

SECTION 23

WATER MAINS

23.1 GENERAL CONSIDERATIONS

23.1.1 TYPE OF WATER MAINS

The CITY will approve PLANS for water supply mains and extensions only when such mains are designed and constructed in accordance with the criteria set forth in this MANUAL.

23.1.2 DESIGN PERIOD

Water mains should be designed for the estimated ultimate tributary population, as delineated in the approved City of Mascotte Water Master Plan (latest edition) except in considering parts of the system that can be readily increased in capacity.

Water systems shall be designed to satisfy the domestic water demand and fire protection requirements for the area.

23.1.3 LOCATION

Water mains shall be located in dedicated rights-of-way or utility easements. When installed in rights-of-way, water mains shall, in general, maintain a consistent alignment with respect to the centerline of the road. All water mains located outside of dedicated rights-of-way shall require a minimum twenty (20) foot easement. Additional easement widths shall be provided when the pipe size or depth of cover so dictate. If a water main is located adjacent to a road right-of-way, a minimum ten (10) foot easement shall be provided. Additional easement widths shall be provided if the pipe size or depth of cover so dictate. Water mains shall not be placed under retention ponds, tennis courts, or other structures. In general, water mains shall not be located along side or rear lot lines.

Placement of a water main along side or rear lot line may be allowed on a case by case basis if such a water main configuration results in efficient placement and utilization of the water main network. The criteria shall also apply to water mains in retention pond berms.

23.2 DESIGN BASIS

23.2.1 AVERAGE DAILY FLOW AND PEAK FLOWS

Average daily water flow shall be calculated by referencing the Equivalent Residential Connection (ERC) flow rates as outlined in Appendix B. Appendix B is subject to revision based upon passage, revision and amendment of any applicable City of Mascotte Ordinance.

23.2.2 FIRE FLOW REQUIREMENTS

Fire flow requirements shall be determined in accordance with applicable City of Mascotte Fire Department Codes. As a minimum, the requirements outlined in the City of Mascotte Subdivision Regulations shall be met. Where fire flow requirements exceed the anticipated available fire flow from the central water system, on-site fire protection system or other Fire Department approved mitigation measures shall be utilized.

23. 2. 3 DESIGN CALCULATIONS

DEVELOPER's ENGINEER shall submit signed, sealed and dated design calculations with the PLANS for all water distribution projects. Calculation shall show the water mains will have sufficient hydraulic capacity to transport peak hourly flows and the combination of maximum daily flows and fire flows while meeting the requirements of Section 23.3.1. Head losses through meters and backflow devices shall also be included in calculations.

23. 3 DETAILS OF DESIGN AND CONSTRUCTION

23. 3. 1 PRESSURE

All water mains shall be designed in accordance with Section 23.2.3 above. The system shall be designed to maintain a minimum pressure of 20 psi at all points in the distribution system under all conditions of flow. Higher pressures may be required at commercial, industrial and high density residential areas. The normal working pressure in the distribution system should be approximately 55 psi, but in no case less than 35 psi on the downstream side of a meter. For pressures greater than 90 psi special provisions may be required. Design Friction Losses for water mains shall be as specified in Section 21.3.2.

23. 3. 2 DIAMETER

Only 4", 6", 8", 10", 12", 16", 20", 24", 30", 36", 42", 48" and 54" diameter water mains shall be permitted. Four (4) inch water mains shall be permitted only in cul-de-sac areas with a maximum length of five hundred (500) feet of pipe. In cul-de-sac areas only, a four (4) inch looped connection may be allowed to prevent dead ends. As a minimum, six (6) inch looped systems shall be required in low density residential projects. Where looping of mains is not practical, minimum eight (8) inch mains shall be required, unless detailed calculations are submitted to substantiate the sufficiency of a six (6) inch main. In commercial, industrial, and high density residential areas, minimum eight (8) inch looped mains shall be required. Larger size mains shall be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure specified in Section 23.3.1.

23. 3. 3 FIRE HYDRANT LOCATION AND SPACING

As a minimum, specifications outlined in the latest version of the City of Mascotte Subdivision Regulations and applicable City of Mascotte Fire Department Codes shall apply. Hydrants shall be placed at two thousand (2,000) feet intervals to provide for proper flushing for all off-site mains.

23. 3. 4 DEAD ENDS

In order to provide increased reliability of service and reduce head loss, dead ends shall be minimized by making appropriate tie-ins whenever practical, as determined by the CITY.

Where dead-end mains occur, they shall be provided with a fire hydrant or with an approved flushing hydrant or blow-off for flushing purposes. Flushing devices shall be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. No flushing device shall be directly connected to any sewer.

23. 3. 5 VALVES

Sufficient valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves shall be located at not more than five hundred (500) foot intervals in commercial, industrial and high density residential areas and at not more than one thousand (1,000) foot intervals in all other areas. Appropriate valving shall also be provided at all areas where water mains intersect to ensure effective isolation of water lines for repair, maintenance or future extension.

23. 3. 6 SEPARATION OF WATER MAINS AND SEWERS

Refer to Section 51.3 of these specifications for applicable requirements. No water main shall pass through or come in contact with any part of a sewer manhole.

Extreme caution should be exercised when locating water mains at or near certain sites such as sewage treatment plants or industrial complexes. Individual septic tanks must be located and avoided.

23. 3. 7 SURFACE WATER CROSSINGS

The CITY shall be consulted before final PLANS are prepared. Requirements outlined in Sections 21.3.6 and 21.3.7 shall apply. All above ground pipe shall be painted as specified in Section 50.4.4 for water mains.

23. 3. 8 AIR RELIEF VALVES

At high points in water mains where air can accumulate, provisions shall be made

to remove the air by means of hydrants or automatic air relief valves. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur. See details in STANDARD DRAWINGS.

23. 3. 9 CHAMBER DRAINAGE

Chambers, pits or manholes containing valves, blow-offs, meters, or other such appurtenances to a distribution system shall not be connected directly to any storm drain or sanitary sewer, nor shall blow-offs or air relief valves be connected directly to any sewer.

23. 3. 10 DISINFECTION FOLLOWING REPAIR OR REPLACEMENT

Any part of the CITY water system which has direct contact with finished water and has been out of service for repair, alteration, or replacement shall be disinfected as outlined in Section 51.6 of these specifications.

23. 4 WATER SERVICES AND CONNECTION

Water services and connections shall conform to the applicable provisions of Section 50 and 51 and the STANDARD DRAWINGS. Only 1", 1-1/2", 2", 4", 6", 8" and 12" services will be permitted. Where water services greater than twelve (12) inches are required, dual services shall be provided. Water services and connections to existing CITY system up to two (2) inches will be made by the CITY after payment of applicable fees and charges. Services and connections to new water systems and to existing systems, sizes four (4) inches and larger shall be made by the CONTRACTOR.

23. 5 WATER METERING

23. 5. 1 GENERAL

All water service connections shall be metered. In general, the method of metering will follow the guidelines listed below. However, the DEVELOPER's ENGINEER must obtain approval before finalizing the design of the metering system.

23. 5. 2 SINGLE FAMILY, DUPLEX, AND MULTI-FAMILY SUBDIVISIONS WITH PUBLIC RIGHTS-OF-WAY

Each unit shall be individually metered. Single and Double services shall be installed at property lines as indicated by the STANDARD DRAWINGS.

23. 5. 3 SINGLE FAMILY AND DUPLEX SUBDIVISIONS WITH PRIVATE STREETS

Individual meters may be permitted in accordance with Section 23.5.2 if the

private streets are designed to CITY Standards and easements are dedicated over the entire private street common areas. In addition, sufficient area must be available outside of paved areas to locate water mains, services, and meters. If the above criteria cannot be met, the subdivision shall be metered pursuant to Section 23.5.5.

23. 5. 4 COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL PROJECTS WITHOUT PRIVATE FIRE LINES

In general, each building shall be individually metered. Meter(s) shall be located in the public rights-of-way at the property line.

23. 5. 5 COMMERCIAL, INDUSTRIAL, INSTITUTIONAL, MULTI-FAMILY WITH PRIVATE STREETS, APARTMENTS, AND CONDOMINIUM PROJECTS WITH PRIVATE FIRE LINES

In general, all such projects shall require installation of a fire line master meter. Where on-site fire systems contain less than seventy-five (75) feet of main, a dual system (separate domestic and fire lines) may be considered. Dual systems shall require installation of a detector check or double detector check as determined by the CITY. Individual meters to each unit may be considered on a case-by-case basis subject to the DEVELOPER executing a Meter Installation and Easement Agreement.

23. 5. 6 SHOPPING CENTERS

In general, shopping centers shall require installation of an individual meter to each unit. Exceptions, and installation of master meters will be considered on a case-by-case basis at the CITY'S discretion, and subject to the DEVELOPER executing a Meter Installation and Easement Agreement.

23. 5. 7 METER INSTALLATION

All 5/8", 3/4", 1", 1.5" and 2" meters will be installed by the CITY after payment of applicable fees and charges. All meters larger than two (2) inches shall be provided and installed by the CONTRACTOR. All meters less than two (2) inch in size will be installed underground in an approved meter box. Meters two (2) inch and larger shall be installed above ground. In general, meters larger than two (2) inch shall be located in a meter easement located adjacent to the public right-of-way.

23. 5. 8 METER SIZING

Size of all meters shall be determined by the Utilities Department. The DEVELOPER's ENGINEER shall provide sufficient information on estimated peak flows and low flows so that meter size can be determined. The

DEVELOPER's ENGINEER shall include headlosses through metering device when designing the water system.

23. 6 MATERIAL, INSTALLATION AND TESTING

Applicable provisions of Division III, IV, and V shall apply.

23. 7 LOCATION AND IDENTIFICATION

A means for locating and identifying all water mains and valves shall be provided in accordance with Sections 50, 51 and the STANDARD DRAWINGS.

23. 8 CROSS CONNECTION CONTROL

23. 8. 1 GENERAL

In order to protect the public water supply system from contamination due to cross-connections, the DEVELOPER shall install CITY approved backflow prevention devices in accordance with the City of Mascotte Cross Connection Control Program where there is the potential of a non-potable substance coming into contact with the public water system. Some of the common instances requiring installation of the cross connection control devices are listed below. However, the DEVELOPER's ENGINEER must obtain CITY approval before finalizing the design of a Cross Connection Control Device.

23. 8. 2 COMMERCIAL, INDUSTRIAL AND MULTI-FAMILY RESIDENTIAL

All commercial and industrial projects shall, as a minimum, require installation of approved double check valve assembly. Projects with a higher degree of hazard may be required to install an approved reduced pressure principle device or other device.

All projects with fire sprinkler and standpipe systems, and projects with extensive on-site water systems shall be required, as a minimum, to install an approved double check valve assembly.

23. 8. 3 IRRIGATION SYSTEMS

Pressure-type vacuum breakers or double check valve assembly shall be utilized on all irrigation systems.

23. 8. 4 LOCATION AND INSTALLATION

In general, all backflow prevention devices are to be located directly following the water meter on DEVELOPER's property. Backflow prevention devices shall be installed above ground to facilitate maintenance and testing. It shall be the DEVELOPER's responsibility to pay for, install and maintain all backflow

prevention devices.