

1 GENERAL

- 1.1 The work of this section includes the provision of all design, labour, materials, equipment and services required to fabricate and install water supply and distribution systems as required for a complete project. The work includes, but is not necessarily limited to, the items referenced herein:
- 1.1.1 Site Domestic Water Distribution.
 - 1.1.2 Site Fire Protection Water Distribution.
- 1.2 Provide all piping and connections to the existing municipal water service as required for the project. All water shall be potable.
- 1.3 All systems to be in strict compliance with the *[Regional Municipality of Ottawa-Carleton Standards and Specifications]*, the Ontario Building Code, local Plumbing Codes and requirements of the authorities having jurisdiction.

2 DESIGN

- 2.1 The Design Builder shall engage a qualified Professional Engineer licensed to practice in the Province of Ontario to design the water supply and distribution systems. Each drawing and specification submission to bear the signature and stamp of the Professional Engineer.
- 2.2 Design shall be completed in accordance with provisions of the Master Planning Report or as deemed appropriate.
- 2.3 Site Domestic Water Distribution:
- 2.3.1 System to be designed to meet current times 150% demand requirements.
 - 2.3.2 Piping to be provided with valved isolation in accordance with local standards. Butterfly valves shall not be used.
 - 2.3.3 Piping to be buried at 2.5 m depth to be protected from frost.
- 2.4 Site Fire Protection Water Distribution:
- 2.4.1 System shall be part of Domestic Water Distribution Network.
 - 2.4.2 Hydrants to be provided at locations as per local codes.

3 MATERIALS

- 3.1 Site Domestic Water Distribution:
- 3.1.1 Ductile iron pipe to *[ANSI/AWWA C151/A21-51]*.
 - 3.1.2 Cast iron pipe, cement mortar lined to *[ANSI/AWWA C104/A21.4]*.
 - 3.1.3 Joints and fittings for ductile iron and cast iron pipe to *[ANSI/AWWA C111/A21.11]* and *[ANSI/AWWA C110/A21.10]*.

- 3.1.4 Concrete pipe to *[ANSI/AWWA C301]* or *[ANSI/AWWA C303]*. Fittings to *[ANSI/AWWA C301]* and *[ANSI/AWWA C303]*.
- 3.1.5 PVC pressure pipe to *[CAN/CSA B137.3]*. Fittings to *[ANSI/AWWA C110/A21.10]* or *[CAN/CSA B137.2]*.
- 3.1.6 Polyethylene pressure pipe:
 - 3.1.6.1 To *[CAN/CSA B137.1]*, *[ASTM D3035 and D3350]* and *[CAN/CGSB 41-GP-25M]*.
 - 3.1.6.2 Polyethylene to polyethylene joints: to be thermal butt fusion joined, to *[ASTM D2657]*.
 - 3.1.6.3 Cast iron fittings with flanged ends: to *[ANSI/AWWA C110/A21.10]* for pipe size above NPS 4.
 - 3.1.6.4 Polyethylene fittings: to *[CAN/CSA B137.1]*, for pipe sizes NPS 4 and less.
- 3.1.7 Valves:
 - 3.1.7.1 Valves to open as per local standards.
 - 3.1.7.2 Gate valves: to *[ANSI/AWWA C500]*, standard iron body, brass mounted wedge or double disc valves with non-rising stems, suitable for 1 MPa with mechanical or push-on joints.
 - 3.1.7.3 Underground indicator valves to accurately indicate position.
 - 3.1.7.4 Air and vacuum release valves to be suitable for 2 MPa working pressure, complete with surge check unit. Flanged ends to *[ANSI/AWWA C110/A21.10]*.
 - 3.1.7.5 Valve boxes and chambers as required by local authorities having jurisdiction.
- 3.1.8 Cast iron fittings: to *[ANSI/AWWA C110/A21.10]*, and for pipe diameters larger than NPS 4 cement mortar lined to *[ANSI/AWWA C104/A21.4]*.
- 3.1.9 Service Connections: as required by authorities having jurisdiction.
- 3.1.10 Disinfection: liquid chlorine to *[ANSI/AWWA B301]* to disinfect water mains.
- 3.2 Site Fire Protection Water Distribution:
 - 3.2.1 System to be same materials as Site Domestic Water Distribution System.
 - 3.2.2 Hydrants to *[CAN/ULC-S250]*, fittings to *[CAN4-S543]*. Key operated gate valve to be located 1 m from hydrant. Paint to be exterior enamel to *[CAN/CGSB-1.59]*.

4 INSTALLATION

4.1 Site Domestic Water Distribution:

- 4.1.1 Install pipe in accordance with *[ANSI/AWWA C600]*, ANSI/AWWA Manual of Practice and manufacturer's instructions.
- 4.1.2 Install valves in accordance with manufacturer's recommendations.
- 4.1.3 Service connections in accordance with local codes and authorities having jurisdiction.
- 4.1.4 Thrust blocks at all changes in pipe direction.
- 4.1.5 Disinfection test results to be certified and given to Owner.
- 4.1.6 Field testing:
 - 4.1.6.1 Testing of main to be carried out in presence of Owner.
 - 4.1.6.2 Strut and brace caps, bends and tees, to prevent movement when test pressure is applied.
 - 4.1.6.3 Expel air from main, by slowly filling main with water. High points to be drilled and tapped and suitable cocks installed to vent air and to be shut when pressure is applied. Remove cocks after satisfactory completion of test and seal holes with tight fitting plugs.
 - 4.1.6.4 Apply hydrostatic test pressure of 1.5 x working pressure kPa based on elevation of lowest point in line and corrected to elevation of test gauge for hydrostatic test and 700 kPa for leakage test.
 - 4.1.6.5 Apply pressure for 1 h for pressure test and 2 h for leakage test.
 - 4.1.6.6 Examine exposed pipe joints and fittings while system is under pressure.
 - 4.1.6.7 Remove defective joints, pipe and fittings and replace with new sound material.
 - 4.1.6.8 Define leakage as amount of water supplied from water storage tank in order to maintain test pressure for 2 h.
 - 4.1.6.9 Do not exceed allowable leakage as defined in *[ANSI/AWWA C600]*.
 - 4.1.6.10 Locate and repair defects if leakage is greater than amount specified.
 - 4.1.6.11 Repeat test until leakage is within specified allowance for full length of main.
 - 4.1.6.12 Complete backfill to Section G1030 – Site Earthwork.
 - 4.1.6.13 Repeat test after completing backfill. Locate and repair defects and backfill. Repeat tests, repairs and backfills as needed until leakage is less than amount specified.

- 4.1.7 Site Fire Protection Water Distribution:
 - 4.1.7.1 To be installed in accordance with requirements of Site Domestic Water Distribution System.
 - 4.1.7.2 Hydrants to be installed in accordance with AWWA Manual of Practice. Thrust blocks at changes in pipe direction. Drains as required by local codes and authorities having jurisdiction. All flow tests are to be provided by the *[Design Builder]*.

End of Section