

UNIFORM DESIGN AND
CONSTRUCTION STANDARDS
FOR POTABLE WATER
DISTRIBUTION SYSTEMS

SECTION 2

UNIFORM
DESIGN
STANDARDS

CONTINUE TO THE NEXT PAGE

**UNIFORM DESIGN STANDARDS
SECTION 2
INDEX**

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>PAGE</u> |
|-------------|--|-------------|
| 2.00 | GENERAL STATEMENT | 2-1 |
| 2.01 | WATER DISTRIBUTION SYSTEM PRESSURE ZONES | 2-1 |
| 2.02 | WATER DISTRIBUTION MAIN SIZES | 2-1 |
| 2.03 | HYDRAULIC ANALYSIS | 2-3 |
| 2.04 | WATER MAIN LOCATION | 2-6 |
| 2.05 | FULL FRONTAGE EXTENSION | 2-6 |
| 2.06 | WATER MAIN JOINT DEFLECTION | 2-7 |
| 2.07 | DEPTH OF COVER | 2-8 |
| 2.08 | PIPE CASING | 2-9 |
| 2.09 | VALVES | 2-10 |
| 2.10 | CAPPING | 2-13 |
| 2.11 | THRUST AND ANCHOR BLOCKS | 2-13 |
| 2.12 | MECHANICALLY RESTRAINED JOINTS | 2-13 |
| 2.13 | TESTING AND DISINFECTING | 2-13 |
| 2.14 | SERVICE LATERALS | 2-14 |
| 2.15 | METERS | 2-18 |
| 2.16 | EXISTING/ABANDONED PRIVATE WELLS | 2-20 |
| 2.17 | BACKFLOW | 2-20 |
| 2.18 | FIRE HYDRANTS | 2-21 |
| 2.19 | WATER AND SEWER/STORM MAIN CROSSINGS AND CLEARANCES | 2-25 |
| 2.20 | NON-POTABLE WATER SYSTEMS | 2-28 |
| 2.21 | TAPS - 4 INCHES AND LARGER | 2-29 |
| 2.22 | LINE STOPS | 2-29 |
| 2.23 | EASEMENTS | 2-29 |
| 2.24 | PLAN SUBMITTAL | 2-31 |
| 2.25 | NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) PERMITS | 2-35 |
| 2.26 | SOUTHERN NEVADA WATER SYSTEMS (SNWS)/ SOUTHERN NEVADA WATER AUTHORITY (SNWA) | 2-35 |

CONTINUE TO THE NEXT PAGE

UNIFORM DESIGN STANDARDS

SECTION 2

2.00 GENERAL STATEMENT

The water facilities design shall include planning to meet present and future demands, population projections, per capita consumption, industrial expansion, area population densities, and fire requirements. These factors must then be considered to size the mains from the various sources of supply to every point in the system. Other design elements are: piping materials selection (after water and soil corrosiveness considerations), the water main pressure requirements, water main location with reference to property lines, sizing of service lines, location and size of line valves, fire hydrants, special valves, and booster pumps. All water system designs shall be prepared by, or under the direction of, a professional engineer licensed in the State of Nevada.

2.01 WATER DISTRIBUTION SYSTEM PRESSURE ZONES

2.01.01 In general, the Agency's pressure zones are designed to maintain a static pressure of 45 - 95 psi. The maximum static water pressure allowed for any service shall not exceed 100 psi.

2.01.02 In areas where a static pressure in excess of 80 psi is realized, individual pressure reducing valves are required to be installed and maintained by the owner/developer in accordance with the Plumbing Code. The Engineer will identify on the water plans the services requiring individual pressure reducing valves.

2.01.03 Design parameters for the minimum water pressure in the various pressure zones, during various flow conditions, are as follows:

- | | | |
|----|----------------------------|--------|
| A. | Static Pressure | 45 psi |
| B. | Maximum Day | 40 psi |
| C. | Peak Hour | 30 psi |
| D. | Maximum Day plus Fire Flow | 20 psi |

2.02 WATER DISTRIBUTION MAIN SIZES

2.02.01 General Requirements

- A. All water mains shall be sized based on flow demands and pressure requirements.
- B. The minimum water main size to be installed in the Agency's system shall be eight (8) inches in diameter unless otherwise approved by the Agency. Additionally the agency may establish minimum water main diameters based on road width or other criteria.

- C. Departures from the minimum requirements will be considered only in special circumstances. Water mains in cul-de-sacs, internal streets within subdivisions, and other areas where water mains will not be extended in the future, may be six (6) inches in diameter if that size water main meets the development's water demand requirements. Any departure from minimum requirements identified above shall be justified by a network hydraulic analysis.

2.02.02

Size - Fire Protection

- A. When fire protection is to be provided, system design shall be such that fire flows and facilities are in accordance with the requirements of the Fire Department having jurisdiction. All systems must be designed with a minimum residual pressure of twenty (20) psi on the customer's side of the meter and/or backflow assembly during a max day fire flow conditions.
- B. Required fire flows, both on-site and off-site, will be identified on both the Project Data Sheet and the water plans by the Fire Department having jurisdiction.
- C. The minimum water main size providing fire protection and serving fire hydrants shall be six (6) inches in diameter. A maximum length of one-hundred fifty (150) feet of six (6) inch main serving a fire hydrant from a single source will be allowed. A larger size main will be required for any distance greater than one hundred fifty (150) feet. Larger diameter mains will also be utilized, if necessary, to meet the required minimum fire flow while maintaining minimum residual pressure. A fire hydrant shall not be connected to a main which does not have sufficient fire flow capacity.
- D. A maximum water velocity of twenty (20) fps will be utilized when designing for fire flows and/or other emergency conditions.
- E. Fire suppression sprinkler systems shall be designed per the fire codes of the Fire Department having jurisdiction. The design shall not be based on a water pressure greater than ten (10) psi below the available static pressure at the water main. The design shall also take into consideration the pressure loss(es) associated with the lateral, meter, backflow assembly, etc.
- F. Fire hydrants shall conform to the Standards of both the Agency and the Fire Department having jurisdiction. All public fire hydrants shall be located eighteen (18) inches behind the right-of-way where an easement exists or is provided. Fire hydrants shall be located inside the right-of-way when easements cannot be obtained, must meet the minimum ADA requirements (See "UDACS Plate 7").

UNIFORM DESIGN STANDARDS

SECTION 2

- G. All water plans must have the approval of the Fire Department having jurisdiction PRIOR to Agency approval.

2.02.03 Oversizing

The Agency may require the Developer to oversize some, or all, of the proposed water main.

2.03 HYDRAULIC ANALYSES

2.03.01 Submittal of Hydraulic Analyses for Review and Approval

- A. The hydraulic analysis report may be submitted with the project design for review. However, for larger projects such as a major subdivision, submitting a hydraulic analysis report prior to water plan submission may be required.
- B. Two (2) copies of the hydraulic analysis report must be submitted. Listed below are general requirements and specific elements that must be addressed in the hydraulic analysis submittal. The Engineer is encouraged to contact the Agency for guidance in preparing the report.

2.03.02 General

- A. The hydraulic analyses must be signed and sealed by a professional engineer licensed in the State of Nevada.
- B. Provide the name, address, telephone number and fax number of the developer and developer's contact person on the cover of the report.
- C. Each page of the submittal must be numbered.
- D. Provide the name and version of software used for the hydraulic analyses.

2.03.03 Project Description

- A. Provide a written description of the type of project, location, and existing facilities.
- B. Include a site map showing the project boundaries.
- C. Provide development information including gross acreage, land use, number of units, anticipated fire flow requirements, development schedule, and phasing requirements. Separate analyses will be required for each development phase.

UNIFORM DESIGN STANDARDS

SECTION 2

- D. If the project is part of an oversizing agreement, indicate so in the report, and use the developer-required pipeline diameter when modeling the project.
- E. Include a node map clearly delineating the pipeline alignments and diameters, layout and names of streets/roadways in which the pipelines will be installed, the pipe and node numbers used in the analyses, and all fire hydrant locations, if known.
- F. The text and node maps shall use a minimum font size of 10 points.

2.03.04 Source HGL and Demand Calculations

- A. Clearly show the source node provided by the Agency and use the Agency-issued HGLs for that node in the analyses. Enclose a copy of the letter sent by the Agency issuing these HGLs.
- B. Provide the type and location of meters, backflow assemblies, etc., and account for the associated losses.
- C. Calculate on-site and off-site demands using demand factors provided by the Agency for gpm/acre and gpm/unit. Use the factor that produces the greater total demand for each development. Show calculations.

2.03.05 Input Data Tables

- A. Provide input data tables for all pipes modeled. Pipe data tables shall include, at a minimum, pipe numbers as shown on the node map, beginning and ending nodes, lengths in feet, diameters in inches, coefficient of friction, and other pertinent information.
- B. Provide input data tables for all nodes modeled. Junction node data tables shall, at a minimum, include node numbers as shown on the node map, elevation in feet for all nodes using the NAVD 88 datum, node demand in gpm, connecting pipes, and other pertinent information. A grading plan may be required for projects adjacent to pressure zone boundaries.

2.03.06 Analysis

- A. Separate analyses for Maximum Day, Maximum Day plus Fire Flow, and Peak Hour conditions are required for each phase of the development, as well as for the entire project. In the analyses for Maximum Day plus Fire Flow, the worst-case scenario must be considered.

- B. Explain any assumptions made as part of conducting the analyses; provide any comments that may ease and expedite the review of the analyses.

2.03.07 Output Data Tables

- A. Output results for pipes shall include, at a minimum, flow rate in gpm, flow velocity in fps, head loss in feet, and other pertinent information for each pipe
- B. Output results for nodes shall include, at a minimum, hydraulic grade in feet, node pressure in psi, elevation, demand, and other pertinent information for each node.
- C. Provide a summary table, for each phase of development, showing the minimum and maximum residual pressures for each condition, and minimum and maximum static pressures.

2.03.08 Miscellaneous

- A. The roughness factors to be used in the analyses should be as follows:

C= 100 for all unlined cast iron pipe
C= 120 for pipe \leq 12" in diameter
C= 130 for pipe \geq 14" in diameter

For any other sizes or materials not covered by the above, the Engineer shall contact the Agency for guidance.
- B. When identifying the fire flow available in a network hydraulic analysis use the hydrant located at the development's weakest point, generally the highest point in the development and/or the last hydrant on dead end main. A junction node should be placed at the appropriate location in the model to represent the fire hydrant.
- C. The elevation in the hydraulic analyses should preferably be based on a project grading plan or the anticipated final elevation. If a grading plan deviates significantly from the elevations used in the analyses, a revised analysis will be required.
- D. A chart to be used as a guide to determine water consumption for various types of developments should be obtained by the Agency.

UNIFORM DESIGN STANDARDS

SECTION 2

2.04 WATER MAIN LOCATION

- 2.04.01 Main extensions should be located within a dedicated right-of-way. If a dedicated right-of-way is not available, the main may be located elsewhere upon Agency approval and upon the granting of an easement to the Agency. The easement shall be thirty (30) feet or greater in width unless otherwise approved by the Agency. Water lines shall be designed to be a minimum of ten (10) feet from the property line or easement edge or as specified by the Agency for the entire water main length. Other utilities may be located in the same easement per Section 2.04.04 or as determined by the Agency.
- 2.04.02 Where street curbs are present, mains will be located in the street seven (7) feet from the back of curb. In areas without curb and gutter, the mains will be located twelve (12) feet from the right-of-way edge unless established otherwise by the Agency.
- 2.04.03 Detector/pipe locator ribbon, and locator balls will be installed in accordance with UDACS Plate 27 over all water mains, and over all service laterals not installed at right angles to the mains.
- 2.04.04 Mains should be located at a distance no less than three (3) feet horizontally from any gas line, ten (10) feet horizontally (outside to outside) from any non potable water line (reclaimed) or sewer line (sanitary or storm), and eighteen (18) inches vertically above any non potable water line or sewer line, or as otherwise specified in Section 2.19 and 2.20. Location of other utilities in the easements should be coordinated with the Agency on an individual basis.
- 2.04.05 If the vertical distance of eighteen (18) inches between the water line installed over a non potable water line or sanitary or storm sewer line cannot be maintained, the criteria for water/ non potable water line or sewer main crossings in Section 2.19 must be complied with.
- 2.04.06 Dead-end mains shall be minimized by looping mains whenever practical.
- 2.04.07 Mains installed in a cul-de-sac shall run the full street length ending approximately fifteen (15) feet from the property's front edge at the end of the cul-de-sac, or five (5) feet past the last service as designated on the plans, unless they are looped.

2.05 FULL FRONTAGE EXTENSION

Water lines may be required at the Agency's discretion along the entire length of at least one property line frontage of the property to be developed whenever future line extension is possible. The property line frontage is that portion of the property along the public right-of-way. If a parcel to be developed has more than one property line frontage, the Agency may require a water line to be installed along the other frontage(s). The minimum pipe diameter required in the frontage street shall be in accordance with Section 2.02, or as required by the Agency.

UNIFORM DESIGN STANDARDS

SECTION 2

2.06 WATER MAIN JOINT DEFLECTION

The maximum allowable water main joint deflection for various pipe materials and lengths is listed in the following tables. If these offsets conflict with the pipe manufacturer's recommendation, the more stringent requirement shall apply. Requirements in excess of these deflections identified shall require installation of fittings.

2.06.01 Polyvinyl Chloride (PVC) Pressure Pipe C-900

Polyvinyl chloride pipe shall be deflected - at the joints only. The maximum allowable joint deflection shall be as stated in the following table. For changes in direction exceeding the maximum allowable joint deflection, fittings shall be used.

| Pipe Size (Inches) | Maximum Joint Deflection (degrees) | Maximum Pipe End Offset 20 Foot Pipe Lengths (inches) | Minimum Radius of Curvature (feet) |
|--------------------|------------------------------------|---|------------------------------------|
| 4-12 | 1 | 4.187 | 1,150 |

2.06.02 Polyvinyl Chloride (PVC) Pressure Pipe C-905

Polyvinyl chloride pipe shall be deflected at the joints only. The maximum allowable joint deflection is limited and shall not exceed manufacturer recommendations. In general, fittings shall be used for all changes in direction.

| Maximum Joint Deflection (degrees) | Maximum Pipe End Offset 20 Foot Pipe Lengths (inches) | Minimum Radius of Curvature (feet) |
|------------------------------------|---|------------------------------------|
| 1 | 4.187 | 1,150 |

2.06.03 Ductile Iron Pipe (DIP)

The maximum allowable joint deflection for push-on type joint and mechanical-joint pipe shall be as follows:

| PUSH-ON TYPE DIP JOINT | | | | | |
|------------------------|----------------------------|-------------------------|------------|------------------------------------|------------|
| Pipe Size (Inches) | Deflection Angle (Degrees) | Maximum Offset (Inches) | | Minimum Radius of Curvature (Feet) | |
| | | 18' Length | 20' Length | 18' Length | 20' Length |
| 4" - 12" | 2.5° | 9" | 10" | 415' | 460' |
| 14" - 24" | 1.5° | 6" | 6" | 690' | 765' |

UNIFORM DESIGN STANDARDS

SECTION 2

| MECHANICAL TYPE DIP JOINT | | | | | |
|---------------------------|----------------------------------|-------------------------|------------|---------------------------------------|------------|
| Pipe Size (Inches) | Deflection Angle (Degrees) | Maximum Offset (Inches) | | Minimum Radius of Curvature (Feet) | |
| | | 18' Length | 20' Length | 18' Length | 20' Length |
| 4" | 4.0° | 15" | 17" | 260' | 290' |
| 6" | 3.5° | 13" | 15" | 295' | 330' |
| 8" - 12" | 2.5° | 9" | 10" | 415' | 460' |
| 14" - 24" | 1.5° | 6" | 6" | 690' | 765' |

2.07 DEPTH OF COVER

The minimum depth of cover shall be maintained for all pipe unless otherwise specified. Vehicle traffic over the water mains may be restricted until the minimum depth of cover is obtained. A twenty-four (24) inch minimum depth of cover must be maintained during construction. The depth of cover required shall be determined by the physical pipe properties, site conditions, manufacturer's recommendations, and construction practices.

2.07.01 Right-of-Way Without an Established Street Grade

A sixty (60) inch minimum depth of cover shall be maintained over any pipe where there is not an established street grade. The Engineer shall consider possible, and probable, future development and grading to achieve the minimum depth of cover as described in Section 2.07.02 and following development of the area.

UNIFORM DESIGN STANDARDS

SECTION 2

2.07.02 Right-of-Way With an Established Street Grade

Where there is an established street grade, the following minimum depth of cover shall be provided:

| Right-of-Way (Feet) | Pipe Diameter (Inches) | Minimum Depth of Cover (Inches) |
|-------------------------|---|---------------------------------|
| Sixty (60) or less | Twelve (12) and smaller | Forty-two (42) |
| Sixty (60) or less | Greater than twelve (12), Less than twenty-four (24) | Forty-eight (48) |
| Sixty (60) or less | Twenty-four (24) and greater | Sixty (60) |
| Greater than sixty (60) | Eight (8) and smaller | Forty-two (42) |
| Greater than sixty (60) | Greater than eight (8), Less than twenty-four (24) | Forty-eight (48) |
| Greater than sixty (60) | Twenty-four (24) and greater | Sixty (60) |

2.07.03 NDOT Right-of-Way

A sixty (60) inch minimum depth of cover shall be maintained over all water mains located within NDOT Right-of-Way.

2.08 PIPE CASING

2.08.01 Steel Casing

Steel casings are required on all pipe installed using boring method, where required to meet specific Railroad and/or NDOT requirements, to provide structural support, or as required under other special conditions. The pipe casing shall be laid true to line and grade with no bends or changes in grade for the full casing length. The casing material used shall be a minimum of one-quarter ($\frac{1}{4}$) inch thick steel (design calculations must be submitted by the developer's engineer) and conform to ASTM A283, Grade B, C, or D. All joints shall be welded. Interior joints shall be grounded to a smooth finish. All welding shall be performed in accordance with AWWA C206, "AWWA Standard for Field Welding of Steel Water Pipe". Coatings for steel casings are not required. Other casing materials may be utilized for applications other than boring when approved by the Agency.

2.08.02 Polyvinyl Chloride Pipe (C900 and C905)

PVC casings may be utilized in lieu of steel casing for protection (See "Section 2.19") where installation of pipe does not require boring methods, structural support, or for Railroad and/or NDOT requirements.

UNIFORM DESIGN STANDARDS

SECTION 2

2.08.03 Pipe Spacers

The pipe shall be symmetrically supported about its centerline inside the casing at each joint end with an Agency approved polyethylene spacer, sized and designed per manufacturer recommendations.

2.08.04 Casing End Caps

The casing ends shall be sealed in a manner acceptable to the Agency. The annular space between the pipe and the casing shall be filled with grout or sand when required by the Agency.

2.09 VALVES

2.09.01 Valve Location

Sufficient valves shall be provided on water mains to minimize inconvenience, degradation of fire protection and sanitary hazards during repairs. Valves shall be generally located as follows, unless otherwise approved by the Agency:

- A. At intervals to isolate no more than two (2) fire hydrants at any time.
- B. At minimum intervals of five hundred (500) feet in commercially zoned areas, and residential off-site water mains.
- C. In residential areas to isolate a maximum of thirty (30) services (approximately 600 feet).
- D. A maximum of five (5) valves will be required to isolate any location.
- E. Valves shall not be located in street gutters, valley gutters, or in driveways.
- F. A valve is required at the end of all temporarily dead-end mains. The valve location is to be a minimum of ten (10) feet upstream of the cap or blow off assembly.
- G. Valved outlet(s) for future service laterals six (6) inches in diameter and larger may be installed when approved by the Agency. Valved outlet installation approval does not constitute a water commitment. When used, the following note shall appear on the drawing:

CONDITIONAL APPROVAL OF VALVED OUTLET (6" and larger)

The water plans show one or more valved outlets extending out of paved areas. Installation of these outlets is acceptable; however, if the outlets are incorrectly located or not used for any reason when the property is actually developed, the Developer shall abandon the outlets at the connection to the active main in accordance with the Agency's Standards and at the Developer's expense. Approval of the valved outlet does not provide or imply a water commitment.

- H. A shut off valve immediately adjacent to the water main shall be provided for all service laterals greater than two (2) inches in diameter, and for all fire hydrant laterals.
- I. The Agency may require additional valves depending upon the project design.

2.09.02 Gate Valves

- A. Gate valves may be used on all water main diameters up to, and including, twenty-four (24) inches, as required by the Agency.
- B. Gate valves shall be installed in the vertical position with non-rising stems in all locations, except vaults, unless otherwise specified by the Agency.
- C. A minimum six (6) inch bypass valve and piping for pressure relief shall be provided for all gate valves twenty-four (24) inches in diameter and greater, unless otherwise specified by the Agency.
- D. All gate valves shall be resilient seat unless otherwise specified by the Agency.

2.09.03 Butterfly Valves

Butterfly valves may be used on water mains fourteen (14) inches in diameter and larger, unless a tapping (gate) valve is required, or as required by the Agency.

2.09.04 Valve stem extensions

Valve stem extensions are required within two (2) feet of finished grade where the distance from the top of the valve box to the top of the operating nut exceeds five (5) feet.

2.09.05 Valve Boxes

Adjustable valve boxes shall be provided for all buried valves. Valve boxes shall be installed in accordance with UDACS Plate 8.

2.09.06 Special Valves

- A. Air relief or air vacuum relief valves may be required on pipelines' high points and changes in grade, depending on the main size (typically 16" and greater) and terrain, in accordance with UDACS Plate 37.
- B. Pressure regulating valves (PRV) will be required where it is necessary to reduce pressure to a maximum value as defined in Section 2.01.
- C. Check valves are to be used where it is required that the water flow in one direction only.
- D. Blow-off valves are required on all permanent dead-end pipe runs and may be required at stub-out locations. Blow-off valves for these locations shall be installed in accordance with UDACS Plate 4A. Six (6) inch manual blow-off valves for installation at low points shall be installed in accordance with UDACS Plate 4B for larger diameter mains as required by the Agency
- E. Backflow Prevention Assembly requirements are identified in Section 2.17.

2.09.07 Valve Abandonment

- A. Any valved outlet installed prior to lot development, and subsequently not required, must be abandoned.
- B. For valve abandonment, the following note shall appear on the drawing:

ABANDONED VALVES

All valves to be abandoned shall be abandoned in the closed position, unless shown otherwise, by removing a minimum of the top twenty-four (24) inches of the valve box and then filling the bottom of the box with a minimum of eight (8) inches of sand or Type II aggregate base, the remaining portion of the valve box shall be filled with concrete having a compressive strength of at least two thousand (2,000) psi.

- C. If the valve is to be abandoned in the closed position, the following note shall appear on the drawing:

CUT AND CAP

The lateral must be cut within three (3) feet of the abandoned valve, or as shown on plans, and capped. The Contractor shall cut the existing pipe where shown on the drawing and install a cap complete with thrust block. Where a joint or coupling in the existing pipe is uncovered at the cut and cap locations, the installation of a plug may be permitted with Agency approval. A concrete thrust block shall be installed at all cap or plug locations in accordance with the provisions of UDACS Plate 5.

2.10 CAPPING

A cap or plug may be used in accordance with UDACS Plate 4A.

2.11 THRUST AND ANCHOR BLOCKS

Thrust blocks are required at all caps, valves, reducers, tees, and fittings used to change the pipe direction, and shall be placed in accordance with UDACS Plates 3 and 5 for all locations where the soil bearing capacity is 3000 psf or greater. Special thrust block design by a NPE for each location of a thrust/anchor block is required if allowable soil bearing capacity is less than 3000 psf. If undisturbed material is not present; (such as in fill sections), then mechanical restraint joints shall be required.

2.12 MECHANICALLY RESTRAINED JOINTS

Mechanically restrained joints may be used in lieu of thrust blocks upon Agency approval, or as required by the Agency. The length of restraint joints should be clearly identified on drawings and calculations should be submitted.

2.13 TESTING AND DISINFECTING

- A. All new water facilities shall be pressure tested and disinfected to the Agency's satisfaction as identified in Section 3.25 of this standard and in accordance with the Nevada Department of Consumer Health requirements. For guidance on chlorine requirements, (See "UDACS Plate 10").
- B. Provisions shall be made to allow a water velocity of 2.5 feet-per-second while flushing water mains through the use of blow off valves, fire hydrants, or a combination thereof.

The following chart from AWWA C651-99 indicating the required flows and opening to flush pipelines (40 psi residual) is provided for your information:

UNIFORM DESIGN STANDARDS

SECTION 2

Table 3 Required flow and openings to flush pipeline (40 psi [276 kPa] residual pressure in water main)*

| Pipe Diameter | | Flow Required to Produce 2.5 ft / s (approx.) Velocity in Main | | Size of Tap – in. (mm) | | | Number of 2½ in. (64-mm) Hydrant Outlets |
|---------------|-------|--|---------|------------------------|----------|--------|--|
| | | | | Number of Taps on Pipe | | | |
| in. | (mm) | gpm | (L / s) | 1 (25) | 1 ½ (38) | 2 (51) | |
| 4 | (100) | 100 | (6.3) | 1 | - | - | 1 |
| 6 | (150) | 200 | (12.6) | - | 1 | - | 1 |
| 8 | (200) | 400 | (25.2) | - | 2 | 1 | 1 |
| 10 | (250) | 600 | (37.9) | - | 3 | 2 | 1 |
| 12 | (300) | 900 | (56.8) | - | - | 2 | 2 |
| 16 | (400) | 1,600 | (100.9) | - | - | 4 | 2 |

*With a 40-psi (276-kPa) pressure in the main with the hydrant flowing to atmospheric, a 2½-in. (64-mm) hydrant outlet will discharge approximately 1,000 gpm (63.1 L/s); and a 4½-in. (114-mm) hydrant outlet will discharge approximately 2,500 gpm (160 L/s).

2.14 SERVICE LATERALS

2.14.01 Location

- A. All service laterals shall be installed in the right-of-way unless other provisions have been approved by the Agency.
- B. The full service lateral length between a water main and water meter shall be installed at ninety (90) degrees to the water main horizontal alignment unless otherwise approved by the Agency.
- C. For service laterals two (2) inches in diameter and smaller, service saddles shall not be closer than eighteen (18) inches from the end of the main, nor closer than eighteen (18) inches to any other service saddle or pipe joint.
- D. The sewer and water laterals leading into the property shall be separated horizontally by a minimum of four (4) feet, the sewer lateral must be a minimum of one (1) foot lower than the water lateral, and the laterals shall be located in separate trenches, per State and local health requirements (See “Section 2.19”).

UNIFORM DESIGN STANDARDS

SECTION 2

- E. All service laterals shall be located a minimum of ten (10) feet from septic tanks, and a minimum of twenty-five (25) feet from leach beds and/or seepage pits.

2.14.02 Lateral Installation

- A. Service saddles shall be installed in accordance with the Agency's approved materials list for the type of pipe used.
- B. Corporation stops shall be male iron pipe thread by compression or flared connection. A corporation stop shall be installed at the water main for all service laterals two (2) inches and smaller.
- C. All services laterals two (2) inches and smaller shall have a minimum lateral diameter equal to the meter size but in no case shall the lateral diameter be less than one (1) inch (i.e., a 1" diameter service lateral is required for 5/8", 3/4" and 1" meters).
- D. All services three (3) inches and larger will require a minimum six (6) inch lateral with valve and shall be installed with a material approved by, and in accordance with, the Agency.

2.14.03 Future Use Laterals

Service laterals two (2) inches in diameter and smaller may be approved for future lots, provided the following conditions are adhered to:

- A. The laterals are to lots identified as a part of a master development and the subdivision map is available in either final or tentative form. Agency approval of the subsequent water plan is required (i.e., future laterals will not be provided for all future lots).
- B. The future laterals will only be installed where the streets over the water main are to be developed with the current project. Additional requirements/limitations may be present dependent upon the Agency's water commitment procedures.
- C. The service laterals will be clearly identified on the drawings and the quantity listed as "laterals for future services." Fees may be required by the Agency having jurisdiction for laterals installed as "future services."
- D. The following note shall be included on the drawing:

FUTURE USE LATERALS (1" through 2")

If any of the service laterals to be installed for future lots are incorrectly located or are not used for any reason when the lots are developed, the Developer

shall abandon the laterals at the connection to the active main in accordance with the UDACS Standards at the Developer's expense.

Installation of service laterals 2 inches in diameter and smaller for future lots shall include the service lateral with all fittings per UDACS Plates 1A through 1D. The Agency may lock these services to prevent unauthorized water use.

- E. Service laterals will not be approved for future lots not part of a master development or for a development with a different owner.

2.14.04 Lateral Removal

- A. When abandoning existing water service assemblies sized two (2) inches and smaller, the following note shall appear on the drawing:

ABANDONMENT OF EXISTING SERVICE LATERALS (2" and smaller)

The Contractor shall notify the Agency 2 full business days prior to the requested removal time to allow the Agency to take the final meter reading. The Contractor may then begin removal procedures for the affected service as follows:

Existing service laterals to be abandoned from existing water mains shall have the corporation stops turned off at the main, a minimum of twelve (12) inches of the lateral cut out near the corporation stops and a brass cap installed on the corporation stop. If the corporation stop is damaged beyond repair or pulled from the existing water main, the main shall be repaired at the Contractor's expense in a manner approved by the Agency. If it is discovered the corporation stop is not water tight, through no fault of the Contractor, the Contractor shall notify the Agency for further direction. The existing meter(s) shall be removed and delivered to the Agency.

- B. For existing water service assemblies three (3) inches and larger that are to be abandoned, the following note shall appear on the drawing:

ABANDONMENT OF EXISTING SERVICE LATERALS (3" and larger)

The Contractor shall notify the Agency two (2) full business days prior to the requested removal time to allow the Agency to take the final meter reading and to notify the Agency's Inspector of the impending work. The Contractor may then begin removal procedures for the affected service as follows:

All valves to be abandoned shall be abandoned in the closed position, unless shown otherwise, by removing a minimum of the top twenty-four (24) inches of the valve box and then filling the bottom of the box with a minimum of eight (8) inches of sand or Type II aggregate base, the remaining portion of the valve box shall be filled with concrete having a compressive strength of at least two-thousand 2,000 psi.

If the valve is to be abandoned in the closed position, the lateral must be cut within three (3) feet of the abandoned valve, or as shown on plans, and capped. Where a joint or coupling in the existing pipe is uncovered at the cut and cap locations, the installation of a plug may be permitted with Agency approval. The Contractor shall install a concrete thrust block in accordance with the provisions of the UDACS Plate at all cap or plug locations.

The existing meter(s) shall be removed and delivered to the Agency. The Contractor shall then remove and/or backfill the abandoned vault with Type II material.

2.14.05 Lateral Relocation

- A. All existing laterals that are to be relocated must first be disconnected from the existing pipeline following abandonment procedures, (See "Section 2.14.04"). The relocated service installation shall comply with Agency's current standards.
- B. If meter box relocation is required, Section 2.14.01.B still applies.
- C. The lateral may be extended, rather than replaced, if the existing lateral is of approved copper material or sized six (6) inches in diameter or larger, provided the ninety (90) degree angle from the existing water main is maintained. All polyethylene tubing service laterals must be fully replaced, in lieu of extension or splicing, to the Agency's current standards.

UNIFORM DESIGN STANDARDS

SECTION 2

2.15 METERS

2.15.01 Size

The meter to be installed will be based on size and service requirements. **Final meter selection approval is the Agency's responsibility.** The table included in Section 4, Tables A and B reflect the AWWA rated capacities for various meter types and sizes. The size for all domestic services shall be based on continuous flow meter capacities when utilizing Peak Hour Demand. Maximum meter flow capacities may be used for maximum domestic demands, when calculated utilizing the applicable plumbing code or other applicable criteria, and fire flow conditions when associated pressure losses are accounted for in the system design.

2.15.02 Agency Provided Meters

- A. All meters two (2) inches and smaller are provided by the Agency and remain the Agency's property.
- B. All meters three (3) inches and larger shall be provided by the developer and must meet the requirements of, be approved by, and remain the property of, the Agency (See "Agency Approved Product List" for requirements).

2.15.03 Installation

- A. All services shall be installed in accordance with UDACS Plates. Meters will not be allowed at locations not contiguous to the property served. Services two (2) inches and smaller may be installed by the Agency upon payment of applicable fees. For services three (3) inches and larger, the following note(s) shall appear on the drawing.

INSTALLATION OF METER AND VAULT

The meter(s) and vault(s) with traffic/non-traffic bearing cover(s) shall be installed in accordance with the UDACS Plate *** and with UDACS Vault Drawing No. C-475, latest revision. Precast vaults approved by the Agency may be used in lieu of the cast-in-place vaults. The designation of pre-cast or cast-in-place must be made prior to plan approval.

Any block wall or other fence material shall be designed and constructed around the outside of the easement(s), to allow the Agency direct access to the vault(s) and inlet piping from the adjacent right-of-way.

Easements shall be clearly marked or staked prior to the start of construction.

*** Agency to insert UDACS Plate No.

INSTALLATION OF DOUBLE CHECK DETECTOR ASSEMBLY AND VAULT

The detector check(s) and vault(s) with traffic/non-traffic bearing cover(s) shall be installed in accordance with the UDACS Plate 20A and with UDACS Vault Drawing No. C-475, or latest revision. Precast vaults approved by the Agency may be used in lieu of the cast-in-place vaults. The designation of pre-cast or cast-in-place must be made prior to plan approval.

Easements shall be clearly marked or staked prior to the start of construction.

- B. A bypass line or bypass provision is required for all meters three (3) inches and larger on projects without redundant services, unless otherwise specified by the Agency.
- C. All meter and meter vaults for services three (3) inches and larger shall be located outside of the right-of-way (even if there is adequate space for the vault within the right-of-way) and the appropriate utility easement granted to the Agency, unless otherwise specified by the Agency.

2.15.04

Meter Boxes

- A. All meter boxes shall be located in the sidewalk, sidewalk area, or within a designated easement in accordance with the UDACS Plates. Meter boxes shall not be located in driveways or streets.
- B. All meters two (2) inches and smaller shall be installed in an approved meter box, sized per the corresponding UDACS Plate.
- C. All meters three (3) inches and larger shall be housed in a vault. Refer to UDACS Vault Drawing No. C-475, latest edition, for dimension and construction details.
- D. Provisions for remote reading devices for all vaults may be required when vault or meter box access has restrictions or as required by the Agency.

2.16 EXISTING/ABANDONED PRIVATE WELLS

2.16.01 Existing Private Wells To Remain in Service - The following note shall appear on the drawing:

EXISTING PRIVATE WELLS TO REMAIN IN SERVICE

If the existing private well is to remain in service, an Agency approved backflow prevention assembly shall be installed immediately downstream of the Agency's water meter in accordance with UDACS Plate 11A. The new service shall not be activated until the backflow prevention assembly has been successfully tested by the Agency.

2.16.02 Private Wells To Be Removed From Service - The following note shall appear on the drawing:

PRIVATE WELLS TO BE REMOVED FROM SERVICE

If the existing private well is to be abandoned, the installation of a backflow prevention assembly will not be required; however, the Agency water service will remain in the off position until the well has been abandoned (which must be accomplished within 30 days of the installation of the Agency service) or physically disconnected from the onsite system. An inspection of the on-site system will be made by the Agency's Inspection Division to verify the well has been disconnected from the on-site system and the well is no longer functional. The State of Nevada Division of Water Resources.

(Telephone Number 702-486-2770) may be contacted for information concerning requirements and procedures for abandoning wells.

2.17 BACKFLOW

Any connection to the Agency's distribution system shall be made in a manner that protects the public potable water supply from contamination or pollution. Containment shall be achieved by the use of an Agency approved backflow assembly that isolates, within the customer's internal distribution system(s) or the customer's private water system(s), such contaminants or pollutants that could backflow into the public water system.

2.17.01 Application

No water service connection to any premises shall be approved, installed, or maintained by the Agency unless the water supply is protected as required by State laws, State regulations, and Agency Standards. Water service to any premises shall not be activated by the Agency if the Agency determines the water service requires a backflow assembly and any of the following conditions prevail:

UNIFORM DESIGN STANDARDS

SECTION 2

- A. The backflow assembly is not installed or has been removed after installation.
- B. The backflow assembly has been by-passed.
- C. The backflow assembly is in any way altered.
- D. Any cross-connection or possibility of cross-connection.
- E. The backflow assembly receives an “unsatisfactory” test result.

2.17.02 The required backflow prevention assembly type shall be determined by facility use. A partial list of facilities with required backflow prevention is provided in Section 4, Table E. The Agency may require all services to a facility or parcel have an equal level of backflow protection. Facilities not listed in Table E shall be Agency evaluated for backflow prevention requirements on a case by case basis.

2.17.03 Any backflow prevention assembly required herein shall be a model and size approved by the Agency. The term "Approved Backflow Prevention Assembly" shall mean an assembly meeting the Agency's specifications.

2.17.04 When backflow prevention assemblies are required, their installation design shall take into consideration pressure loss across the device and maintenance requirements for critical services. Parallel assembly use should be considered to prevent service disruption during scheduled maintenance.

2.18 FIRE HYDRANTS

2.18.01 Location and Spacing

- A. All fire hydrants, permanent or temporary, will be installed in accordance with UDACS Plate 7.
- B. Hydrant spacing and location are ultimately determined by the Fire Department having jurisdiction.
- C. Fire hydrants shall not be located in the following locations:
 - 1) Within six (6) feet of a driveway, power pole, light standard, or any obstruction.
 - 2) On the circular portion of a cul-de-sac, or within twenty (20) feet of the cul-de-sac radius.

UNIFORM DESIGN STANDARDS

SECTION 2

3) Within three (3) feet of any block wall or fence.

4) As Agency specified.

2.18.02 Materials

Fire hydrants shall be approved by, and conform to the requirements of, the Fire Department having jurisdiction.

2.18.03 Hydrant Drains

A. Hydrant drains shall not be plugged, and a gravel pocket shall be provided.

B. Hydrant drains shall not be connected to, or located within ten (10) feet of, sanitary sewers or storm drains.

2.18.04 Temporary Fire Hydrants

A. A temporary fire hydrant is classified as "temporary" due to its projected useful life and in no way reflects a lesser standard of construction. The requirements for temporary fire hydrants, to the extent possible, will be identified during the design stage and included on the developer's plans for review and approval.

B. Separate requests for a temporary fire hydrant installation require the submission of a full size (24" x 36") reproducible site drawing, or an abbreviated drawing (8½" x 11") to include the items listed below. An amendment can be made to a previously approved water plan if the hydrant is for the same project. The application will, as a minimum, identify the following:

1) Dimensions from existing features and property lines, etc., to establish the point of connection to the water line and the extent of construction.

2) Period of time the fire hydrant will be in use, and the work associated with its removal.

3) Procedure for removing / abandoning the fire hydrant upon termination of use.

4) Professional Engineer signature and seal.

5) Agency Standard Notes.

6) Agency approval (signature) block.

2.18.05 Fire Hydrant Permit

A fire hydrant permit and meter will be required to use a fire hydrant, and these charges will be in accordance with the Agency's Service Rules, latest edition. A backflow assembly may also be required as determined by the Agency.

2.18.06 Relocation/Abandonment

- A. If a hydrant lateral needs to be lengthened, continuing further back in the same direction, and at the same depth as the original lateral, the hydrant assembly may be disconnected, the lateral lengthened and the assembly reconnected. The following note shall appear on the drawing:

**RELOCATION OF FIRE HYDRANTS
(Extension of Existing Lateral)**

The Contractor shall remove and relocate both the upper and lower barrels of the existing fire hydrant(s) where shown, extend the existing lateral as required, and reinstall such hydrant(s) at the new location(s) indicated. Fire Hydrants shall be tested prior to and after relocation under the direction of the Agency to ensure quality. Installation shall be in accordance with UDACS Plate 7. Laterals made of unapproved materials shall be replaced from the main to the fire hydrant.

- B. If a hydrant is to be relocated and the hydrant lateral must be abandoned, the following note shall appear on the drawing:

**FIRE HYDRANT RELOCATION AND LATERAL
ABANDONMENT (Existing Lateral to be Abandoned)**

Where shown on the drawing(s), the Contractor shall abandon the existing fire hydrant(s) by removing both the upper and lower barrels of the fire hydrant so that no portion of the remaining fire hydrant assembly is closer than 2 feet to the existing grade. Fire Hydrants shall be tested prior to and after relocation under the direction of the Agency to ensure quality of the fire hydrant (s). The existing hydrant shall be installed at the new location as indicated on the drawing, in accordance with UDACS Plate 7. The existing valve shall be abandoned in a closed position, unless shown otherwise, by removing a minimum of the top twenty-four (24) inches of the valve box, and then filling the bottom of the box with a minimum of eight (8) inches of sand or Type II aggregate base, the remaining portion of

the valve box shall be filled with concrete having a compressive strength of at least two-thousand (2,000) psi. The lateral shall be cut within three (3) feet of the abandoned valve, or as shown on plans, and capped. Where a joint or coupling in the existing pipe is uncovered at the cut and cap location, the installation of a plug may be permitted, with Agency approval. A concrete thrust block shall be installed at all cut and cap locations in accordance with the provisions of UDACS Plate 5.

- C. If the fire hydrant is to be abandoned, the following note shall appear on the drawing:

FIRE HYDRANT AND LATERAL ABANDONMENT

Where shown on the drawing, the Contractor shall abandon the existing fire hydrant(s) by removing both the upper and lower fire hydrant barrels so no portion of the remaining fire hydrant assembly is closer than 2 feet to the existing grade. The existing hydrant shall be delivered to the Agency. The existing valve shall be abandoned in a closed position, unless shown otherwise, by removing a minimum of the top twenty-four (24) inches of the valve box and then filling the bottom of the box with a minimum of eight (8) inches of sand or Type II aggregate base, the remaining portion of the valve box shall be filled with concrete having a compressive strength of at least two-thousand (2,000) psi. The remaining portion of the lateral shall be cut within three (3) feet of the abandoned valve, or as shown on plans, and capped. The existing concrete hydrant pad shall be removed.

- D. Vertical Adjustments

Where grades are changed which affect fire hydrants, the Contractor shall make adjustments as necessary to bring the fire hydrant into compliance with UDACS Plate 7.

2.18.07 Fire Department Approval

Approval by the Fire Department having jurisdiction is required PRIOR to obtaining final water plan approval from the Agency.

2.19 WATER AND SEWER/STORM MAIN CROSSINGS AND CLEARANCES

2.19.01 Parallel Separations (Mains)

- A. The following separations must be maintained between all storm and sanitary sewer lines which parallel water lines six (6) inches and larger.
 - 1) Water mains and sewer lines shall be installed in separate trenches with at least ten (10) feet of separation measured horizontally from exterior pipe walls.
 - 2) Sewer lines shall be placed lower than water mains whenever possible.
- B. Where the required ten (10) feet separation is not practicable, the engineer may petition the Agency for approval of one of the following options:
 - 1) Less than ten (10) feet horizontal separation with eighteen (18) inches vertical separation, the following will apply:
 - a. Pipes shall be installed in separate trenches.
 - b. Horizontal separation shall be at least five (5) feet from exterior pipe walls and sewer structures.
 - c. Vertical separation shall be at least eighteen (18) inches between exterior pipe walls with the water main being placed above the sewer main.
 - 2) Where the required ten (10) foot horizontal separation or the five (5) horizontal and the eighteen (18) inch vertical separation with the water line above the sewer can not be met, the following provisions will apply:
 - a. All efforts will be made to place the water line above the sewer main.
 - b. Horizontal separation shall not be less than six (6) feet from exterior pipe walls and sewer structures.
 - c. The sewer line will be constructed using one of the following options:
 - i. The sewer main will be constructed of water supply quality materials meeting AWWA standards.

- ii. Existing sewer mains may be totally encased with a minimum of four (4) inches of cement slurry (300 PSI +/-).
 - iii. Storm sewers twenty-four (24) inches in diameter or greater may be installed with watertight joints using Agency approved elastomeric joint sealant, with provisions to insure against differential settlement of the storm drain.
- 3) Where separation requirements cannot be met using the above provisions, the Engineer may petition the Agency for approval to encase the water main with a minimum of four (4) inches of cement slurry (300 psi +/-), in addition to the requirements of Paragraph 2.19.01 B above. Encasement will not be permitted for asbestos cement pipe water mains.

2.19.02 Crossing Separations (Mains)

The following separations must be maintained between all storm and sanitary sewer mains which cross water mains six (6) inches and larger.

- A. Sewer mains shall be placed below water mains and shall be separated vertically by at least eighteen (18) inches between exterior pipe walls.
- B. Where the water main is below the sewer main, or where the water main is above the sewer main with a vertical separation less than eighteen (18) inches, the following provisions shall apply:
 - 1) A reasonable effort must be made to place water and sewer pipeline joints an equal distance from the crossing point. This requirement does not apply to welded joints.
 - 2) A vertical separation of no less than six (6) inches must be maintained and structural support for the sewer and/or water main be determined by the Engineer and approved by the Agency having jurisdiction.
 - 3) The sewer main will be constructed using one of the following options, in the following priority:
 - a. The sewer main must be constructed of water supply quality materials meeting AWWA standards.
 - b. The sewer main (depending on field conditions) shall be totally encased in a minimum of four (4) inches of cement slurry (300 PSI +/-) for a distance of ten (10) feet on each side of the crossing.

UNIFORM DESIGN STANDARDS

SECTION 2

Encasement will not be permitted for asbestos cement pipe.

- c. The sewer main or water main may be installed in a sleeve of water quality pipe which extends, without joints, ten (10) feet on each side of the main. (See UDACS Plate 15).
 - d. The Engineer may petition the Agency for approval to encase the water main (depending on field conditions) in a minimum of four (4) inches of cement slurry (300 PSI +/-) for a distance of ten (10) feet on each side of the crossing. Encasement will not be permitted for asbestos cement pipe.
- C. Where the existing large diameter water main, twenty-four (24) inches or larger, is below the storm/sewer main to be constructed, or above the storm/sewer main with a vertical separation less than eighteen (18) inches, the following provisions shall apply:
- 1) The storm/sewer shall be constructed of cast-in-place reinforced concrete with no expansion joints within ten (10) feet of the exterior wall of the water main, or
 - 2) The storm/sewer shall be constructed with precast reinforced concrete sections, installed with watertight joints using Agency approved elastomeric joint sealant, with provisions to insure against differential settlement of the storm drain.

2.19.03 Service Lateral Crossings and Clearances

For purposes of this section "service laterals" are those sewer and water lines extending from a main and terminating on-site. They are generally of smaller diameters (water: 1" to 4"; sewer: 4" to 6").

A. Parallel Separation (Service Laterals)

- 1) Water and sewer service laterals shall be installed a minimum of forty-eight (48) inches apart in separate trenches. Water laterals shall be a minimum of twelve (12) inches above the sewer lateral (Ref.: "Plumbing Code").
- 2) For maintenance purposes, service laterals shall be installed a minimum of forty-eight (48) inches from the exterior of the manholes.

B. Crossings (Service Laterals)

- 1) Where a water service lateral crosses a sewer main or sewer lateral, it shall be above the sewer with a vertical separation of at least eighteen (18) inches. Any relocation of existing water laterals to achieve these clearance must be performed with the approval of and in accordance with the procedures and standards of the Agency responsible for water distribution.
- 2) When a sewer main or sewer lateral must cross over or under a water lateral or water main with less than eighteen (18) inches clearance, the provisions of Section 2.19.02.B1 through 2.19.02. B3 shall apply.

2.19.04 Septic Tank Clearances

(See “Section 4, Figure 1” for requirements).

2.20 NON-POTABLE WATER SYSTEMS

This section is intended to provide the criteria for protection of the potable water distribution system in areas where non-potable, such as reclaimed and raw water irrigation systems are installed. All requirements for the construction and operation of a Reclaimed Water Distribution System are not identified in this standard, and the engineer shall review the standards established for these systems prior to design and construction of these systems.

2.20.01 Separation

Non-potable water systems will meet all storm/sewer requirements, and therefore, shall comply with the potable water location/separation criteria included in Sections 2.04 and 2.19.

2.20.02 Non-potable Water Distribution Pressure

The pressure requirements for the non-potable water system should be based on the system design; however, it is desirable that a pressure differential of ten (10) psi or greater be maintained on-site with the potable water supply having the higher pressure.

2.20.03 Backflow Prevention

Backflow protection shall be provided for all potable water services servicing a site that is also provided non-potable water service. Reduced

Pressure Principle Assemblies (RPPA's) shall be the minimum levels of backflow protection provided.

UNIFORM DESIGN STANDARDS

SECTION 2

2.21 TAPS 4 INCHES AND LARGER

2.21.01 Materials

- A. Mechanical joint, or other Agency approved, tapping sleeves and valves shall be used for wet taps where the tap diameter is greater than seventy-five (75) percent of the nominal pipe diameter being tapped.
- B. Mechanical joint or steel fabricated tapping sleeves shall be used for wet taps where the tap diameter is less than or equal to seventy-five (75) percent of the nominal pipe diameter being tapped.

2.21.02 Identification

The steel cylinder thickness, as well as the mortar lining and coating thickness, must be noted on all project plans where SCCP or MLCP mains are to be tapped.

2.21.03 Installation

- A. Wet taps shall be in accordance with each Agency's requirements.
- B. Where the Agency will perform the wet tap, the minimum tapping pit size required is four (4) feet parallel and eight (8) feet perpendicular from the face of the tapping valve to the back of the tapping pit per UDACS Plate 22.

2.22 LINE STOPS

Line stops may be required by the Agency, with or without by-pass, to ensure continuous operation of the water system. Line stops are used to temporarily shut down a pipeline system to complete modifications or repairs. They allow a system to operate without any interruption of service.

2.23 EASEMENTS

2.23.01 General Requirements

- A. Easements, where identified and allowed by the Agency, are required whenever the water main, service lateral, meter, backflow assembly, or any associated appurtenances are not located in a public right-of-way. All easement locations shall be identified on the water plan, as well as any area(s) dedicated as public utility easements to be occupied by water facilities, to facilitate field verification.
- B. Trees, shrubs, or decorative rocks, and any block wall or other fence material, shall be designed and constructed around the

UNIFORM DESIGN STANDARDS

SECTION 2

easement(s) to allow the Agency direct access to the vault(s), backflow assemblies, and piping from the adjacent right-of-way.

- C. The area within the easement shall be graded to provide drainage away from the vault and/or backflow assembly(ies) to prevent vault flooding and provide access for maintenance
- D. The area within the easement shall not contain any grades or materials such as large rocks (greater than two inches) that would hinder or restrict maintenance of the facilities.
- E. The final grade within the easement shall be at an elevation equal to back of sidewalk / right-of-way to allow safe ingress/egress to facilities. Retaining walls shall be provided when required, and a minimum distance of three (3) feet will be provided from the edge of the pad(s) or vault to any fence or wall.
- F. The Agency may identify other specific requirements or limitations for easements.

2.23.02

Size

- A. The easement size required for a water main will be per Section 2.04.01, or as specified by the Agency.
- B. The following chart identifies the minimum easement dimensions for various size meter configurations and meters with Agency owned backflow assemblies where required by the Agency:

| METER SIZE | METER TYPE | MINIMUM EASEMENT REQUIRED | |
|---------------|---|---------------------------|----------------------------|
| | | METER ONLY | METER WITH SINGLE BACKFLOW |
| 3" and 4" | Compound | 10' X 15' | 10' X 20' |
| 6" | Compound | 10' X 20' | 10' X 25' |
| 3" through 4" | Turbine & Type 3 Fire Service | 10' X 15' | 10' X 20' |
| 4" | Turbine & Type 3 Fire Service | 10' X 20' | 10' X 25' |
| 4" | Type 1 & Type 3 Fire Service | 10' X 15' | 10' X 20' |
| 6" | Type 1 & Type 2 Fire Service Combination Fire/Domestic | 15' X 20' | 15' X 25' |
| 8" | Type 1 & Type 2 Fire Service Combination Fire/Domestic | 15' X 25' | 15' X '30' |
| 10" | Type 1 & Type 2 Fire Service Combination Fire/Domestic | 15' X 25' | 15' X 30' |

UNIFORM DESIGN STANDARDS

SECTION 2

NOTE: *A larger easement may be required by the Agency if the lateral is offset in any manner from the connection to the main, or if dual backflow assemblies are required.*

C. The following chart identifies the minimum easement size required for various sizes of backflow prevention assemblies where required by the Agency:

| ASSEMBLY SIZE | DCDA & RPDA | MINIMUM EASEMENT REQUIRED: 10' X 15' |
|------------------------------|------------------------|---|
| Backflow Prevention Assembly | Perpendicular to R-O-W | Parallel to R-O-W |
| 1" through 2" | 05' X 10' | 05' X 10' |
| 3" | 10' X 10' | 10' X 15' |
| 4" | 10' X 10' | 10' X 15' |
| 6" | 10' X 15' | 10' X 20' |
| 8" | 10' X 15' | 10' X 20' |
| 10" | 10' X 15' | 10' X 20' |

NOTE: *Above sizes are based on compact assemblies. Size may be adjusted based on specific locations or assemblies, upon Agency approval.*

2.24 PLAN SUBMITTAL

2.24.01 General Requirements

All plans submitted to the Agency for review will meet the minimum requirements identified herein, and additional requirements may be established by the Agency. The following will be included in a submittal:

- A. Two (2) copies of a hydraulic or system analysis for flow and pressure.
- B. A legal map or legal property description to be served.
- C. A completed Agency Project Data Sheet. Copies must be obtained at the appropriate Agency Office.

UNIFORM DESIGN STANDARDS

SECTION 2

- D. Two (2) sets of the water plan indicating all water details up to, and for, the property to be served. The only acceptable size of the submitted drawings shall be 24" x 36" with a horizontal scale between 1" = 10' and 1" = 60'.
- E. One copy of any miscellaneous drawings (i.e., grading plans).
- F. One copy of an overall master plan showing the area to be developed and any other adjoining proposed developments by the builder.

2.24.02 Water Plan Drawing Submittal Requirements

The following are the requirements for drawings submitted to the Agency:

- 1) Project (Drawing) name
- 2) Engineer's name
- 3) Engineer's P.E. stamp with signature (required on final drawings)
- 4) Standard Notes
- 5) Legend
- 6) North arrow(s)
- 7) Scale(s) (horizontal and vertical)
- 8) Signature block for Agency approval
- 9) Vicinity map
- 10) 24" x 36" sheets (oversized drawings will not be accepted). profiles will be provided for all mains being installed in an unimproved area and for all mains 16 inches and larger in diameter
- 11) Benchmark data and identification of a tie between existing or proposed survey monuments and the submitted easement documents
- 12) Curve data on deflected water mains
- 13) Driveway locations
- 14) Rights-of-ways, easement, and property lines
- 15) Street names, and right-of-way dimensions
- 16) Show all existing mains, laterals, valves, hydrants, etc.
- 17) Show all proposed mains, stubs, valves, bends, reducers etc., dimensioned from existing stationary markers (street light, sign, hydrant, etc.), and surveyed controls (street intersections, centerlines, property lines, etc.)
- 18) Show proposed services
- 19) All new mains shall be drawn true to scale with no break lines
- 20) Layout should show the adjacent area and the relationship between the new facilities and the existing facilities, (i.e., surface grading, etc.)
- 21) Identify all other utilities, existing and proposed (i.e., gas, sewer, etc.)
- 22) Locate all existing or proposed obstructions such as utility vaults, catch basins, traffic islands, etc.
- 23) Quantity estimates
- 24) Fire flow requirements and location of all existing fire hydrants supporting the project
- 25) Fire Department approval
- 26) Notes as required by these Standards

2.24.03 Subdivision Water Plan Additional Drawing Requirements

In addition to the general water plan drawing requirements, the following will be required on subdivision water plans:

- 1) Lot and block numbers on all sheets
- 2) Total number of lots to be served
- 3) An overview map; e.g., copy of Assessor's Parcel Map, with Assessor Parcel outlines prior to the subdivision under review.

2.24.04 Above-Ground Structures Additional Drawing Requirements

Above ground structures and above-ground electrical and mechanical equipment shall be protected against physical damage due to a one-hundred (100) year storm event. Booster pumping stations shall remain fully operational and accessible during a twenty-five (25) year storm event. When required by the Agency, a flood study verifying these requirements must be submitted with the design drawings.

2.24.05 Approval Requirements

A. Preliminary Approval

Preliminary plan technical approval may be obtained after submitting the water plans for plan check, and making all the required changes as requested by the Agency. The preliminary approval will state:

"This project water plan complies with the Agency's technical requirements. However, this water plan is NOT APPROVED FOR CONSTRUCTION at this time and this signature does not provide or imply a water commitment."

The project fees, applications, agreements and/or easements are not required at this time. Final project approval must be obtained before construction is initiated.

B. Final Approval

- 1. All plans submitted to the Agency must be signed and have the stamp of a Civil Engineer who is licensed within the State of Nevada, in accordance with the Nevada Revised Statutes.
- 2. The Developer's Engineer will submit the original plans for Agency approval. A mylar copy must be submitted at the time of approval for all subdivisions, water main extensions, or service connections within NDOT rights-of-ways. The Agency will retain this mylar copy. A digital submission of

UNIFORM DESIGN STANDARDS

SECTION 2

the utility plan may also be required by the Agency. Standards for this submission will be established by the Agency having jurisdiction.

3. Prior to Agency water plan approval, the executed agreements, applications, fees, and required easements must be submitted and accepted by the Agency.
4. Approval of the Fire Department having jurisdiction must be obtained PRIOR to the Agency's approving the final water plan.

2.24.06 Expiration Date

Construction must commence within one (1) year of the approval date shown on the plans, and must be diligently pursued to completion or the project may be subject to cancellation and must then be resubmitted for review and approval in accordance with the Agency's Service Rules and requirements.

2.25 NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) PERMITS

A State Highway Permit is required when working within the right-of-way of any State owned or maintained road. The Agency will apply to the State for a permit upon obtaining approved water plans, and a check made payable to the Nevada Department of Transportation (NDOT) for the application fee (currently \$200). An easement for the Agency should be obtained from any underlying fee owner in the event NDOT does not own the full fee simple interest in the right-of-way. Prior to performing any work within the right-of-way, approval by the State must be received. The following note shall appear on the drawing:

NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) PERMIT REQUIRED

An approved NDOT Occupancy Permit shall be obtained through the Agency prior to any construction within the NDOT right-of-way. Plans showing work in NDOT right-of-way must show NDOT stationing. The developer assumes all liability for work conducted under the Agency obtained permit through warranty expiration.

2.26 SOUTHERN NEVADA WATER SYSTEM (SNWS)/ SOUTHERN NEVADA WATER AUTHORITY (SNWA)

If the project overlays an area involving existing or future SNWS/SNWA facilities, the Developer's engineer shall submit the plans to SNWS/SNWA for their review parallel with the Agency's review. SNWS/SNWA approval must be obtained PRIOR to Agency water plan approval. The SNWS/SNWA may be contacted by telephone at (702) 862-3444, by FAX at 862-3485, or by mail at 1900 East Flamingo Road, Suite 70, Las Vegas, Nevada 89119.

CONTINUE TO THE NEXT PAGE