

CHAPTER 8

WATER SYSTEM STANDARDS

8.1 GENERAL

The standards established by this chapter are intended to represent the minimum standards for the design and construction of water system facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. Extensions, connections or modifications to the existing system shall be in compliance with the State Department of Health.

Off-site improvements to the existing system may be warranted based on (1) the condition and capacity of the existing water system; and (2) impacts caused by the proposed development. These off-site improvements (in addition to “on-site improvements”) shall be completed as determined by the City Engineer to mitigate impacts caused by the development.

8.2 DESIGN STANDARDS

The design of water system improvements shall depend on their type and local site conditions. The design elements of water system improvements shall conform to City Standards as set forth herein.

- A. Detailed plans shall be submitted for the City’s review which provide the locations, size, and type of the proposed water system and points of connection. These Plans shall be separate from Sewer Plans.
- B. Project plans shall conform to the requirements of the Plan Checklist.
- C. Computations and other data used for design of the water system shall be submitted to the City for approval.
- D. Material and installation specifications shall contain appropriate requirements that have been established by the industry in its technical publications, such as ASTM, AWWA, WPCF, and APWA standards. Requirements shall be set forth in the specifications for the pipe and methods of bedding and backfilling so as not to damage the pipe or its joints.
- E. The location of the water mains, valves, hydrants, and principal fittings including modifications shall be staked by the Developer. No deviation shall be made from the required line or grade. The Contractor shall verify

and protect all underground and surface utilities encountered during the progress of this work.

- F. Unless otherwise approved or required by the City Engineer, the water main shall be ductile iron pipe class as shown below. The minimum nominal size for water mains shall be 8 inches, unless otherwise approved/required by City Engineer.

TABLE 8-1

Water Main Thickness

Class	Pipe Diameter
Class 52	4" through 14"
16" and larger	Class 50

- G. All fittings shall be cement-lined ductile iron.
- H. Water mains shall be laid only in dedicated street, rights-of-ways or easements shown on preliminary plats or which have been granted to the City. A street is normally not considered dedicated until the plat which created it has been officially filed with the County Auditor.
- I. All water main distribution pipeline construction shall have a minimum 36-inch cover from finished grade and 42-inch cover over transmission mains. Mains shall generally be located parallel to and 6 feet northerly or easterly of street centerline. Water mains shall be extended to the far property line(s) of the property being served. Off-site extensions may be required to hydraulically loop existing and new systems. Oversizing of water mains may be required to be installed per City's current Water Comprehensive Plan.
- J. Fire hydrants are generally required approximately every 600 feet in residential areas, and every 300 feet in commercial areas. However, fire hydrants shall be furnished and installed at all locations as specifically mandated by the local fire marshal and/or per the International Building Code and the International Residential Code.
- K. Fire hydrants on dead end streets and roads shall be located within approximately 300 feet from the frontage center of the farthest lot. Distances required herein shall be measured linearly along street or road.
- L. Valves shall be installed at not more than 1,000-foot spacing. Valves shall be installed on all legs of all tees and crosses except fire hydrant tees.

- M. Pipes connecting hydrants to mains shall be at least 6 inch in diameter and be less than 50 feet in length.
- N. Dead end lines are not permitted except where the Developer can demonstrate to the City's satisfaction that it would be impractical to extend the line at a future date. Water mains on platted cul-de-sacs shall extend to the plat line beyond the cul-de-sac to neighboring property for a convenient future connection, and extended offsite to create a hydraulic loop, or, as minimum, have a 2-inch blowoff assembly installed at the termination point for water mains 8-inch in diameter or smaller or 4-inch blowoff assemblies for water mains greater than 8 inch in diameter.
- O. Bends shall be included in the design as needed to maintain proper depth and spacing from other utilities. Bends shall be utilized so as not to exceed allowable deflection at pipe joints in accordance with pipe manufacturer's recommendations.
- P. Provide thrust blocking and/or restrained joints at all fittings and bends in accordance with the City standards and conditions.
- Q. Provide anchor blocking at all up-thrust vertical bends in accordance with these standards. Blocking to be designed by Developer's Engineer.
- R. Residential water service pipe shall be a minimum 1-inch IPS diameter high density "Poly" pipe, meeting or exceed ASTM D2239, 200 psi with copper tracer wire. The pipe shall be one continuous run from the water main corp stop to the meter setter, no joints are allowed. Larger service lines may be needed if otherwise required by the Uniform Plumbing Code in accordance with fixture units.

8.3 CONSTRUCTION REQUIREMENTS

- A. Except as otherwise noted herein, all work shall be accomplished as recommended in applicable American Water Works Association (AWWA) Standards, and according to the recommendations of the manufacturer of the material or equipment concerned.
- B. Prior to final inspection, all pipelines shall be tested and disinfected.
- C. Prior to construction, the Contractor shall notify the City for a preconstruction meeting
- D. Work shall be performed only by contractors experienced in laying public water mains.

- E. Prior to any work being performed, the Contractor shall contact the City Manager or City Engineer to set forth his proposed work schedule.
- F. Contractor shall obtain approval of materials to be used from City Manager and/or City Engineer prior to ordering of materials.
- G. During water main installation calcium hypochlorite granules shall be added to each section of new water main in the proportions indicated in the table below. The resulting chlorine concentration within the water main shall not be less than 50 mg/L (see Standard Specifications, Section 7-09.3(24)D).

TABLE 8-2

Calcium Hypochlorite (65 Percent Chlorine) Addition Per 100 Feet of Pipe

Pipe Diam. (Inches)	Quantity	
	Grams	Ounces
4	0.67	0.02
6	1.52	0.05
8	2.70	0.09
10	4.22	0.15
12	6.07	0.21

- H. All closure fittings shall be swabbed with a 5 percent chlorine solution of chlorine immediately prior to installation per AWWA Standard C651.
- I. Specific requirements regarding pressure testing and bacteriological testing are presented below in the Water Pipe Testing and Disinfection Section.
- J. All materials shall be new and undamaged.
- K. Provide bends in field to suit construction and in accordance with pipe manufacturer's recommendations so as not to exceed allowable deflection at pipe joints.
- L. Meter services and meter boxes shall be set to final grade and all adjustments shall be made prior to final pressure testing of the system. Service inlet shall be centered at inlet end of box and faced toward outlet end of box parallel with long sides.
- M. Meter setters shall be Mueller B-2400, or Ford Series 70 with top entry dual check valve.
- N. All water services shall end within road right-of-way or easements.

- O. All meters shall be installed by the City, and the Developer shall pay the current meter installation charge.
- P. Contractor shall furnish and install one water sample station for development in size of 1 to 10 lots. One additional station is required to be furnished and installed for each additional 50 lots or portions thereof.
- Q. All new buildings and residences shall include in their water service a suitable pressure reducing valve to protect the plumbing from excessive pressures, unless waived on the application form of the City.
- R. All new construction shall comply with the current Cross-Connection Control requirements.
- S. Cut in connections shall not be made on Fridays, holidays or weekends. All tapping sleeves and tapping valves shall be pressure tested prior to making connection to existing mains.
- T. The pipe and fittings shall be inspected for defects before installation. All lumps, blisters and excess coal tar coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and dry, and free from oil and grease before the pipe is laid.
- U. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and pipe forced home and brought to correct line and grade. The pipe shall be secured in place with select backfill tamped under it. Precaution shall be taken to prevent dirt from entering the joint space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry. No pipe shall be laid in water or when trench conditions are unsuitable.
- V. The cutting of pipe for inserting fittings or closure pieces shall be done in a neat and workmanlike manner, without damage to the pipe or cement lining, and so as to leave a smooth end at right angles to the axis of the pipe. When pipe lengths are cut, the outer edge shall be beveled to prevent damage to the gasket during jointing of pipes.
- W. Pipe shall be laid with bell ends facing in the direction of the laying, unless directed otherwise by the City. Wherever it is necessary to deflect

pipe from a straight line, the amount of deflection allowed shall not exceed pipe manufacturer's recommendations.

- X. For connection of mechanical joints, the socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing, and shall be jointed according to manufacturer's directions. Bolts shall be tightened alternately at top, bottom and sides, so pressure on gasket is even.
- Y. For connection of push-on joints, the jointing shall be done according to manufacturer's recommendations, with special care used in cleaning gasket seat to prevent any dirt or sand from getting between the gasket and pipe. Lubricant to be used on the gasket shall be non-toxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be beveled with a file to prevent injury to the gasket during jointing.
- Z. Valves, fittings, plugs and caps shall be set and jointed to pipe in the manner per manufacturers' recommendations. All dead ends on new mains shall be closed with dead end M.J. caps.
- AA. Fittings shall be "blocked" with poured-in-place concrete, with a firm minimum bearing against an undisturbed earth wall. Timber blocking will not be permitted. Thrust blocks shall be poured as soon as possible after setting the fittings in place to allow the concrete to "set" before applying the pressure test. The concrete thrust blocks shall be in place before beginning the pressure test. Anchor blocks shall be allowed to set sufficiently to develop the necessary bond strength between the reinforcing rods and the concrete anchor before beginning the pressure test.
- BB. All of the new piping, valves and blocking shall have been installed, disinfected and tested up to the point of cutting into existing lines before the crossover is made. The crossover to the existing system shall be in full readiness, including the cut and sized specials. Forty-eight-hour notice shall be given the City in advance of the planned "cut-ins." All sleeves shall be ductile iron.
- CC. Contractor shall notify City's Manager and obtain approval from them prior to any water shut-off or turn-on, affecting the water system, a minimum of 48 hours in advance.
- DD. Road restoration shall be per these Standards. Developer and Contractor shall become familiar with all City conditions of required permits, and shall adhere to all conditions and requirements.

- EE. Before acceptance of the water system by the City, all pipes, assemblies, and other appurtenances shall be cleaned of all debris and foreign material. After all other work is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections for a new roadway consistent with the original section.

8.4 MATERIALS

A. Water Mains and Fittings

1. Water mains to be installed unless otherwise approved (or required) in writing by the City Engineer shall be ductile iron pipe for all sizes.
2. The ductile iron pipe shall conform to ANSI/AWWA C151/A21.51-91 Standards, and current amendments thereto, except the ductile iron pipe shall be thickness Class 52 for 4-inch through 14-inch-diameter pipe and Class 50 for 16 inches and larger. Grade of iron shall be a minimum of 60-42-10. The pipe shall be cement lined to a minimum thickness of 1/16 inch, and the exterior shall be coated with an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight.
3. Type of joint shall be mechanical joint or push-on type, employing a single gasket, such as "Tyton," except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi.
4. Restrained joint pipe, where shown on the Plans shall be push-on joint pipe with "Fast Tight" gaskets as furnished by U.S. Pipe or equal for 12-inch diameter and smaller pipe and "TR FLEX" as furnished by U.S. Pipe or equal for 16-inch and 24-inch-diameter pipes. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.
5. All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, be carefully installed in complete compliance with the manufacturer's recommendations.

6. Joints shall be “made up” in accordance with the manufacturer’s recommendations. Standard joint materials, including rubber ring gaskets, shall be furnished with the pipe. Material shall be suitable for the specified pipe size and pressures.
7. All fittings shall be short-bodied, ductile iron complying with applicable ANSI/AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined and either mechanical joint or flanged, as indicated on the Plans.
8. Fittings in areas shown on the Plans for restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG, Star Pipe Products, or approved equal. FIELD LOK gaskets manufactured by U.S. Pipe may be allowed as well.
9. All couplings shall be ductile iron mechanical joint sleeves. If existing pipe is not ductile iron, extended range couplings are required.

B. Valves

All valves 14 inch and larger shall generally be furnished and installed as butterfly valves. All valves 12 inch and smaller shall generally be furnished and installed as resilient seat gate valves.

1. Resilient-Seated Gate Valves

The gate valves shall be ductile iron body valves, iron disk completely encapsulated with polyurethane rubber and bronze, non-rising stem with “O” ring seals conforming to AWWA C509 or C515. The valves shall open counter-clockwise and be furnished with 2-inch square operating nuts except valves in vaults shall be furnished with handwheels. All surfaces, interior and exterior shall be fusion bonded epoxy coated, acceptable for potable water.

For applications with working pressure above 175 psi, a valve rated as 250 psi or higher shall be used.

Valves shall be Mueller A-2360 Series, M&H 515 Series, or approved equal.

2. Butterfly Valves

Butterfly valves shall be ductile iron body of the tight closing rubber seat type with rubber seat either bonded to the body or mechanically retained in the body with no fasteners or retaining hardware in the flowstream. The valves shall meet the full requirements of AWWA C504, Class 150B except the valves shall be able to withstand 200 psi differential pressure without leakage. The valves may have rubber seats mechanically affixed to the valve vane. Where threaded fasteners are used, the fasteners shall be retained with a locking wire or equivalent provision to prevent loosening. Rubber seats attached to the valve vane shall be equipped with stainless steel seat ring integral with the body, and the body internal surfaces shall be epoxy coated to prevent tuberculations buildup, which might damage the disc-mounted rubber seat.

No metal-to-metal sealing surfaces shall be permitted. The valves shall be bubble-tight at rated pressures with flow in either direction, and shall be satisfactory for applications involving valve operations after long periods of inactivity. Valve discs shall rotate 90 degrees from the full open position to the tight shut position.

Valves shall be Henry Pratt Company “*Groundhog*,” M&H, or Mueller “*Linesal III*.”

3. Tapping Sleeves and Tapping Valves

The tapping sleeves shall be rated for a working pressure of 250 psi minimum and furnished complete with joint accessories. Tapping sleeves shall be constructed in two sections for ease of installation and shall be assembled around the main without interrupting service.

Mechanical joint style sleeves shall be ductile iron and comply with AWWA C110. Ductile iron mechanical joint style sleeves are required for all size-on-size connections. Mechanical joint sleeves shall be cast by Clow, Dresser, Mueller, Tyler, U.S. Pipe or approved equal.

Fabricated steel style sleeves shall be fusion bonded epoxy-coated, acceptable for potable water. Fabricated steel style sleeves will not be allowed for size-on-size connections.

Tapping valves shall be provided with a standard mechanical joint outlet for use with ductile iron pipe and shall have oversized seat rings to permit entry of the tapping machine cutters. In all other respects, the tapping valves shall conform to the resilient seat gate valves herein specified with regards to operation and materials.

The tapping sleeve and valve shall be tested to 100 psi (air) prior to tapping the main.

The installation contractor for the tapping sleeves and valves shall be approved by the City.

4. All Valves

The valves shall be set with stems vertical. The axis of the valve box shall be common with the axis projected off the valve stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable.

All valves with operating nuts located more than 4'-0" below finished grade shall be equipped with extension stems to bring the operating nut to within 18 inches of the finished grade.

At the top of the extension stem, there shall be a 2-inch standard operating nut, complete with a centering flange that closely fits the 5-inch pipe encasement of the extension stem. The valve box shall be set in a telescoping fashion around the 5-inch pipe cut to the correct length to allow future adjustment up or down.

Each valve shall be provided with an adjustable two-piece cast iron valve box of 5-inches minimum inside diameter. Valve boxes shall have a top section with an 18-inch minimum length. The valve boxes and covers shall be Olympic Foundry No. 940 or equal.

Valves located in easements or outside of paved areas shall have a concrete pad with a minimum size of 2'-0" diameter by 4-inches thick.

4. Valve Markers

Provide a blue Carsonite valve marker post for each valve outside of asphalt.

Markers shall be placed at the edge of the right-of-way opposite the valve and set so as to leave 2'-0" of the post exposed above grade. The distance in feet and inches to the valve shall be clearly stenciled on the side facing the valve in black numerals 2 inches in height.

5. Pressure Reducing and Relief Valves

When water main pressure exceeds 100 psi, an approved pressure reducing valve with an approved pressure relief device shall be installed to reduce the pressure to 60 psi or lower. Pressure reducing valve stations shall generally consist of a large and a small valve for high flow and low flow periods. The Pressure reducing valve stations shall be approved by the City on a case by case basis.

C. Fire Hydrants

All fire hydrants shall be approved by the National Board of Fire Underwriters and conform to AWWA Specification C502, break-away type, in which the valve will remain closed if the barrel is broken. The hydrant barrel shall have a diameter of not less than 8-1/2 inches, and the valve diameter shall be not less than 5-1/4 inches. Each hydrant shall be equipped with two 2-1/2-inch hose ports (National Standard Thread), and one 4-1/2-inch pumper connection (National Standard Thread), with permanent Storz hydrant adaptor and Storz blind cap installed on each pumper port. Each hydrant shall be equipped with a suitable positive acting drain valve and 1-1/4-inch pentagonal operating nut (counter-clockwise opening). A blue pavement marker shall be furnished and installed in the pavement in front of each hydrant.

The holding spools between the gate valve and fire hydrant shall be made from 6-inch Class 52 ductile iron pipe, 0.31-inch wall thickness. The hydrant and gate valve shall be anchored in place using holding spools and mechanical joint restraint device. Holding spools with length in excess of 17 feet shall be supplied with an M. J. sleeve and mechanical joint restraint device.

The fire hydrants shall be painted per local fire marshal requirements with two coats of Preservative Brand caterpillar yellow paint. After installation, they shall be wire brushed and field painted with two additional coats of similar yellow enamel paint. Distance to the hydrant valve shall be clearly stenciled in black numerals 2 inches in height on the fire hydrant below the pumper port.

Between the time that the fire hydrant is installed and the completed facility is placed in operation, the fire hydrant shall at all times be wrapped in burlap, or covered in some other suitable manner to clearly indicate that the fire hydrant is not in service.

D. Blowoffs and Air Relief Assemblies

Two-inch (for 8-inch mains or smaller) or 4-inch (for greater than 8-inch mains) blowoff assemblies shall be installed at the terminus of all dead end water mains. Blowoffs utilized by the Contractor for flushing the water main shall be sufficient size to obtain 2.5 feet per second velocity in the main. Temporary blowoffs shall be removed and replaced with a suitably sized watertight brass plug.

Two-inch air and vacuum release valves shall be installed at principal high points in the system. See detail.

The installation of these items shall include connection piping, gate valve, valve box, and all accessories. Valve markers shall be optional with City.

8.5 WATER PIPE TESTING AND DISINFECTING

All pipelines shall be tested and disinfected prior to acceptance of work. A water hydrant meter/backflow device shall be required and procured from the City for all water utilized for flushing pipelines. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Contractor. Feed for the pump shall be from a barrel or other container within the actual amount of “makeup” water, so that it can be measured periodically during the test period.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking.

As soon as pipe is secured against movement under pressure, it may be filled with water. New water mains are only filled using an approved backflow prevention assembly. The water main is filled from the lower elevation end, so that as the water main is filled the chlorine is contacted and dissolved and the chlorine is spread relatively uniformly through the length of the new water main.

The chlorinated water is allowed to remain in contact with the new system for a minimum of 24-hours. After 24-hours, water may be added to the water main for

the purposes of pressure testing. Pressure testing must also include testing against valves.

Contractor shall preflush all water mains after water has remained in the main for 24 hours and before pressure testing the main.

After the pipe is filled and all air expelled, it shall be pumped to a test pressure of 250 psi, and this pressure shall be maintained for a period of not less than 30 minutes to insure the integrity of the thrust and anchor blocks. **The contractor/developer is cautioned regarding pressure limitations on butterfly valves.** All tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrostatic tests shall be performed on every complete section of water main between two valves, and each valve shall withstand the same test pressure as the pipe with no pressure active in the section of pipe beyond the closed valve.

In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline. The leakage test shall be conducted at 150 psi for a period of not less than 1 hour. The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{SD(P)^{0.5}}{266,400}$$

in which

L = Allowable leakage, gallons/hour
S = Gross length of pipe tested (ft)
D = Nominal diameter of the pipe in inches
P = Average test pressure during the leakage test, psi

Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Contractor at the Contractor's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be rerun at the Contractor's expense until a satisfactory test is obtained.

If the pressure tests fails and retesting of the water main is required the Contractor shall flush the water main with a water chlorine bleach solution (1 gallon of 5 percent bleach to 1,000 gallons of water). The volume of new water pumped into and through the water main is three times the pipe volume.

After successful pressure testing, and additional chlorine contact if necessary, the water main is thoroughly flushed to remove all super chlorinated water from the new water main. A minimum of five pipe volumes is flushed out of the water main. After flushing, samples are collected for bacteriological analysis.

After receipt of a satisfactory bacteriological test the system is flushed at a flow rate sufficient to develop a water velocity in the pipe of 2.5 ft/sec for a minimum of five pipe volumes. Pressure tests and bacteriological tests are completed and must be passed before any new water main is physically connected to the system. **No new water main is connected to the system until a satisfactory bacteriological analysis is obtained.**

All closure fittings shall be swabbed with a 5 percent chlorine solution of chlorine immediately prior to installation per AWWA Standard C651. Additional samples for bacteriological analysis shall be collected and analyzed after the final connections are made.

In all disinfection processes, the Contractor shall take particular care in flushing and wasting the chlorinated water from the mains to assure that the flushed and chlorinated water does no physical or environmental damage to property, streams, storm sewers or any waterways. The Contractor shall chemically or otherwise treat the chlorinated water to prevent damage to the affected environment, particularly aquatic and fish life of receiving streams.

City forces only will be allowed to operate existing and new tie-in valves. The Contractor's forces are expressly forbidden to operate any valve on any section of line, which has been accepted by the City.

8.6 BACKFLOW PREVENTION AND SPRINKLER SYSTEMS

1. All water systems connected to the public water system shall have backflow prevention as required by WAC 248-54-285.
2. All fire sprinkler systems as mandated/proposed/or required by the local fire marshal and/or City Ordinance that have a fire department connection shall have backflow prevention as required by WAC 248-54-285.
3. Building sprinkler systems may be required based on Building Codes/Fire Marshall requirements.
4. All commercial and industrial connections will require premise isolation with a minimum of an RPBA assembly. The assembly shall be placed directly downstream of the service meter to ensure no connections can be made in between. The assembly shall be placed above ground in a lockable, heated enclosure.

8.7 SERVICE CONNECTIONS

Individual services to each property shall be installed and connected to the new water mains. New services from existing mains will be installed by the City. The Developer shall be responsible for permitting, traffic control, excavation to expose main, shoring to protect City employees, backfilling trench, and completion of all restoration.

Upon completion of the installation of the water main (before testing and disinfection) services shall be installed by connecting to the water main and extending the service line to the property line as shown on the Standard Details or approved equal. Larger service lines shall be of the type and style as designated in the Standard Details and shown on the Plans.

All single-family residential homes, and each living unit in a building up to a quad-plex shall be provided with its own meter and meter setter including a check valve. All services supplying water to more than one living unit, or to commercial/industrial development shall be provided with a Washington State-approved backflow prevention located immediately behind and on the property side of the water service box. Irrigation, meters and services supplying internal fire suppression system shall be completed with double check valve assemblies (DCVA). All other connections shall require reduced pressure backflow assemblies (RPBA). Commercial fire sprinkler system, if unmetered shall require reduced pressure detector assemblies (RPDA).

All irrigation using chemical feed, or water features, including decorative ponds, pools and fountains requiring make-up water shall be protected from backflow into the public water supply by a minimum of an approved air-gap to be located at the fill point of the pond or water feature. This "air-gap" shall be inspected by the City prior to filling. In all instances, the water supply used for filling purposes shall be protected by a double check valve assembly (DCVA) installed behind the meter for new construction or retrofitted as close as practical on modified systems.

Corporation stops and the single meter shutoff valves shall be Mueller, Ford, or A.Y. McDonald with the type and style noted on the Standard Details or approved equal. Included as a part of the service connection shall be the furnishing and installation of the meter box complete with lid, set flush with the proposed finished grade of the lot in the designated location near the property line, all as shown on the Standard Details. The angle type of shut-off valve and angle type dual check valve shall be set inside the meter box in a proper position for installation of a future meter by the City.

Service lines between the main and the property line shall be placed at a trench depth sufficient to maintain a 3'-0" cover over the top of the service line for its

full length, taking into consideration the final finished grade of the proposed street and the final finished grade of any storm ditches.

Upon completion of each service line as indicated herein, the Developer shall flush the service line to remove the debris that may interfere with the future meter installation, and further verify that the service line has full pressure and flow to the meter box.

8.8 1-1/2-INCH AND LARGER METERS

If extensions require water meters 1-1/2 inches or larger, then such entire meter installation, including valves, piping, vaults or meter boxes, drain lines and meters shall be furnished and installed by the Developer conforming to City standards. Activation of meter is subject to conformance with City requirements and payment of connection fees.

CHAPTER 9

MISCELLANEOUS UTILITY SERVICES AND ADDITIONAL DEVELOPMENT REQUIREMENTS

9.1 GENERAL

The standards established by this chapter are intended to represent the **minimum** standards for the design and construction of additional facilities. Greater or lesser requirements may be mandated by the City due to localized conditions. The following design and construction considerations shall apply.

9.2 UTILITY SERVICES

All utility lines, including electric, telephone, fire alarm and television cables shall be placed underground prior to paving. Easement for maintenance of all utilities, both on and offsite, shall be provided as applicable to the satisfaction of the City Engineer.

9.3 STREET LIGHTING

Street lighting shall be provided by the Developer to the guidelines established by the City Engineer. All costs of such, including, but not limited to, design, underground wiring, light standard base and luminaire shall be borne by the developer. The City shall approve of all street lighting plans as furnished by the developer to include size, spacing, height and type of pole/illuminaire.

9.4 CABLE TELEVISION

Service lines (suitable empty conduits placed and capped) for cable television shall be installed underground (location as approved by City Engineer) on all subdivisions regardless of whether or not cable television service is currently available.

9.5 STREET NAME AND TRAFFIC SIGNS

All street name signs and traffic directional signs shall be designated by the City and provided by the Developer. All costs of providing the signs, to include the installation, labor, materials, and other relevant City costs associated with determining the type, location, and associated work items shall be invoiced to and paid by the developer.

9.6 LANDSCAPING

Street landscaping shall be provided by the developer to the guidelines established in these standards and a landscaping plan shall be submitted as part of the plan package for City review and approval.

9.7 EROSION CONTROL

The detrimental effects of erosion and sedimentation shall be minimized by conforming with the following general principles:

- A. Soil shall be exposed for the shortest possible time.
- B. Reducing the velocity and controlling the flow of runoff.
- C. Detaining runoff on the site to trap sediment.
- D. Releasing runoff safely to downstream areas.

In applying these principles and accepted Best Management Practices (BMPs) as approved by the Department of Ecology in the latest city approved edition of the Stormwater Management Manual for Western Washington, the Developer and/or Contractor shall provide for erosion control through such BMPs as conducting work in phases; minimizing the disturbance to vegetation; providing mulch and/or temporary cover, sedimentation basins, and/or diversions in critical areas during construction; controlling and conveying runoff; and establishing permanent vegetation and installing erosion control structures as soon as possible.

1. Trench Mulching

Where there is danger of backfill material being washed away due to steepness of the slope along the direction of the trench, backfill material shall be compacted and held in place by covering the disturbed area with mulch, jute matting or other accepted BMP practices.

2. Cover-Crop Seeding

A cover crop shall be sown in all areas excavated or disturbed during construction that were not paved, landscaped and/or seeded prior to construction. Areas landscaped and/or seeded prior to construction shall be restored to their original or superior condition. Cover-crop seeding shall follow backfilling operations.

The Developer and/or Contractor shall be responsible for protecting all areas from erosion until the cover crop affords such protection. The cover crop shall be reseeded if required and additional measures taken to provide

protection from erosion until the cover crop is capable of providing protection.

During winter months, the Contractor may postpone seeding, if conditions are such that the seed will not germinate and grow. The Developer and/or Contractor will not, however, be relieved of the responsibility of protecting all areas until the cover crop has been sown and affords protection from erosion.

The cover crop shall be sown at a rate of 10 to 15 pounds of seed per acre using a hand or power operated mechanical seeder capable of providing a uniform distribution of seed.