

5. WATER SYSTEM

5.1 General:

The design and construction of the water distribution system to serve the development shall be in accordance with good engineering principles, with these Standards of Design, the Standard Specifications for Construction and the Standard Details and with the requirements of the Texas Commission on Environmental Quality (TCEQ). All off-site water mains shall be sized and located to conform to projected demands in accordance with the latest Water Master Plan and the computer model with regard to the impact of each development on the existing and proposed water distribution system. No construction shall commence prior to the approval of the complete construction plans and specifications by the City.

All facilities shall be of sufficient size to provide adequate capacity for ultimate development. The pipelines shall be sized to meet the maximum instant domestic requirements plus an appropriate allowance for fire protection water. The design criteria for water demand shall be submitted to the City with the plans and specifications. The City reserves the right to require larger pipelines than required for the proposed development in order to provide capacities for areas outside the development. The developer will be responsible to construct water lines adjacent to his property in accordance with the latest Water Master Plan or as required by the City's Engineer.

The minimum pipeline size to serve residential areas shall be eight (8) inches in diameter, and the minimum pipeline size serving commercial, business, industrial, etc. shall be eight inches (8"). In general, all lines shall be looped with no dead-ends. Dead-end lines will be considered on a case by case basis and shall be furnished with an approved flush valve arrangement. The developer shall provide facilities sufficient for fire flows in accordance with the Fire Code adopted by the City.

Fire flows to be calculated with a minimum of thirty five pounds per square inch (35psi) of residual pressure at the fire hydrant with a 35 psi residual in the water distribution system.

5.2 Connections to Existing Distribution System:

Preliminary discussions concerning take-off points in the distribution system should be conducted with the City of Royse Public Works Department prior to finalizing the preliminary designs of the distribution system, which will serve the development. Connections to the City's existing system will be allowed only at locations where the City has determined that sufficient quantity and pressures are available to meet the projected requirements of the development. In general, the connections to the existing distribution system shall be made in such a manner to keep "shut-downs" to a minimum. Preference will be given to a tapping sleeve and valve connections.

In a proposed development where City water is not adjacent to the property but is accessible, the developer shall provide, at his expense, an off-site water main of

sufficient size to serve his development or as shown on the City's Water Master Plan, which ever is larger. The City may participate or collect pro-rata for the oversizing of the required line. The City participation must be approved by the City Council, prior to plans approval. The proposed development will normally require a loop into the existing water distribution system in order to provide adequate water pressure. The loop will be at the developer's expense.

In general, the City will not approve a development, which cannot be served by extensions to the City distribution system. Some areas in the City may be served by private water companies. In those cases, the Developer shall contact and make proper arrangements with the private water company. The Developer shall always be responsible to construct water facilities that meet City requirements and as shown on the City's Water Master Plan. The City will observe the facilities during construction for compliance with these standards. This in no way relieves or reduces the obligations of the developer to comply fully with these requirements. Under certain circumstances, the City may consider approval of a private water system, which will supply an adequate quantity of potable water for all uses, including residential, commercial and fire fighting requirements. Such systems must meet the approval of the City, the TCEQ, the State Board of Insurance and all other appropriate regulatory agencies. In addition, an agreement between the City and the developer shall be executed whereby the City may acquire the system when it can be connected into the City's owned and operated distribution network. In all cases, the engineering drawings shall show the source of water for the development.

5.3 Location of Facilities:

- A. Pipelines: Water pipelines shall be located in the parkways between the back of the curb and the street right-of-way. The location shall be two feet (2') from the back of curb on the north side of east-west streets and on the west side of north-south streets. A blue EMS Locator Pad will be located as shown in the Standard Drawings.
- B. Gate Valves: Gate valves shall be located outside the paved streets and shall be two feet (2') from back of curb of the intersecting street. In general, gate valves shall be located at street intersections (except for fire hydrant leads). Unless otherwise approved by the City, valves shall be located in the northwest quadrant of the street intersection. All valve boxes shall be encased in a concrete pad that shall be twelve inches by twelve inches by six inches (12" x 12" x 6") and reinforced with No. 3 steel bars.
- C. Fire Hydrants: In general, fire hydrants shall be located at each street intersection and at intervals on the interior of each block. All fire hydrants shall have isolation valves constructed as described above. No services lines or other connections will be allowed to the fire hydrant leads.
 - 1. Residential and Duplex: Residential and duplex areas shall have a fire hydrant at each street intersection and at four hundred foot (400') intervals on the interior of each block. In no case, shall there be more than four hundred feet (400') of hose lay from a fire hydrant and fire lane to any main building.

2. Multi-Family: Multi-Family areas shall have a fire hydrant at each street intersection and at three hundred foot (300') intervals on the interior of each block and along fire lanes. In no case, shall there be more than one hundred and fifty feet (150') of hose lay from a fire lane or two hundred and fifty feet (250') from a fire hydrant to any portion of a building.
3. Commercial, Retail and Industrial: Commercial, retail and industrial areas shall have a fire hydrant at each street intersection and at a maximum of three hundred foot (300') intervals on the interior of each block and along fire lanes. In no case, shall there be more than one hundred and fifty feet (150') from a fire hydrant and fire lane to any portion of a building in any development.

All fire hydrants, which are placed in off street rights-of-way, shall have a paved concrete access road and proper pavement markings, which have been accepted by the Fire Marshall and City's Engineer.

All fire hydrants shall be marked in the center of the adjacent street with a Blue Stimsonite (or approved equal) Model 88-SSA Fire Hydrant Marker.

The spacing of fire hydrants shall be measured along the street frontage or fire lanes. The City Fire Marshall and City's Engineer shall review all fire hydrant spacing. When a special condition exists due to land use, the Fire Marshall or City's Engineer may require additional hydrants for fire protection.

5.4 Water Service Connections:

A water service pipeline shall be laid to each lot with fittings and a meter box in accordance with the Standard Specifications for Construction and the Standard Details. All service pipelines, which supply water to each single-family lot, shall be constructed of HDPE (DR-9) Poly-pipe having a minimum size of One inch (1") from the service tap to the curb stop.

All water services under pavement shall be encased in a minimum 2" diameter SDR 21 PVC encasement pipe or approved equivalent.

All residential services shall be tapped to the PVC water main using double strap brass saddle. Tapping tees are required for all services large than 4-inch.

Meter boxes shall be DFW Plastics DFW 1200.12 Body meter boxes with blue top and no reader lid. Meter box tops shall be set one-half inch to one and one-half inch ($\frac{1}{2}$ " to $1\frac{1}{2}$ ") above the curb, and an angle meter stop shall be set six inches (6") below the meter box top. Meter boxes shall have a one-inch (1") wide slot from five inches (5") below the top of the box to the bottom of the box on the side facing the lot for service connection. All meter boxes shall be set at least two feet (2') behind the curb.

- A. Installation of Multiple Meter Boxes: Installation of multiple meter boxes for multi-family, condominium and townhouse developments may be installed only at approved locations. Each service box shall service one (1) single-family unit or two (2) single-family units (one or two water meters with a maximum capacity of approximately twenty (20) gallons per minute each). The minimum size service line for multiple meter box installations is tabulated in Table 5.1.

Service pipeline size for commercial and industrial developments shall be designed by the developer in accordance with the City's adopted Uniform Plumbing Code.

5.5 Materials and Installation:

- A. Pipe: 4" through 12" diameter Water pipelines shall be PVC pipe conforming to the Standard Specifications for Construction. In general, the water pipelines shall be AWWA Standard C-900, (minimum DR 18 – Class 150), with cast-iron outside dimensions, and installed with a minimum of four feet (4') of cover, unless otherwise approved by the City.

16" through 24" diameter water lines shall be AWWA C905 (DR 18 – 235-psi) or Ductile Iron AWWA C151 (Class 150) with cement mortar lined interior and polyethylene encased exterior, and installed with a minimum of six feet (6') of cover. For diameters larger than 24", pipe material and cover shall be approved by the City's engineer or designee.

- B. All water mains under pavement shall be encased as follows:
- a. 6-inch diameter and under- encase in SDR 21 PVC or approved equal
 - b. 8-inch through 10-inch – encase in SDR 35 PVC or approved equal
 - c. 12-inch and larger – encase in steel pipe, size and thickness to be approved by the City's Engineer
- C. All pipes not under pavement shall be installed in embedment material as shown on the Standard Drawings and in conformance with the Standard Specifications for Construction.
- D. All water pipe shall be installed with a "tracer tape" blue in color over the top of the pipe. The tape shall be Terra Tape "D" Detectable as supplied by Griffolyn Co., Inc. of Houston, Texas or approved equal. Locator marker pads shall be installed at 250 feet along water lines.

TABLE 5.1
MINIMUM-SIZE SERVICE CONNECTIONS FOR MULTIPLE UNITS
Water Caps

<u>Maximum Number of Family Unit Connections</u> <u>(Water Meters at 20 gpm)</u>	<u>Minimum Size Service Pipeline</u> <u>(Inches)</u>
2	1
5	4
10	4

- E. Gate Valves: All gate valves shall be conform to AWWA C-509 standards manufactured by Mueller, Clow or AVK, or an approved equal with resilient seat

only and shall conform to and shall be installed according to the Standard Specifications for Construction.

- F. **Fire Hydrants:** Fire hydrants shall be Mueller, East Jordan, AVK or an approved equal conforming, to the requirements set forth in the Standard Specifications for Construction. All fire hydrants shall be equipped with a 4-1/2" X 5" Storz hydrant converter as manufactured by Kocheck Co. Inc., or approved equal. All fire hydrants shall be installed with a six-inch (6") gate valve on the hydrant lead and located 3-feet off the back of curb. The installation shall be as set forth in the Standard Specifications for Construction. Fire hydrants shall be painted to meet the City's requirements for color code as set forth in the Standard Specifications. In general, the fire hydrant will be reflective silver with differing cap color, which corresponds to the size of hydrant feeder line, as detailed in Table 5.2. Fire hydrants shall be installed at the end of each dead end line. Minimum main size for a fire hydrant for residential and non-residential uses shall be eight inches (8").

Fire hydrants shall be three way breakaway type and conform to AWWA C-502 specifications.

Fire hydrants shall be painted with two coats of TNEMEC Series 530 Omnithane paint or approved equal, and two coats of primer by the manufacturer. Bonnet to flange and nozzle caps of fire hydrants shall painted in the field with two coats of TNEMEC Safety Paint Series 2H "Hi-Build" or equal in accordance with Table 5.2.

- G. **Water Service Connections:** Service pipelines shall be in accordance with the designs shown on the Standard Drawings. The materials shall be Mueller or approved equal and shall be installed in accordance with the Standard Specifications for Construction. All connections shall be flare type or approved equal.
- H. **Bends:** Mega-lugs or approved equal shall be installed at horizontal change in directions 45° or greater and at all vertical change in directions that require a bend. The restraints shall be placed at the bend and at the next pipe joint in each direction from the bend.
- I. Commercial irrigation meters shall have a testable double check backflow preventer.

TABLE 5.2
FIRE HYDRANT COLOR CODE

Size of Main Line Hydrant is Attached	Color of Caps
6"	Silver
8"	Blue
10" and Larger	Yellow