

WATER & SEWER DESIGN

(Last revised X/XX/XX)

This division contains 31 pages!

SELECTED LINKS TO SECTIONS WITHIN THIS DOCUMENT

Part 1 – General	Fire Hydrant Flow Requirements	Services - Water
Part 2 – Water Distribution	Materials - Force Mains	Services - Sewer
Part 3 – Gravity Sewer	Materials - Sewer Pipe	Sewer Aerial Crossings
Air Release Valve - Water	Materials - Water Pipe	Sewer - Bury/Slope
Bury - Water	Manholes	Sewers in Fine Grained Soils
Computing Fire Demand	Manholes - Drop Across Invert	Sewer - Size/Mat'ls Change
Cross Connection Prevention	Manholes - Drop	Sewers at Streams
Dead Ends/Blow Offs	Manhole Connections	Sewer/Well Conflicts
Easements - Sewer	MHs - Watertightness/Flooding	Valving - Water
Fire Hydrants	Pump Stations - Sewer	

HYPERLINK TO HELPFUL CALCULATION SHEETS (requires Excel)

[MH Buoyancy Comp Sheet](#)

[Pipe Buoyancy Sheet](#)

USEFUL REFERENCES (Hyperlinks)

[XX Department of Insurance, XX State Building Codes On-Line \(Link to their web site\)](#)
[City of San Antonio Cross Connection Control Policy](#)

1.1 GENERAL

1.1.1 SPECIFICATION AND DESIGN MANUAL:

- A. All projects within the jurisdiction of the City of San Antonio shall be designed and constructed in accordance with the City of San Antonio's Manual of Specifications and Standards, latest revision.
- B. Public sanitary sewer gravity mains, force mains, and lift stations shall conform to the design and construction requirements of the XX Department of Environment and Natural Resources, Division of Water Quality, XXAC Title 15A 2H .0200 *Waste not Discharged to Surface Waters*, latest revision.
- C. Public water distribution systems shall conform to the design and construction requirements of the XX Department of Environment and Natural Resources, XXAC Title 15A, Subchapter 18C, *Rules Governing Public Water Systems*, latest revision.

- D. All structures and utilities shall comply with the applicable Areas of Environmental Concern (AEC) Standards, as amended, in accordance with the State Guidelines for AEC's (15 NCAC 7H) pursuant to the Coastal Area Management Act of 1974.

1.1.2 PERMITS:

- 1.1.3 **Plan approvals, Water & Sewer Permits:** Prior to commencing construction, all plan approvals and water and/or sewer permits shall be obtained. A ...



1.2 WATER SYSTEM DESIGN STANDARDS

The purpose of this module is to establish standard design procedures and criteria for water system design on systems owned and maintained by the City of San Antonio.

DISTRIBUTION SYSTEM

- A. **General:** Distribution systems shall generally meet the minimum requirements of the XX Department of Environment and Natural Resources, XXAC Title 15A, Subchapter 18C, *Rules Governing Public Water Systems*, latest revision.
- 1) **Water Supply System:** The subdivider shall connect the subdivision or development with the water system at his expense, and shall construct it in such a manner as to serve adequately for both domestic use and for fire protection.
 - 2) No new permanent structure or pond shall be constructed over water mains or located within water or sewer easements.
- B. **Fire Demand:** [Demand forecasting projects the future water use based on historic use factors, socioeconomic trends, climatic factors and other parameters. Distribution system design must also account for peak periods of daily use. Peak factors are a function of land use, present population, and population growth rate. Older established areas tend to have peak factors two to three times lower than those of rapidly expanding areas.

Although the overall volume of water used for fighting fires is quite low relative to most other uses, the rate at which it must be supplied places a heavy, short-term drain on the system. Various types of forecasting models may be used; the least complex of which is a single-coefficient method used herein. Here, the projected demand is based on a factor relating to type of construction and square footage of the structure.

For design purposes, the estimated fire flow can be established using the Insurance Services Office (ISO) *Guide for Determination of Needed Fire Flow*, latest revision.]

or, insert this paragraph

[For design purposes, refer to the XX Fire Prevention Code, latest revision. Click on link at top of this document (Web address: <http://www.XXncdoi.com/OSFM/Home/Marshal.asp?PARAMSection=sidEngineeringCode&PARAMCategory=cidResidentialBuildingCode>).]

- C. **Design - System Design:** As part of the design, the Engineer shall model all new systems using **EPAnet, KyPipe, WaterCAD**, or other approved compatible, software. The design data shall include a sketch of the system showing assumed minor losses, pipe roughness (“C” Constants assumed), line lengths, fixed grade node elevations, node numbers, demands, pipe numbers, time of day of field test of hydrant (static pressure converted to elevation head) for verification of starting elevation head, the static water elevation in tank at the time a static pressure reading was taken and, ground elevation of hydrant tested.
- D. **Pipeline Velocity:** 3 to 6-fps normal working conditions are preferred although higher velocities in short lengths of pipe may be tolerated for brief periods. Sustained high ...



1.3.1 COLLECTION SYSTEM DESIGN

- A. **Minimum Size/Sizing:** No public gravity sewer conveying wastewater shall be less than 8 inches in diameter. No private gravity sewer conveying wastewater shall be less than 4 inches in diameter.
- A. **Developments:** Wastewater flows for developments with localized sewers shall be determined in accordance with XXAC Title 15A 02H .0219 *Minimum Design Requirements*.
- B. **Main Depths:** The depth of sewer mains shall be great enough to serve adjoining property, allowing for sufficient grade on service lines. Main depth shall also take into consideration potential conflicts with parallel pipe systems (such as water mains and storm drainage lines), providing room for the service laterals to pass either over or below lines.
- C. **Extensions to Adjacent Property:** Where tributary flow is expected from an upstream natural drainage basin, designers shall provide easements for future extensions of sewer mains to the farthest property line of the tract.