



Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The work described hereunder shall consist of the construction of sewer and/or water pipeline or watermain crossings of watercourses, including: the excavation of trenches and trenchless method; drainage and dewatering of excavations; sediment control and the construction and removal of coffer dams and diversions as may be required; the supply and installation of pipe; the supply and placement of bedding and backfill materials; the disposal of all surplus and unsuitable material, and the restoration of the construction site. The work shall also include shoring and other protective works necessary for and incidental to the safe and proper execution of the work.
- .2 “Trenchless method” shall mean auguring, horizontal directional drilling, pipe jacking, pipe ramming or coring beneath the ground surface. A Hammering Permit is required and shall be in place prior to ground breaking.

1.2 STANDARDS

The following organizations publish Standards which have been referred to in this Section:

- .1 CSA International
178 Rexdale Boulevard,
Etobicoke, ON M9W 1R3
- .2 Pipeline Associated Watercourse Crossings Fish Habitat Impact Assessment Tool
5th Edition, May 2018
- .3 Department of Fisheries and Oceans
Interim Operational Position Statement
Pipeline Crossings in the Prairies Area
- .4 Transport Canada
Navigation Protection Program
Canadian Navigable Waters Act
June 21, 2019

The Standards referred to shall be the most recent edition.

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1.3 REFERENCED STANDARD DETAILS

- .1 SD-31 Water Course Crossing

1.4 JOB CONDITIONS

.1 GUIDELINES AND REGULATIONS

- .1 All work adjacent to or crossing waterways including creeks and ditches draining into waterways is regulated by the Federal Department of Fisheries and Oceans (DFO) and Provincial Regulator.

- .2 Obtain regulations prior to commencement of any excavation works and complete works in accordance with DFO and Provincial Guidelines and Regulations.

.2 SEDIMENT CONTROL PLAN – Where required sediment and erosion control plans shall be submitted as follows:

- .1 Do not undertake work that may impact water bodies or other areas under the jurisdiction of DFO and the Province until approval has been obtained from DFO and the Province.

- .2 Prepare an Erosion and Sediment Control Plan and schedule for construction for review by the Engineer.

- .3 Submit an Erosion and Sediment Control Plan that has been reviewed by the Engineer to DFO for approval.

- .4 Prior to commencement of the works, submit applications and receive approval from the Department of Fisheries and Oceans and the Province for the proposed construction schedule, construction method, and Erosion and Sediment Control Plan.

- .5 Construction activities within the water body will not be allowed during fish spawning periods between April 1 and June 15 or as otherwise stipulated by the Engineer.

- .6 Schedule for work adjacent to or crossing waterways to be detailed and include the duration start date, and resources for the works.

1.5 INSPECTION

- .1 Inspection of the work described in this Section shall be performed by the Engineer and authorities exercising jurisdiction and control over crossing sites.

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Part 2 PRODUCTS

2.1 APPROVED PRODUCTS

- .1 Products shall be supplied in accordance with the Listing of Approved Products in the attached Appendix, or as detailed on the Plans or in Section 01 00 10, Special Provisions.

2.2 BEDDING AND BACKFILL

- .1 Bedding and backfill materials shall conform to the requirements of Clause 2.1 and 2.4 of Section 02 21 80, Pipe Excavation, Bedding and Backfill.

2.3 PIPE

- .1 Pipe and related materials (gaskets, lubricants and other such materials as are required to join the pipe) shall conform to the relevant specifications set forth in Part 2 of whichever of the following Sections as applicable:
 - .1 Section 02 70 30 – Sewers
 - .2 Section 02 70 60 – Pressure Pipelines
 - .3 Section 02 70 20 – Water Service Connections

2.4 BALLAST WEIGHTS

- .1 Concrete ballast weights shall conform to the design shown on the plans or as specified in Section 01 00 10, Special Provisions. The concrete shall have a 28-day compressive strength of 15 MPa and shall be manufactured with sulphate resisting cement meeting the current CSA A 23.1 (most recent edition), HS sulphate Portland Cement. Ballast weight halves shall be joined with all stainless steel nuts, bolts and washers.

2.5 GASKETS

- .1 Gaskets for ballast weights shall be preformed neoprene.

2.6 SILT FENCING

- .1 Shall conform to Part 2 of Section 02 20 10, Construction of Waterways.

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Part 3 EXECUTION

3.1 EXCAVATION BEDDING AND BACKFILLING

- .1 The requirements of Part 3, Section 02 21 80, Pipe Excavation, Bedding and Backfill shall apply.

3.2 ALIGNMENT AND GRADE

- .1 The pipeline shall be laid to the grade and alignment shown on the plans, and in accordance with Clause 3.1 Section 02 21 80, Pipe Excavation Bedding and Backfill or as staked on the ground by the Engineer.

3.3 CONSTRUCTION OF PIPELINE

- .1 Except as specified otherwise in this Section, the installation of the pipe and liner or encasement pipe (if required) shall conform to the relevant clauses set forth in Part 3 of whichever of the following Sections is applicable.
 - .1 Section 02 70 30 – Sewers
 - .2 Section 02 70 60 – Pressure Pipelines
 - .3 Section 02 70 20 – Water Service Connections

3.4 WATERCOURSE CROSSING CONSTRUCTION

- .1 There are three types of watercourse crossing construction. An above grade crossing is one in which a portion of the pipeline rests untrenched and unbackfilled on the bottom of the body of water. A below grade crossing is one in which the entire length of the pipeline is buried in a trench below the bottom of the body of water or by using a trenchless method to install the pipe below the bottom of the body of water. A detail of a typical river, creek, drain crossing is shown on SD-31 of the Standard Construction Drawing Appendix. Wherever possible, watercourse crossings shall be installed with trenchless method.

.1 ABOVE GRADE PIPELINE WATERCOURSE CROSSING

- .1 A single continuous length of polyethylene pipeline shall be formed by joining (by means of thermal butt fusion) lengths of pipe to allow the completed single length to extend from one onshore trench to the other. Concrete ballast weights shall be attached to the pipeline at the intervals shown on the plans or as specified in Section 01 00 10, Special Provisions. The weights, each of which shall consist of two halves, shall be bolted together. Preformed neoprene gaskets shall be used to fill the gap between

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the inside surface of the concrete ballast weight and the outside surface of the pipe.

- .2 Trenches shall be excavated above the river shoreline as indicated on the plans and in accordance with the approved sediment control plan and the requirements of DFO and the Provincial Regulator. Unless there is adequate ice cover on the body of water, the pipeline shall be securely capped to ensure the water tightness, and then it shall be floated on the water and one end pulled across to the opposite shore. (If there is adequate ice cover on the body of water, the pipeline shall be laid on the ice parallel to the proposed location of the pipeline crossing. The ice shall be cut and removed over the proposed pipeline location. The pipeline shall be submerged into place at a controlled rate by uncapping the ends on dry land, and by filling the pipeline with water (such water shall be potable if the pipeline is to be used to convey potable water after construction). When the pipeline has been lowered into place, the Contractor shall join the two ends of the pipeline to the on shore portion of the pipeline.

.2 BELOW GRADE PIPELINE WATERCOURSE CROSSING

- .1 The Contractor shall employ cofferdams, diversions, dewatering and other equipment and to excavate a dry trench across under the river to permit the installation of the pipeline to the alignment and grade indicated on the construction plans. All temporary dams, diversions and other such works shall conform to the approved sediment control plan and the requirements of DFO and the Provincial Regulator.

.3 TRENCHLESS METHOD WATERCOURSE CROSSING

- .1 The Contractor shall carry out trenchless method watercourse crossings in accordance to the approved sediment control plan and the requirements of DFO and the Provincial Regulator and as detailed below:

.2 MITIGATION MEASURES

- .1 All watercourse crossings shall be directionally bored, wherever possible.
- .2 A minimum undisturbed buffer zone of 15 metres shall be maintained between directional bored entry/exit areas and banks of watercourse.
- .3 Heavy equipment (tractors, backhoes) shall not be allowed within the buffer zone.

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- .4 Enforce restrictions regarding fuelling or servicing of equipment within 100 metres of watercourse.
 - .5 Waste drill mud shall be contained at the entry/exit points and prevented from entering surface water.
 - .6 Should long term erosion control measures be necessary, post construction monitoring shall be conducted to ensure effectiveness.
 - .7 Further erosion control measures to be implemented as directed by approval authorities.
- .3 RESTORATION
- .1 Restore all disturbed areas to original condition.
 - .2 Install erosion control measures, as directed and maintain until stabilized and vegetation becomes established.
- .4 PRESSURE LOSS/FLUID LOSS RESPONSE/FAC OUT MONITORING
- To avoid or minimize the potential for drilling mud and slurry from entering watercourses because of a frac-out, the following monitoring and response plan will be followed:
- .1 A record of boring progress shall be maintained to indicate the location of the bore head relative to the point of entry.
 - .2 A record of boring component usage (type and quantity) shall be maintained throughout each boring operation.
 - .3 A record of drilling volume used and returned continuously monitored. Abnormal loss of returned fluids or loss of fluid pressure that may be indicative of a frac-out will be reported immediately to the Engineer.
 - .4 At watercourse crossings where water clarity permits a view of the stream bottom, an observer shall continuously check for signs of mud/slurry entry to the watercourse.
- .5 LOSS OF FLUID AND FRAC-OUT RESPONSE PLAN
- .1 If an abnormal loss of fluid, drop in pressure or visible plume is observed indicating a frac-out or possible frac-out, boring is to stop immediately.
 - .2 The Contractor will notify the Engineer of the frac-out condition or potential condition and advise on the appropriate action as follows:
 - .1 Assign a person to visually monitor for the presence of muddy plume.

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- .2 Make adjustments to the mud mixture; add lost circulation material (LCM) to the drilling fluid in an attempt to prevent further loss of fluid to the ground formation and/or watercourse.
- .3 Where conditions warrant and permit (i.e., shallow depth, clear water, low water velocity, potentially sensitive habitat) and where a frac-out has been visually detected, attempt to isolate the fluid release using a large diameter standpipe such as a short piece of culvert.
- .4 Under circumstances where a frac-out has occurred, and where conditions do not permit containment and the prevention of drilling fluids release to the watercourse, attempts to plug the fracture by pumping LCM are not to continue for more than 10 minutes of pumping time.
- .5 If the frac-out is not contained within this time, the Engineer will halt any further attempts until a course of action (either abandon the directional drilling attempt or obtain further approvals) is decided upon.

3.5 RESTORATION

- .1 The construction site shall be restored to its original condition to the satisfaction of the Engineer and to the satisfaction of the appropriate authorities, which have jurisdiction over the watercourse.

3.6 PIPELINE MARKERS

- .1 The Contractor shall place pipeline marker posts at the location shown on the Plans or designated in the field by the Engineer when crossing under or through the watercourse.

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