PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCES

.1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
.1 ANSI/AWWA C207-07, Standard for Steel Pipe Flanges for Waterworks Service, Sizes 4 Inch Through 144 Inch (100 mm Through 3,600 mm).

.2 ASTM International
.1 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12, 400 ft-lbf/ft^3 (600kN-m/m^3).
.2 ASTM 02774-12, Standard Practice for Underground Installation of Thermoplastic Pressure Piping.

.3 Canada Green Building Council (CaGBC):
.1 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations .

.4 CSA International
.1 CSA B137 Series-09, Thermoplastic Pressure Piping Compendium.

.5 Washington State Department of Ecology.
.1 Stormwater Management Manual for Western Washington, Volume II, Construction Pollution Prevention (2015 edition).

.6 Newfoundland and Labrador Department of Municipal Affairs.
.1 Municipal Water, Sewer and Roads Master Construction Specifications, latest revision.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:
.1 Schedule Work to minimize interruptions to existing services.
.2 Submit schedule of expected interruptions and adhere to schedule approved by Departmental Representative.
.3 Notify Departmental Representative.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for for pipes and backfill and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
.2 Submit shop drawings showing proposed method of installation for sewage force main in undercrossing.

.4 Samples:
.1 Submit 4 weeks minimum before beginning Work, with proposed source of bedding materials and provide access for sampling.
.2 Submit for testing 2 weeks before beginning Work, samples of materials proposed for use as follows:
.1 Pipe bedding and surround materials.

.5 Certification to be marked on pipe.

.6 Test and Evaluation Reports: submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.

.7 Manufacturer's Instructions: submit to Departmental Representative 1 copy of manufacturer's installation instructions.

1.4 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.8 Sustainable Design Submittals:

.1 LEED Canada-2009 - Submittals: in accordance with Section 01 35 21 - LEED Requirements.

.2 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with EPA 832/R-92-2005 authorities having jurisdiction and Section 01 35 21 - LEED Requirements.

.3 Construction Waste Management:

.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.

.4 Recycled Content:

.1 Submit listing of recycled content products used, including details of required percentages of recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

.2 Submit evidence, when Supplementary Cementing Materials (SCMs) are used, to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.

.5 Regional Materials: submit evidence that project incorporates required percentage 20% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

1.5 DELIVERY, STORAGE AND HANDLING (Cont'd)

.3 Storage and Handling Requirements:
.1 Store materials in accordance with manufacturer's recommendations.
.2 Store and protect pipes from damage.
.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21 - LEED Requirements.

.5 Packaging Waste Management: remove for reuse or return of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Polyethylene pressure pipes: to CSA B137.1:
.1 Type: coil, HDPE.
.2 Series: 75.
.3 Joints: to ANSI/AWWA C207, thermal butt fusion.
.4 Polyethylene fittings: to CSA B137, for pipe sizes 100 mm and less.

2.2 PIPE BEDDING AND SURROUND MATERIALS

.1 Type 1 bedding accordance with Section 02233 of the Newfoundland and Labrador Municipal Water, Sewer and Roads Master Construction Specifications.

.2 Concrete mixes and materials for cradles for undercrossing and thrust blocks to Section 03 30 00 - Cast-in-Place Concrete.

2.3 BACKFILL MATERIAL

.1 As indicated.

.2 Type 3, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:
.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings.
.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Pipes and fittings to be clean and dry.

.3 Prior to installation, obtain Departmental Representative's approval of pipes and fittings.

3.3 TRENCHING

.1 Do trenching Work, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Trench alignment and depth require approval from Departmental Representative prior to placing bedding material or pipe.

3.4 GRANULAR BEDDING

.1 Place granular bedding in unfrozen condition.

.2 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.

.3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.

.4 Shape transverse depressions as required to suit joints.

.5 Compact each layer full width of bed to at least 95% maximum density to ASTM D 698.

.6 Fill excavation below design elevation of bottom of specified bedding with compacted bedding material.

3.5 INSTALLATION

.1 Install HDPE pipe in accordance with ASTM D2774.

.2 Avoid damage to machined ends of pipes in handling and moving pipe.

.3 Keep pipe and pipe joints free from foreign material.

3.6 PIPE SURROUND

.1 Place surround material in unfrozen condition.

.2 Upon completion of pipe laying, and after Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.

3.6 PIPE SURROUND (Cont'd)

.2 (Cont'd)
Leave joints and fittings exposed until field testing is completed.

.3 Hand place surround material in uniform layers simultaneously on each side of pipe not exceeding 150 mm compacted thickness as indicated.
.1 Do not dump material within 1 m of pipe.

.4 Compact each layer from pipe invert to mid height of pipe to at least 95% maximum density to ASTM D 698.

.5 Compact each layer from mid height of pipe to underside of backfill to at least 90% maximum density to ASTM D 698.

.6 When field test results are acceptable to Departmental Representative, place surround material at pipe joints.

3.7 BACKFILL

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

.3 Under paving and walks, compact backfill to at least 95% maximum density to ASTM D 698. In other areas, compact to at least 90% maximum density to ASTM D 698.

.4 Install marker tape as indicated.

3.8 FIELD TESTING OF FORCE MAIN

.1 Testing of force main to be carried out in presence of Departmental Representative.

.2 Strut and brace caps, bends and tees, to prevent movement when test pressure is applied.

3.8 FIELD TESTING OF FORCE MAIN (Cont'd)

.3 Expel air from force main, by slowly filling main with water.

.1 Drill and tap high points and intake suitable cocks to vent air and to be shut when pressure is applied.

.2 Remove cocks after satisfactory completion of test and seal holes with tight fitting plugs.

.4 Apply hydrostatic test pressure of 150% of the normal working pressure, based on elevation of lowest point in main and corrected to elevation of test gauge location for hydrostatic test or a minimum of 1000 kPA which is greater.

.5 Apply pressure for 1 hour pressure test and 2 hours for leakage test.

.6 Examine exposed pipe, joints and fittings while system is under pressure.

.7 Remove defective joints, pipe and fittings and replace with new sound material.

.8 Define leakage as amount of water supplied from water storage tank in order to maintain test pressure for 2 hours.

.9 Do not exceed allowable leakage of 0.3 L/mm pipe diameter per 300 meters, per hour for a working pressure of 1000 kPa.

.10 Locate and repair defects if leakage is greater than amount specified.

.11 Repeat test until leakage is within specified allowances for full length of force main.

.12 Complete backfill.

.13 Repeat test after completing backfill. Locate and repair defects and backfill. Repeat test, repairs and backfills as needed until leakage is less than amount specified.

3.9 TESTING

.1 Inspection and testing of pipe bedding surround and backfill material will be carried out by independent inspection and testing agency designated by Departmental Representative. Costs of these tests will be paid by Contractor in accordance with Section 01 29 83 - Payment Procedures for Testing Laboratory Services and Section 01 45 00 - Quality Control.

3.10 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END