placed on each side of the pipe and shall be completed simultaneously. At no time shall the levels on each side differ by more than the 200 mm uncompacted layer.

401.07.10.05 Backfill

Backfill material shall be placed in uniform layers not exceeding 300 mm in thickness, loose measurement, for the full width of the trench and each layer shall be compacted according to OPSS 501 before a subsequent layer is placed.

Power operated tractors or rolling equipment shall not be used for compacting until backfill material has been placed to a minimum depth of 900 mm above the crown of the pipe. Uniform layers of backfill material exceeding 300 mm in thickness may be placed with the approval of the Contract Administrator.

401.07.11 Extra Trenching, Backfilling, and Compacting

Extra trenching, backfilling, and compacting shall be as described in the Trenching and Backfilling and Compacting subsections.

Unsuitable material shall be excavated and the resulting excavation shall be backfilled and compacted to obtain a suitable foundation.

401.07.12 Site Restoration

Site restoration shall be according to OPSS 492.

401.07.13 Management of Excess Material

Management of excess material shall be as specified in the Contract Documents.

401.09 MEASUREMENT FOR PAYMENT

401.09.01 Actual Measurement

401.09.01.01 Extra Trenching, Backfilling, and Compacting

Extra trenching, backfilling, and compacting shall be based on the volume of the extra excavation measured in cubic metres prior to installation of the pipe.

The volume of the excavation that is in addition to the limits specified in the Contract Documents shall be determined.

401.10 BASIS OF PAYMENT

401.10.01 Trenching, Backfilling, and Compacting

Payment at the Contract price for the appropriate tender items for the installation of pipe, end sections, and associated appurtenances, shall be full compensation for all labour, Equipment, and Material to do the work.

When the Contract contains separate items for work required by this specification, payment shall be at the Contract prices and according to the specifications for such work.

Any expenses for remedial work resulting from unauthorized over-excavation of the trench width and depth shall be at no additional cost to the Owner.

When native material is deemed unsuitable for backfill for reasons other than those attributed to the Contractor's mode of operation, any extra work done to provide acceptable backfill beyond the work herein specified shall be paid for as Extra Work.

401.10.02 Extra Trenching, Backfilling, and Compacting - 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.

401.10.03 Rock Excavation for Trenches

Payment for rock excavation for trenches shall be according to OPSS 403.

Appendix 401-A, November 2021

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

The designer may consider including soil boring data, a geotechnical report, a subsurface report, or a soils report in the tender documents.

The designer may consider specifying requirements for a pre-condition survey in the Contract Documents.

The designer should specify the following in the Contract Documents:

- Extra excavation. (401.03)
- Type of embedment material. (401.05.01)
- Type of bedding material. (401.05.01)
- Type of cover material. Unshrinkable fill or native material may be a consideration in the cover (401.05.02)
- Type of backfill material. (401.05.04.01)
- Trench line, grade, and dimensions. (401.07.09)
- Pipe bedding class and dimensions. (401.07.10.03)
- Volume of the excavation that is in addition to the limits. (401.09.01.01)

For utilities, the designer should reference their respective trenching, backfilling, and compaction details.

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

| | |
|--------------|---|
| OPSD 802.010 | Flexible Pipe Embedment and Backfill, Earth Excavation |
| OPSD 802.013 | Flexible Pipe Embedment and Backfill, Rock Excavation |
| OPSD 802.014 | Flexible Pipe Embedment in Embankment, Original Ground: Earth or Rock |
| OPSD 802.020 | Flexible Pipe Arch Embedment and Backfill, Earth Excavation |
| OPSD 802.023 | Flexible Pipe Arch Embedment and Backfill, Rock Excavation |
| OPSD 802.024 | Flexible Pipe Arch Embedment in Embankment, Original Ground: Earth or Rock |
| OPSD 802.030 | Rigid Pipe Bedding, Cover and Backfill, Type 1 or 2 Soil - Earth Excavation |
| OPSD 802.031 | Rigid Pipe Bedding, Cover and Backfill, Type 3 Soil - Earth Excavation |
| OPSD 802.032 | Rigid Pipe Bedding, Cover and Backfill, Type 4 Soil - Earth Excavation |
| OPSD 802.033 | Rigid Pipe Bedding, Cover and Backfill, Rock Excavation |
| OPSD 802.034 | Rigid Pipe Bedding and Cover in Embankment, Original Ground: Earth or Rock |
| OPSD 802.050 | Horizontal Elliptical Rigid Pipe Bedding, Cover and Backfill, Type 1 or 2 Soil - Earth Excavation |
| OPSD 802.051 | Horizontal Elliptical Rigid Pipe Bedding, Cover and Backfill, Type 3 Soil - Earth Excavation |
| OPSD 802.052 | Horizontal Elliptical Rigid Pipe Bedding, Cover and Backfill, Type 4 Soil - Earth Excavation |
| OPSD 802.053 | Horizontal Elliptical Rigid Pipe Bedding, Cover and Backfill, Rock Excavation |

| | |
|--------------|---|
| OPSD 802.054 | Horizontal Elliptical Rigid Pipe Bedding and Cover in Embankment, Original Ground: Earth or Rock |
| OPSD 803.010 | Backfill and Cover for Concrete Culverts |
| OPSD 803.030 | Frost Treatment - Pipe Culverts, Frost Penetration Line Below Bedding Grade |
| OPSD 803.031 | Frost Treatment - Pipe Culverts, Frost Penetration Line Between Top of Pipe and Bedding Grade |



CONSTRUCTION SPECIFICATION FOR PIPE SEWER INSTALLATION IN OPEN CUT

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| 410-A | Commentary |
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410.01 SCOPE

This specification covers the requirements for the installation of storm and sanitary pipe sewers, laterals, service connections, and concrete appurtenances in open cut.

410.01.01 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 according to the Contract Documents.

410.01.02 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.

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.

410.02 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 206 | Grading |
| OPSS 401 | Trenching, Backfilling, and Compacting |
| OPSS 404 | Support Systems |
| OPSS 407 | Maintenance Hole, Catch Basin, Ditch Inlet, and Valve Chamber Installation |
| OPSS 409 | Closed-Circuit Television Inspection of Pipelines |
| OPSS 490 | Site Preparation for Pipelines, Utilities, and Associated Structures |
| OPSS 491 | Preservation, Protection, and Reconstruction of Existing Facilities |
| OPSS 492 | Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures |
| OPSS 510 | Removal |
| OPSS 517 | Dewatering of Pipeline, Utility, and Associated Structure Excavation |
| OPSS 539 | Temporary Protection Systems |
| OPSS 904 | Concrete Structures |
| OPSS 905 | Steel Reinforcement for Concrete |

Ontario Provincial Standard Specifications, Material

| | |
|-----------|---|
| OPSS 1004 | Aggregates - Miscellaneous |
| OPSS 1205 | Clay Seal |
| OPSS 1301 | Cementing Materials |
| OPSS 1302 | Water |
| OPSS 1350 | Concrete - Materials and Production |
| OPSS 1440 | Steel Reinforcement for Concrete |
| OPSS 1801 | Corrugated Steel Pipe Products |
| OPSS 1820 | Circular Concrete Pipe |
| OPSS 1840 | Non-Pressure Polyethylene Plastic Pipe Products |
| OPSS 1841 | Non-Pressure Polyvinyl Chloride (PVC) Pipe Products |

OPSS 1843 Non-Pressure Polypropylene (PP) Plastic Pipe Products
OPSS 1860 Geotextiles

CSA Standards

B182.1-11 Plastic Drain and Sewer Pipe and Pipe Fittings
[Part of B1800-11, Plastic Non-Pressure Pipe Compendium]

ASTM International

C 507-12 Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe

410.03 DEFINITIONS

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

Backfilling means the operation of filling the trench with bedding, cover, and backfill material or embedment and backfill material.

Concrete Appurtenances means concrete head walls, cut-off walls, stiffeners, aprons, collars, and any other concrete fixtures associated with the pipe sewer, excluding concrete bedding or concrete structures specified in the Contract Documents.

Dimension Ratio means the average specified outside diameter of a pipe divided by the minimum specified wall thickness.

Drainage Structure means a maintenance hole, catch basin, or ditch inlet.

Excavation, Earth and Rock means the excavation classified as earth and rock according to OPSS 206.

Flexible Pipe means pipe that can deflect 2% or more without cracking, such as polyvinyl chloride or polyethylene or steel pipe.

Pipe Class means a pipe's physical material specification, such as load and pressure ratings, wall thickness, protective coatings, corrugation profiles, ring stiffness constants, and reinforcement.

Pipe Run means a section of a pipe sewer between two drainage structures or between a drainage structure and an outlet.

Pipe Sewer means an installation designed for the conveyance of sanitary sewage or storm water using preformed or precast pipe sections, circular or non-circular in cross-section, laid end to end using suitable jointing material and connected by maintenance holes for sanitary pipe sewers and by maintenance holes, catch basins, ditch inlets, or concrete appurtenances for storm pipe sewers.

Pipe Type means a pipe's inner wall design, which can be smooth or corrugated.

Polypropylene Plastic means a material made with virgin polymers in which propylene is essentially the sole monomer.

Service Connection means the pipe used to convey sanitary sewage or storm water from the property line to the main sanitary or storm pipe sewer respectively.

410.05 MATERIALS

410.05.01 Pipe Materials

410.05.01.01 General

Pipe sewer size, type, and class shall be as specified in the Contract Documents.

Pipe sewer size and class shall be consistent throughout a pipe run as specified in the Contract Documents. Pipe type shall be consistent throughout a pipe sewer as specified in the Contract Documents.

Fittings shall be suitable for and compatible with the pipe type and class for which they will be used.

410.05.01.02 Concrete Pipe

Circular concrete pipe and joints shall be according to OPSS 1820.

Elliptical concrete pipe and joints shall be according to ASTM C 507.

410.05.01.03 Corrugated Steel Pipe Products

Corrugated steel pipe products shall be according to OPSS 1801.

410.05.01.04 Polyethylene Pipe Products

Polyethylene pipe products shall be according to OPSS 1840.

410.05.01.05 Polyvinyl Chloride Pipe Products

Polyvinyl chloride pipe products shall be according to OPSS 1841.

Polyvinyl chloride service connection pipe shall be according to CSA B182.1 and shall have bell and spigot joints with elastomeric gaskets.

410.05.01.06 Polypropylene Plastic Pipe Products

Polypropylene plastic pipe products shall be according to OPSS 1843.

410.05.02 Mortar

Mortar for joints shall be composed of one part general use Portland cement and two parts mortar sand, wetted with only sufficient water to make the mixture plastic. The mortar sand shall be according to OPSS 1004, the general use Portland cement shall be according to OPSS 1301, and the water shall be according to OPSS 1302.

410.05.03 Clay Seal

Clay seal material shall be according to OPSS 1205.

410.05.04 Concrete

Concrete for concrete appurtenances shall be according to OPSS 1350 with a nominal minimum 28-Day compressive strength of 30 MPa.

410.05.05 Steel Reinforcement

Steel reinforcement shall be of the size and grade specified in the Contract Documents and shall be according to OPSS 1440.

410.05.06 Geotextile

Geotextile shall be according to OPSS 1860.

410.07 CONSTRUCTION

410.07.01 Site Preparation

Site preparation shall be according to OPSS 490.

410.07.02 Removals

Removals shall be according to OPSS 510.

410.07.03 Preservation and Protection of Existing Facilities

Preservation and protection of existing facilities shall be according to OPSS 491.

410.07.04 Protection Against Floatation

Damage to the pipeline due to floatation shall be prevented during construction and until completion of the work.

410.07.05 Cold Weather Work

All work shall be protected from freezing. Pipes and bedding material shall not be placed on frozen ground.

410.07.06 Transporting, Unloading, Storing, and Handling Pipe

Manufacturer's recommendations for transporting, unloading, storing, and handling of pipe shall be followed.

All pipes, fittings, and gaskets that are unsound or damaged shall be rejected.

410.07.07 Excavation

Excavation for the placement of pipe sewers shall be according to OPSS 401.

410.07.08 Support Systems

Support systems shall be according to OPSS 404.

410.07.09 Dewatering

Dewatering shall be according to OPSS 517.

410.07.10 Protection Systems

The construction of all protection systems shall be according to OPSS 539. When the stability, safety, or function of an existing roadway, railway, other works, or proposed works may be impaired due to the method of operation, such protection as may be required shall be provided. Protection may include sheathing, shoring, and the driving of piles, when necessary, to prevent damage to such works or proposed works.

410.07.11 Backfilling and Compacting

Backfilling and compacting shall be according to OPSS 401.

410.07.12 Pipe Installation

410.07.12.01 General

If a universal dimple coupler or any other coupler does not follow the contour of the flexible pipe sections to be joined, polyethylene gaskets shall then be installed at all joints when such couplers are used. Polyethylene gaskets shall be installed symmetrically about the pipe joint, between the coupler and the pipe, and shall be of sufficient length to equal the circumference of the pipe plus a minimum overlap of 300 mm.

Pipe shall be laid within the alignment and grade tolerances specified in the Contract Documents. When bell and spigot pipe is laid, the bell end of the pipe shall be laid upgrade.

Pipe shall be kept clean and dry as work progresses. The trench shall be kept dry. A removable watertight bulkhead shall be installed at the open end of the last pipe laid whenever work is suspended.

Pipe shall not be laid until the preceding pipe joint has been completed and the pipe is carefully embedded and secured in place.

When the Owner raises or lowers the invert of a pipe sewer by 150 mm or less, it shall not constitute a Change in the Work and no adjustment shall be made to the payment. When the invert of a pipe sewer is raised or lowered by more than 150 mm, it shall constitute a Change in the Work for the full extent of the change from the original grade.

When installing gaskets, all pipe ends shall be thoroughly cleaned. For gaskets requiring field lubrication, a lubricant recommended by the pipe manufacturer shall be used.

When gaskets have been affixed, the pipe shall be handled in a way so that the gasket is not damaged, displaced, or contaminated with foreign matter. Any gasket displaced or contaminated shall be removed, cleaned, and lubricated, if required, and reinstalled before closure of the joint is attempted. When specified in the Contract Documents, nitrile gaskets shall be used.

The pipe shall be properly positioned by means of an appropriate mechanism. Sufficient pressure shall be applied in making the joint to ensure that the joint is in position. Sufficient restraint shall be applied to the line to ensure that joints are held in this position.

Once the pipe has been jointed, a test shall be made with a feeler gauge at intervals around the joint to ensure that the gasket has not been displaced from the spigot groove. If the gasket is found out of position, the joint shall be opened and the gasket placed in its proper position. If necessary, a new gasket shall be installed.

410.07.12.02 Circular Concrete Pipe

All circular concrete pipe joints shall have elastomeric gaskets.

410.07.12.03 Non-Circular Concrete Pipe

Elliptical concrete pipes and joints shall be used for storm pipe sewers only.

All non-circular concrete pipe joints shall be according to the procedures recommended by the manufacturer.

410.07.12.04 Corrugated Steel Pipe Products

Corrugated steel pipe products shall be used for storm pipe sewers only.

Helical corrugated steel pipe without rerolled ends shall be installed so that the helix angle is constant for the total length of the installation. Each pipe section shall be installed next to the previous section so that the lockseam forms a continuous helix. For rerolled ends, the correct fit of the coupling system does not depend on the location of the helical lockseam and corrugation.

Corrugated steel pipe sections shall be joined by means of steel couplers. The couplers shall be installed to lap approximately equal portions of the pipes being connected so that the corrugations or projections of the coupler properly engage the pipe corrugations. As the coupler is being tightened, it shall be tapped with a mallet to take up the slack.

When joint seals are specified in the Contract Documents, they shall be installed immediately prior to the installation of steel couplers.

410.07.12.05 Polyethylene Pipe

Polyethylene pipe shall be jointed by one of the following methods, as recommended by the manufacturer:

- a) Bell and Spigot
- b) Welded Joint
- c) Thermal Fusion Joint
- d) Screw-on Coupler
- e) Split Coupler
- f) Threaded Joint

410.07.12.06 Polyvinyl Chloride Pipe

Polyvinyl chloride pipe shall be jointed, as recommended by the manufacturer, using a bell and spigot joint with an elastomeric gasket.

At the end of a day's work, the last pipe shall be blocked as may be required to prevent movement.

410.07.12.07 Polypropylene Pipe

Polypropylene pipe shall be jointed by means of a bell and spigot joint with elastomeric gasket or a coupler joint as recommended by the manufacturer to satisfy the pipe joint specification.

410.07.13 Service Connections

Service connections to the main pipe sewer shall be made using factory made tees or wyes, strap-on-saddles, or other approved saddles. Factory made tees or wyes shall be used for all service connections when the diameter of the main pipe sewer is:

- a) less than 450 mm; or
- b) less than twice the diameter of the service connection.

Strap-on-saddles shall be installed before laying the pipe.

Holes in the main pipe sewer shall be cut with approved cutters and shall be the minimum diameter required to accept the service connection saddle. If mortar-on saddles are used, the inside of the pipe shall be mortared at the connection.

Service connections shall be plugged at the property line with watertight caps or plugs. Plugs or caps shall be braced sufficiently to withstand test pressures.

When existing service connections shall be connected to new pipe sewers or service connections, proper jointing procedures shall be used.

410.07.14 Marking and Recording Service Connections

A painted temporary location marker consisting of a 50 x 75 mm stake or two short sections of lumber connected by a piece of heavy gauge wire shall be placed at the end of the plugged or capped service connection. The marker shall be placed from 300 mm below the finished grade to a point 300 mm above the plugged end of the service pipe.

A painted surface stake, 50 x 75 x 450 mm long, shall be placed after trench restoration.

Service connections shall not be backfilled until they have been inspected and measurements of location have been taken by the Contract Administrator.

410.07.15 Breaking into Maintenance Holes, Catch Basins, Ditch Inlets, Pipe Culverts, and Pipe Sewers

Openings shall be made as necessary in an existing maintenance hole, catch basin, ditch inlet, pipe culvert, or pipe sewer to install the new pipe sewer and connect it to the structure according to OPSS 407. Benching in existing maintenance holes shall be altered to accommodate the flow in the new pipe sewer system.

When specified in the Contract Documents, the opening for the connection of a subdrain outlet shall be formed by coring. The subdrain outlet pipe shall be sealed into place using non-shrink grout. When specified in the Contract Documents, a 50 mm diameter weep hole shall be cored into the same wall as the subdrain connection and at the same invert elevation.

410.07.16 Field Testing

410.07.16.01 General

Field tests described in this subsection shall be conducted when specified in the Contract Documents and applied to sanitary and storm pipe sewers. All tests shall be carried out in the presence of and accepted by the Contract Administrator.

When specified in the Contract Documents, leakage tests shall be carried out on completed pipe sewers 1,200 mm in diameter and smaller. There shall be no visible leakage for pipe sewers larger than 1,200 mm diameter.

Testing shall be carried out from maintenance hole to maintenance hole, including house service connections as work progresses.

The construction of new mainline pipe sewers shall not proceed when three previously placed sections of the pipe sewer have not been tested or have been tested and are unsatisfactory.

Leakage up to 25% in excess of the calculated limits shall be approved in any test section provided that the excess is offset by lower leakage measurements in adjacent sections so that the total leakage is within the allowable limits for the combined sections.

Pipe sewers shall be repaired and retested, as required, until the test results are within the limits specified in this specification. Visible leaks shall be repaired regardless of the test results.

No part of the work shall be accepted until the pipe sewers are satisfactorily tested following completion of installation of service connections and backfilling.

410.07.16.02 Prequalification Leakage Tests

Prequalification leakage tests shall be carried out as either infiltration or exfiltration tests, as required.

The test shall be performed on the first section of the pipe sewer of each size, not less than 100 m in length, installed by each crew in order to prequalify the crew and the material. Tests may be carried out prior to service connections being installed in the section being tested.

When tests are unsatisfactory, the test section shall be repaired and retested until satisfactory results are obtained.

410.07.16.03 Infiltration Test

Dewatering operations shall be discontinued at least three days prior to conducting the test and allow for the groundwater level to stabilize. Infiltration tests shall be conducted when the groundwater level at the time of testing is 600 mm or more above the crown of the pipe for the entire length of the test section. The test section is normally between adjacent maintenance holes.

A watertight bulkhead shall be constructed at the upstream end of the test section. All service laterals, stubs, and fittings shall be plugged or capped to prevent water entering at these locations. A V-notch weir or other suitable measuring device shall be installed at the downstream end of the test section. Infiltrating water shall be allowed to build up behind the weir until the flow through the V-notch has stabilized. The rate of flow shall then be measured. The rate of flow shall not exceed the maximum allowable infiltration calculated for the test section. Allowable infiltration shall be calculated as 0.075 litres/millimetre diameter/100 metres of pipe sewer/hour.

410.07.16.04 Exfiltration Test

410.07.16.04.01 General

Exfiltration tests shall be conducted when the groundwater level is lower than 600 mm above the crown of the pipe or the highest point of the highest service connection included in the test section.

The test section is normally between adjacent maintenance holes. The test section of the pipe sewer shall be isolated by temporarily plugging the downstream end and all incoming pipes of the upstream maintenance hole. All service laterals, stubs, and fittings are plugged or capped to prevent water entering at these locations.

410.07.16.04.02 Testing With Water

The test section shall be slowly filled with water ensuring that all air is removed from the line. A period of 24 hours for absorption or expansion shall be allowed prior to starting the test, except if exfiltration requirements are met by a test carried out during the absorption period.

Water shall be added to the pipeline prior to testing until there is a head in the upstream maintenance hole of 600 mm minimum over the crown of the pipe or at least 600 mm above the existing groundwater level, whichever is greater. The maximum limit of the net internal head on the line is 8 m. In calculating the net internal head, allowance for groundwater head, if any, shall be made.

The distance from the maintenance hole frame to the surface of the water shall be measured. After allowing the water to stand for one hour, the distance from the frame to the surface of the water shall again be measured. The leakage shall be calculated using volumes.

The leakage at the end of the test period shall not exceed the maximum allowable calculated for the test section. Allowable leakage shall be calculated as 0.075 litres/millimetre diameter/100 metres of pipe sewer/hour.

An allowance of 3.0 litres per hour per metre of head above the invert for each maintenance hole included in the test section shall be made.

Maintenance holes shall be tested separately, if the test section fails.

410.07.16.04.03 Low Pressure Air Testing

The Contract Administrator may allow or require testing by use of air when water is not readily available or the differential head in the test section is greater than 8 m or freezing temperatures exist.

Air control equipment that includes a shut off valve, safety valve, pressure regulating valve, pressure reduction valve and monitoring pressure gauge with pressure range from 0 to 35 kPa with minimum divisions of 0.5 kPa and accuracy of approximately 0.25 kPa shall be provided.

Tests shall be conducted between two consecutive maintenance holes. The test section shall be plugged at each end. One plug shall be equipped with an air inlet connection to fill the pipe sewer system with air.

The test section shall be filled slowly until a constant pressure of 24 kPa is maintained. If the groundwater is above the pipe sewer being tested, the air pressure shall be increased by 3.0 kPa for each 300 mm that the groundwater level is above the invert of the pipe.

The air pressure shall be stabilized for five minutes and then regulated to maintain it to 20.5 kPa plus the allowance for groundwater, if any. After the stabilization period, the time taken for a pressure loss of 3.5 kPa shall be recorded.

The time taken for a pressure drop of 3.5 kPa shall not be less than the times shown in Table 1.

If the length of the test section is greater than the length for minimum time, the new testing time shall be a product of the length of test section multiplied by the time shown in Table 1 for the appropriate size pipe.

If the results of an air test are marginal, the Contract Administrator may require the section to be retested using water.

410.07.16.05 Deflection Testing of Pipe Sewers

Ring deflection testing shall be performed on all pipe sewers constructed using flexible pipe. The allowable deflected pipe diameter is calculated as:

| | |
|----------------------------|--|
| Pipes 100 to 750 mm: | 7.5% of the Base Inside Diameter of the Pipe |
| Pipes Greater Than 750 mm: | 5.0% of the Base Inside Diameter of the Pipe |

Where:

Base Inside Diameter is defined in the CSA or ASTM standard to which the pipe is manufactured.

A suitably designed device as defined below shall be pulled through the pipe sewer to demonstrate that the pipe deflection does not exceed the allowable deflected pipe diameter. The device shall be pulled manually through the pipe not sooner than 30 Days after the completion of backfilling and installation of service connections.

The suitably designed device shall be a mandrel, cylindrical in shape, and constructed with an odd number of evenly spaced arms or prongs, minimum 9 in number. The minimum diameter of the circle scribed around the outside of the mandrel arms shall be equal to the allowable deflected pipe diameter ± 1 mm. The contact length of the mandrel shall be measured between the points of contact on the mandrel arm or between sets of prongs. This length shall not be less than that shown in Table 2.

The mandrel shall be checked with a go-no-go proving ring. The proving ring shall have a diameter equal to the allowable deflected pipe diameter ± 0.1 mm. An acceptable mandrel shall not pass through the proving ring. The proving ring shall be fabricated from steel a minimum of 6 mm thick.

Any section of pipe that does not allow the mandrel to pass shall be considered to have failed the deflection test.

All sections of pipe that fail the deflection test shall be repaired and retested.

410.07.16.06 Closed-Circuit Television (CCTV) Inspection

Pipe sewers shall be inspected using CCTV equipment. CCTV inspection of pipe sewers shall be according to OPSS 409.

410.07.17 Cleaning and Flushing of Pipe Sewers

When specified in the Contract Documents, all pipe sewers shall be cleaned and flushed immediately prior to inspection and acceptance.

410.07.18 Clay Seals

Clay seals shall be placed as specified in the Contract Documents and compacted to 95% of the maximum dry density.

410.07.19 Concrete Appurtenances

Concrete appurtenances shall be constructed as specified in the Contract Documents. Concrete in concrete appurtenances shall be placed according to OPSS 904. Steel reinforcement shall be placed according to OPSS 905. Steel grating shall be installed when specified in the Contract Documents.

410.07.20 Site Restoration

Site restoration shall be according to OPSS 492.

410.07.21 Management of Excess Material

Management of excess material shall be as specified in the Contract Documents.

410.09 MEASUREMENT FOR PAYMENT

410.09.01 Actual Measurement

410.09.01.01 Pipe Sewers

Measurement of pipe sewers shall be by length in metres along the horizontal centreline length of the pipe from the centre of one drainage structure to the centre of another drainage structure or outlet end of the pipe sewer. When the grade of the pipe sewer is 10% or greater, the above measurement is then of the slope length.

410.09.01.02 Service Connections

Measurement of the service connections shall be by length in metres along its horizontal centreline from the centreline of the main pipe sewer to the end of the service connection.

410.09.01.03 Breaking into Maintenance Holes, Catch Basins, Ditch Inlets, Pipe Culverts, and Pipe Sewers

For measurement purposes, a count shall be made of the number of openings made in maintenance holes, catch basins, ditch inlets, pipe culverts and pipe sewers.

410.09.01.04 Concrete Appurtenances

Measurement for concrete appurtenances shall be by volume in cubic metres for the volume of concrete placed. Alternatively, concrete appurtenances may be a lump sum item.

410.09.01.05 Clay Seal

Measurement for clay seal shall be by volume in cubic metres for the volume of clay placed. Alternatively, clay seal may be a lump sum item.

410.09.02 Plan Quantity Measurement

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

410.10 BASIS OF PAYMENT

410.10.01 ***"size, type, class"* Pipe Sewers - Item**
Service Connections - Item
Breaking into Maintenance Holes, Catch Basins, Ditch Inlets, Culverts and
Sewers - Item
Concrete Appurtenances - Item
Clay Seal - Item

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

410.10.02 Closed-Circuit Television (CCTV) Inspection

When a CCTV inspection of pipe sewers is specified in the Contract Documents, payment for CCTV inspection shall be according to OPSS 409.

TABLE 1
Exfiltration Test - Low Pressure Air Testing

| NominalPipe Size mm | MinimumTime min:sec | Length for Minimum Time m | Time For Longer Length sec |
|--------------------------------|--------------------------------|--|---|
| 100 | 1:53 | 182 | 0.623 |
| 150 | 2:50 | 121 | 1.140 |
| 200 | 3:47 | 91 | 2.493 |
| 250 | 4:43 | 73 | 3.893 |
| 300 | 5:40 | 61 | 5.606 |
| 375 | 7:05 | 48 | 8.761 |
| 450 | 8:30 | 41 | 12.615 |
| 525 | 9:55 | 35 | 17.171 |
| 600 | 11:20 | 30 | 22.425 |
| 675 | 12:45 | 27 | 28.382 |
| 750 | 14:10 | 24 | 35.040 |
| 825 | 15:35 | 22 | 42.397 |
| 900 | 17:00 | 20 | 50.450 |

TABLE 2
Deflection Testing of Pipe Sewers

| Nominal Pipe Size mm | Mandrel Contact Length mm |
|---------------------------------|--------------------------------------|
| 150 | 100 |
| 200 | 150 |
| 250 | 200 |
| 300 | 250 |
| 350 | 300 |
| 375 | 300 |
| 400 | 300 |
| 450 | 350 |
| 500 | 400 |
| 525 | 450 |
| 600 | 500 |
| 675 | 575 |
| 750 | 675 |
| 900 | 750 |
| 1050 | 900 |
| 1200 | 1050 |

Appendix 410-A, November 2018
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

The designer should specify the following in the Contract Documents:

- Pipe sewer size, type, and class. (410.05.01.01)
- Pipe size. (410.05.01.01)
- Size and grade of steel reinforcement. (410.05.05)
- Alignment and grade tolerances for the pipe installation. (410.07.12.01)
- Placement of clay seals. (410.07.18)
- Requirements to construct concrete appurtenances. (410.07.19)
- Depth of backfill over the pipe sewer. (410.07.20)

The designer should determine if the following are required and, if so, add the requirement in the Contract Documents:

- Use of nitrile gaskets. (410.07.12.01)
- Use of joint seals with corrugated steel pipe products. (410.07.12.04)
- Coring for the installation of subdrain. (410.07.15)
- Coring of a 50 mm diameter weep hole. (410.07.15)
- Field tests. (410.07.16.01)
- Cleaning and flushing prior to inspection and acceptance. (410.07.17)
- Use of steel grating. (410.07.19)
- Payment of concrete appurtenances by volume or lump sum. (410.09.01.04)

The tender item description for pipe sewer should include reference to one or more of the attributes shown, i.e., *size, type, class*. (410.10.01)

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Appendix 410-A

Related Ontario Provincial Standard Drawings

| | |
|---------------|--|
| OPSD 708.010 | Catch Basin Connection for Rigid Main Pipe Sewer |
| OPSD 708.020 | Support for Pipe at Catch Basin or Maintenance Hole |
| OPSD 708.030 | Catch Basin Connection for Flexible Main Pipe Sewer |
| OPSD 802.010 | Flexible Pipe Embedment and Backfill Earth Excavation |
| OPSD 802.013 | Flexible Pipe Embedment and Backfill Rock Excavation |
| OPSD 802.014 | Flexible Pipe Embedment in Embankment Original Ground: Earth or Rock |
| OPSD 802.020 | Flexible Pipe Arch Embedment and Backfill Earth Excavation |
| OPSD 802.023 | Flexible Pipe Arch Embedment and Backfill Rock Excavation |
| OPSD 802.024 | Flexible Pipe Arch Embedment in Embankment Original Ground: Earth or Rock |
| OPSD 802.030 | Rigid Pipe Bedding, Cover, and Backfill, Type 1 or 2 Soil - Earth Excavation |
| OPSD 802.031 | Rigid Pipe Bedding, Cover, and Backfill, Type 3 Soil - Earth Excavation |
| OPSD 802.032 | Rigid Pipe Bedding, Cover, and Backfill, Type 4 Soil - Earth Excavation |
| OPSD 802.033 | Rigid Pipe Bedding, Cover, and Backfill, Rock Excavation |
| OPSD 802.034 | Rigid Pipe Bedding and Cover in Embankment, Original Ground: Earth or Rock |
| OPSD 802.050 | Horizontal Elliptical Rigid Pipe Bedding, Cover, and Backfill, Type 1 or 2 Soil - Earth Excavation |
| OPSD 802.051 | Horizontal Elliptical Rigid Pipe Bedding, Cover, and Backfill, Type 3 Soil - Earth Excavation |
| OPSD 802.052 | Horizontal Elliptical Rigid Pipe Bedding, Cover, and Backfill, Type 4 Soil - Earth Excavation |
| OPSD 802.053 | Horizontal Elliptical Rigid Pipe Bedding, Cover, and Backfill, Rock Excavation |
| OPSD 802.054 | Horizontal Elliptical Rigid Pipe Bedding and Cover in Embankment, Original Ground: Earth or Rock |
| OPSD 802.095 | Clay Seal for Pipe Trenches |
| OPSD 804.030 | Concrete Headwall for Pipe Less Than 900 mm Diameter |
| OPSD 804.040 | Concrete Headwall for Sewer or Culvert Pipe |
| OPSD 804.050 | Grating for Concrete Endwall |
| OPSD 805.010 | Height of Fill Table, Round Corrugated Steel Pipe and Structural Plate Corrugated Steel Pipe |
| OPSD 805.020 | Height of Fill Table, Corrugated Steel Pipe Arch and Structural Plate Corrugated Steel Pipe Arch |
| OPSD 805.030 | Height of Fill Table, Spiral Rib Round Pipe |
| OPSD 805.040 | Height of Fill Table, Spiral Rib Pipe Arch |
| OPSD 806.020 | Height of Fill Table, Dual Wall Corrugated Polyethylene Gravity Sewer Pipe, 210 and 320 kPa |
| OPSD 806.021 | Height of Fill Table, Closed Profile Wall Polyethylene Pipe, RSC 160 and 250 |
| OPSD 806.022 | Height of Fill Table, Dual Wall Corrugated Polyethylene Gravity Sewer Pipe, RSC 100 and RSC 160 |
| OPSD 806.030 | Height of Fill Table, Dual and Triple Wall Corrugated Polypropylene Gravity Sewer Pipe, 320 kPa |
| OPSD 806.040 | Height of Fill Table, Polyvinyl Chloride Gravity Sewer Pipe, 210, 320, and 625 kPa |
| OPSD 806.060 | Height of Fill Table, Polyvinyl Chloride Pressure Pipe for Different Dimension Ratios |
| OPSD 807.010 | Height of Fill Table, Reinforced Concrete Pipe - Confined Trench Class 50-D, 65-D, 100-D, and 140-D |
| OPSD 807.030 | Height of Fill Table, Reinforced Concrete Pipe - Embankment Class 50-D, 65-D, 100-D, and 140-D |
| OPSD 807.040 | Height of Fill Table - Nonreinforced Concrete Pipe Class 3 |
| OPSD 807.050 | Height of Fill Table, Horizontal Elliptical Concrete Pipe Class HE-A, HE-I, HE-II, HE-III, and HE-IV |
| OPSD 1006.010 | Sewer Service Connections for Rigid Main Pipe Sewer |
| OPSD 1006.020 | Sewer Service Connections for Flexible Main Pipe Sewer |



MATERIAL SPECIFICATION FOR PRESSURE POLYETHYLENE PIPE PRODUCTS

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1842.01 SCOPE

This specification covers the requirements for pressure polyethylene pipe products to be used for sewage forcemains, watermains, and associated service connections.

1842.01.01 Specification Significance and Use

This specification has been developed for use in municipal-oriented Contracts. The administration, testing, and payment policies, procedures, and practices reflected in this specification correspond to those used by many municipalities in Ontario.

Use of this specification or any other specification shall be according to the Contract Documents.

1842.01.02 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.

1842.02 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:

Canadian Standards Association (CSA)

B137.1-13 Polyethylene (PE) Pipe, Tubing, and Fittings for Cold Water Pressure Services
[Part of B137 Series-05, Thermoplastic Pressure Piping Compendium]

American Water Works Association (AWWA)

C901-17 Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service
C906-15 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 63 In. (1,600 mm), for Water Distribution and Transmission

1842.05 MATERIALS

1842.05.01 Polyethylene Pipe Products

The moulding and extrusion material used to manufacture polyethylene pipe shall be polyethylene according to the requirements of AWWA C901 or AWWA C906.

The moulding and extrusion material used to manufacture polyethylene fittings shall be polyethylene according to the requirements of AWWA C906 for fittings 100 mm through 1,600 mm and CSA B137.1 for fittings less than 100 mm diameter.

1842.07 PRODUCTION

1842.07.01 Requirements

The requirements for the production of polyethylene pipe and tubing shall be according AWWA C901 or AWWA C906.

The requirements for the production of polyethylene pipe fittings shall be according to AWWA C906 for fittings 100 mm through 1,600 mm diameter and CSA B137.1 for fittings less than 100 mm diameter.

1842.07.02 Markings

Markings for polyethylene pipe and tubing shall be placed so that the intervals between markings are no greater than 1.5 m.

For polyethylene pipe and tubing according to AWWA C901, minimum markings shall be as follows:

- a) Nominal size.
- b) Standard material code designation (e.g., PE 2406).
- c) On pipe, the dimension ratio and diameter base (e.g., DR 11).
- d) On tubing, the word "Tubing" and dimension ratio.
- e) Pressure class (e.g., PC 160).
- f) Standard designation (e.g., AWWA C901).
- g) Manufacturer's name or trademark.
- h) Production record code.

For polyethylene pipe according to AWWA C906, minimum markings shall be as follows:

- a) Nominal size and OD base.
- b) Standard material code designation (e.g., PE 3408).
- c) Dimension ratio (e.g., DR 17).
- d) Pressure class (e.g., PC 100).
- e) Standard designation (e.g., AWWA C906).
- f) Manufacturer's name or trademark.
- g) Production record code.

Markings shall be applied in a manner that will not reduce the strength or damage the pipe and shall remain legible during normal handling and storage.

1842.08 QUALITY ASSURANCE

1842.08.01 Certificate

Upon request, suppliers shall provide a certificate to indicate that the product was produced and tested according to the appropriate specification requirements.

1842.08.02 Inspection and Testing

The Owner may make inspections and tests at such times as considered necessary to ensure that the material supplied is according to this specification.

All materials failing to comply with the requirements of this specification shall be rejected.

1842.08.03 Transporting, Unloading, Storing, and Handling

Manufacturer's recommendations for transporting, unloading, storing, and handling of materials shall be followed.

1842.09 OWNER PURCHASE OF MATERIAL

Measurement of pressure polyethylene pipe and tubing shall be by length in metres along the centreline of the pipe.

For measurement purposes, a count shall be made of the pressure polyethylene pipe fittings supplied and accepted as specified on the purchasing order.

Payment at the price specified in the purchasing order shall be for the supply of the pressure polyethylene pipe products delivered to the destination on the date and time specified.

The cost of all testing, except that performed in the Owner's laboratory, shall be included in the price.

Appendix 1842-A, November 2020
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

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.