

## **SECTION 2.0 WATERWORKS SYSTEM**

### **2.1 Designs**

2.1.1 The waterworks system shall be designed in accordance with recommended standards and the design manual of the American Water Works Association (AWWA) and the “Alberta Environmental Protection Standards and Guidelines”. The system shall be designed as part of the overall or ultimate Town of Whitecourt system for the peak hourly demands or the peak day demand consumption plus fire flows, whichever is greater. The peak day to average day factor is 2.0 and the peak hour to average day factor is 3.0 for design purposes.

2.1.2 The waterworks system shall be designed to meet or exceed the latest recommendations of the Fire Underwriters Survey (FUS) Guide to Recommended Practice.

### **2.2 Mains**

2.2.1 Minimum size of main shall be 150 mm (6 inch) diameter in residential areas and 250 mm (10 inch) in commercial and industrial areas, unless otherwise specified.

2.2.2 Main sizes may be increased as considered necessary by the Town to accommodate future development.

2.2.3 Pipe 450 mm diameter and smaller shall be PVC AWWA C900 or C905, DR18 class 1035 kpa (150 psi) or better and be certified as conforming to CSA B137.3.

2.2.4 Reinforced concrete cylinder pipe conforming to AWWA C303 or yellow jacket, cement lined welded steel pipe, to AWWA C-200 and C-205-85 respectively, or approved equivalent, shall be used in pipes exceeding 450 mm diameter.

2.2.5 All mains shall be installed to a minimum depth of 3 m (10 feet) of cover below finished grade. The Town may approve reduced depth of cover providing a method of insulation acceptable to the Town is provided.

2.2.6 Mains shall generally be located 3.0 m off the centreline of the streets as indicated on the drawings.

### **2.3 Hydrants**

2.3.1 Maximum spacing between hydrants is to be 200 m in residential. No property is to be more than 150 m from a hydrant along the normal travel route of the fire department. In multi family, school or commercial/industrial, the maximum spacing will be 120 m or as recommended by the FUS, whichever is the lesser.

2.3.2 Hydrants shall be set plumb and with the pumper nozzle at right angles to the road centreline.

- 2.3.3 In the areas with a “rural” roadway cross-section, hydrants shall be located on special “access pads” extending perpendicular to the roadway centerlines and a minimum of 3.25 m (10.7 feet) from the edge of the proposed road surface and shall be accessible from the roadway. The elevation of the “access pads” shall be no less than 0.3 m (1 foot) below the crown of the road at that point and shall be seeded with grass.
- 2.3.4 Hydrants shall be of the same style and make as presently existing in the Town and shall be complete with:
- .1 Two (2) 65 mm (2 ½ inch) hose nozzles.
  - .2 One (1) 100mm Storz (pumper) connection.
  - .3 Threads on the 65mm connection to be Alberta Standards.
  - .4 Hydrants shall be painted with acrylic yellow enamel paint.
  - .5 Drains shall not be plugged unless the water table is above the pipe.
  - .6 Bolts and nuts that are intended for buried underground service shall be manufactured stainless steel.
  - .7 Alternative models and styles will require Town approval.
- 2.3.5 Hydrant Protection as deemed necessary by the Town will be provided in certain areas where damage is a concern. This will be by placement of 150 mm concrete filled steel posts set 1.2 m in the ground and above the ground and painted yellow.

## 2.4 **Valves**

- 2.4.1 A sufficient number of valves shall be provided so that no more than four (4) valves must be closed to isolate any one section of water main (one section of water main is defined and shall mean that extent of water main piping serving one hydrant and a maximum of 30 dwelling units).
- 2.4.2 Valves shall be iron body (epoxy coated or galvanized), fully bronze mounted gate valves, with resilient seat and non-rising spindle to open by turning in a counterclockwise direction. Stainless steel bolts and nuts to be utilized throughout.
- 2.4.3 Valve boxes with operating stem, nut and rock disc are required on all valves. At least one intermediate extension with a minimum length of 400mm shall be installed in each valve box.
- 2.4.4 An isolating valve shall be provided on each hydrant lead located 1.0 m from the main tee.
- 2.4.5 Hydrants shall be installed at extensions to property lot line and/or cut-off corners.

2.5 **Thrust Blocking**

- 2.5.1 Concrete thrust blocking is to be provided at all fittings, valves and hydrants and shall be designed for pressure equal to the design of the pipe.
- 2.5.2 Concrete shall be made using type 50 sulphate resistant cement with a maximum slump of 75 mm and a minimum 28 day strength of 25 MPa (3600 psi).

2.6 **Service Connections**

- 2.6.1 Minimum service sizes:  
19 mm (3/4 inch) diameter for single family residences  
25 mm (1 inch) diameter for commercial and multiple family  
40 mm (1 1/2 inch) diameter for industrial  
50 mm diameter for industry  
40 mm & 50 mm connections required saddles
- 2.6.2 Minimum size 150 mm (6 inch) diameter to convey fire flow requirement.
- 2.6.3 No pipe size between 50 mm (2 inch) diameter and 100 mm (4 inch) diameter will be allowed.
- 2.6.4 A curb stop or valve stamped "Water" on the cap or lid shall be provided with each service connection. It shall be placed 0.3 m (1 foot) off the property line, installed to the centreline of the front of all lots. Curb stops shall be the self draining type unless ground conditions predicate otherwise.
- 2.6.5 For service connection 100 mm in diameter or greater the service pipe shall be PVC pipe as specified for mains.
- 2.6.6 All service lines shall be type "K" copper and installed to provide a minimum depth of 3.0 m of cover (including the gooseneck) located as per the drawing.
- 2.6.7 The water service pipe shall be installed on the upstream side of the sewer service pipe relative to the direction of flow of the sewer main.
- 2.6.8 Tapping and installation of main stop shall be performed by qualified personnel to manufacturer's specifications for 19 mm and 25 mm only.

2.7 **Materials**

- 2.7.2 All materials shall be of the manufacturers stated in the "Approved List" in Appendix A unless otherwise approved in writing by the Town.

2.8 **Waterworks System** - Cathodic Protection (when requested by the Town)

- 2.8.1 The Town may require soil testing to determine cathodic protection requirements and a cathodic protection system based on these results be designed. The system may be impressed current or sacrificial anode. A maintenance and monitoring

program shall be provided where applicable. Following are the minimum cathodic protection requirements:

- .1 All ferrous fittings, valves, hydrants and other appurtenances shall be protected with a 5.5 kg Zinc anode.
- .2 Zinc anodes shall conform to ASTM B418-73 Type II.
- .3 Lead wires No. 10A WG/7, 2 meters long.
- .4 Wire shall be connected with a Cadweld.

## 2.9 **Leakage, Testing, Flushing, Disinfection and Inspection**

### 2.9.1 Leakage Testing

- .1 Leakage testing shall be performed to the latest applicable AWWA Standards.
- .2 The test pressure shall be 1035 kpa or 1.5 times the normal operating pressure based on the lowest point on the main and corrected to the elevation of the test gauge.
- .3 The minimum test duration shall be two hours.
- .4 The allowable leakage shall be calculated using the following formula:

$$L = \frac{ND(P)^{0.5}}{128,320}$$

L = allowable leakage (litre/hour)

N = number of joints

D = nominal diameter (mm)

P = test pressure (kpa)

(1.0 psi = 6.9 kpa)

### 2.9.2 Flushing

- .1 Watermains shall be flushed with sufficient flow to produce a minimum velocity of 1.5 m/s within the pipe for a minimum duration of 10 minutes and until all foreign material is removed from the pipe and flushed water is clear.

### 2.9.3 Disinfection

- .1 Watermains shall be disinfected to current AWWA standards.
- .2 Water samples must be submitted to the Health Unit for bacteriological testing. Results of these tests are to be submitted to the Town and must be satisfactory to the Town prior to putting the watermain into service.

### 2.9.4 Inspection

The operation of all appurtenances including valves, curb stops and hydrants shall be tested by and shall be acceptable to the Town prior to issuance of a Construction Completion Certificate.

2.10      **System Operation**

- 2.10.1      Only the Town Utility Department personnel will operate any existing water valves or curbstops.
- 2.10.2      All work is to be arranged for a minimum disruption of services, and if necessary to interrupt water services, the Town and affected residents or businesses shall be notified not less than 48 hours in advance and immediately when restored.
- 2.10.3      Approval to use the water system during construction shall be obtained from the Town and a temporary metered by-pass may be required to be installed and removed thereafter.