

PART E
SPECIFICATIONS

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

E1.1 *The City of Winnipeg Works and Operations Division Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.1.1 Division 2 - Standard Provisions, Provision CW 1100 of The City of Winnipeg Works and Operations Division Standard Construction Specifications shall apply to the Work.

E1.1.2 Further to GC:2.4(d), Specifications included in the Tender Package shall govern over The City of Winnipeg Works and Operations Division Standard Construction Specifications.

E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing</u>
5356	Montcalm Sewage Pumping Station Forcemain Replacement
5357	Montcalm Sewage Pumping Station Forcemain Replacement
5358	Montcalm Sewage Pumping Station Forcemain Replacement
5359	Montcalm Sewage Pumping Station Forcemain Replacement Site Plan

Information Drawings

229a	Plan and Profile for Montcalm River Crossing
261	Montcalm Pumping Station Additions(Equipment)
262	Montcalm Pumping Station Additions(Equipment)
1091	Piping Alterations for Montcalm Pumping Station and Forcemains

E2. SOILS INVESTIGATION REPORT

E2.1 Further to GC:3.1, of the General Conditions, a geotechnical soils investigation has been done in the vicinity of the proposed Works to determine the character of the subsurface soil to facilitate the design of the Work. The soil logs will be provided separately from this specification. The bidder shall be aware that some of the soils information has been included on the drawings but that the soils investigation was not completed when this tender was issued and that the final soils report will be issued by addendum as soon as it is available.

E2.2 Bidders are responsible for any interpretation they place on the supplied information and are expected to make such additional investigation of the soil as they feel necessary to satisfy themselves.

E2.3 Any test borings made by the Bidder shall be done in accordance with the requirements of the appropriate authorities of the City of Winnipeg. Bidders shall notify the Contract Administrator prior to starting any soil boring operation.

E3. INSTALLATION OF HDPE FORCEMAINS

E3.1 Description

E3.1.1 This specification covers the joining and installation of HDPE wastewater forcemains, the connection to flanged fittings, the connection to existing concrete discharge manhole and related Work.

E3.2 Materials

- E3.2.1 The City of Winnipeg, Water and Waste Department will provide the following materials at no expense for the Work.
- (a) 624.86 metres of 600 millimetre diameter DR 11 (HDPE) polyethylene pipe.
 - (b) 2 – 600 millimetre diameter DR 11 (HDPE) Stub ends.
 - (c) 2 – 600mm diameter ductile iron back up flanges for connecting to cast iron flanged fittings.
 - (d) 40 stainless steel fasteners for connecting HDPE pipe to cast iron flanged fittings.
 - (e) 4 – 600 millimetre diameter 45 degree HDPE bends with plain ends.
- E3.2.2 All other material required for the completion of the Work shall be supplied by the Contractor.
- E3.3 Construction Methods
- E3.4 Pick-up and Delivery of HDPE Pipe, Fittings and Appurtenances
- E3.4.1 Arrange for pick-up of City supplied materials from Perma Engineered Sales located at 34 Roy Roche Drive in Winnipeg and deliver to the Site.
- E3.4.2 Inspect the material before loading to ensure there is no damage. Notify the Contract Administrator of any damage observed before loading material.
- E3.4.3 Assume responsibility for material from time material is loaded until material is installed and accepted by the City.
- E3.5 Handling of HDPE Pipe
- E3.5.1 Handle pipe in a manner that will not damage or deform the pipe.
- E3.5.2 Replace at own expense pipe that has been kinked or has scratches, cuts or gouges deeper than 10% of the total wall thickness.
- E3.5.3 Lift pipe sections using at least two slings spread far enough apart to balance the load. Use pads under chains or cables if used to lift pipe. Do not position slings on butt fused joints.
- E3.5.4 Ensure ground where pipe is stored is level and free of sharp objects that may damage the pipe. Limit stacking of pipe to a maximum height as recommended by the manufacturer to prevent excessive deformation of pipes on the bottom.
- E3.5.5 Take precautions to ensure joined sections of pipe are not damaged or over-stressed when dragging into position to install in bore hole. Do not drag pipe over sharp and cutting objects. Do not insert chains, cables and ropes into pipe ends to drag pipe.
- E3.5.6 Temporarily plug ends of pipe with suitable plugs or stoppers until pipe is joined and installed.
- E3.6 Joining HDPE Pipe Sections
- E3.6.1 Join HDPE pipe sections together by means of thermal butt-fusion or electrofusion in general accordance with the manufacturer's instructions. Fusion shall produce a joint weld with strength equal to or greater than the tensile strength of the pipe itself.
- E3.6.2 Join pipe sections together on-Site and temporarily store the full length on-Site.
- E3.7 Connecting HDPE Pipe to Flanged Fittings
- E3.7.1 Connect HDPE pipe to flanged fittings by using a flange assembly consisting of an HDPE stub-end butt-fused to the HDPE pipe and a ductile iron flange and gasket.

- E3.7.2 Allow HDPE pipe sufficient time to recover and rebound after pull-in before connecting to flanged fittings
- E3.8 Hydrostatic Testing
- E3.8.1 Perform hydrostatic testing of the pipe in accordance with specification CW 2125 after joining into continuous length before installation and again after installation.
- E3.8.2 Test pressure shall be 0.70 MPa
- E3.9 Installation of HDPE Pipe Using Horizontal Directional Drilling
- E3.9.1 Install HDPE pipe using the horizontal directional drilling method in general accordance with ASTM Standard Guide F 1962 for "Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings".
- E3.9.2 Employ experienced personnel to operator the directional drilling and tracking equipment.
- E3.9.3 Provide the Contract Administrator with the following information before beginning installation.
- (a) Equipment specifications and capabilities
 - (b) Size of pilot hole.
 - (c) Number and size of pre-reams.
 - (d) Method of suspending, supporting and directing pipe during pullback.
 - (e) Type and capabilities of tracking system.
 - (f) Drilling fluid and cuttings management plan including type of drilling fluid, drilling fluid pressure and fluid containment.
 - (g) Management plan for "frac-outs".
 - (h) Confirmation of entrance and exit locations.
- E3.9.4 The Contractor shall be aware that the south forcemain is not in service and shall be replaced first.
- E3.9.5 Maintain alignment of directional drilling as close as possible to the proposed plan and profile shown on the drawings taking into account the capabilities of drilling equipment and the allowable stresses of HDPE pipe. Advise the Contract Administrator of deviations to line and grade as they occur for discussion and approval.
- E3.9.6 Continuously monitor and track the drill bore in the pilot hole. Record the depth to the nearest 0.10 metres from ground surface at major changes in surface elevation, at maximum 10 metre intervals along flat surfaces and at horizontal and vertical changes in alignment. Spray paint a mark at the location the depth was recorded to allow the Contract Administrator to survey the coordinates of the location.
- E3.9.7 Begin reaming operations to enlarge pilot hole after the Contract Administrator has accepted the pilot bore. The number and size of reaming heads is at the discretion of the Contractor.
- E3.9.8 Operate and maintain a closed loop drilling fluid system if possible.
- E3.9.9 Ensure drilling fluids and cuttings are contained and stored at entrance and exit hole locations in accordance with the management plan. Drilling fluid shall a no time be directed to the river, sewers, manholes or catch basins. Drilling fluid and cuttings shall be loaded, hauled from the Site and disposed of at a Site approved by the Contract Administrator.

- E3.9.10 Provide a swivel when pulling pipe into bore hole to reduce torsional loads transmitted to the pipe.
- E3.9.11 Cap end of pipe before pulling into bore hole to prevent matter and fluids from entering the pipe.
- E3.9.12 Provide pipe rollers, side booms or other devices to support and protect pipe while pulling into bore hole.
- E3.9.13 Continuously measure the pull back force on the pipe and do not exceed the maximum force allowed by the pipe manufacturer.

- E3.10 Bedding and Backfill of HDPE Pipe in Open Excavations
 - E3.10.1 Bed pipe in excavations using Type 3 granular bedding in accordance with specification CW 2030 and SD-001.
 - E3.10.2 Backfill excavations using Class 2 backfill in accordance with CW 2030 and SD-002.
- E3.11 Connecting HDPE Pipe to Existing Discharge Manhole
 - E3.11.1 Remove existing steel forcemain as required and connect HDPE pipe to existing discharge manhole in accordance with Section 3.8.4 of specification CW 2130.
 - E3.11.2 Allow HDPE pipe sufficient time to recover and rebound after pull-in before connecting to existing manhole.
- E3.12 Silt Fence and Containment Berm
 - E3.12.1 Install silt fencing satisfactory to the Contract Administrator between the excavation at the Montcalm Pumping station and the river to ensure drilling fluids and sediment from excavation do not enter the riverbank and river.
 - E3.12.2 Install a containment berm satisfactory to the Contract administrator around the excavation at the discharge manhole to ensure drilling fluids and sediment from the excavation do not enter private property, the riverbank and river.

E4. MONTCALM PUMPING STATION PIPING CONNECTIONS

- E4.1 Description
 - E4.1.1 This specification covers the connections to the existing piping inside the Montcalm Pumping Station to accommodate the new HDPE forcemains.
 - E4.1.2 City crews who maintain the pumping station will assist with station shutdown and start-ups to facilitate the piping connections.
- E4.2 Materials
 - E4.2.1 The City of Winnipeg, Water and Waste Department will provide the materials specified in E3.2.1. All other material shall be supplied by the Contractor
- E4.3 Construction Methods
- E4.4 Pick-up and Delivery of Fittings and Appurtenances
 - E4.4.1 Arrange for pick-up of City supplied materials from a location in Winnipeg as directed by the Contract Administrator and deliver to the Site.
 - E4.4.2 Inspect the material before loading to ensure there is no damage. Notify the Contract Administrator of any damage observed before loading material.

- E4.4.3 Assume responsibility for material from time material is loaded until material is installed and accepted by the City.
- E4.5 Connection to existing cast iron Fittings
 - E4.5.1 Approximately 9.5 hours of shutdown time will be available if required to complete the connection at the Montcalm Station or at the discharge manhole.
 - E4.5.2 Existing south forcemain must be done first. The north forcemain must stay in service until the south forcemain is complete and in service.
 - E4.5.3 Be aware of and contend with the wastewater in the existing forcemains and station piping when preparing to disassemble the existing piping. Pump out and clean-up all wastewater spilt into the pump room.
 - E4.5.4 Cut holes in existing concrete walls and floor slabs using concrete coring equipment. Core hole should be left with smooth surface to accept link seal.

E5. CONNECTION TO EXISTING DISCHARGE MANHOLE

- E5.1 Construction Methods
 - E5.1.1 The connection of the new forcemain shall include all Work required to remove existing steel forcemain and to install the new forcemain.
 - E5.1.2 Remove all waste material from the Site and legally dispose of it at no cost to the City.
 - E5.1.3 The Contractor shall be aware that the discharge manhole is located on private property but that an easement is in place to allow this Work to take place. The Contractor shall notify the property owner two weeks in advance before entering the property to do this Work.

E6. SHAFT EXCAVATION

- E6.1 The shaft excavation shall have vertical tightly shored walls. There shall be no void between the shaft wall and the excavation. Prior to construction a drawing of the shaft design shall be submitted to the Contract Administrator for review and approval. The shaft shall be designed by a Professional Engineer licensed to practice in the Province of Manitoba.

E7. ABANDONING EXISTING FORCEMAINS

- E7.1 Abandon both existing steel forcemains as shown on the Drawing.
- E7.2 Remove existing forcemains as required for the installation of the new forcemains and plug the ends of the exiting forcemains with concrete to a minimum of one meter in length. Pump sewage from the existing forcemains into existing station wetwell. Be advised river water may be able to enter the forcemains through cracks and breaks. Request approval from Contract Administrator to stop pumping if it is suspected only river water is being pumped.
- E7.3 Ensure that concrete grout fill does not enter the river through cracks or breaks in the existing pipe.
- E7.4 Use a "quick setting" hydraulic cement for permanent plugs.

E8. RESTORATION OF DISTURBED SURFACES

- E8.1 Restore the construction Site to its original condition.

- E8.2 Restore grassed areas within the limits of construction by sodding using imported topsoil in accordance with CW 3510 and CW 3520 as indicated in the Specifications and as directed by the Contract Administrator.
- E8.3 Restore concrete pavement slabs, miscellaneous concrete slabs, and curbs in accordance with CW3230, CW 3235, CW 3240 and CW 3410 as indicated in the Specifications and as directed by the Contract Administrator.

E9. MEASUREMENT AND PAYMENT

- E9.1 Mobilization/Demobilization to and from the Site shall be paid on a lump sum basis and shall include all costs to move equipment to and from the Site required for the completion of the Work.
- E9.2 HDPE forcemain installation will be measured for payment on a length basis, made at grade along the centreline of each pipe from the connection to the cast iron flange fitting in the Montcalm Station to the connection to the discharge manhole. And paid for at the Contract Unit Price per metre for "600 diameter HDPE Forcemain by horizontal directional drilling". Length to be paid for will be the total number of linear metres of HDPE forcemain installed in accordance with this specification, accepted and measured by the Contract Administrator.
- E9.3 Connecting HDPE forcemains to the existing discharge manhole will be measured for payment on a unit basis and paid for at the Contract Unit Price for "Connecting HDPE Forcemain to Existing Discharge Manhole". Number of units to be paid for will be the total number of connections installed in accordance with this specification, accepted and measured by the Contract Administrator.
- E9.4 Connecting HDPE forcemains to the 600 diameter cast iron flanged fitting in the Montcalm Pumping Station will be measured for payment on a unit basis and paid for at the Contract Unit Price for "Connecting HDPE Forcemain to existing piping at the Pumping Station". Number of units to be paid for will be the total number of connections installed in accordance with this specification, accepted and measured by the Contract Administrator.
- E9.5 Abandoning the existing forcemains shall be measured for payment on a unit basis and paid for at the Contract Unit Price for " Abandon existing Forcemains". Number of units paid for will be the number of forcemains abandoned in accordance with this specification, accepted and measured by the Contract Administrator.
- E9.6 Shaft excavation shall be measured for payment on a unit basis and paid for at the Contract Unit Price for " Shaft excavation at the Montcalm Station and Shaft excavation at the discharge manhole". Number of units paid for will be the number of shafts excavated in accordance with this specification, accepted and measured by the Contract Administrator.
- E9.7 Silt fencing and containment berms will not be paid for as a separate item.
- E9.8 Restoration will not be paid for as a separate item.
- ## **E10. DANGEROUS WORK CONDITIONS**
- E10.1 The Contractor shall provide the necessary precautions to safeguard against any gas hazard during construction and shall provide adequate safety protection for personnel engaged in this Work and for all others who are exposed to the Work environment under this Contract.
- E10.2 The Contractor shall be aware of the potential hazards which can be encountered in a pumping station or discharge manhole , such as explosive gases, toxic gases and oxygen deficiency.

- E10.3 The air in a pumping station and discharge manhole must be tested before entry and continuously during the time that personnel are inside the structure. Equipment for continuous monitoring of gases must be explosion-proof and equipped with a visible and audible alarm. The principal tests are for oxygen deficiency, explosion range and toxic gases. Testing equipment must be calibrated in accordance with the manufacturer's specifications.
- E10.4 Temporary ventilation must be provided for at least 15 minutes prior to entry and continue while the station is occupied. If no ventilation is supplied, a worker must wear an airline respirator to enter the station or the trunk sewer.
- E10.5 The contractor shall be aware that the pumping stations and discharge manhole are considered a confined entry and shall follow the latest revision of the "Guidelines for Confined Entry Work" as published by the Manitoba Labour Workplace Safety and Health Division.

E11. AUTHORIZED WORK ON PRIVATE PROPERTY

- E11.1 The contractor shall confine his Work to the City of Winnipeg right of way or easement area. If Work is required to be done beyond this area or on private property the Contractor shall make all arrangements required with property owners and shall be responsible for all damages incurred as a result of the construction activities.