Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for sewage force mains.

1.2 RELATED SECTIONS

.1 CW 2110 – Watermains and all specifications referenced within CW 2110.

.2 This specification shall revise, amend and supplement the requirements of CW 2110.

1.3 SUBMITTALS

.1 Submit complete details regarding manufacturer's pipe plant and quality control procedures if requested by Contract Administrator.

Part 2 Products

2.1 MATERIALS

.1 High Density Polyethylene Pipe

- .1 Standards
  - .1 CGSB-41GP-25M
  - .2 CSA-B317.1
  - .3 ASTM F714
- .2 Pipe Series
  - .1 150 mm Leachate: DR 11, Series 100
  - .2 200 mm Sludge and Leachate: DR 9, Series 200

.2 Joints

- .1 Thermal butt fusion to manufacturer's recommendations
- .2 Flanged connections to (AWWA C207) valves, fittings and building connections.

.3 Markings

- .1 All pipes shall be clearly marked as follows:
  - .1 Manufacturer name
  - .2 Nominal pipe size
  - .3 Pressure rating and DR number
  - .4 Polyethylene pipe type and category
  - .5 Hydrostatic design basis
  - .6 Manufacturing standard reference (CGSB/CSA)
  - .7 Production code for date of manufacture

.4 Drilling Fluids

.1 The drilling fluids shall be mixed according to the manufacturer's recommendations and be appropriate for the anticipated soil conditions. Only bentonite and the manufacturer-approved polymers shall be permitted for use as drilling fluids. All addictives used shall be chemically inert, biodegradable and non-toxic. No petroleum-based or detergent additives shall be permitted.

2.2 DIRECTIONAL DRILLING EQUIPMENT

.1 General

.1 The directional drilling equipment shall consist of a directional drilling rig and a drilling fluid mixing and delivery system of sufficient capacity to successfully complete the product installation without exceeding the maximum tensile strength of the product being installed.

.2 Drilling Rig

.1 The directional drilling rig shall:

.1 consist of a leak-free hydraulically powered boring system to rotate, push, and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill head.

.2 contain a guidance system to accurately guide boring operations.

.3 be anchored to the ground to withstand the rotating, pushing, and pulling forces required to complete the product installation.

.4 be grounded during all operations or as specified by the drilling rig manufacturer.

.3 Drill Head

.1 The drill head shall be steerable by changing its rotation, be equipped with the necessary cutting surfaces and drilling fluid jets, and be of the type for the anticipated soil conditions.

.4 Guidance System

.1 The guidance system shall be setup, installed, and operated by trained and experienced personnel. The operator shall be aware of any magnetic or electromagnetic anomalies and shall consider such influences in the operation of the guidance system when a magnetic or electromagnetic system is used.

.5 Drilling Fluid Mixing System

.1 The drilling fluid system shall be of sufficient size to thoroughly and uniformly mix the required drilling fluid.

.6 Drilling Fluid Delivery System

.1 The delivery system shall have sufficient flow capacity to ensure that all slurry volumes are adequate for the length and diameter of the final bore and the anticipated soil conditions. Connections between the delivery pump and drill pump and drill pipe shall be leak-free.

Part 3 Execution

3.1 INSTALLATION

.1 General

.1 The product shall be jointed according to the manufacturer's recommendations. Where space permits, the length of the product to be pulled shall be jointed as one length before commencement of the pulling operation.

.2 The product shall be protected from damage during the pullback operation.

.3 The minimum allowable bending radius for the product shall not be exceeded at the entry point, exit point, or any other location along the bore path.

.4 Product shall be allowed to recover before connection to new or existing facility is made. Product recovery time shall be according to manufacturer's recommendations.

.2 Preservation and Protection of Existing Facilities

.1 Minimize horizontal and vertical clearances to existing facilities as specified on the drawings shall be maintained. Clearances shall be measured from the nearest edge of the largest backreamer required to the nearest edge of the facility being paralleled or crossed.

.2 Existing underground facilities hall be exposed to verify its horizontal and vertical locations when the bore path comes within 1.0 m horizontally or vertically of the existing facility. Existing facilities shall be exposed by hydro excavation methods.

.3 Trenching, Backfilling and Compacting

.1 Trenching, backfilling, and compacting for entry and exit points or other locations along the bore shall be according to CW 2030.

.4 Drilling Fluid Management

.1 The Contractor shall employ a containment, collection, and disposal method satisfactory to the Contract Administrator to prevent spillage of drilling fluids and inadvertent returns. The Contractor shall immediately clean up and dispose of any spillages of drilling fluids.

.5 Pilot Bore

.1 The pilot bore shall be drilled along the bore path in accordance with the grade and alignment, specified on the drawings. In the event the pilot bore does deviate, the Contract Administrator shall be notified. The Contract Administrator may require the Contractor to pullback and re-drill from the location along the bore path before the deviation. In the event that a drilling fluid fracture, inadvertent returns, or loss of circulation occurs during pilot bore drilling operations, the Contract Administrator shall be advised of the event and of the action taken.

.2 If a drill hole beneath a road must be abandoned, the hole shall be backfilled with grout or bentonite to prevent future subsidence.

.6 Reaming

.1 When necessary, the bore shall be reamed using the appropriate tools to a diameter 50% greater than the outside diameter of the product to a maximum of 300 mm beyond the product diameter.

.2 The drilling mud in the annular region should not be removed after installation, but permitted to solidify and provide support for the pipe and surrounding soil.

.7 Pullback

.1 After successfully reaming the bore to the required diameter, the product shall be pulled through the bore path. Once the pullback operation has commenced, it shall continue without interruption until the product is completely pulled into the bore.

.2 A swivel shall be used between the reamer and the product being installed to prevent rotational forces from being transferred to the product. A weak link or breakaway connector shall be used to prevent excess pulling force from damaging the product.

.3 The product shall be inspected for damage where visible at excavation pits and where it exist the bore. Any damage noted shall be rectified to the satisfaction of the Contract Administrator.

3.2 HYDROSTATIC TESTING

.1 Flushing in accordance with CW 2125.

.2 Test Pressures

.1 150 mm Leachate: 700 KPa

.2 200 mm Leachate and Sludge: 1400 KPa

.3 General Requirements

.1 The pipe shall be filled and pressurized until a minimum of 24 hours has passed since the pipe was filled with water.

.2 The pipe shall be pressurized at the specified test pressure and over a 4-hour period, at hourly intervals, sufficient make-up water shall be added to return the pipe to the test pressure.

.3 At the end of the 4-hour period the pipe shall be brought up to the test pressure and over a 2-hour period, the amount of make-up water required to bring the pipe back up to test pressure shall be measured.

.4 The amount of make-up water shall not exceed the following limits

.1 150 mm Leachate: 85.0 litres per kilometre of pipe

.2 200 mm Leachate and Sludge: 109.5 litres per kilometre of pipe

.5 Leaks to be located and repaired until a passing test is achieved.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for underground vent pipe.

1.2 RELATED SECTIONS

.1 CW 2130 – Gravity Sewers and all specifications referenced within CW 2130.

Part 2 Products

2.1 MATERIALS

.1 PVC Schedule 80 to CSA B137.3 with solvent weld bell ends.

Part 3 Execution

3.1 INSTALLATION

.1 In accordance with CW 2130 for Sewer Services.

END OF SECTION