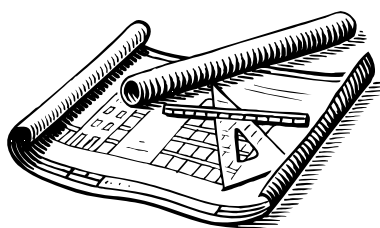




**ARIZONA**  
**AMERICAN WATER**



**2012**  
**DEVELOPER GUIDE**

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## **CHAPTER 1**

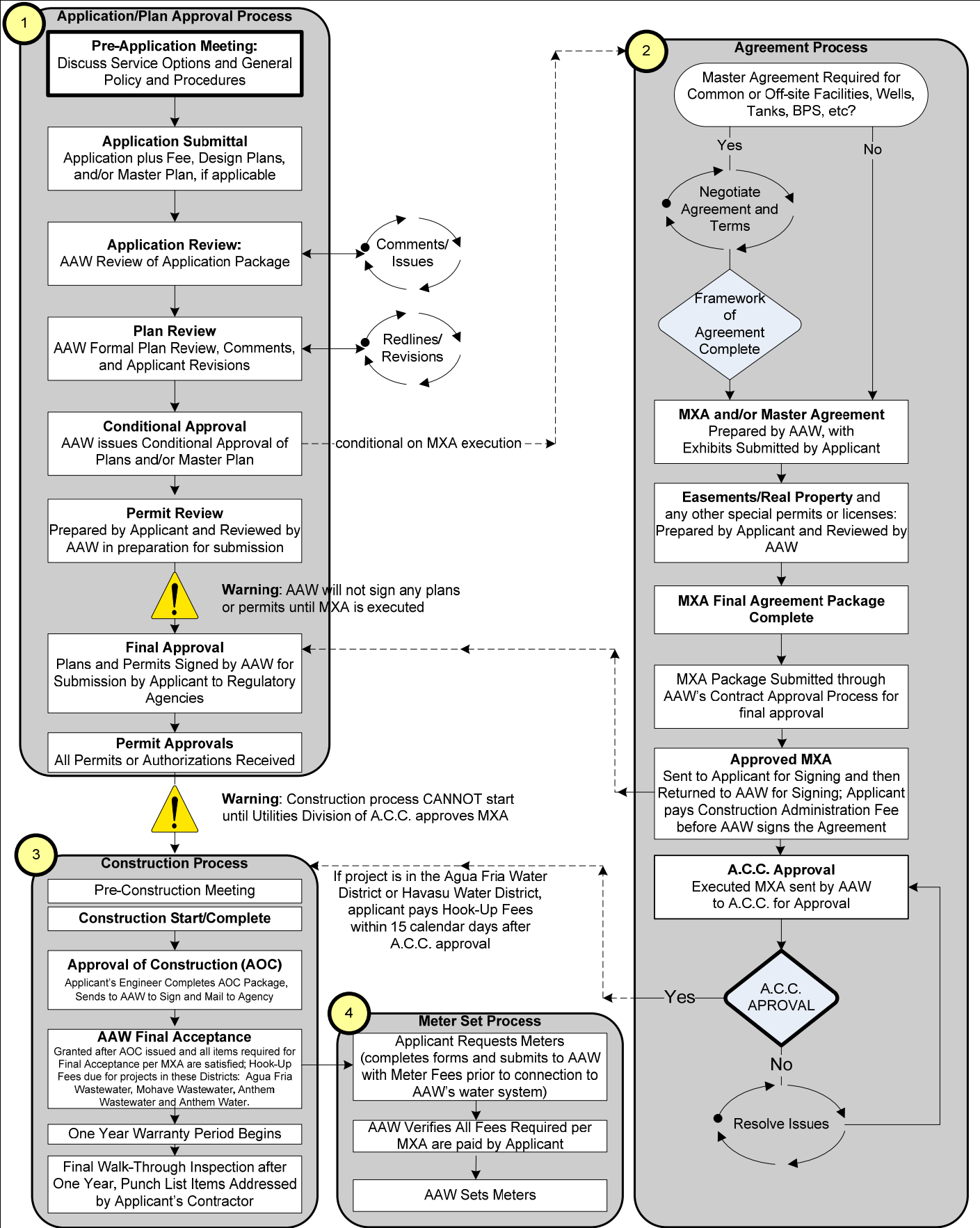
### **GENERAL INFORMATION**

**Note:** Throughout this Developer Guide, “Utility” means Arizona-American Water Company.

# Main Extension Process Overview

See "Summary of Key Points" for Details

Revision Date: August 2011



## ARIZONA-AMERICAN WATER COMPANY DEVELOPER SERVICES – FEE SCHEDULE

All fees are subject to change.

<p><b>Review Fee for Master Plan Reports for developments with 100 or less residential services</b></p> <ul style="list-style-type: none"> <li>• This Fee is submitted to Utility along with the “Application for Water or Sewer Main Extension” and with the Master Plan Report.</li> <li>• The Types of Master Plan Reports include water, sewer, and reclaimed water.</li> </ul>	\$1,500 per report type
<p><b>Review Fee for Master Plan Reports for developments with more than 100 residential services</b></p> <ul style="list-style-type: none"> <li>• This Fee is submitted to Utility along with the “Application for Water or Sewer Main Extension” and with the Master Plan Report.</li> <li>• The Types of Master Plan Reports include water, sewer, and reclaimed water.</li> </ul>	\$2,500 per report type
<p><b>Review Fee for Master Plan Reports for commercial developments</b></p> <ul style="list-style-type: none"> <li>• This Fee is submitted to Utility along with the “Application for Water or Sewer Main Extension” and with the Master Plan Report.</li> <li>• The Types of Master Plan Reports include water, sewer, or reclaimed water.</li> </ul>	\$2,500 per report type
<p><b>Plan Review Fee</b></p> <ul style="list-style-type: none"> <li>• Does not apply to projects that are “fire protection services only.”</li> <li>• This Fee is submitted to Utility along with the “Application for Water or Sewer Main Extension” and with the first submittal of engineering plans and specifications to Utility for review.</li> </ul>	\$5,000
<p><b>Plan Review Fee – for Fire Protection Services Only</b></p> <ul style="list-style-type: none"> <li>• This Fee is submitted to Utility along with the “Application for Fire Lines” and with the first submittal of engineering plans and specifications to Utility for review.</li> </ul>	\$2,500
<p><b>Construction Administration Fee</b></p> <ul style="list-style-type: none"> <li>• Does not apply to projects that are “fire protection services only.”</li> <li>• This fee is due upon execution of the Main Extension Agreement.</li> <li>• The developer’s engineer determines the estimated total cost of construction of the main extension, which is added as an exhibit to the Main Extension Agreement.</li> </ul>	\$6,500 + 5% of the Engineer’s Estimated Total Cost of Construction
<p><b>Line Testing Water Fee</b></p> <ul style="list-style-type: none"> <li>• This fee is due upon execution of the Main Extension Agreement.</li> <li>• This fee is the cost of the water used during testing of the main extensions (i.e., flushing, chlorination, filling).</li> </ul>	9 x (volume of the main extensions) x Water Rate per the applicable Water Tariff
<p><b>Application for Public Fire Hydrants</b></p> <ul style="list-style-type: none"> <li>• This fee is due after Utility’s review of the completed Application and before construction begins.</li> </ul>	\$750 per hydrant
<p><b>Requests for Assignment of Main Extension Agreements</b></p>	\$250 per request
<p><b>Hook-Up Fees</b></p>	As Stated in Tariff
<p><b>Water Meter Fees</b></p>	As Stated in Tariff

## SUMMARY OF KEY POINTS in the MAIN EXTENSION PROCESS

This outline provides an overview of the key procedures involved in administration, design, and construction of water distribution or sewer collection facilities for developer-funded projects. These procedures have been designed to promote efficient completion of projects at the lowest possible cost. Adherence to these procedures will avoid costly delays.

1. When it is determined that a proposed development is within Utility's service area, the developer will complete an Application for Water or Sewer Main Extension and will submit the application along with engineering plans and a \$5,000 Plan Review Fee to Utility. The Plan Review Fee is non-refundable and is to cover the initial cost of the Utility's project management expenses, including reviews of engineering plans, specifications and design reports, preparation and reviews of the Main Extension Agreement (MXA) and coordination of flow tests where necessary. The application for main extensions is available at <http://www.amwater.com/azaw/Working-With-Us/Doing-Business-with-Us/developers.html>.
2. The Plan Review Fee is structured to cover up to two reviews of engineering plans, specifications and design reports. If the developer's engineer fails to satisfactorily address Utility's review comments with its second submittal, the remaining portion of the Plan Review Fee may not be sufficient to cover Utility's time to review the engineer's third submittal. In that case, or in any other case where the Plan Review Fee has been exhausted, Utility will be unable to continue work until a second \$5,000 Plan Review Fee is submitted.
3. **Utility will not begin any work until the \$5,000 Plan Review Fee is received.** Upon receipt of the Plan Review Fee, Utility will assign a project manager to coordinate with the developer's engineer to assist them in developing engineering plans and specifications in accordance with Utility's requirements. These requirements are outlined in Utility's Developer Guide, which is available at the website provided above. During the course of plan development, the following may be required from the developer:
  - a. A letter or design report from the engineer estimating the ultimate population equivalents for the development, the average and maximum anticipated daily water demands (or wastewater flow rates) for domestic, irrigation, and fire protection, and the anticipated number and sizes of meters and service lines and proposed backflow prevention devices.
  - b. A letter from the jurisdictional fire protection agency setting forth requirements for fire flows, public fire hydrants, and/or private fire protection systems. These requirements must be incorporated into the engineering plans.
  - c. Preliminary plats or final plats showing lot numbers with corresponding street addresses and public utility easements. A final recorded plat is required prior to final closeout.
  - d. Easements of not less than 12 feet in width for all water/sewer facilities that are out of public right-of-way. Larger width easements may be required in certain cases. Utility's easement forms are available upon request. Draft easement forms, deeds, ALTA surveys and title reports will be submitted for Utility review prior to recordation of easements or execution of deeds. After Utility approval, developer will be responsible for recording the easements. A notarized copy of the recorded document shall be provided to Utility. Recorded off-site easements will be required prior to construction. Recorded on-site easements are required prior to activation of service.
  - e. Three complete sets of final engineering plans (approved by the fire protection agency, the governing regulatory agency, and Utility).
  - f. Copies of Certificates of Approval to Construct as issued by the governing regulatory County or State agency.
  - g. A material breakdown sheet in a format approved by Utility showing the quantity, size, and estimated construction cost of all water/sewer facilities to be conveyed to Utility, including permitting and engineering costs. This sheet must be signed and sealed by an engineer.
4. Before Utility will sign the approval block on the engineering plans, Utility must receive the Construction Administration fee. The Construction Administration fee is to cover Utility's construction administration expenses, including inspecting and testing the construction work, participating in construction progress meetings, reviewing as-built engineering drawings, coordinating with the Utilities Division of the Arizona

Corporation Commission (see paragraph 7 below), coordinating with the governing regulatory County or State agency to obtain the Certificate of Approval of Construction, reviewing developer's invoices (see paragraph 8.b below), reviewing ALTA surveys, title reports, easement and deed documents, coordinating meter set requests, and facilitating other numerous internal project management activities. An invoice for this fee will be sent to the developer at the time the plans are ready to be signed by Utility. **The Construction Administration fee is \$6,500 plus 5% of the Engineer's Estimated Total Cost of Construction.** The Engineer's Estimated Total Cost of Construction is the agreed-upon cost as detailed in paragraph 3.g above. This fee is a non-refundable contribution in aid of construction.

5. Except for projects in Mohave County, the developer is responsible to coordinate and award a construction contract to an Arizona-licensed contractor. For projects in Mohave County, the following steps will be taken after Utility receives the Construction Administration Fee:
  - a. Utility will sign / approve the engineering plans.
  - b. Developer's engineer will obtain all required permits, including the "Approval to Construct" and the Certificate of Assured Water Supply, and will furnish copies of these permits to the Utility.
  - c. The developer must specify, in writing, the date for the Utility to put the project out to bid ("Request to Bid"). Utility will determine the bid due date. Any developer requirements regarding time constraints (construction completion deadlines) must be noted in the Request to Bid. Please note the estimated time required from the invitation to bid to the start of construction is typically eight weeks, though may be longer.
  - d. Prior to bidding, developer will prepare all roads to rough grade and will have all waterline locations surveyed and staked so that the waterline locations correspond with the approved engineering plans.
  - e. Utility will solicit bids from qualified contractors.
  - f. After Utility receives and reviews the bids, Utility will provide developer a bid evaluation report that includes the recommended contractor, the bid amount, and the contractor's construction schedule. If the developer deems the contract price or construction schedule to be unreasonable, the developer may solicit bids from bonded contractors provided that all bids will be submitted by the bid due date stipulated by Utility. If a lower bid is obtained, or if a bid is obtained at an equal price with a more preferred construction schedule, Utility may continue to use Utility's chosen contractor but only if the chosen contractor meets the terms and conditions of the bid proffered; otherwise, Utility will be required to contract with the contractor proffering such bid.
  - g. The developer will pay to Utility, as a refundable advance in aid of construction, before construction is commenced, the cost of the winning bid.
  - h. If the final construction cost is less than the amount advanced by developer, Utility will refund the difference to the developer within 30 days after completion of construction or Utility's receipt of construction invoices. If construction change orders are incurred that result in an increase in costs, the change order work will not be performed until the additional cost is paid by the developer. If the developer fails to remit the additional funds, construction may be discontinued until the cost is paid in full.
  - i. After construction is completed and Utility issues final acceptance of the project, the developer's costs and fees that are refundable advances in aid of construction will be refunded by Utility in accordance with Arizona Administrative Code § R14-2-406.D for water and § R14-2-606.C for sewer. Any unrefunded balance of such advances remaining at the end of the applicable refund period shall become non-refundable. No interest shall be paid on any amount advanced by Developer.
  - j. Developer's engineer is responsible for creating as-built engineering plans that are subject to review and approval by Utility.
6. The contractor's insurance coverage must be in the types and amounts required by Utility and must include Utility as an additional insured. A sample certificate of insurance form with the required coverage is available upon request. The contractor is responsible to coordinate the site pre-construction meetings, inspection schedules and testing of new facilities by notification to Utility two business days prior to any planned activity.
7. If the development includes any public drinking water service, Utility will send a copy of the executed MXA and Certificate of Approval to Construct to the Utilities Division of the Arizona Corporation

Commission (ACC) for approval. Construction may not begin until approval is received from the Utilities Division of the ACC, which typically takes a minimum of 4 to 6 weeks.

8. After completion and testing of the new facilities, the following items are required to be submitted to and approved by Utility prior to activation of water/sewer service:
  - a. All items listed in section 3
  - b. Developer's actual cost breakdown, including copies of all contracts and paid bills, invoices and other statements of expenses incurred by developer, covering all of the costs of permitting, design, and construction of the water/sewer facilities
  - c. Unconditional lien waivers and releases
  - d. Three sets of as-built engineering plans on full-size bond paper, one set on 11" x 17" paper, one set on CD either as a CAD file or as a PDF file
  - e. Recorded easements and deeds
  - f. Backflow Certification
  - g. Copies of Certificates of Approval of Construction as issued by the governing regulatory County or State agency
  - h. Final walk-through inspection by Utility and resolution of all punch list items
  - i. Payment of all applicable tariff fees (meter fees, hook-up fees, etc.)
9. For all projects that involve an MXA, the above information is required before Utility will accept the facilities constructed by developer and before refunds of advances can be initiated. After Utility issues its written final acceptance of the new facilities, project closeout begins, which includes the final balancing of developer advances.

The above steps are not necessarily all inclusive, but rather an outline of critical points in the development of developer-funded projects. These steps should be included when planning such projects. Other specific project requirements may apply on a case-by-case basis.

## CONTACT LIST

<u>NAME</u>	<u>TITLE</u>	<u>RESPONSIBILITIES</u>	<u>DIRECT #</u>	<u>MOBILE #</u>	<u>FAX #</u>
Main Office Customer Service		General Inquiries General Inquiries	623.445.2400 800.383.0834		623.445.2454
Jake Lenderking	Water Resources Manager	Water Rights and ADWR Permitting	623.445.2410	623.238.0671	623.445.2454
Brad Finke	Developer Services Manager	Project Management, New Development Coordination	623.445.2402		623.445.2454
Kimberly Moreland	Project Manager	Real Estate, Easements, Deeds	623.780.3777		623.445.2454
John Reynolds	Project Manager	Plan Review/ Coordination Areas: Agua Fria – City of Surprise and south to Buckeye, Goodyear, and Verrado	623.445.2438		623.445.2454
Josh Vig	Project Manager	Plan Review/ Coordination Areas: Mohave County, Anthem, Paradise Valley, Tubac, Sun City, Sun City West, NE Agua Fria	623.445.2495		623.445.2454
Ed Radwanski	Manager of Construction	Construction Management and Inspections	623-445-2409	602.999.4528	
Cliff Wahlers	Sr. Engineering Tech	Construction Inspections	623.445.2447		623.933.0032
Dale Barnard	Construction Inspector	Construction Inspections	623.445.2443	602.388.7746	623.933.0032
Eric Coppinger	Construction Inspector	Construction Inspections	623.445.2445	602.309.1164	623.933.0032
Nathan Ellis	Construction Inspector	Construction Inspections	928.763.0488	928.542.0000	928-763-0495
Paul Reyes	Backflow Prevention Specialist	Backflow Prevention/ Pre-treatment Program Tracking	623.445.2411		623.445.2454

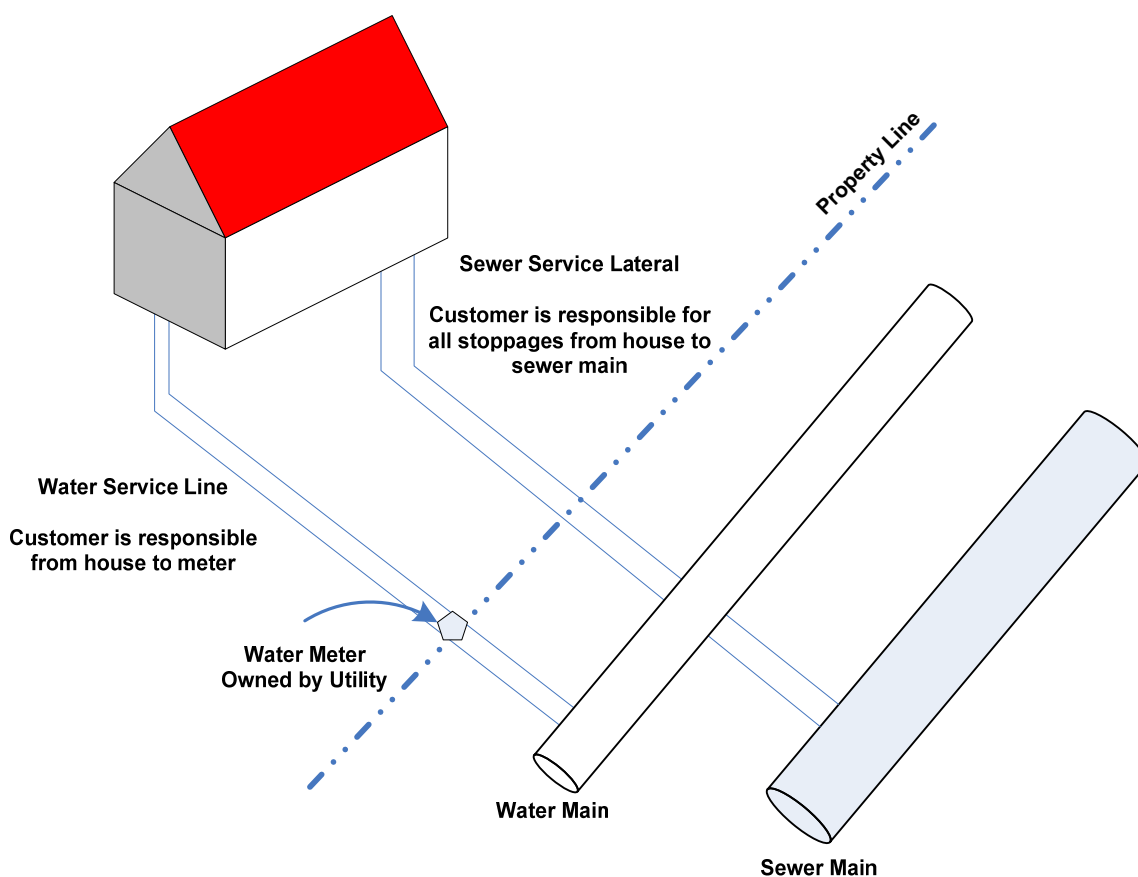
## Digital Files

<u>NAME</u>	<u>TITLE</u>	<u>E-MAIL/DIRECT #</u>	<u>RESPONSIBILITIES</u>
Christina Martinez	GIS Project Manager	Christina.Martinez@amwater.com 623.780.3790	Digital Details, mapping and "As-Builts"

## UTILITY OWNERSHIP OF FACILITIES

All water facilities on the Utility side of the service meter, including meter, are owned by Utility. All fire hydrants and related facilities are owned by Utility. Fire sprinkler taps, isolation valves, and that portion of the fire sprinkler services in the street rights-of-way or dedicated public utility easements are owned by Utility.

All sewer mains are owned by Utility. Utility will repair all leaks and will remove all stoppages in the sewer main. The property owner is responsible for all leaks and stoppages in the sewer service lateral. For that portion of the sewer service lateral outside the boundary of the parcel of private property, the property owner is responsible for all stoppages and Utility is responsible for all structural defects or failures (including penetration of tree roots). In all cases, when a problem arises with a sewer service lateral within the boundaries of the private property, the property owner is solely responsible.



The water and sewer facilities that will be owned by Utility as described above shall become the sole property of the Utility when Utility issues Final Acceptance of such facilities. Full legal and equitable title thereto shall be vested in the Utility, free and clear of any liens, without the requirement of any written document of transfer to Utility or acceptance by the Utility.

## DEVELOPER SERVICES SUBMITTAL LIST

<u>Item</u>	<u>Code</u>	<u>Item Description</u>
1.	a,1	24" x 36" Blue-line Plan and electronic PDFs of each sheet
2.	c,1	Water/Sewer Material Specifications
3.	a,1	Property Legal Descriptions in 8 ½" x 11" format suitable for incorporation into the Main Extension Agreement
4.	a,1	Project Drawing showing property, easements, water/sewer facilities and ROWs in 8 ½" x 11" format suitable for incorporation into the Main Extension Agreement
5.	a,1	Legal Descriptions in 8½" x 11" format for incorporation into the easement document (if needed). All legal descriptions shall have a corresponding exhibit.
6.	a,1	Engineer's Estimate of Probable Cost
7.	a,1	Certificate of Approval To Construct (ATC)
8.	d,1	Main Extension Agreement (MXA)
9.	a,1	Master Plans for subdivision development
10.	a,1	Water/Sewer Service Agreement
11.	a,1	Address/Lot Map/CAD File
12.	c,2	Trench Compaction Test Results
13.	a,2	Final Recorded Property Plat and/or Final Recorded Easement
14.	c,2	Backflow Prevention Assembly and Certification Data submitted to Utility's Backflow Prevention Specialist for Approval
15.	b,2	Certificate of Assured or Adequate Water Supply, whichever applies
16.	a,2	Certified As-Built Plans on 24" x 36" 4-mil Mylar, and PDFs of each sheet
17.	b,2	Complete Project Invoice/Cost Data, Approval of Construction (AOC)
18.	c,2	Lien Waivers
19.	a,1	Well Siting Study
20.	a,2	ADWR Non-Exempt Well Permit
21.	b,2	ADWR form Request to Change Well Information (change of ownership)

Codes:

a - Typically provided by Engineer  
b - Typically provided by Developer  
c - Typically provided by Contractor  
d - Provided by Utility

1 - Required prior to Start of Construction  
2 - Required prior to Final Acceptance

\*All items listed with code of 1 shall be submitted to the Utility and approved prior to the Utility's approval of the Developer's construction plans.

## **REQUIREMENTS FOR DEVELOPER-DESIGNED AND BUILT WATER/SEWER MAIN EXTENSIONS**

1. Developer shall prepare and submit Water and/or Sewer Plans in accordance with the requirements outlined in Chapter Three.
2. Utility's engineers will be available to discuss plan development and design concepts. Developer is encouraged to contact Utility prior to plan development for special instructions that may apply to a particular expansion.
3. Easements, legal descriptions and exhibits for all facilities to be Utility-owned shall be required for all such facilities not within dedicated rights-of-way. Easements shall have a minimum width of 12 feet and shall be centered about the centerline of the Utility-owned facilities. For cases where Utility will have a waterline and sewerline within the same easement, then the easement shall have a minimum width of 20 feet (with a minimum of 4 feet between edge of pipe and easement boundary). The easement legal descriptions and exhibits shall be submitted on 8 ½" X 11" sheets and signed and sealed by a Professional Civil Engineer or Land Surveyor registered in the State of Arizona.
4. Prior to commencing construction, Developer must supply Utility with an "Approval to Construct" as issued by the Maricopa County Environmental Services Department (for projects in Maricopa County), by the Santa Cruz County Department of Environmental Quality (for projects in Santa Cruz County) or by the Arizona Department of Environmental Quality (for projects in Mohave County). For projects that are exempt from the plan review requirements per A.A.C. R18-5-505.B.3, the Developer shall submit to Utility a letter from the applicable regulator confirming the exemption.
5. Developer shall only install materials approved in writing by Utility.
6. Developer shall construct all infrastructure in accordance with the Standards and Specifications of the Arizona Department of Environmental Quality, the Maricopa Association of Governments (regardless of project location), and the Utility.
7. Utility will conduct periodic inspections of Developer's construction. Utility does not provide full time on-site inspection. Responsibility for proper installation rests with Developer. Such inspection as the Utility personnel may perform in no way relieves Developer of its responsibility for construction and installation of the infrastructure.
8. Developer shall not make any changes from approved plans and specifications without prior written approval of Utility. Change orders authorizing changes in the approved plans and specifications must be co-signed by Utility and Developer's engineer of record prior to construction.
9. Utility will give final acceptance upon completion of all construction, including final adjustments of all valve boxes, manholes, meter boxes, etc. and submittal of any other required documentation.
10. Unless indicated otherwise by the provisions of the applicable main extension agreement, the date of final acceptance shall be the date of the Final Acceptance Letter from Utility to Developer unless otherwise stated in that letter. Developer shall be responsible for the repair of the facilities installed for one year from the date of final acceptance.
11. In order to establish actual cost of construction, Developer shall provide copies of all invoices for material and labor for that portion of the work to be owned by Utility. The invoices must be provided in a binder, itemized and include engineering, construction supervision, actual installation costs, and any other costs directly associated with the project.

**REQUIREMENTS FOR DEVELOPER-DESIGNED AND BUILT WATER/SEWER MAIN  
EXTENSIONS  
(CONTINUED)**

12. Developer shall provide unconditional lien releases from all contractors, subcontractors and material suppliers for all water and sewer construction projects.
13. Developer shall provide "As-Built" plans of facilities installed. The "As-Built" plans shall include the locations of all vertical and horizontal pipe bends, valves, manholes, sewer taps, etc., by station/offset and northing and easting on State plane coordinates. Developer shall provide three sets of as-built drawings on full-size bond paper, one set on 11" x 17" paper, and one set on CD either as a CAD file or as a PDF file. The plan must be certified for correctness by a Professional Civil Engineer or Land Surveyor registered in the State of Arizona. Reference the "As-Built" section, Chapter Three Construction Plan Requirements, for detailed "As-Built" plan requirements.
14. No refunds for "Advances in Aid of Construction" will be made prior to receipt of invoices, lien waivers and approved "As-Built" plans.

## **CERTIFICATE OF ASSURED OR ADEQUATE WATER SUPPLY AND GRANDFATHERED RIGHTS “EXTINGUISHMENT CREDITS”**

Prior to the approval of a plat and the issuance of a public report for a new development located within an Active Management Area (AMA) (the Utility's Agua Fria, Anthem, Paradise Valley, Sun City, Sun City West and Tubac water districts), Arizona law requires that the development secure a 100-year Assured Water Supply. This can be done in one of two ways: 1) the Developer secures a Certificate of Assured Water Supply (CAWS) for the proposed development, or 2) the water provider which will serve the proposed development (in this case, the Utility) has a Designation of Assured Water Supply (DAWS). Currently, the Utility does not possess a DAWS and it is therefore the Developer's responsibility to secure a Certificate of Assured Water Supply for the proposed development. Accordingly, the Utility requires that developers of subdivisions and commercial properties on lands having Irrigation Grandfathered Rights (groundwater pumping rights) file with the state to “extinguish” the rights and pledge the rights to the Developer's CAWS. This requirement is included in the main extension agreement.

For new developments located outside of an AMA (the Utility's Mohave and Havasu water districts), Arizona law requires that the development apply for a 100-year Adequate Water Supply prior to the platting and the issuance of the public report. Although state law does not require that the developments outside of AMAs obtain a 100-year adequate supply, it is the Utility's policy that all developments have sufficient supplies and obtain the 100-year Adequate Water Supply.

If Irrigation Grandfathered Rights or Type I Non-Irrigation Grandfathered Rights are associated with the land to be developed, the Developer shall, within 30 days of plat recordation or prior to execution of a Membership Agreement with the Central Arizona Groundwater Replenishment District, whichever occurs first, submit to the Director of the Arizona Department of Water Resources (ADWR), a notarized Statement of the Intent to Extinguish the Grandfathered Rights, including the Certificate of Grandfathered Right to be Extinguished. If the Grandfathered Right is a Type I right, proof of ownership of the land shall be submitted with the statement of intent. Any forms required to be submitted by ADWR shall also be included with the Statement of Intent.

The Statement of the Intent to Extinguish the Grandfathered rights shall include the statement, “It is requested that the Director of the Department of Water Resources make the extinguishment credits available for use by pending CAWS application number [insert appropriate CAWS application number].” A statement pledging the credits to the appropriate application for a CAWS shall also be indicated as appropriate on the extinguishment forms submitted. A copy of the Statement of the Intent to Extinguish Grandfathered Rights with all enclosures and a copy of the ADWR extinguishment forms shall be mailed to:

Arizona American Water  
Attn: Water Resources Manager  
2355 West Pinnacle Peak Road, Suite 300  
Phoenix, AZ 85027

## **SANTA CRUZ COUNTY DEVELOPMENT PLAN APPROVAL PROCESS**

### **FOR SANTA CRUZ COUNTY ONLY**

1. Developer must contact the Utility's Developer Services Department for a Santa Cruz County Supplemental Forms Package.
2. Developer's engineer shall submit plans, required forms and property legal description to Utility.
3. Concurrently, Developer's engineer must submit plans, required forms and any required review fees to Santa Cruz County Department of Health Services. Contact Santa Cruz County Department of Health Services at 2150 North Congress Drive, Nogales, Arizona 85621 or at (520) 375-7900 for information.
4. Developer must obtain written approval for the project from the Santa Cruz County Department of Health Services. Note that this approval does not constitute approval of the Developer's water plans.
5. Developer's engineer must submit plans, required forms and review fees for review and approval to the Arizona Department of Environmental Quality (ADEQ), Water Quality Division, Engineering Review Desk, in Phoenix. The Developer must obtain ADEQ's Certificate of Approval to Construct.
6. Developer's engineer must prepare and forward to the Utility the property legal description and exhibits needed for preparation of the main extension agreement and any required easements.
7. Utility will prepare the main extension agreement and any required real property conveyance documents for easements and forward them to the Developer for execution.
8. Utility will review and comment on the Developer's plans for the proposed water main extension. If necessary, the Developer's engineer will revise those plans in accordance with the Utility's comments and resubmit the plans to the Utility.
9. Once the Developer's plans are acceptable to the Utility, the Developer's engineer will forward original Mylar Cover sheet with ADEQ signature and Certificate of Approval to Construct to the Utility for approval and signature.
10. Utility will approve and sign the Developer's plans after receipt from the Developer of the signed and notarized main extension agreement, easements and the Certificate of Approval to Construct.
11. Utility will forward the executed main extension agreement and supporting documents to the utilities division of the ACC for review and approval. Upon approval of the main extension agreement, the utilities division of the ACC will notify the Utility in writing and the Utility will notify the Developer.
12. Only after the preceding steps are complete may construction of the fully approved water facilities begin. The Developer's contractor is required to contact the Utility's construction inspector 48 hours in advance of the start of construction.

## **CHAPTER 2**

### **MASTER PLAN AND DESIGN CRITERIA**

## MASTER PLANNING AND DISTRIBUTION MAIN REQUIREMENTS

Arizona American Water (Utility) requires that distribution systems be designed in accordance with Utility's design requirements, applicable state and county requirements, any authority having jurisdiction within Utility's service area, sound engineering practices, and other applicable codes or recognized standards.

Distribution systems should be designed with sufficient "looping" and other redundancies as may be necessary to minimize outages to customers in the event of main breaks, routine maintenance, and repairs. Distribution systems should be sized to accommodate sufficient fire flows as may be required. The design and sizing of the distribution systems should include a main break analysis to ensure the provision of adequate fire flows and service to our customers.

As a condition of service, and in addition to the distribution system design standards, Utility requires that distribution systems include a **secondary 8-inch diameter distribution main** in addition to the normally required "backbone" or larger diameter distribution mains. This requirement is most easily achieved by increasing the size of portions of typically 6-inch diameter distribution piping to 8-inch diameter. The selected alignment of the secondary 8-inch distribution main would ideally traverse the center of the development or phase of development, originating and terminating at larger "backbone" mains. This requirement is not to be construed as a request for over-sizing, rather as a sound engineering design condition. In accordance with Arizona Corporation Commission rules and regulations, no waterlines less than 6 inches in diameter will be accepted.

Plan submittals will be reviewed for the inclusion and acceptability of the 8-inch secondary distribution main and its alignment. An approved water distribution analysis is required to accompany all waterline Construction Drawings. The analysis shall identify proper distribution system sizing based on the required flow parameters, as well as the criteria listed above.

Where a land developer has subdivided any piece of land for development by another party, Utility may require an individual water master plan in line with these guidance notes, unless the principal land developer's approved master plan has adequately covered distribution of all individual parcels. All developers should coordinate with Utility's Developer Services and Planning Division to identify whether or not additional master plans are required for their area of development.

Where land is intended to be developed in phases, details and timing of the phases of the development must be included in the master plan. The phasing information should include details and timing of any landscaped areas requiring irrigation from the potable water system (where the system tariff structure allows), especially where this will be effective prior to construction and/or sales of dwelling units.

Master plans will be reviewed by Utility's Developer Services and Planning Division to ensure new developments are coordinated and consistent with the long term master plans of the relevant service area. Developers are required to submit two copies of the master plan and the appropriate electronic files of the hydraulic analysis. Initial master plan reviews may take up to 8 weeks for initial review depending on the complexity of the project. This does not include any time needed for revisions and subsequent reviews. Failure to provide two copies of the master plan as well as electronic files for the hydraulic model may result in a delay of Utility's review that may then take more than 8 weeks.

## MASTER PLANNING AND DISTRIBUTION MAIN REQUIREMENTS

(CONTINUED)

A hydraulic analysis using the current version of WaterCAD (or equivalent with prior approval of Utility), must be performed for the proposed water distribution system and submitted as part of the Master Plan. The Master Plan shall be prepared in accordance with Utility's master plan outline. A color exhibit showing water line locations, sizes, parcel boundaries, junctions, contour elevations, pressure zone boundaries, etc. shall be submitted as part of the Master Plan. In addition to the hard copy documents required here, the submittal must also include a copy of the full hydraulic model and any tabular files used for the hydraulic analysis in electronic format on CD. The Master Plan shall be signed and sealed by a Registered Professional Civil Engineer in the State of Arizona and submitted to Utility for review and approval.

Any and all criteria not listed herein shall be in accordance with, but not limited to, the following governmental agency requirements and any such criteria presented in the Master Plan shall be referenced appropriately for Utility review: Environmental Protection Agency (EPA), Arizona Department of Environmental Quality, Arizona Department of Water Resources, Maricopa Association of Governments (if applicable to development), Maricopa County Health Code Chapter V (if applicable to development), local jurisdictional Planning and Zoning Requirements, and appropriate municipality regulations, if development is in a municipality serviced by Utility. If a development is outside Maricopa County it must conform to regulations and requirements of local jurisdictions and governmental agencies. All developments shall be compliant with AWWA standards. Fire flow requirements shall be determined by the jurisdictional Fire Marshal and the requirements shall be stated in a letter from the Fire Marshal, which must be included as an appendix with the Master Plan.

The "Demands" table provided in the Design Criteria section below shows typical demand values used by Utility for internal planning purposes. It should be noted however that this table may not be applicable to certain developments. **In all instances developers should coordinate with Utility's Developer Services and Planning Division prior to development of master plans, to ensure appropriate demand projections are made.**

## DESIGN CRITERIA FOR WATER SYSTEMS

### Demands<sup>1</sup>

Land Use	Average Day Demand	Persons per Dwelling Unit	Max Day Peaking Factor	Peak Hour Peaking Factor
Active Adult	160 gpd/person	1.9	1.8	3.0
Single Family	150 gpd/person	3.2	1.8	3.0
Multi Family	110 gpd/person	2.0	1.8	3.0
Commercial <sup>2</sup>	1,700 gpd/acre	n/a	1.8	3.0
Developed Open Space <sup>2, 3</sup>	1,800 gpd/acre	n/a	n/a	n/a
Schools <sup>2</sup>	1,800 gpd/acre	n/a	n/a	n/a
Hotels/Resorts	Contact Utility's Planning Division to discuss your specific case			

<sup>1</sup>Please contact Utility's Planning Division for Resource Data on other demand types.

<sup>2</sup>Acreage is based on gross number of acres.

<sup>3</sup>Developed Open Space includes general landscaped areas where irrigation will be required, such as road medians, and areas to be maintained by HOAs.

**Specific Modeling Requirements:** Demands should be distributed among nodes to provide a reasonable reflection of the expected system demand distribution. Where demands are grouped and represented by only a few nodes those demands should be allocated to the nodes with the highest elevation as well as the furthest point from the development's point of supply.

### Pressures

Minimum Pressures: 55 psi static and 40 psi @ peak hour, 20 psi @ max day + fire flow

Maximum Pressures: In accordance with the Uniform Plumbing Code, any structure experiencing pressures greater than 80 psi shall have an individual pressure reducing valve on the customer side of the meter. Maximum system pressures in excess of 90 psi static shall be approved by Utility in writing prior to submittal of any master plan. Areas where many customers experience pressures higher than 80 psi may require a PRV station or modification to the distribution system, to be approved by Utility.

### Velocity & Headloss

10 fps maximum velocity for distribution system  
 2 fps minimum and 6 fps maximum velocity for well transmission lines  
 10 ft headloss per 1,000 linear feet of pipe for well transmission lines

### Hazen-Williams Coefficient 130 (for new pipes)

The Darcy-Weisbach equation must be used for booster station design.

Where development models include existing pipes, appropriate coefficients will need to be selected. Where an existing calibrated model exists, the coefficients in the existing model must be used. If there is no existing calibrated model, the developer's engineer will need to consult with Utility's planners to identify suitable coefficients.

### Fire Flows

Fire flows must be in accordance with jurisdictional Fire Marshal requirements. Provide a written statement from the jurisdictional Fire Marshal that states the required flows and duration by class of customer. In the absence of a jurisdictional Fire Marshal, fire flow requirements must be in accordance with the latest version of the International Fire Code.

## DESIGN CRITERIA FOR WATER SYSTEMS

(CONTINUED)

### Storage Requirements

Equalization	30% of max day, plus
Emergency reserve	the greater of 10% of max day OR the storage volume required based on the fire flow requirements stated above

### Booster Pump Station

Firm Capacity	Shall meet or exceed the greater of peak hour flow or max day + fire flow with the largest pump out of service for the pressure zone(s) that the booster station serves. Shared redundancy between pressure zones may be acceptable via a PRV (with the prior approval of Utility) provided adequate redundancy exists in the higher zone.
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### Water Valves

Number of Valves = number of radiating mains at intersection minus one  
Valve spacing shall be in accordance with ADEQ Bulletin #10  
Valves in well transmission mains shall be kept to a minimum.

### Wells

Where developments are supplied solely by groundwater wells, the following criteria must be met:

**Firm Capacity:** Any wellfield supplying a booster station must meet the maximum day demand for the entire station with the greatest producing well out of service. Single source wellfields are not allowed. Proposed wells supplying directly into the distribution system are discouraged and will be reviewed on a case-by-case basis.

**Permitted Capacity:** The total *permitted* capacity of a wellfield shall be adequate to meet the anticipated total annual demand for the development.

Well transmission lines shall have an 8" minimum diameter. Where a transmission line will have multiple wells connected to it, the pipe shall be sized such that **all** wells connected to that line can run simultaneously at their full capacity while meeting the velocity and headloss constraints defined in this guide. If this cannot be achieved, contact Utility's Developer Services Division for guidance.

### Fire Hydrants

Fire hydrant spacing shall be in accordance with the International Fire Code, the Arizona State Fire Code, and any applicable local jurisdictional agency.

### Air Release Valves

Air release and air vacuum valves shall be located at all high points and at vertical realignments of the water line. All air valves shall be designed and installed in accordance with requirements shown in the "Booster Pump Station & Reservoir Design Guideline," which may be provided by Utility upon request.

### Pressure Reducing Valves

Pressure reducing valves shall be located on transmission/distribution mains to maintain design pressure ranges in accordance with established or proposed water master plans. These locations must be coordinated with, and approved by, Utility. PRV sizing shall be based on anticipated minimum/maximum flow ranges.

## DESIGN CRITERIA FOR WATER SYSTEMS

(CONTINUED)

### Wash Crossings

All waterlines that cross washes or channels shall be MEGALUG restrained joint ductile iron pipe (Class 350). The depth requirement for placing waterlines under washes or channels shall be the deeper of the following two cases:

1. Per the Arizona Department of Environmental Quality's Engineering Bulletin No. 10, the minimum cover over the pipe shall be greater than or equal to two (2) feet below the scour depth (based on Scour Analysis described below).
2. The minimum cover over the pipe may be based on the 100-year flow rate of the wash or channel as shown in the table below. Note that the "additional depth" in the table refers to the depth of pipe that must be added to the normal cover requirements that are provided in Detail No. 350-1.

100-Year Flow Rate	Additional Depth
1 to 49 cfs	1 foot
50 to 99 cfs	2 feet
100 to 499 cfs	3 feet
Greater than 499 cfs	Scour Depth (based on Scour Analysis); minimum of 3 feet

Details on the determination of the 100-year flow rate shall be submitted to the Utility for review. The Scour Analysis shall be in accordance with the Arizona "State Standard for Watercourse System Sediment Balance" (SS5-96), Guideline 2, Level I, as published by the Arizona Department of Water Resources (<http://www.azwater.gov/azdwr/SurfaceWater/FloodManagement/StateStandards.htm>). The Scour Analysis shall be submitted to the Utility for review for all wash crossings.

### Minimum Residential Potable Water Meter Sizing

All residential meters shall be at least as large as follows, and shall also be sized in compliance with the current Uniform Plumbing Code (UPC) and any applicable municipal or other governmental requirements. The municipality-approved architectural calculations shall be submitted to Utility to document the sizing of meters for each residence.

#### Non-Age Restricted Single Family

- 5/8" x 3/4" Meter - Residential lots less than 60 feet wide and less than 8,000 square feet in area.
- 3/4" Meter - Residential lots 60 feet wide or larger; or, having an area greater than or equal to 8,000 square feet and less than 12,000 square feet.
- 1" Meter – Lots equal to or greater than 12,000 square feet in area.

#### Age Restricted Single Family

- 5/8" x 3/4" Meter - Residential lots less than 12,000 square feet in area.
- 3/4" Meter – Residential lots greater than or equal to 12,000 square feet in area.

For residences that include fire sprinklers or landscape irrigation, the meter size shall be the greater of the following:

- (1) meter size as determined by the current UPC, or
- (2) from each fire sprinkler zone within the residence, the highest of these fire flows must be in accordance with the table below (i.e., if the calculated fire sprinkler flow is 31 gpm, then a 1-inch meter will be required), or

## DESIGN CRITERIA FOR WATER SYSTEMS

(CONTINUED)

(3) the landscape irrigation flow must be in accordance with the table below:

Minimum Required Meter Size (inches)	Maximum Allowed Fire Flow or Irrigation Flow (gal/min)
5/8	20
3/4	30
1	50
1 1/2	100
2	160
3 and larger	Determined on a case-by-case basis

The maximum flows provided in the table above should only be imposed on the meter for short, intermittent periods. Meters should not be operated on a continuous 24-hour service at flows greater than one-half of the maximum flows provided in the table above.

### Service Line Size

The minimum service line size is 1-inch, installed in accordance with Utility's STD. DET. 342-2. The appropriate adapter shall be installed with the meter box as shown on STD. DET. 342-2. Where the water meter size is greater than 1-inch, the service line must be the same size as the meter.

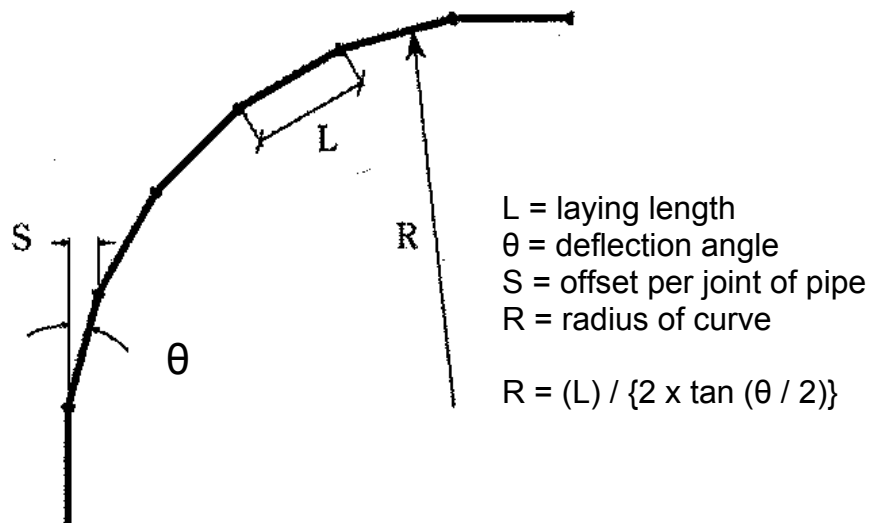
### Meter Location

Meters shall be doubled up on lot lines where possible, shall not be installed at road intersection corners, and shall not be adjacent to fire hydrants. Each service line requires a separate tap to the main. Proposed connections of two or more meters in a manifold configuration will be reviewed by Utility on a case-by-case basis. Existing service lines that will not be used by a development shall be abandoned and plugged at the main.

(Continued)

## Curvilinear Alignments

Design constraints are provided below:



### C900, DR18, PVC Pipe

Pipe Diameter	Laying Length	Max Deflection Angle	Offset per joint of pipe	Min. Curve
6"-12"	20'	2.0°	8.4"	573'

### C905, DR18, PVC Pipe

In accordance with AWWA C605-94, section 5.6, the bending of the PVC Pipe barrels larger than 12-inch (300-mm) nominal diameter is not recommended due to the forces required. The curved alignment of PVC pipelines larger than 12-inch (300-mm) in diameter shall be determined by one-half the pipe manufacturers published axial-joint-deflection limits. Manufacturer's technical data sheets shall be submitted to Utility for review and approval.

### Ductile Iron Pipe, AWWA C150/151/153

Pipe Diameter	Laying Length	Max Deflection Angle	Offset per joint of pipe	Min. Curve
8"-12"	18'	2.5°	9.4"	413'
14"-16"	18'	2.0°	7.5"	516'
18"-20"	18'	1.5°	5.7"	688'
24"	18'	1.0°	3.8"	1032'
8"-12"	20'	2.5°	10.4"	459'
14"-16"	20'	2.0°	8.4"	573'
18"-20"	20'	1.5°	6.2"	764'
24"	20'	1.0°	4.1"	1146'

## **WATER MASTER PLAN OUTLINE**

The following outline shall be used for the preparation of master plan reports:

1. Cover Sheet
  - a) Title (Development Name), Date, Revision Date(s)
  - b) Developer and engineer's contact information.
  - c) Sealed by a Professional Engineer registered in the state of Arizona.
2. Table Of Contents
  - a) Sealed by a Professional Engineer registered in the state of Arizona.
3. Executive Summary
  - a) 1 or 2 pages with emphasis on proposed facilities to serve the development.
4. Introduction
  - a) Plan Objective – state purpose of the report
  - b) Site Location w/ vicinity map.
  - c) Proposed Development
5. Design Criteria
  - a) Demands, Pressures, Storage, Booster Pumps, Wells, Distribution System (pipe sizing)
    - i. Utility Developer Guide criteria
    - ii. MAG, ADEQ, other governmental agency criteria as applicable
    - iii. Generally accepted engineering standards (requires Utility approval)
6. Demands
  - a) Single family, multi family, commercial, school, open space, parks, landscaping etc.
  - b) Details of all zoning obtained within development, including any pending re-zoning applications.
  - c) Quarterly projections of demands from beginning of construction (construction water) to buildout, to include a breakdown of any phasing that may be involved with construction. This should include an exhibit to show locations, and a schedule showing the expected timing of demand growth for any phases as applicable. The intention would be to show how demand is projected to increase at all locations over time through buildout of the development.
  - d) Summary narrative of demands table. Discuss which demand scenario governs design (Peak Hour or Maximum Day plus Fireflow)
  - e) Tabular calculations (spreadsheet) of all demands.
7. Existing Facilities/Conditions
  - a) Reference any previous master plans used and their dates as applicable.
8. Proposed Facilities
  - a) Required storage, proposed location, or expansion of existing if applicable.
  - b) Required booster pump capacity.
  - c) Required well capacity, number of wells if applicable.
  - d) Distribution system piping, onsite as well as any offsite infrastructure needed.
  - e) PRV's if applicable.
  - f) Phasing if applicable. Where facilities will be constructed in phases, the timing and responsible party for each facility must be defined. If the timing of more than one development in adjacent areas allows, developers are encouraged to meet and plan with Utility to maximize the possibility and benefit of regionalization of facilities.
9. Water Model
  - a) Describe model used.
  - b) Assumptions
    - i. Pump curves obtained from Utility information/staff or otherwise accepted test
    - ii. Criteria used in the model.
  - c) Results/Discussion – proposed facilities are adequate to serve development based on hydraulics

## 10. Summary/Conclusions

- a) Discuss how the objective of report has been met, i.e. proposed facilities will serve the proposed development in accordance with established criteria.
- b) List major facilities required and phasing as applicable.

## 11. Appendices

### a) Water Modeling Results Organized by:

- i. Average Day
- ii. Maximum Day
- iii. Peak Hour
- iv. Maximum Day plus Fire Flow

### b) The following information is to be included for the above scenarios:

- i. Junction/Node report showing node label, elevation, demand in gpm, hydraulic grade line in feet, pressure in psi, and assigned pressure zone for that node (zone assignment to node shall be in accordance with the existing operation of the service area and in accordance with Utility naming conventions). Also, for phased developments, reports and exhibits should identify those nodes that are active and those that are inactive for various model runs.
  - ii. Pipe report showing pipe label, start/stop node, length, diameter, Hazen-Williams "C" value, flow, velocity, headloss, headloss gradient, and intended year of installation.
  - iii. Pump report showing pump label, elevation, discharge, discharge pump grade, and pump head. An attachment to the pump reports should also be included to show assumed pump patterns and efficiency curves for any pumps modeled in the hydraulic analysis.
  - iv. Valve report showing valve label, elevation, diameter, valve status, discharge, and from/to hydraulic grade line.
  - v. Tank report showing tank label, base elevation, maximum elevation, volume, hydraulic grade line, and outflow.
  - vi. Reservoir report showing reservoir label, elevation, hydraulic grade line, and outflow.
  - vii. A separate fire flow report for the maximum day plus fire flow scenario shall be submitted. The fire flow report is to show the following information for all nodes: node label, satisfies fire flow constraint, needed fire flow, available fire flow, total flow available, residual pressure, minimum system pressure, and minimum system pressure node
  - viii. An extended period simulation (EPS) model showing storage tank levels varying with time may be required for complex system designs, to verify adequate fire flow storage and also to verify that wells have sufficient capacity for tank replenishment during maximum day demands. Where an EPS model is used, an explanation will be required for the basis of diurnal demand patterns, and the basis of demand allocation. A clear explanation will also be required for the naming convention used for the different model scenarios. Finally, detail will be required on how the source of water has been modeled. A summary of the techniques used to generate the hydraulic model and engineering analysis should clearly be described.
- c) 11" X 17" (24" X 36" for large developments as applicable) color exhibit for peak hour. Average day and maximum day exhibits may be required. Exhibits to include:
- i. Pipes and nodes labeled.
  - ii. Pressures at nodes.
  - iii. Major roadways labeled.
  - iv. Pipe size shown by color.
  - v. Major contour lines shown.
  - vi. Pressure zone boundaries.

### d) Cost Estimate

\*Figures, exhibits, tables, spreadsheets, etc. to be placed in the body of the report where possible.

## DESIGN CRITERIA FOR WASTEWATER SYSTEMS

A hydraulic analysis must be performed for the proposed wastewater collection system and submitted as part of the Master Plan. The design methodology shall be presented and appropriately referenced. The results of this analysis shall be presented in tabular form with at least the following information presented: pipe number, to/from manhole number, pipe size, pipe slope (slopes that are greater than minimum design shall be noted), average daily flow, peak hour flow, d/D ratio at peak hour, and velocity at peak hour. An analysis of sewer force mains must be performed, including impacts due to pump surge, and submitted as part of the master plan. Force main hydraulic losses shall be performed using the Darcy-Wiesbach equation. A 24" X 36" color exhibit showing flow contributing area, sewer line number and manhole number locations, flow direction, property boundaries, contour elevations, etc. shall be submitted as part of the Master Plan. The Master Plan shall be signed and sealed by a Registered Professional Engineer and submitted to ARIZONA AMERICAN WATER (Utility) for review and approval.

Average Daily Flow	100 gpcd
Commercial/Industrial Average Daily Flow	1,500 gal/acre/day
Population Density Active Adult Single Family Multi Family	1.9 persons per DU 3.2 persons per DU 2.0 persons per DU
Peak Hour Factor	3.0
Sewer Depth of Cover	7'-6" minimum for trunklines 6'-0" minimum for all other provided that service lines have 5'-0" minimum cover at the property line.
Rim Elevations	Above 100-year floodplain
Manning's Roughness Coefficient	n = 0.013
Sewer Pipe Material	Concrete encased PVC at wash crossings. PVC for all other.
Velocities	2.0 fps minimum at peak hour 2.0 fps minimum at average daily flow for trunklines. 10.0 fps maximum
Manhole Spacing	500 ft maximum for lines less than 18" in diameter. Reference A.A.C. R18-9-E301 for larger diameter lines.
Cleanouts	At end of lines less than 200 ft
Sewer Capacity Ratio	d/D = 0.75 maximum at peak hour
Minimum Pipe Diameter	8"
Minimum Manhole Diameter	4', except 5' for pipe diameters 15" or greater, and 5' for manholes 10' or deeper  All manholes shall have a 30" frame and cover.

## DESIGN CRITERIA FOR WASTEWATER SYSTEMS

(CONTINUED)

Force Main Velocities	3.0 fps minimum 7.0 fps maximum										
Force Main Air Release Valves	Sized and located per manufacturer's recommendation at high points.										
Wash Crossings	<p>All sewer lines that cross washes or channels shall be concrete-encased PVC. The depth requirement for placing sewer lines under washes or channels shall be based on the 100-year flow rate of the wash or channel as shown in the table below.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">100-Year Flow Rate</th> <th style="text-align: center;">Minimum Depth from Bottom of Wash to Top of Pipe</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1 to 49 cfs</td> <td style="text-align: center;">5 feet</td> </tr> <tr> <td style="text-align: center;">50 to 99 cfs</td> <td style="text-align: center;">6 feet</td> </tr> <tr> <td style="text-align: center;">100 to 499 cfs</td> <td style="text-align: center;">7 feet</td> </tr> <tr> <td style="text-align: center;">Greater than 499 cfs</td> <td style="text-align: center;">Scour Depth (based on Scour Analysis) plus 3 feet; minimum of 7 feet</td> </tr> </tbody> </table> <p>Details on the determination of the 100-year flow rate shall be submitted to Utility for review. The Scour Analysis shall be in accordance with the Arizona "State Standard for Watercourse System Sediment Balance" (SS5-96), Guideline 2, Level I, as published by the Arizona Department of Water Resources (<a href="http://www.azwater.gov/azdwr/SurfaceWater/FloodManagement/StateStandards.htm">http://www.azwater.gov/azdwr/SurfaceWater/FloodManagement/StateStandards.htm</a>). The Scour Analysis shall be submitted to Utility for review for washes with a 100-year flow rate greater than 499 cfs.</p>	100-Year Flow Rate	Minimum Depth from Bottom of Wash to Top of Pipe	1 to 49 cfs	5 feet	50 to 99 cfs	6 feet	100 to 499 cfs	7 feet	Greater than 499 cfs	Scour Depth (based on Scour Analysis) plus 3 feet; minimum of 7 feet
100-Year Flow Rate	Minimum Depth from Bottom of Wash to Top of Pipe										
1 to 49 cfs	5 feet										
50 to 99 cfs	6 feet										
100 to 499 cfs	7 feet										
Greater than 499 cfs	Scour Depth (based on Scour Analysis) plus 3 feet; minimum of 7 feet										
Manhole Invert Drops < 45° direction change ≥ 45° direction change	0.1' drop across manhole 0.2' drop across manhole										
Manhole Lining	<p>All sewer manholes shall be lined with one of the following products, as applied by a certified applicator:</p> <ul style="list-style-type: none"> <li>• NeoPoxy NPR-5300 Series epoxy</li> <li>• Raven 405/A10</li> <li>• Sauereisen 210</li> <li>• Sewer Shield 100</li> </ul>										

## DESIGN CRITERIA FOR WASTEWATER SYSTEMS

(CONTINUED)

### Curvilinear Alignments

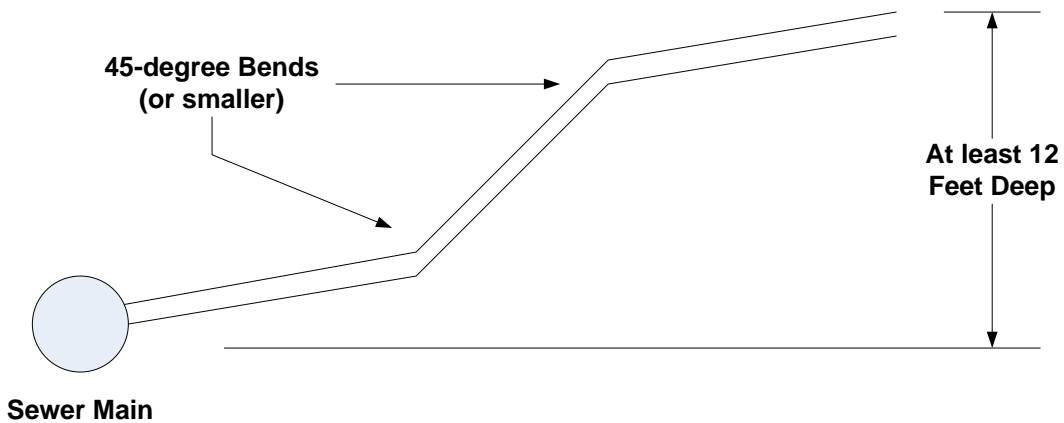
#### SDR 35 PVC Sewer Pipe

<u>Pipe Diameter</u>	<u>Laying Length</u>	<u>Max Deflection Angle</u>	<u>Offset per joint of pipe</u>	<u>Min. Curve</u>
8"-15"	12.5' *	2.5	6.5"	287'
8"-15"	20'	2.5	10.5"	458'

\* The use of reduced pipe lengths must be clearly noted on the construction plans for Contractor's attention.

### Service Lines

No bends in sanitary sewer service lines are allowed except for services that are 12 feet deep or deeper, which may use vertical bends. For services that are 12 feet deep or deeper, 45-degree bends (or smaller bends) may be used as illustrated below.



The developer shall endeavor to use existing sanitary sewer lines that have been stubbed out to a property by previous construction. Where the use of stubbed out lines are not feasible, the existing lines shall be abandoned and capped at the sanitary sewer main.

## **CHAPTER 3**

### **CONSTRUCTION DRAWINGS**

## CONSTRUCTION DRAWING REQUIREMENTS

1. The drawings shall be labeled "Water" and/or "Sewer" as applicable.
2. The drawings shall be on 24" x 36" sheets.
3. The drawings shall be signed and sealed by a Professional Civil Engineer registered in the State of Arizona.
4. The drawings shall meet the requirements of the Arizona Department of Environmental Quality, Engineering Bulletin #10 and A.A.C. R18-5-502 for water, Engineering Bulletin #11 and A.A.C. R18-9-E301 for Sewer.
5. All design calculations and other supporting data shall be submitted with the drawings.
6. The Utility's "Material Specifications" and "General Notes" must be shown on the drawings, as well as all itemized quantities separated for facilities that will be Utility-owned versus those that will not be Utility-owned. The Utility's logo, water and/or sewer owner information, the Utility's approval signature block and As-Built block shall be shown on the cover sheet of the drawings.
7. If the drawings cover any facilities to be Developer-owned at the conclusion of construction, a clear distinction between facilities to be Utility-owned from those that will remain Developer-owned shall be made.
8. Sewer drawings shall include sewer services to the easement or right-of-way line.
9. Water drawings shall show the size and location of all water services and meters.
10. Waterlines 12" or larger shall be shown in profile with the appropriate elevations. Vertical deflections of waterlines shall be profiled regardless of size. Utility crossings of any waterline shall be shown in profile and dimensioned for minimum clearances and/or separations. All sewer mains shall be profiled.
11. All referenced details required by the Utility shall be shown on the drawings. The appropriate detail shall be clearly referenced where the item is called out.
12. The drawings shall show easements for Utility-owned facilities on private property. If a plat is not required then a metes and bounds easement legal description and exhibit signed and sealed by a Professional Civil Engineer or Land Surveyor registered in the State of Arizona shall be submitted on 8 ½" X 11" sheets with the drawings for approval.
13. Three copies of the drawings shall be submitted to the Utility for approval.
14. An itemized engineer's cost estimate for construction of Utility-owned facilities signed and sealed by a Professional Civil Engineer registered in the State of Arizona must be submitted with the drawings. These estimates must be provided on 8 ½" X 11" sheets separately for water and sewer.
15. The drawings shall include a Master Water and/or Sewer Drawings sheet.
16. A site plan showing roadways and facilities must be provided on 8 ½" X 11" sheets.
17. The drawings shall include a summary table showing quantities for all sewer and water constructed items. Sizes and materials must be included.

## CONSTRUCTION DRAWING REQUIREMENTS

(CONTINUED)

18. Pipelines depicted in the drawings shall be located via roadway centerline stationing and centerline offset.
19. The cover sheet of the drawings shall contain an index map showing water and/or sewer facilities as well as the corresponding sheet number.
20. For waterlines, all valves, fittings, vertical and horizontal offsets, hydrants, meters and services shall be called out with station and offset, along with northing and easting coordinates.
21. For sewer lines, manholes, cleanouts and services shall be called out with station and offset, along with northing and easting coordinates.
22. The following information shall be on the cover sheet of the drawings:

### UTILITY OWNER INFORMATION

### WATER AND/OR SEWER OWNER/OPERATOR



ARIZONA

AMERICAN WATER

2355 West Pinnacle Peak Road, Suite 300  
Phoenix, Arizona 85027  
(623) 445-2400

23. The Utility owner information with logo, and the Utility's General Notes, Material Specifications and Standard Details are available in digital format. Digital files are located on Arizona American Water's website. For assistance, please contact the Developer Services Department as listed in the Contact List section on page 6. Utility's General Notes are provided on Detail Nos. 100-1 and 100-2. Utility's Material Specifications are provided on Detail Nos. 100-3, 100-4, and 100-5.

## WATER SYSTEM MATERIAL SPECIFICATIONS

**NOTE: Where M.A.G. standards are specified, those standards are applicable regardless of project location.**

- Distribution Piping - C900 Polyvinyl Chloride (PVC): In accordance with American Water Works Association (AWWA) Standard C900 for pipe diameters up to 12"; DR=18, elastomeric-gasket bell-end. Areas subjected to pressures greater than 100 psi shall be C900, DR=14.
- Note: In Mohave County, all PVC must be DR14 only. DR18 is not permitted.
- Note: Paradise Valley District – Ductile Iron only. PVC is not permitted.
- C905 Polyvinyl Chloride (PVC): In accordance AWWA Standard C905 for pipe diameters greater than 12"; DR=18, elastomeric-gasket bell end.
- Ductile Iron Pipe, mortar-lined (D.I.P.): In accordance AWWA Standards C150, C151 and C153. Equivalent O.D., Pressure Class 150 minimum. Mortar lining shall be in accordance with M.A.G. Section 750 and AWWA C104. All Ductile Iron Pipe shall be polyethylene wrapped for the entire length in accordance with M.A.G. Section 610.5. Areas subjected to pressures greater than 100 psi shall be pressure class 200 minimum.
- Concrete Pressure Pipe, Steel Cylinder Type: In accordance with AWWA Standard C303 and M.A.G. Section 758 for pipe diameters greater than 24". Manufacturer's technical data sheets shall be submitted to the Utility for review and approval. Service taps are not permitted on concrete pressure pipe.
- Distribution Fittings - Push-on or mechanical joint in accordance with AWWA C111 and M.A.G. Section 750.4. Joint restraints, where required, shall be Mechanical Restrained Joint with product approved by the Utility or flanged joint for lengths in accordance with M.A.G. Detail 303-2. Field lock gaskets are not allowed.
- Water Line Valve - Mueller, Clow, Kennedy, or M&H resilient wedge seated Gate Valve in accordance with M.A.G. Section 630.3 with valve box and cover in accordance with M.A.G. Detail 391-1 Type "C" minimum lid weight of 16lbs. Valves installed outside the pavement or in the flow line of a roadway shall have a debris cap installed per M.A.G. STD. DET. 392. Butterfly valves are permitted above-ground only.
- Tapping Sleeve & Valve- Stainless Steel Cascade JCM
- NOTE: Paradise Valley District may require a bypass on valves on 12" or larger pipe. Contact Utility for approval on a case-by-case basis.
- Distribution System - Butterfly valves in accordance with AWWA Standard C504 for valve sizes greater than 16". All butterfly valves shall be above-ground only.

## WATER SYSTEM MATERIAL SPECIFICATIONS

(CONTINUED)

- Water Service - For taps, pipe and fittings for water services through 2 inches, the size shall be in accordance with the Utility's STD. DET. 342-2. Requests for larger sizes must be submitted for review and approval. Minimum water service line size diameter shall be 1".
- NOTE: Tubac District requires meter setters on all projects. Also, 2" meter setters are required for critical service developments in Paradise Valley District and Anthem District.
- Approved Saddles, all IPT: Ford S90, Ford F202, Mueller H-1300, James Jones J-965, and JCM 403 for C900 PVC. Ford FS202, James Jones J-969 and JCM 404 for C905 PVC. Ford F202, JCM 404, James Jones J-979, and Mueller BR2B for ACP. Ford F202, JCM 402, James Jones J-979, and Mueller BR2B for DIP.
- All brass fittings must be manufactured by Ford or James Jones. All angle meter stops must include locking wings.
- Fire Hydrants - Dry Barrel Fire Hydrants are for use in Mohave County, Tubac, Paradise Valley, and Anthem Water Districts only, see Utility's Detail 360-1. Dry barrel fire hydrants shall be Mueller "Centurion", Clow "Medallion", or Kennedy "K81D", with national standard hose threads. No approved equals will be accepted.
- Wet Barrel Fire Hydrants are for use in Sun City, Sun City West, and Agua Fria Water Districts only, see Utility's Detail 360-2. Wet barrel hydrants shall be Jones, Clow, or AVK. No approved equals will be accepted.
- Tracer Wire - See Utility's Detail 350-1. Tracer wire must be used for all water lines.
- Dip Sections - All dip sections shall be constructed of D.I.P. in accordance with above specified distribution piping for D.I.P and the Utility's Detail 370-1. Joint Restraints shall be Mechanical Restrained Joint with product approved by the Utility for lengths in accordance with M.A.G. STD. DET. 303-2. All Ductile Iron Pipe shall be polyethylene wrapped for the entire length in accordance with M.A.G. Section 610.5.
- Marking tape - See Utility's Detail 350-1. Marking tape must be used for all water lines and services.
- Marking Posts - Carsonite marking posts are required for all water valves located outside of ROW and outside of paved areas, installed with concrete collar.
- All Other Items - In accordance with M.A.G. Specifications.

## SEWER SYSTEM MATERIAL SPECIFICATIONS

- Collection Mains - SDR35 PVC sewer pipe in accordance with M.A.G. Specifications, ASTM D-3034, and ASTM F-679 or US Pipe Protecto 401 ceramic epoxy ductile iron pipe. All Ductile iron pipe shall be polyethylene wrapped for the entire length in accordance with M.A.G. Section 610.5
- Sewer Service - SDR35 PVC sewer pipe in accordance with M.A.G. Specifications, including Marker Ball and ASTM D-3034.
- Manholes - Precast Concrete in accordance with M.A.G. Specifications, except that no steps shall be installed in any manholes. Each manhole shall be treated with "Insecta" insect treatment as soon as that manhole is raised to grade and prior to final acceptance. See Utility's Detail No. 100-1 for information on manholes. All sewer manholes shall be lined with one of the following products, as applied by a certified applicator:
- NeoPoxy NPR-5300 Series epoxy
  - Raven 405/A10
  - Sauereisen 210
  - Sewer Shield 100
- Manhole Cover - Cast Iron in accordance with M.A.G. Specifications. All manholes shall have a 30" frame and cover, Neenah R-1743. Lid to be stamped "Arizona-American Sanitary Sewer" in accordance with M.A.G. Detail 424. See Utility's Detail No. 100-1 for information on water tight manhole covers.
- All other Items - In accordance with M.A.G. Specifications.
- Force Mains - PVC pressure pipe in accordance with AWWA C900 or C905, Griffin H<sub>2</sub>Sewer Safe or US Pipe Protecto 401 Ductile Iron Pipe, min. pressure class 150. All ductile iron pipe shall be polyethylene wrapped for the entire length in accordance with M.A.G. Section 610.5.
- Marking Posts - Carsonite marking posts are required for all sewer mains outside of ROW and outside of paved areas, and are required for force mains greater than 16 inches in diameter.
- Tracer Wire - See Utility's Detail 350-1. Tracer wire must be used for all sewer force mains.
- Marking tape - See Utility's Detail 350-1. Marking tape must be used for all sewer lines and services.

## RECLAIMED WATER SYSTEM MATERIAL SPECIFICATIONS

- Piping
- C900 Polyvinyl Chloride (PVC): In accordance with American Water Works Association (AWWA) Standard C900 for pipe diameters up to [ 12"; DR=18, elastomeric-gasket bell-end.  
Note: In Mohave County, all PVC must be DR14 only. DR18 is not permitted.
  - C905 Polyvinyl Chloride (PVC): In accordance AWWA Standard C905 for pipe diameters greater 12"; DR=18, elastomeric-gasket bell end.
  - Ductile Iron Pipe (D.I.P.): In accordance with AWWA Standards C150, C151 and C104. Equivalent O.D., Pressure Class 150 minimum. All Ductile Iron Pipe shall be polyethylene wrapped for the entire length in accordance with M.A.G. Section 610.5.
  - All pipe shall be appropriately identified through integral coloring and wording of the pipe, stenciling of the pipe, or pipe sleeving (pipe socks) in accordance with M.A.G. Section 616. Marking tape shall be installed in accordance with the Utility's STD. DET. 350-1.
- Fittings
- Push-on or mechanical joint in accordance with M.A.G. Section 750. Joint restraints, where required, shall be Mechanical Restraint Joint with product approved by the Utility for lengths in accordance with M.A.G. STD. DET. 303-2.
- Valves
- Mueller, Clow, Kennedy, or M&H resilient wedge seated Gate Valve in accordance with M.A.G. Section 630.3 with valve box and cover in accordance with M.A.G. Detail 391-1 Type "C" minimum lid weight of 16lbs.
  - Valve riser pipes shall be painted purple (Seymour Safety Purple) inside and out. Debris caps with identification tag shall be installed in accordance with M.A.G. STD. DET. 392, M.A.G. Section 616, and the Utility's STD. DET. 600-1.
- Services
- Taps, pipe and fittings for water services 1-1/2" and 2" size shall be in accordance with the Utility's STD. DET. 610-1. Larger sizes to be submitted for approval. No services smaller than 1-1/2" will be approved by the Utility.
- Dip Sections
- All dip sections shall be constructed of D.I.P. in accordance with above specified distribution piping for D.I.P and the Utility's STD. DET. 370-1. Joint Restraints shall be Mechanical Restraint Joint with product approved by the Utility for lengths in accordance with M.A.G. STD. DET. 303-2. All Ductile Iron Pipe shall be polyethylene wrapped for the entire length in accordance with M.A.G. Section 610.5 and appropriately identified in accordance with M.A.G. Section 616.
- Marking tape
- Wording per M.A.G. Section 616 to be used on all reclaimed water mains. The marking tape shall be printed "Caution: Reclaimed Water Line" on Purple Tape for reclaimed water lines.
- All Other Items
- In accordance with M.A.G. Specifications.

## PLAT DEDICATION VERBIAGE

The following plat dedication verbiage shall be on the final recorded plat if any of the facilities to be owned by the Utility will be outside of dedicated rights-of-way and separate easements are not provided:

PERPETUAL WATER AND SEWER EASEMENT ("EASEMENTS") AS DESCRIBED IN THE PLAT ARE GRANTED TO ARIZONA AMERICAN WATER, AND ITS SUCCESSORS AND ASSIGNS (COLLECTIVELY, "GRANTEE"), TO CONSTRUCT, OPERATE, AND MAINTAIN WATER AND SEWER LINES AND APPURTENANT FACILITIES (COLLECTIVELY, "FACILITIES") UPON, ACROSS, OVER AND UNDER THE SURFACE OF THE EASEMENTS, TOGETHER WITH THE RIGHT TO OPERATE, REPAIR, REPLACE, MAINTAIN, AND REMOVE THE FACILITIES FROM THE PREMISES; TO ADD OR TO ALTER THE FACILITIES, AND TO PROVIDE GRANTEE WITH REASONABLE INGRESS AND EGRESS TO THE FACILITIES. GRANTEE WILL HAVE UNRESTRICTED ACCESS TO THE EASEMENT FOR THE ACTIVITIES DESCRIBED ABOVE AND FORMAL NOTIFICATION OR APPROVAL BY ANY ASSOCIATION PRIOR TO ACCESSING THE EASEMENT WILL NOT BE REQUIRED.

GRANTOR SHALL NOT ERECT OR CONSTRUCT OR PERMIT TO BE ERECTED OR CONSTRUCTED ANY BUILDING, STRUCTURE OR SIMILAR IMPROVEMENT WITHIN THE LIMITS OF THE EASEMENT GRANTED HEREIN, GRANTOR SHALL NOT, NOR PERMIT, THE GRADE OVER GRANTEE'S FACILITIES TO BE SUBSTANTIALLY ALTERED WITHOUT, IN EACH INSTANCE, THE PRIOR WRITTEN CONSENT OF GRANTEE, AND GRANTOR AGREES THAT NO OTHER PIPES OR CONDUITS SHALL BE PLACED WITHIN THE PREMISES SUBJECT TO THE EASEMENT GRANTED HEREIN, EXCEPT PIPES CROSSING GRANTEE'S FACILITIES AT RIGHT ANGLES, IN WHICH CASE, A MINIMUM VERTICAL DISTANCE OF TWO (2) FEET (AS MEASURED FROM THE CLOSEST POINTS ON THE OUTSIDE EDGES) SHALL BE MAINTAINED BETWEEN GRANTEE'S FACILITIES AND SUCH OTHER PIPES OR CONDUITS. UNLESS GRANTEE EXPRESSLY CONSENTS IN WRITING OTHERWISE, ANY AND ALL SEWER PIPES CROSSING THE EASEMENT GRANTED HEREIN SHALL BE LAID BELOW GRANTEE'S FACILITIES. HOWEVER, GRANTOR SHALL HAVE THE RIGHT TO CONSTRUCT AND ERECT FENCES, TO INSTALL LANDSCAPING, PARKING FACILITIES AND DRIVEWAYS, AND TO ESTABLISH OTHER USES WHICH ARE NOT INCONSISTENT WITH USES WITHIN THE LIMITS OF SAID EASEMENT IN A MANNER WHICH WILL NOT UNREASONABLY INTERFERE WITH GRANTEE'S ACCESS TO THE FACILITIES.

## **“AS-BUILT” PLAN REVIEW REQUIREMENTS**

1. Plans shall be 24” x 36” (two blue line copies), each submittal until approved.
2. Plans must be fully approved and signed by all required agencies.
3. Stamped and signed by a Professional Civil Engineer or Land surveyor registered in the State of Arizona.
4. Station/offset and state plane northing/easting coordinates on all water fittings, including valves, tees, bends, all vertical and horizontal changes, etc.
5. Station/offset and state plane northing/easting coordinates on all sewer manholes, clean-outs and other facilities.
6. Swing ties to fixed points may be required for commercial projects that do not have a roadway centerline for stationing within a reasonable distance from the project.
7. Distances from lot lines to sewer taps.
8. Call out all water and sewer pipe lengths between fittings and branches.
9. Elevations for all DIP sections regardless of the pipe diameter.
10. As-Built profiles for all sewer lines 8” and larger including manhole rim and invert elevations.
11. As-Built profiles for all water lines 12” and larger.
12. As-Built all changes in pipe materials and sizes.
13. Correct street names, addresses and lot numbers.
14. Submit two As-built Blueline copies for review. Written approval by the Utility is required prior to submitting three sets of as-built drawings on full-size bond paper, one set on 11” x 17” paper, and one set on CD either as a CAD file or as a PDF file.
15. The Utility’s receipt and approval of as-builts is a condition to the Utility’s final approval of water and sewer facilities. In addition, no refunds will be issued on facilities until as-builts have been received and approved by the Utility and the Utility’s final acceptance has been granted.

## **WATER/SEWER “AS-BUILT” CERTIFICATION**

The following “As-Built” certification shall be on the cover sheet of the plans:

### **WATER/SEWER “AS-BUILT” CERTIFICATION**

I hereby certify that the “as-built” measurements as shown hereon were made under my supervision or as noted, and are correct to the best of my knowledge after due review. Additionally, I hereby certify that all mains and services have been installed within the limits of easements dedicated to ARIZONA AMERICAN WATER or inside dedicated street rights-of-way or public utility easements.

**Seal**



## **CHAPTER 4**

# **CONSTRUCTION INSPECTION**

## **PROCEDURE FOR SCHEDULING WATER LINE CONSTRUCTION INSPECTIONS**

To schedule appointments, contact the Utility's Construction Management Department at (623) 445-2400, or see the "Contact List" near the front of this guide for direct phone numbers.

**NOTE:** When appointments are arranged at least 48 hours in advance, the inspection/test will be conducted as scheduled.

When appointments are requested for the same day, the Utility's Construction Inspector will conduct the inspection/test based upon his availability.

The Utility's Construction Inspector and the Developer's contractor can schedule the following items in the field:

- Open trench before pipe is installed in trench.
- After pipe, bends, fittings, joint restraints, etc. has been installed in trench, but before backfilling is started to verify position and type.
- All waterlines - Inspection after backfill, installation of marking tape and prior to other backfilling of trench.
- After bedding (from bottom of trench to one [1] foot above pipe) has been placed into trench and properly compacted.
- After each lift of backfill material has been placed into the trench and properly compacted.
- Blocking and thrust blocks where required.
- Compaction sampling.
- Pressure test for tapping sleeve.
- Pressure test for waterline.
- Waterline chlorine injection.
- Bacteriological sampling.
- Operational Inspection, Final Inspection and re-inspection if required.

**NOTE:** If the Developer's contractor proceeds with construction before having approval of the Utility's Construction Inspector, the Developer's contractor will be required to expose the pipeline, valve, thrust blocks, etc., at no cost to the Utility, to permit inspection by the Utility's Construction Inspector. The required exposure of pipeline by the Developer's contractor shall not deem acceptance of facility by the Utility. The Utility reserves the right to reject any facility not properly scheduled for inspection by the Utility for any reason. The rejection shall be final.

## **PROCEDURE FOR SCHEDULING SEWER LINE CONSTRUCTION INSPECTIONS**

To schedule appointments, contact the Utility's Construction Inspector in the Developer Services Department at (623) 445-2400.

**NOTE:** When appointments are arranged at least 48 hours in advance, the inspection/test will be conducted as scheduled.

When appointments are scheduled for the same day, the Utility's Construction Inspector will conduct the inspection/test based upon his availability.

The Utility's Construction Inspector and the Developer's contractor can schedule the following items in the field:

- Open trench before pipe is laid into trench.
- After pipe has been installed in trench and before backfilling is started.
- After each lift of backfill material has been placed into the trench and properly compacted.
- Each new manhole, including manhole coatings.
- Connecting to an existing manhole.
- Installation of service tap before service line is connected to saddle.
- Low-pressure air test on sewer line.
- Operational Inspection, Final inspection and re-inspection if required.
- The contractor shall uniform slope test all sewer lines, including sewer service lines, by videotape and shall vacuum or water test all manholes in accordance with A.A.C. R18-9-E301. These tests shall be conducted prior to operational inspection and coordinated with the Utility's Construction Inspector. Documented results and videotape shall be submitted to the Utility for approval.

**NOTE:** If the Developer's contractor proceeds with construction before having approval of the Utility's Construction Inspector, the Developer's contractor will be required to expose the pipeline, manhole, etc., at no cost to the Utility, to permit inspection by the Utility's Construction Inspector. The required exposure of pipeline by the Developer's contractor shall not deem acceptance of facility by the Utility. The Utility reserves the right to reject any facility not properly scheduled for inspection by the Utility for any reason. The rejection shall be final.

## **CHAPTER 5**

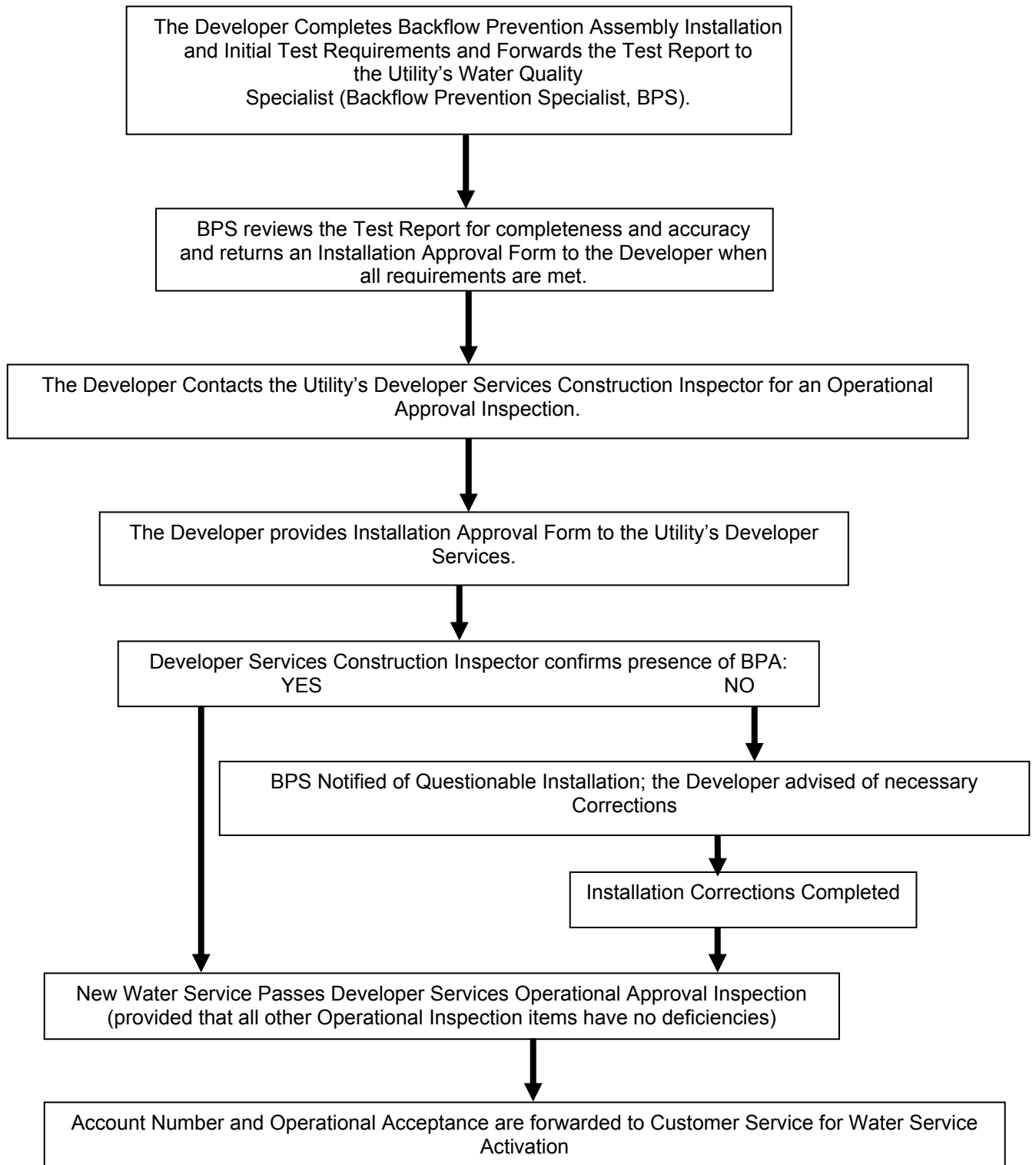
### **BACKFLOW PREVENTION**

## **BACKFLOW PREVENTION APPROVAL PROCESS**

### **Approval Process (see flowchart)**

1. All new backflow prevention assemblies (BPAs) shall be tested and functional as designed prior to approval or acceptance by the Utility in accordance with A.A.C. R-18-4-215F.
2. The Developer shall forward the passing test report with required BPA information to the Utility's Backflow Prevention Specialist.
3. The Utility's Water Quality Specialist (Backflow Prevention) will return the BPA installation approval form to the Developer.
4. The Developer will schedule the operational inspection of the BPA with the Utility's Construction Inspector.
5. The Developer will provide the installation approval form to the Utility's Construction Inspector.
6. The Utility's Construction Inspector will confirm the installation of the BPA.
7. Backflow Prevention approval process complete.
8. The Utility's operational approval of the BPA will not be granted unless all other items requiring the Utility's operation inspection have been approved by the Utility.

# BACKFLOW PREVENTION OPERATIONAL APPROVAL FLOWCHART



## PREMISES REQUIRING BACKFLOW PREVENTION

<i>TYPE OF ASSEMBLY REQUIRED</i>	DC	RP	PVB	AG	<i>TYPE OF ASSEMBLY REQUIRED</i>	DC	RP	PVB	AG
<i>TYPE OF BUSINESS</i>					<i>TYPE OF BUSINESS</i>				
Aircraft and Missile Plants		x			Irrigation Systems(see standard details to determine)		x	x	
Animal Clinics and Grooming		x			Labs Using Contaminating Materials		x		
Automotive Plants		x			Metal Manufacturing, Cleaning, Processing and Fabricating Plants		x		
Auxiliary Water Systems (interconnected)		x			Mobile Home Parks	x			
Auxiliary Water Systems (non-interconnected)	x				Motion Picture Studios		x		
Beverage Bottling Plants		x			Multiple Services - Interconnected	x			
Breweries		x			Oil and Gas Production, Storage or Transmission Properties		x		
Buildings Greater than 3 Stories or 34 Ft High	x				Paper and Paper Products Plants		x		
Buildings with Booster Pumps or Potable Water Storage	x				Plating Plants		x		
Buildings with Landscape Fountains, Ponds, or Baptismal Tanks		x		x	Power Plants		x		
Buildings with Sewage Ejectors		x			Radioactive Materials Handling		x		
Canneries, Packinghouses and Reduction Plants		x			Restaurants		x		
Car Wash Facilities		x			Restricted, Classified or Other Closed Facilities		x		
Centralized Heating and Air Conditioning Plants		x			Rubber Plants		x		
Chemical Plants		x			Sand and Gravel Plants		x		
Chemically Treated Potable or Non-potable Water systems		x			Sanitariums, Nursing and Convalescent Homes		x		
Civil Works		x			Schools and Colleges		x		
Commercial Laundries		x			Sewage and Storm Drain Facilities, Reclaimed Water		x		x
Dairies and Cold Storage Plants	x				Shopping Centers	x			
Dye Works		x			Water Trucks, Water Tanks, Hydraulic Sewer Cleaning Equipment		x		x
Film Processing Labs		x			<b>FIRE SYSTEM REQUIREMENTS</b>				
Food Processing Plants	x				Class 1&2	x			
Holding Tank Disposal Stations		x			Class 3-6		x		
Hospitals, Medical Bldgs, Morgues, Mortuaries, Autopsy Facilities, etc		x			Any questions or variance requests should be directed to the Backflow Prevention Office, 623-445-2400.				