

BACKFLOW PREVENTION  
AND  
CROSS-CONNECTION  
CONTROL PROGRAM  
FOR  
TRUCKEE MEADOWS WATER AUTHORITY



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# TABLE OF CONTENT

<b>SECTION 1</b>	<b>PURPOSE, LEGAL AUTHORITY, AND RESPONSIBILITY .....</b>	<b>1</b>
	PURPOSE .....	1
	LEGAL AUTHORITY .....	1
	RESPONSIBILITY .....	1
	TMWA RESPONSIBILITY .....	1
	WATER CUSTOMER RESPONSIBILITY .....	2
	REFERENCES TO OTHER SECTIONS OF THIS POLICY .....	3
<b>SECTION 2</b>	<b>DEFINITIONS .....</b>	<b>4</b>
<b>SECTION 3</b>	<b>GENERAL BACKFLOW PREVENTION REQUIREMENTS.....</b>	<b>10</b>
	CURRENT INSTALLATION REQUIREMENTS .....	10
	DESIGN CONSIDERATIONS .....	10
	APPROVED ASSEMBLIES .....	10
	TYPES AND METHODS OF BACKFLOW PREVENTION .....	11
	DOMESTIC, IRRIGATION .....	11
	FIRE .....	11
	SPECIAL CIRCUMSTANCES.....	12
	ATMOSPHERIC VACUUM BREAKER (AVB) .....	12
	INSPECTIONS .....	12
	BACKFLOW PREVENTION ASSEMBLY TESTS.....	12
	Initial Tests .....	13
	Annual Tests.....	13
	REPAIR OR REPLACEMENT OF ASSEMBLIES .....	14
	REMOVAL OR RELOCATION OF ASSEMBLIES .....	14
	INSTALLATION LOCATION .....	14
	Special Circumstances.....	14
	Domestic, Irrigation .....	15
	Fire Services.....	15
	Fire Services Definitions.....	15
	Location Requirements. ....	15
<b>SECTION 4</b>	<b>RETROFIT PROCEDURE FOR EXISTING SERVICE CONNECTIONS.....</b>	<b>17</b>
	REMODELS, TENANT IMPROVEMENTS, OTHER CONSTRUCTION .....	17
	NON CONSTRUCTION RELATED RETROFITS .....	17
	RETROFIT STEPS .....	18
<b>SECTION 5</b>	<b>REQUIREMENTS FOR RETROFITS.....</b>	<b>19</b>
	GENERAL BACKFLOW PREVENTION REQUIREMENTS .....	19
	EXISTING BACKFLOW PREVENTION ASSEMBLIES .....	19
	REDUCED LEVEL OF SERVICE PROTECTION .....	19
	INSTALLATION LOCATION .....	20
	Special Circumstances.....	20

---

Domestic Services.....	21
Irrigation Services.....	21
Fire Services.....	21
<b>TYPES AND METHODS OF BACKFLOW PREVENTION .....</b>	<b>22</b>
Domestic Services.....	22
Irrigation Services.....	22
Fire Services.....	22
Fire System Backflow Prevention Options .....	23
<b>SECTION 6 CONSTRUCTION WATER &amp; FIRE HYDRANT USAGE .....</b>	<b>25</b>
CONSTRUCTION WATER DEFINITION.....	25
CONSTRUCTION WATER SUPPLY.....	25
FIRE HYDRANT AND FIRE WATER SERVICE USE .....	26
<b>SECTION 7 CERTIFIED BACKFLOW ASSEMBLY TESTERS .....</b>	<b>27</b>
TESTER CERTIFICATION.....	27
TESTER RESPONSIBILITIES AND TESTING REQUIREMENTS .....	27
<b>SECTION 8 CROSS-CONNECTION CONTROL SPECIALISTS .....</b>	<b>29</b>
SPECIALIST CERTIFICATION .....	29
SURVEY REQUIREMENTS .....	29
<b>SECTION 9 ENFORCEMENT ACTION .....</b>	<b>31</b>
GENERAL.....	31
BASIS FOR WATER SERVICE TERMINATION.....	31
TERMINATION PROCEDURE .....	31
<b>SECTION 10 PROCEDURE FOR A BACKFLOW OR CROSS-CONNECTION INCIDENT .....</b>	<b>33</b>
GENERAL.....	33
BACKFLOW EVENT CONFINED TO A PARTICULAR PREMISE OR PROPERTY.....	33
BACKFLOW EVENT CAUSED BY A SYSTEM LOSS OF PRESSURE .....	33
<b>SECTION 11 NON-POTABLE WATER USAGE &amp; AUXILIARY WATER .....</b>	<b>35</b>
TYPE OF BACKFLOW PREVENTION REQUIRED .....	35
CONSTRUCTION REQUIREMENTS.....	35
OPERATION AND MAINTENANCE REQUIREMENTS OF NON-POTABLE SYSTEMS .....	36
DECLARATION OF USE OF RECLAIMED OR NON-POTABLE WATER.....	36
TEMPORARY POTABLE WATER SUPPLY .....	36
SHUTDOWN TESTS .....	37
QUALIFICATIONS FOR WATER USER SUPERVISOR .....	37
QUALIFICATIONS FOR DIRECTOR OF SHUTDOWN TEST .....	37
WATER SERVICE TERMINATION.....	37
AUXILIARY APPROVED WATER SUPPLY.....	38
WELL ABANDONMENT.....	38
REFERENCES TO OTHER SECTIONS OF THIS POLICY.....	38
<b>APPENDIX A RESIDENTIAL FIRE SPRINKLER SYSTEMS .....</b>	<b>39</b>

---

BACKGROUND .....	39
BACKFLOW PREVENTION ASSEMBLY REQUIREMENTS.....	39
<b>APPENDIX B      UNIFORM PLUMBING CODE: INTERNAL BACKFLOW PREVENTION REQUIREMENTS</b> .....	<b>4</b>
<b>0</b>	
<b>APPENDIX C      NAC 445A EXCERPT .....</b>	<b>41</b>

## **SECTION 1      PURPOSE, LEGAL AUTHORITY, and RESPONSIBILITY**

### **Purpose**

The purpose of TMWA's Backflow Prevention Program is:

1. To protect TMWA's potable distribution system against the possibility of contamination or pollution from the water customer's private internal water system.
2. To develop and implement an effective, ongoing, consistent backflow prevention program which will comply with Nevada Administrative Codes (NAC) 445A.67185 through NAC 445A.67255, Public Water Systems.
3. To educate water customers about health (contamination) and non-health (pollution) hazards associated with their use of water to promote the elimination of actual and potential cross-connections.

### **Legal Authority**

Under Nevada Administrative Code 445A.67185, Public Water Systems, the water purveyor has the primary responsibility for preventing water from unapproved water supplies, or any other substances, from entering the potable public water system. Per NAC 445A.67185, the water purveyor shall:

1. Ensure that there are no unprotected connections between the supplies of water, systems for the pumping, storage and treatment of water, and distribution system of the public water system and any source of pollution or contamination pursuant to which any unsafe water or other degrading material can be discharged or drawn into the public water system as a result of backsiphonage or backpressure.
2. Develop and carry out a program for the control of cross-connections that is approved by the health authority.

### **Responsibility**

NAC assigns TMWA the responsibility to develop, implement and maintain an effective backflow prevention and cross-connection control program. TMWA believes that an effective backflow prevention program includes both service protection; appropriate protection within the customer's internal system; and safe water use practices conscientiously followed by all water customers.

### **TMWA RESPONSIBILITY**

TMWA's responsibilities as a purveyor of drinking water include developing, implementing and maintaining a backflow prevention program consisting of service protection at the point where customer services connect to the distribution system.

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1. TMWA's Backflow Prevention Group will review all new service connection requests and all existing service connections to determine when a service connection presents an actual or potential hazard to TMWA's water distribution system.
  2. For the purposes of providing service protection for new or existing water services, TMWA will designate the required type of backflow prevention to comply with NAC 445A and TMWA's policy.
  3. TMWA will designate the installation location for backflow prevention installation.
  4. TMWA will provide backflow prevention installation standards to the water customer or his/her representative.
  5. TMWA will require the water customer to install the designated backflow prevention, by and at the customer's expense, within a length of time determined by TMWA, as a requirement for water service.
  6. TMWA will not authorize water service turn on until backflow prevention has been satisfactorily installed, inspected by a member of the TMWA's Backflow Prevention Group and has been tested by a certified tester.
  7. TMWA will terminate an existing water service if, after a reasonable attempt, a satisfactory conclusion to a retrofit of existing services is not achieved. A satisfactory conclusion includes installation which has been inspected and approved by a member of the TMWA's Backflow Prevention Group and has been tested by a certified tester.
  8. TMWA will notify water customers of testing requirements and test due dates.
  9. TMWA will maintain records and monitor that backflow prevention is properly installed, maintained and tested.
  10. TMWA will periodically reevaluate service connections to assess the degree of hazard posed by the water customer's premise. This will be done by TMWA's Backflow Prevention Group whenever there is a change in the customer at a premise or per a schedule acceptable to TMWA.
  11. TMWA will define enforcement actions for any customers that fail to comply with the Backflow Prevention Program.
  12. TMWA is not responsible for detecting, eliminating or controlling cross-connections within a customer's water system.

#### WATER CUSTOMER RESPONSIBILITY

Customers have very clear responsibilities for backflow prevention and cross-connection control. The following measures ensure the quality of the community's water supply as well as ensuring water quality within internal plumbing.

1. Water customers claim ownership, or custody, of potable water once it passes the point of connection to TMWA's distribution system. Furthermore, customers have the prime responsibility to maintain their internal water piping to ensure that "used water" shall not reverse back into TMWA's distribution system.
2. All costs associated with backflow prevention assemblies shall be borne by the water customer.

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3. It is the water customer's responsibility to design the backflow prevention installation to meet all of TMWA's requirements and to conform with other applicable codes, such as the Uniform Plumbing Code (UPC), the National Fire Protection Association (NFPA) and all city or building codes.
  4. The customer shall design his water system (either a new water service or the retrofit of an existing water service) to accommodate pressure losses attributed to the installation of backflow prevention assemblies. This may include, but is not limited to, installing pumps or renovating existing private water systems with thermal expansion tanks.
  5. Upon notification from TMWA, the customer shall install, repair, replace or test the backflow prevention assembly within a length of time determined by TMWA.
  6. When it is not practical for the backflow prevention assembly to be installed immediately after the point of connection, the water customer shall provide annually in writing to TMWA a declaration that no connections exist, or will be made, between the point of connection and the backflow prevention assembly. This declaration shall be prepared by a Certified Specialist.
  7. The customer shall make all installations and repairs to insure that the assembly remains in factory working condition.
  8. Customers have a responsibility to design, build and maintain their internal private water system per City Building and UPC codes.
  9. The water customer shall have the assembly tested per the requirements in this policy.
  10. The customer is responsible for any loss or damage resulting from the installation, repair, maintenance, operation, malfunction or vandalism of a backflow prevention assembly.
  11. Customers are responsible to notify TMWA immediately of any possible hazards, pollutants or contaminants which may have entered TMWA's distribution system from the customer's internal system.
  12. If service protection does not exist or has been installed internal to a customer's system, the customer's system shall be available at all reasonable times for inspection or testing by TMWA to determine the existence of unprotected cross-connections.
  13. Customers have the responsibility to notify TMWA's Backflow Prevention Group of the intent to use non-potable water on the same premise where TMWA water is being delivered.
  14. If non-potable water is being used on the customer's premise, the customer's water system shall be available at all reasonable times for a shutdown inspection and test by TMWA to determine the existence of cross-connections.

## **References To Other Sections Of This Policy**

### **Enforcement Action**

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## **SECTION 2      DEFINITIONS**

The following terms are relevant to TMWA's backflow prevention and cross-connection control program. Any term not specifically defined in this section shall revert to the meaning as defined by the Nevada Administrative Code (NAC) 445A – Public Water Systems – and subsequent revisions thereof.

**AIR GAP SEPARATION:** The term “air-gap separation” shall mean a physical break between the free flowing end of the supply pipe and the overflow rim of a receiving vessel. The air-gap shall be at least double the diameter of the supply pipe measured vertically above the top rim of the vessel, in no case less than one inch. In certain proximity to walls, the air gap shall be three times the diameter of the supply pipe.

**APPROVED BACKFLOW PREVENTION ASSEMBLY:** The term “approved backflow prevention assembly” shall mean an assembly which has passed laboratory and field evaluation tests performed by the University of Southern California (USC) Foundation for Cross-Connection Control and Hydraulic Research.

**APPROVED WATER SUPPLY:** The term “approved water supply” in the context of this policy statement shall mean the treated water supplied by TMWA, the water quality of which is regulated by the Nevada Department of Environmental Protection, Bureau of Safe Drinking Water and the District Health Department.

**ATMOSPHERIC VACUUM BREAKER (AVB):** The term “atmospheric vacuum breaker” shall mean a vacuum breaker that contains an air inlet valve, a check seat and one or more air inlet ports, in which: 1) The flow of water causes the air inlet valve to close the air inlet ports, and 2) When the flow of water stops: (a) the air inlet valve falls and forms a check valve against backsiphonage and (b) the air inlet ports open to allow air to enter and satisfy the vacuum.

**AUXILIARY WATER SUPPLY:** The term “auxiliary water supply” shall mean any water supply on or available to the premise other than the approved water supply.

**AWWA STANDARD:** The term “AWWA standard” shall mean an official standard developed by the American Water Works Association (AWWA).

**AWWA TEST:** The term “AWWA test” shall be synonymous with the term “test”.

**BACKFLOW:** The term “backflow” shall mean an undesirable flow condition, caused by a differential in pressure, which causes the flow of water or other liquids, gases, mixtures or substances into the distribution system of a potable supply of water from

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any source or sources other than an approved water supply source. Backsiphonage is one cause of backflow. Backpressure is the other cause.

**BACKFLOW PREVENTION GROUP:** The term “backflow prevention group” shall mean the personnel charged with administration of TMWA’s Backflow Prevention Program.

**CALIFORNIA-NEVADA SECTION OF THE AMERICAN WATER WORKS ASSOCIATION:** The term “California-Nevada Section of the American Water Works Association” shall be synonymous with “CA-NV AWWA”.

**CERTIFIED SPECIALIST:** The term “certified specialist” shall mean an individual who is certified to perform cross-connection control and backflow prevention surveys. Certification shall be obtained through the CA-NV AWWA. TMWA maintains a list of certified specialists who are eligible to perform surveys for TMWA water customers. Cross-Connection Control Specialist is synonymous with Certified Specialist.

**CERTIFIED TESTER:** The term “certified tester” shall mean an individual who is certified by the CA-NV AWWA, to perform tests on backflow prevention assemblies. In Washoe County, the District Health Department maintains a current list of certified testers.

**COMMUNITY’S DRINKING WATER OR COMMUNITY’S WATER DISTRIBUTION SYSTEM:** The terms “community’s drinking water” or “community’s water distribution system” shall mean the potable water in TMWA’s Water Distribution System.

**CONSTRUCTION WATER:** The term “construction water” shall mean any water, potable or otherwise, which may be used for any construction activity, i.e., dust control and grading purposes, mixing concrete, etc. Potable water supplied by TMWA for construction purposes shall be protected with backflow prevention as determined by TMWA’s Backflow Prevention Group.

**CONTAMINATION:** The term “contamination” shall mean a degradation of the quality of water by any foreign substance which creates a hazard to the public health, or which may impair the usefulness or quality of the water.

**CROSS-CONNECTION:** The term “cross-connection” as used in this program shall mean any unprotected actual or potential connection between a potable water system and any source or system containing water or a substance that is not or cannot be approved as safe and potable. By-pass arrangements, jumper connections, removable sections, swivel or changeover assemblies, or other assemblies through which backflow could occur, shall be considered cross-connections.

**CUSTOMER’S PRIVATE WATER SYSTEM:** The term “customer’s private water

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system” shall refer to all piping from the service connection, including the yard line and private plumbing system within the customer’s premise.

**DIRECT CROSS-CONNECTION:** The term “direct cross-connection” shall mean a cross-connection which is subject to both backsiphonage and backpressure.

**DISTRIBUTION SYSTEM:** The term “distribution system” shall mean TMWA’s Water Distribution System.

**DISTRICT HEALTH DEPARTMENT:** The term “District Health Department” shall refer to the Washoe County District Health Department.

**DOUBLE CHECK VALVE ASSEMBLY (DC):** The term “double check valve assembly” shall mean an assembly of two internally loaded, independently acting check valves, including tightly closing, resilient seated shut-off valves on each end of the assembly and four properly located resilient seated test cocks.

**DOUBLE CHECK DETECTOR ASSEMBLY (DCDA):** The term “double check detector assembly” shall mean a Double Check Valve with a smaller sized approved bypass containing a specific water meter and an approved double check valve assembly.

**FREEZE PROTECTION:** The term “freeze protection” as it pertains to this program shall mean an above or below ground enclosure designed with sufficient insulation and heat to prevent the water in a backflow prevention assembly from freezing. Such enclosure shall also allow ready access for maintenance and testing purposes and provide clearances as defined by TMWA Installation Standards.

**HEALTH AGENCY:** The term “health agency” as it pertains to this program shall mean the Nevada Department of Environmental Protection, Bureau of Safe Drinking Water.

**HEALTH HAZARD:** The term “health hazard” shall mean actual or potential threat of contamination to the approved water supply.

**INDIRECT CROSS-CONNECTION:** The term “indirect cross-connection” shall mean a cross-connection which is subject to backsiphonage only.

**INSTALLATION INSPECTION:** The term “installation inspection” as it pertains to this program shall mean an inspection by a member of TMWA’s Backflow Prevention Group of a newly installed backflow prevention assembly providing service protection.

**INSTALLATION STANDARDS:** The term “installation standards” as it pertains to TMWA’s Backflow Prevention and Cross-Connection Control Program shall mean

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TMWA's Installation Requirements and Standards and this policy as developed by TMWA. These standards are consistent with the Nevada Administrative Code and other recognized experts in the backflow prevention field, such as the USC Foundation for Cross-Connection Control and Hydraulic Research. These standards can be found in Appendix 10A of TMWA's Construction and Design Standards.

**INTERNAL BACKFLOW PREVENTION OR INTERNAL BACKFLOW PROTECTION:** The terms "internal backflow prevention" or "internal backflow protection" shall refer to backflow prevention used for the purpose of isolation on a piece of equipment or use of water within a water customer's private plumbing system.

**INTERNAL WATER SYSTEM:** The term "internal water system" shall refer to the private water piping and appurtenances on a water customer's premises.

**LOCAL HEALTH AGENCY:** The term "local health agency" shall mean the Washoe County District Health Department.

**NON HEALTH HAZARD:** The term "non health hazard" shall mean actual or potential threat of pollution to the approved water supply.

**NON-POTABLE WATER:** The term "non-potable water" shall mean a water supply which has not been approved for human consumption by the health agency having jurisdiction.

**POINT OF CONNECTION (POC):** The term "point of connection" shall be synonymous with Service Connection.

**POLICY:** The term "policy" or "TMWA policy" or "TMWA's backflow policy" shall refer to the document titled "Backflow Prevention and Cross-Connection Control Program for Truckee Meadows Water Authority" and its contents.

**POLLUTION:** The term "pollution" shall mean a degradation of the quality of water by any foreign substance which would not constitute a health hazard to the public health, but which would adversely and unreasonably affect the aesthetic qualities of water for domestic uses.

**PRESSURE VACUUM BREAKER (PVB):** The term "pressure vacuum breaker" shall mean an assembly containing an independently operating internally loaded check valve and an independently operating, loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with properly located resilient seated test cocks and tightly closing, resilient seated shut-off valves at each end of the assembly. This assembly is designed to protect against non-health or health hazards under a backsiphonage condition only. It is approved for residential services separating

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the irrigation from the domestic yardlines in the TMWA service area. NOT TO BE USED IN NEW CONSTRUCTION/NEW SERVICES FOR COMMERCIAL, IRRIGATION, OR FIRE.

PRIVATE WATER SYSTEM: See the definition under “Customer’s Private Water System”.

PREMISE(S): The term “premise” shall mean any and all areas on a water customer’s property which are served or have the potential to be served by TMWA’s water system.

RECLAIMED WATER: The term “reclaimed water” shall mean effluent derived from wastewater treatment system, which as a result of treatment, is suitable for uses other than potable use.

REDUCED PRESSURE PRINCIPLE ASSEMBLY (RP): The term “reduced pressure principle assembly” shall mean an assembly incorporating two internally loaded, independently operating check valves and an automatically operating differential pressure relief valve located between the two checks, with resilient seated shut-off valves on each end of the assembly, and equipped with four properly located, resilient seated test cocks.

REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY: The term “reduced pressure principle detector assembly” shall mean a reduced pressure principle assembly with a smaller sized approved bypass containing a specific water meter and an approved reduced pressure principle assembly.

RETROFIT: The term “retrofit” shall refer to installation of backflow prevention assemblies, for the purpose of providing service protection, on existing water services.

SERVICE CONNECTION: The term “service connection” shall refer to the point of connection of the customer’s (or water user’s) piping to TMWA’s facilities, as determined by the Authority, usually located within a public utility easement or other public easement or right-of-way.

SERVICE PROTECTION: The term “service protection” as it pertains to this program shall mean the installation of backflow prevention on the water service connection, just downstream of the service connection, the purpose of which is to protect TMWA’s distribution system from cross-connections or potential cross-connections within the customer’s piping system. A synonym is containment. NAC 445A defines the service connection as the point at which the water purveyor loses its authority and control over water.

TRUCKEE MEADOWS WATER AUTHORITY (TMWA): The term “Truckee Meadows

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Water Authority” shall be synonymous with TMWA.

**TEST:** The term “test” as it pertains to this program shall mean a functional test of a USC approved backflow prevention assembly. This test shall be conducted by a CA-NV AWWA Certified Backflow Prevention Tester, per procedures adopted by AWWA.

**THERMAL EXPANSION:** The term “thermal expansion” shall mean the increase in water pressure within a customer’s water system due to thermal affects. Thermal expansion is a potential problem within a customer’s system which has been equipped with a backflow prevention assembly. Appropriate measures shall be taken by the customer, i.e., properly designed and sized thermal expansion tanks.

**USED WATER:** The term “used water” shall mean water which has passed the point of connection and therefore has left the control of the water purveyor.

**UTILITY:** The term “utility” shall mean TMWA, who is responsible for the operation of the water distribution system.

**WATER CUSTOMER:** The term “water customer” shall mean any person (or that person’s representative) or agency (or that agency’s representative) obtaining or using water from TMWA’s water distribution system.

**WATER DISTRIBUTION SYSTEM:** The term “water distribution system” shall mean TMWA’s water distribution system.

**WATER USER SUPERVISOR:** The term “water user supervisor” shall mean a person appointed by the water customer, at the request of TMWA, who shall be responsible for conformance with all applicable laws, rules and regulations pertaining to backflow prevention; for the installation, operation and use of all water piping systems, backflow prevention assemblies and water using equipment on the premises; and for the avoidance of unprotected cross-connections. The Water User Supervisor will be responsible for the customer’s private water system and be responsive to backflow prevention requirements set forth by the water purveyor and NAC 445A.

**WATER SUPPLIER:** The term “water supplier” shall mean the persons who own or operate the approved water supply system. The water supplier in this program is TMWA.

**YARD LINE:** The term “yard line” shall mean all piping between the house piping (private plumbing system) and the service connection.

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## **SECTION 3      GENERAL BACKFLOW PREVENTION REQUIREMENTS**

### **Current Installation Requirements**

Backflow prevention assemblies are required by TMWA (on all services) to provide service protection for TMWA's distribution system. This backflow prevention shall be installed per TMWA's Backflow Prevention Installation Requirements and Standards and this policy as a condition for new water service or continuation of existing service. Any proposed deviation from these requirements and standards will require approval from a member of TMWA's Backflow Prevention Group.

TMWA's Backflow Prevention Installation Requirements and Standards may change over time. It is the responsibility of the water customer to ensure compliance with the current version of these standards and this policy. These requirements refer to both new and existing water services, and for domestic, irrigation and fire services, unless specified otherwise by TMWA's Backflow Prevention Group.

Retrofits of existing services may present some special circumstances that will be dealt with on a case-by-case basis. For additional information on retrofits of existing services, please refer to those sections of this policy.

Refer to Appendix 10A of TMWA's Construction and Design Standards for detailed installation, inspection, testing and design requirements.

### **Design Considerations**

The installation of backflow prevention requires a number of considerations be reviewed prior to installation. Of particular importance in the design of a system incorporating a backflow prevention assembly are provisions:

1. For thermal expansion of downstream water or fluids
2. For drainage systems to handle full port discharges from the relief valves of reduced pressure principle backflow prevention assemblies
3. To prevent freezing of the backflow prevention assembly and the water service
4. To prevent submergence of internally or externally installed backflow prevention assemblies
5. To accommodate additional pressure losses that will occur through the backflow assembly

### **Approved Assemblies**

Pursuant to NAC 445A, any backflow prevention assembly installed for service

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protection on TMWA water services shall be on the current University of Southern California (USC) List of Approved Backflow Prevention Assemblies. TMWA maintains a current USC list of the approved assemblies.

Backflow prevention assemblies are approved by USC as an integral unit beginning with the #1 shut-off valve, through the assembly body and through the #2 shut-off valve. Any modification, including use of spare parts other than those of the original manufacturer or using a non-USC-approved shut-off valve, invalidates the USC approval, thus, invalidates the approval of TMWA as an acceptable assembly.

### **Types And Methods Of Backflow Prevention**

Types and methods of backflow prevention that are acceptable to TMWA for providing service protection include the following:

1. Pressure Vacuum Breaker or Spill Prevention Pressure Vacuum Breaker - only for Single Family Residential use to separate the domestic yardline from the irrigation line.
2. Double Check Valve Assembly and Double Check Valve Detector Assembly
3. Reduced Pressure Principle Assembly and Reduced Pressure Principle Detector Assembly
4. Air Gap

A member of TMWA's Backflow Prevention Group shall specify the required type of protection based on NAC 445A and TMWA's policies, and to be commensurate with the assessed degree of hazard on the customer's premise. In situations that are not covered in NAC 445A, TMWA shall evaluate each situation on a case-by-case basis and will determine the required type of backflow prevention. The water customer may at his/her discretion choose a higher level of protection than the minimum required by TMWA.

Per NAC 445A.6721, TMWA reserves the right to require more stringent requirements than that set forth in NAC 445A.

#### **DOMESTIC, IRRIGATION**

DC, RP or Air Gap, to be determined by TMWA's Backflow Prevention Group.

#### **FIRE**

1. Dry systems also require double check valve assemblies due to the potential of contamination when non-potable water is introduced through the fire pumper connection.
2. NFPA Class 1, 2 and 3 systems require the installation of an approved double check valve assembly.
3. NFPA Class 4, 5 or 6 systems require the installation of an approved reduced pressure principal assembly.

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4. At its discretion TMWA may require detector check assemblies.

### **SPECIAL CIRCUMSTANCES**

The normal types of backflow prevention required for a water service are listed above. However, a retrofit situation or any special circumstances listed below (or not listed) may require an exception to the norm.

1. Where access to a premise is denied by the water customer to TMWA's Backflow Prevention Group, TMWA's distribution system shall be protected with an Air Gap.
2. Where there is one contaminant (health) hazard, TMWA's distribution system shall be protected with a Reduced Pressure Principle Assembly, to be determined by TMWA's Backflow Prevention Group.
3. If it is impossible or impractical to make a cross-connection survey, TMWA's distribution system shall be protected with an Air Gap or a Reduced Pressure Principle Assembly, to be determined by TMWA's Backflow Prevention Group.

### **Atmospheric Vacuum Breaker (AVB)**

The use of atmospheric vacuum breakers for service protection on all service connections is prohibited.

### **Inspections**

All inspections shall be performed by TMWA's Backflow Prevention Group unless otherwise assigned by mutual agreement to another department of TMWA. Any backflow prevention installed for service protection for a new service connection or existing service connection shall be inspected by a TMWA Backflow Prevention Group member as a condition for new water service or continuation of existing service.

If an inspection is not requested, TMWA may require the service trench be excavated and/or the backflow prevention assembly moved to the meter or the point of connection.

### **Backflow Prevention Assembly Tests**

The water customer shall have each assembly, which was installed for service protection, tested by a certified tester as a condition for new water service or continuation of existing service. Upon conclusion of the test, it is the water customer's responsibility to submit a copy of this written test report to TMWA. Assembly tests are required:

1. After installation of a new assembly
2. After repair, replacement, or relocation of an assembly
3. After a backflow incident

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4. Annually; or more frequently as required by TMWA for the purpose of monitoring cross-connection hazards; or more frequently for the purpose of reviewing assemblies that repeatedly fail the tests.

Water service will be terminated if tests are not performed as required by TMWA.

Refer to the portion of this section titled "Repair or Replacement of Assemblies" regarding when a test is not successfully completed.

#### Initial Tests

Each newly installed backflow prevention assembly installed on a new domestic or irrigation service will have the initial test completed by TMWA's Backflow Prevention Group. It is the responsibility of the owner or owner's representative to have the assembly re-tested if the initial test fails. The successful test results shall be received by TMWA within seven (7) days of the test. Any newly installed backflow assembly on a fire service or a backflow prevention assembly which has been repaired, replaced or relocated, shall be tested and the successful test results shall be received by TMWA within seven (7) days of the water meter turn on or repair of the assembly. If the test is not received in this period, the procedure to terminate water service, based on Section 9, ENFORCEMENT ACTION, BASIS FOR WATER SERVICE TERMINATION, Item 3 (Refusal or unapproved delay to test a backflow prevention assembly), will be instituted.

#### Annual Tests

TMWA will notify customers by mail when the periodic (usually annual) testing of the assembly providing service protection is required. TMWA may require certain assemblies be tested more frequently and will notify the customer of this requirement. The following communication process will be used:

1. TMWA will notify the water customer of the required backflow prevention test at the beginning of the quarter in which the test is due. The customer will be given a forty-five (45) day time frame to comply and have the test results provided to TMWA.
2. A second notice will be sent to the water customer who does not take action on the first notification. The second notice will allow a fifteen (15) working day time frame to comply.
3. The third notice will notify the customer of a Disconnect Notice to be carried out within 48 hours and to remain in effect until the test is completed.
4. A delayed test in the current year will not change the next year's test date to the later date when the test was actually done. For example, a test is due in August 1998, but is not performed until October 1998. The next test will be due in August 1999, not in October 1999.

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### **Repair Or Replacement Of Assemblies**

An assembly may be removed by the customer for repair provided the unprotected water service is not used until the repair is completed. A re-test of the repaired assembly will be required after the repair is complete.

An assembly may be removed by the customer for replacement provided the unprotected water service is not used until the replacement assembly is installed. All assemblies used as replacements shall be installed per TMWA's Backflow Prevention Installation Requirements and Standards and this policy and shall be tested by a certified tester after installation. The manufacturer, serial number, and size of the replaced assembly shall be noted on the test form and shall be noted as being replaced.

TMWA may notify the customer of required repairs to a backflow prevention assembly or replacement of a backflow prevention assembly. TMWA will notify customers by mail regarding repair or replacement requirements.

### **Removal Or Relocation Of Assemblies**

Approval shall be obtained from TMWA's Backflow Prevention Group before a backflow prevention assembly, which was installed for service protection, can be permanently removed or relocated. Relocation, inspections and tests of the relocated assembly shall be completed as noted in the TMWA Backflow Prevention Installation Requirements and Standards and this policy.

### **Installation Location**

The location of backflow prevention for service protection shall be designated by the TMWA Backflow Prevention Group. The normal installation locations are listed below; however, a retrofit situation or any special circumstances listed below (or not listed) may cause an exception to the norm.

TMWA shall require of any water customer with backflow prevention designated as service protection that is not installed immediately after the meter, or point of connection, to submit an annual certification stating that no connections or taps have been made between the meter, or point of connection and the backflow prevention.

#### **Special Circumstances**

The backflow prevention assembly for all water services to a premise shall be installed at the meter or point of connection to TMWA's main if any of the following apply:

1. An auxiliary water supply or non-potable water supply (recycled, ditch, well, surface, etc.) is on the premises.
2. Entry to any portion of the premises is not available for inspection by TMWA.

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3. Any customer cannot or will not allow an on-premise inspection of his private internal water system.
  4. All conditions for an internal installation as noted in the TMWA Backflow Prevention Installation Requirements and Standards or this policy are not met, including approval by TMWA's Backflow Prevention Group for an internal installation.

#### Domestic, Irrigation

Domestic services shall have the backflow assembly located immediately downstream of the meter. The irrigation service shall have the backflow assembly located immediately downstream of the meter.

#### Fire Services

##### Fire Services Definitions.

The following definition system is used by TMWA for determining the appropriate installation location for backflow prevention on a private fire protection system for new or existing services. It is not to be confused with the NFPA fire system classification system.

1. Type A System - Single Fire Service exhibits all of the following characteristics:
  - a. A single fire service line (one point of connection to TMWA's main) that serves one fire suppression system in one building with one riser, and
  - b. the fire suppression system is not directly or indirectly connected to any other fire suppression system, and
  - c. is not a looped system, and
  - d. has no fire hydrants on the fire service line.
2. Type B System - defined as any configuration of fire service not designated as Type A system. Type B systems may include, but are not limited to, the following characteristics:
  - a. Multiple points of connection to TMWA's main.
  - b. Looped systems with one point of connection.
  - c. One fire service line provides water suppression to more than one building.
  - d. Fire hydrants are on the fire service line.
  - e. Private fire hydrants with a lateral greater than fifty (50) feet in length

##### Location Requirements.

The location for the backflow prevention shall be determined by TMWA for each service.

For all backflow prevention assemblies that are required by TMWA for service protection, the location of the backflow prevention assembly shall be immediately inside

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the property being served. The rationale for this requirement is that TMWA loses control of water quality once water passes into the customer's system. On the other hand, TMWA is aware that locating the backflow prevention assembly at the fire system riser provides easier accessibility for testing and maintenance purposes, and may provide some freeze protection benefits. For these reasons the following standards shall be used in the location of backflow prevention assemblies:

1. Type A System - The backflow prevention assembly is required at the point of connection (immediately inside the customer's property line) for this system. All requirements for installation as described in the TMWA Backflow Prevention Installation Requirements and Standards and this policy shall be met. Internal installations will be accepted for the fire suppression systems only upon approval by TMWA's Backflow Prevention Group. If, in the opinion of TMWA, these requirements for internal installations have not been met, TMWA will require corrections to the installation or may require the backflow prevention assembly be moved to an exterior location just inside the property line.
2. Type B System - The backflow prevention assembly is required at the point of connection (immediately inside the customer's property line) for this system. All requirements for installation as described in the TMWA Backflow Prevention Installation Requirements and Standards and this policy shall be met.
  - a. DC's may be installed above ground in a freeze-proof enclosure, or in an underground vault where drainage has been properly designed to keep vault dry throughout the year.
  - b. RP's shall be installed above ground in a freeze-proof enclosure properly designed for drainage.
  - c. On request from the water customer, rather than an RP at the property line, TMWA will consider allowing a double check valve assembly at property line accompanied by RP's inside the facility at the glycol loops. The RP installations shall meet all requirements for an internal installation.

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## **SECTION 4      RETROFIT PROCEDURE FOR EXISTING SERVICE CONNECTIONS**

TMWA shall review all existing water service connections to assess the degree of hazard within a premise to designate the required backflow prevention. All existing domestic, irrigation and fire service connections will be reviewed. The retrofit program will be carried out:

1. Through mailings to specific water customers,
2. During remodels, tenant improvements, expansions, or construction projects; or
3. Through other methods deemed necessary by TMWA.

### **Remodels, Tenant Improvements, Other Construction**

Retrofits which are initiated in conjunction with a building permit for remodels, tenant improvements, building additions, etc., may not require the detailed survey discussed below. TMWA's Backflow Prevention Group will review the construction project and water use and will determine the appropriate type of backflow assembly and location. These retrofits shall be completed during the course of the construction project and are required for continuing water service.

### **Non Construction Related Retrofits**

TMWA will contact other customers for retrofit of their domestic, irrigation and fire water services without the stimulus of a construction project. Upon being contacted by TMWA, a water customer of an existing service connection may have two options (and will be notified of the available options):

1. The water customer shall install the required backflow prevention in conformance with NAC 445A and TMWA policy, and per TMWA's Backflow Prevention Installation Requirements and Standards. Backflow prevention, commensurate with the degree of hazard per NAC 445A, shall be installed for service protection if TMWA, in its sole discretion, determines that one or more of the following characteristics exist:
  - a. Premise with complex plumbing arrangements which make it impractical to assess whether cross-connection hazards exist,
  - b. Premise with a repeated history of cross-connections being established or reestablished, or
  - c. Premise where cross-connections are unavoidable, or not corrected, or where there is a high potential for change in the plumbing system.
2. If the customer wishes to install backflow protection internal to his plumbing system, or if petition is being made with TMWA to lower the level of backflow prevention for service protection, the customer shall contract with a Certified Specialist to perform a detailed survey of the premise. TMWA strongly encourages customers to conduct cross-connection control surveys to provide internal protection.

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- a. The survey will list the hazards associated with the water use on the premise and will recommend the proper level of backflow prevention for these hazards for internal protection. The survey will also list backflow prevention requirements for service protection.
  - b. A copy of the survey will be forwarded by the Certified Specialist to TMWA's Backflow Prevention Group.
  - c. TMWA will evaluate this survey; review, approve or change requirements and locations for internal protection; and may make additional requirements for internal protection.
  - d. Having a survey performed will not eliminate, and may not reduce the service protection requirement designated by NAC 445A or TMWA Policy.
  - e. The retrofit will be carried out as noted in this section under Retrofit Steps.

### **Retrofit Steps**

After it has been determined which step above will be followed, the following is a brief description of the next steps in the retrofit.

1. The type of backflow prevention for service protection and its location will be determined by a member of TMWA's Backflow Prevention Group. The level of protection listed in NAC 445A will be the minimum requirement for service protection. Any water use not listed in this detail will be reviewed on a case-by-case basis for service protection requirements.
2. TMWA recognizes the hardships that may be imposed on a customer through this retrofit program. Therefore, the schedule for implementation of the backflow prevention improvements may be flexible, provided TMWA, after any necessary consultation with the District Health Department, determines there is no immediate risk. TMWA will determine completion date after consultation with the customer. General time frames for completion of installation follow:
  - a. Where TMWA identifies a contaminant (health) hazard, service protection shall be completed within 180 days or in accordance with an alternate schedule acceptable to TMWA.
  - b. Where TMWA identifies a pollutant (non health) hazard, service protection shall be completed in accordance with a schedule acceptable to TMWA.
3. After the final determination is made, a letter will be mailed to the water customer describing in detail the improvements to be made and a schedule by which the improvements shall be completed.
4. If the retrofit is not completed at the agreed upon time, the procedure to terminate water service, based on Section 9, ENFORCEMENT ACTION, BASIS FOR WATER SERVICE TERMINATION, Item 3 will be instituted, unless the customer receives an approval from TMWA's Backflow Prevention Group for an extension.

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## **SECTION 5            REQUIREMENTS FOR RETROFITS**

### **General Backflow Prevention Requirements**

As a general rule, backflow prevention assembly installations shall be per the requirements in this policy and TMWA's Backflow Prevention Installation Requirements and Standards. This section covers only items which may be exceptions to these standards or requirements set forth in Section 3, General Backflow Prevention Requirements.

If, in the original utility plans for the project, a backflow prevention assembly was called for but not installed, the backflow prevention assembly as called for on the utility plans shall be installed.

### **Existing Backflow Prevention Assemblies**

Regarding any presently existing backflow prevention assembly which was a USC approved assembly at the time of installation, but is not currently on the USC Approved Assemblies list:

1. As long as the assembly passes the annual AWWA functional test;
2. Has been maintained and/or repaired to meet original factory working conditions;  
and
3. Is commensurate with TMWA's assessed degree of hazard.

The assembly will be accepted as an approved assembly for service protection. It shall be replaced with an approved assembly at the point when it is either moved or can no longer meet the specifications listed above.

### **Reduced Level Of Service Protection**

This section is applicable to domestic and fire water services. TMWA recognizes that, on occasion during a retrofit, the installation of the proper backflow prevention assembly may be difficult due to space, drainage constraints or the physical configuration of the water customer's premise. In these situations, at the water customer's request, TMWA may consider a reduced level of protection. As a requirement for a reduced level of service protection, the water customer shall commit in writing to the following:

1. In the event a water customer requests a reduced level of service protection, the owner accepts liability for installing the pollutant (non health) hazard level type of assembly to protect against a contaminant (health) hazard.
2. The water customer shall have a Certified Specialist perform a detailed cross-connection survey of the premise as noted in the section titled Procedure for Retrofit of Existing Services.

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3. The customer shall complete installation of internal protection improvements as outlined in the survey and approved by TMWA to provide a level of protection commensurate with the assessed degree of hazard.
  4. TMWA will require the water customer to maintain an aggressive, on-going internal backflow prevention program.
  5. The backflow prevention for internal protection shall be installed per TMWA's Backflow Prevention Installation Requirements and Standards and this policy, inspected by TMWA's Backflow Prevention Group, maintained or repaired to original factory working condition, and tested by a certified tester at an interval to be determined by TMWA.
  6. An increased frequency of testing of service protection assemblies as determined by TMWA may be required.
  7. For reduced service protection on a domestic service, some additional requirements are noted in the Domestic Service, Backflow Prevention Options, noted below.
  8. For reduced service protection on a fire system, some additional requirements are noted in the Fire Service, Backflow Prevention Options, noted below.
  9. Records detailing the internal protection, the repair and maintenance, and tests shall be maintained by the water customer and will be submitted to TMWA on an annual basis.
  10. Each year, a written cross-connection survey shall be required of the owner or property manager containing details regarding the items listed below. After receipt and review of the survey, TMWA's Backflow Prevention Group shall then determine if the reduced service protection is still adequate. Should the level of service protection not be adequate for the level of hazard, the water customer shall be required to upgrade the service protection backflow prevention assembly to the proper type as a requirement for continued water service. The following will be included in the survey:
    - a. Changes in tenancy
    - b. Changes in water use
    - c. Plumbing changes
    - d. Use of non-potable water
  11. TMWA shall require reasonable access to the premise to conduct an initial cursory survey and periodic re-evaluations to determine if the internal protection is adequate to protect the TMWA distribution system.
  12. TMWA may also require the customer have additional detailed surveys performed by a Certified Specialist.

## **Installation Location**

### **Special Circumstances**

The backflow prevention assembly for all water services to a premise shall be installed at the meter or point of connection to TMWA's main if any of the following apply:

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1. A water customer's premise has internal cross-connections that cannot be permanently corrected or controlled.
  2. A water customer's premise has intricate internal plumbing and piping.
  3. The water service laterals between the point of connection and the water use cannot be located or defined to the satisfaction of TMWA.
  4. Any conditions listed in the section General Backflow Prevention Requirements, Installation Location, Special Circumstances apply.

#### Domestic Services

Backflow prevention shall be as close as possible to the meter.

TMWA may consider allowing the backflow prevention assembly to be located internally at the water riser if physical space is limited for an exterior installation, if proof is provided through a Cross-Connection Survey that no lateral taps exist prior to the proposed installation location inside the building, and if all requirements are met for an internal installation including sufficient access to the assembly for testing and maintenance purposes.

#### Irrigation Services

Backflow prevention shall be immediately downstream of the meter. Installations shall be per the TMWA Backflow Prevention Standards and this policy.

#### Fire Services

Backflow prevention shall be located at the point of connection. If the assembly is a double check it shall be located in a vault just inside the curb/sidewalk; if the assembly is an RP it shall be located in a heated enclosure just inside the curb/sidewalk. The fire hydrants, number of fire risers, and the fire department pumper connection will be a consideration during placement of the backflow prevention assembly.

TMWA may consider allowing the backflow prevention assembly to be located internally at the fire system riser if physical space is limited for an exterior installation, if proof is provided through a Cross-Connection Survey that no lateral taps exist prior to the proposed installation location inside the building, and if all requirements are met for an internal installation including sufficient access to the assembly for testing and maintenance purposes

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## **Types And Methods Of Backflow Prevention**

### **Domestic Services**

Double Check Valve In Lieu Of Reduced Pressure Principle Assembly – With approval from TMWA’s Backflow Prevention Group, a DC may be used in lieu of an RP. All requirements noted above in the section titled Reduced Level of Service Protection shall be met by the water customer. In addition, the DC requires a minimum of semi-annual testing and a possible higher level of testing as directed by TMWA or the District Health Department. This substitution may be considered for retrofit situations only under the following exclusive conditions:

1. Where retrofit of an RP induces pressure losses which render the existing domestic system inoperable and there is not space for installation of a pump. The owner of the domestic system shall submit to TMWA photos, sketches, calculations and a detailed flow and pressure report to substantiate this claim. The calculations and report shall be provided by a licensed plumber or engineer. TMWA reserves the right to inspect the premises to verify the constraints.
2. Where safety or drainage problems exist with the installation of an RP which cannot be reasonably corrected. The owner of the system shall provide a written report which details the problems or logistics of installing the RP.

### **Irrigation Services**

Stop And Waste Valves – NAC 445A.67255 specifically defines stop and waste valves as a potential source of contamination to a distribution system and prohibits their use upstream of a backflow prevention assembly. Any existing irrigation system with a stop and waste valve between the meter (or point of connection) and the backflow prevention assembly shall be changed to meet current TMWA Backflow Prevention Standards as a requirement for continued water service.

Double Check Valve – TMWA may accept the use of the existing double check (DC) as system protection if it can be demonstrated that:

1. The DC passes the periodic functional test
2. The DC is installed correctly including the proper shut-off and drain system
3. No stop and waste valve is installed upstream of the DC.

At the time that a DC no longer passes the test, it shall be replaced with an assembly approved for service protection.

### **Fire Services**

Regulatory Requirements And Water Quality Issues – NAC 445A requires that all fire sprinkler systems be equipped with a backflow prevention assembly. The type of backflow prevention assembly is based upon the NFPA Classification of the particular

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fire sprinkler system and will be designated by a member of TMWA's Backflow Prevention Group.

Based upon the results of field surveys conducted by TMWA, many existing fire protection services are not equipped with proper backflow prevention assemblies. Proper backflow prevention assemblies are testable double check valve assemblies (DC), or testable reduced pressure principle assemblies (RP) or air gap.

Research and testing conducted by the Water Research Foundation (The Foundation) has established that fire sprinkler systems constitute a contaminant (health) hazard to TMWA's distribution system and shall be equipped with appropriate backflow prevention assemblies. However, since installation of a backflow prevention assembly will reduce the water pressure and may affect sprinkler performance, care must be exercised when installing backflow prevention, to not jeopardize a critical public safety requirement while providing for a public health concern. The fire sprinkler system must continue to perform hydraulically during a fire event. Therefore, any retrofit shall equally address public health (backflow prevention) and public safety (maintaining reliable fire flow).

Other issues that are a concern in retrofitting existing fire sprinkler systems are inadequate space and, in the case of reduced pressure principle assemblies, no drainage system or an inadequate drainage system necessary to handle full discharge from the relief valve. Another issue encountered in TMWA's Backflow Prevention Program includes the safety issue of installing a reduced pressure principle assembly near electrical equipment. Safety requirements dictate that a reduced pressure principle assembly be installed away from electrical equipment.

#### Fire System Backflow Prevention Options

1. No Backflow Prevention Assembly. TMWA specifies that all fire services be equipped with backflow prevention assemblies consistent with NAC 445A. Based upon the water quality data presented in The Foundation study and the potential acute and chronic health effects associated with backflow from fire sprinkler systems, the "no backflow prevention option" is not an option.
2. Installation Of Required Backflow Prevention. This shall be per the requirements listed in the section titled General Backflow Prevention Requirements.
3. Delayed Installation Of Double Check Valves. In situations where the retrofit is extremely difficult due to space limitations or where the backflow prevention assembly adversely affects sprinkler system operation, TMWA will consider an extended installation schedule under the following conditions:
  - a. The existing system is equipped with at least a non-testable single check valve.
  - b. The owner of the system shall submit a report prepared by a licensed fire contractor or engineer which adequately describes the space or hydraulic

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problems and provides the flow and pressure requirements of the jurisdictional fire agency.

- c. The owner of the premise consents to a prescribed plan and schedule for eventual retrofit of the fire sprinkler system with a double check valve assembly and a tank-pump installation, if necessary, for pressure and flow. Such plan and schedule shall be with the approval of the District Health Department and the jurisdictional fire agency.
4. Double Check Valve In Lieu Of Reduced Pressure Principle Assembly. With approval from TMWA's Backflow Prevention Group, the District Health Department, and the jurisdictional fire agency, a DC may be used in lieu of an RP on certain NFPA Class 4, 5 & 6 fire sprinkler systems. All requirements noted above in the section titled Reduced Level of Service Protection shall be met by the water customer. In addition, the DC requires a minimum of semi-annual testing and a possible higher level of testing as directed by TMWA or the District Health Department. This substitution may be considered for retrofit situations only under the following exclusive conditions:
- a. Where retrofit of an RP induces pressure losses which render the existing fire system inoperable and there is not space for installation of a pump. The owner of the fire system shall submit to TMWA photos, sketches, calculations and a detailed flow and pressure report to substantiate this claim. The calculations and report shall be provided by a licensed fire contractor or engineer. A letter from the jurisdictional fire agency listing required pressures and flows shall be provided to TMWA.
  - b. Where safety or drainage problems exist with the installation of an RP which cannot be reasonably corrected. The owner of the system shall provide a written report which details the problems or logistics of installing the RP.

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## SECTION 6 CONSTRUCTION WATER & FIRE HYDRANT USAGE

### Construction Water Definition

Backflow prevention is required by TMWA on all methods of using potable water for construction. During the course of construction for a particular premise, water may be used for various construction activities. Such activities include, but is not limited to, water used for dust control, site grading and compaction, on-site mixing of concrete and cement, water used for the pressure testing of pipes, and water used in the cleaning of tools and equipment.

### Construction Water Supply

Several options available for construction water are as follows:

Truck Fill Sites. TMWA encourages the use of non-potable supplies for construction water needs, particularly water used for dust control. However, TMWA has developed a mix of potable and non-potable construction water fill stations strategically located around the community. Each station is equipped with metering and appropriate backflow prevention assembly. TMWA encourages contractors and developers to utilize these stations, and arrangements can be made with TMWA for their use.

Temporary Construction Water Meter. If in fact a customer or developer requires construction water specifically at its construction site, then the owner/developer may request a temporary construction water service utilizing potable water from TMWA's distribution system. Temporary construction water service shall require metering, will be billed at the appropriate construction water rate, shall be equipped with appropriate backflow prevention assembly which shall be tested by a Certified Tester, and shall be retired by the customer/developer at a time specified by TMWA. TMWA's Backflow Prevention Group will specify the appropriate level of backflow prevention assembly on a case-by-case basis.

Permanent Domestic Or Irrigation Water Meter. Another source of potable construction water is to use the permanent domestic or irrigation water service for that property. The meter box shall be set to subgrade in the final permanent location, the permanent backflow prevention assembly installed (with a hose bib at the downstream end of the backflow prevention assembly), inspected by TMWA's Backflow Prevention Group, and tested by a Certified Tester. At the end of the construction project, the only change required is for the developer to remove the hose bib from the end of the backflow prevention assembly and notify the TMWA customer service department to change the service into the appropriate customer's name. All installation requirements and inspections shall be performed as noted in TMWA's Backflow Prevention Standards and this policy.

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### **Fire Hydrant And Fire Water Service Use**

At no time shall a private entity utilize water from a public or private fire hydrant or from a fire sprinkler water service inside a facility for any purpose other than fire fighting. TMWA shall designate the approved water supplies that shall be utilized by private entities (including contractors) for construction, or any, purposes.

Any municipal agency that uses water from a private or public fire hydrant or other water outlet shall:

1. Have written approval from TMWA for use of water from this non metered supply.
2. Have an approved Air Gap on each vehicle or equipment being filled from the hydrant.
3. Have the air gap on those vehicles and equipment approved by TMWA's Backflow Prevention Group before water fill.

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## **SECTION 7      CERTIFIED BACKFLOW ASSEMBLY TESTERS**

### **Tester Certification**

Persons wishing to perform tests on backflow prevention assemblies in Nevada shall have a CA-NV AWWA Backflow Prevention Assembly Tester Certification pursuant to NAC 445A. Certification requires passing a tester class resulting in a certificate from the CA-NV AWWA. Re-certification shall be obtained as required.

All testers who perform tests on backflow prevention assemblies which provide service protection for TMWA shall be on the approved List of CA-NV AWWA Certified Testers. The tester's name will be automatically removed from the list if proof of re-certification has not been provided by the tester to the District Health Department.

TMWA reserves the right to remove any tester from the approved list for TMWA testing due to non performance reasons or for performing the tests in a method not consistent with TMWA, AWWA and NAC 445A standards or requirements.

### **Tester Responsibilities And Testing Requirements**

1. A successful, operational function test by a tester shall be completed and submitted to TMWA within seven (7) days after the assembly is installed and water service is set and/or water service is established. Water service will be terminated after the meter is set if this requirement is not met.
2. Any tester who conducts tests of backflow prevention assemblies which protect fire service connections shall also be a licensed fire contractor or work under the direct supervision of a licensed fire contractor. This directive is per the District Health Department.
3. TMWA's Backflow Prevention Group members will perform tests on backflow prevention assemblies throughout the year on a random basis as a quality control measure.
4. TMWA may request the tester perform the test in the presence of a TMWA Backflow Prevention Group member.
5. TMWA may conduct periodic spot checks of a tester's work using the tester's own gauge.
6. NAC 445A.67245 requires all test gauges to be calibrated at least annually by a qualified firm capable of such calibration. The calibration certification forms, for any test gage used to test backflow prevention assemblies on TMWA water services, shall be provided to TMWA's Backflow Prevention Group annually.
7. Both backflow prevention assemblies on a Detector Check assembly shall be tested. Designate the test for the bypass assembly as such on the test form. Read the bypass meter and record it on the test form.

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8. Place in the comment field any items such as and including:
    - a. An incorrectly installed assembly (per TMWA Installation Standards)
    - b. An assembly which has been modified from the original factory configuration such as having a #1 shut-off valve without a test cock or one in which a shut-off valve has been detached from the body of the backflow assembly.
    - c. An installation which has a stop and waste valve between the meter and the assembly
    - d. An installation which has a water outlet, tap, tee, etc., upstream of the backflow prevention assembly
    - e. Use of a test cock for water supply
    - f. A fire service which has a tap for non-fire services upstream or downstream of the backflow prevention assembly
  9. Test criteria for a passing test for an RP:
    - a. Minimum 2.0 pounds per square inch differential (PSID) on relief valve opening
    - b. Minimum 1.0 PSID on check valve #1
    - c. Minimum 3.0 PSID buffer between relief valve opening and check valve #1
    - d. Both shut-off valves shall not leak
  10. Test criteria for a passing test for a DC:
    - a. Minimum 1.0 PSID on check valve #1 and check valve #2
    - b. Both shut-off valves shall not leak
  11. Test criteria for a passing test for a PVB:
    - a. The air inlet shall open at a minimum 1.0 PSID
    - b. Minimum 1.0 PSID on check valve #1
    - c. Both shut-off valves shall not leak

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## **SECTION 8      CROSS-CONNECTION CONTROL SPECIALISTS**

### **Specialist Certification**

Any person who wishes to conduct Cross-Connection Surveys for TMWA water customers shall be a Cross-Connection Control Specialist (“Certified Specialist”). This certification shall be obtained through successful completion of the specialist class presented by the CA-NV AWWA.

TMWA maintains its own list of approved Cross-Connection Control Specialists. Certified Specialists wishing to perform work for TMWA water users shall submit a copy of their certificate to TMWA’s Backflow Prevention Group.

TMWA reserves the right to remove any Certified Specialist from the list should he/she fail to perform the survey work in accordance with TMWA, AWWA and NAC 445A standards.

### **Survey Requirements**

Surveys conducted for TMWA water users shall be complete, well written and concise. Surveys shall include the following minimum information:

1. A clear and complete description of the water service connections at the premise being surveyed including, but not limited to:
  - a. Types of services
  - b. Service address
  - c. Owner name and address
2. A recommendation for type of backflow prevention for service protection that is consistent with requirements of NAC 445A. Describe potential external and internal installation locations. Describe locations and sizes of drains, and locations of electric panels and/or electric equipment. Describe any logistical problems, such as space problems, meters in driveways, lack of drains, high water tables, water run-off problems, etc.
3. A detailed review of the on-site water use and the health or pollutant level hazards associated with such use. List backflow prevention that exists on internal plumbing hazards.
4. A physical description of the facility and premise including a map showing pertinent data such as buildings and where water services are located in relation to buildings and parking lots, location of the service connection and description of the area immediately around and downstream of the service connection, location of sewer mains or laterals, location of on-site sewage treatment/disposal facilities, etc.
5. Note any special factors such as:

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- a. Auxiliary approved potable water supplies on the premise.
  - b. Non-potable auxiliary water supplies being used (seasonal or year round) on, adjacent to, or close to the premise: recycled, reclaimed, well, ditch, surface water.
  - c. Actual or possible unauthorized water taps or usage upstream of any backflow prevention assembly for service protection.
  - d. Existing backflow prevention assemblies, their purpose, general condition, size, manufacturer, model, serial number and any test history.
  - e. Relationships to other properties relating to water services or private water mains.
6. Surveys that address internal protection should also include the following:
- a. A detailed description of internal plumbing, including existing or potential cross-connections.
  - b. A recommendation for “internal protection” consistent with industry codes and references including but not limited to: the Uniform Plumbing Code, city building codes, NAC 445A, ‘Orange Book’, etc.

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## **SECTION 9      ENFORCEMENT ACTION**

### **General**

If, in the opinion of TMWA, it is found that a customer is not meeting its responsibilities relative to service protection backflow prevention, TMWA may implement enforcement actions. Enforcement may include:

1. Denying or terminating water service to a customer's premise.
2. TMWA may install backflow prevention, at the customer's expense, for the purpose of service protection, commensurate with the degree of hazard on the premise.

### **Basis For Water Service Termination**

When TMWA encounters a water use that represents a clear and immediate hazard to the potable water supply that cannot be immediately abated, TMWA will notify the District Health Department and will institute a procedure for discontinuing the water service. Conditions or water uses that create a basis for water service termination shall include, but are not limited to, the following:

1. Direct or indirect cross-connection between TMWA's water system and a sewer line.
2. Unprotected direct or indirect connection between the public water system and an unapproved auxiliary water system or source.
3. Refusal to install a required backflow prevention assembly. Unapproved delays by the water customer to install backflow prevention assemblies shall constitute such a refusal.
4. Refusal or unapproved delay to test a backflow prevention assembly.
5. Refusal or unapproved delay to repair a faulty backflow prevention assembly.
6. Refusal or unapproved delay to replace a faulty backflow prevention assembly.
7. Unprotected direct or indirect connection between the public water system and a system or equipment containing contaminants.
8. If a backflow prevention assembly has been removed, bypassed or disabled without prior approval from TMWA's Backflow Prevention Group.
9. If a cross-connection exists that is not controlled commensurate to the degree of hazard as assessed by TMWA's Backflow Prevention Group.

### **Termination Procedure**

For condition 1 or 2, TMWA will terminate water service to a customer's premise immediately if the hazard to the potable water supply cannot be immediately abated.

For all other conditions, TMWA will terminate service to a customer's premise after two written notices described in steps 1 and 2 below have been sent to the water customer specifying the corrective action needed and the time period in which it shall be

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completed. If the corrective action is not taken by the water customer within the specified time period, then water service may be terminated per the following steps:

1. TMWA shall notify the water customer of the requirements related to backflow prevention (installation, maintenance, relocation, testing, etc.). The customer shall be given ten (10) working days to comply and have inspections completed by TMWA's Backflow Prevention Group.
2. TMWA shall send a second notice to the water customer who does not take action on the first notification. The second notice shall allow five (5) working days to comply.
3. TMWA shall send a third notice to the customer which will be a Disconnect Notice to be carried out within 48 hours.
4. TMWA will terminate water supply and lock the service valve. The water service will remain inactive until all violations have been corrected, inspected and approved by TMWA and the District Health Department, and any applicable termination charges have been collected in accordance with TMWA's Rules and Rates.

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## **SECTION 10      PROCEDURE FOR A BACKFLOW OR CROSS- CONNECTION INCIDENT**

### **General**

Whenever backflow occurs (either from backpressure or backsiphonage) the potential exists for contamination of TMWA's distribution system. Backflow incidents may be confined on site to a particular premise or may be more widespread in the event of sudden pressure loss in TMWA's distribution system. The following procedures shall be used for responding to backflow incidents:

### **Backflow Event Confined To A Particular Premise Or Property**

This type of backflow event may be communicated to the District Health Department or TMWA. The following will be the procedure followed by TMWA for an event isolated to a single property.

1. TMWA's Backflow Prevention Group or water production staff will notify the District Health Department of the event and the nature of the event. Based upon the particular circumstances and with consultation with the District Health Department, TMWA may immediately implement one or more of the following actions: water quality testing, flushing of services and mains, and/or boil water order to customers or areas of the system affected by the event. Water service may be terminated to the premise suspected of being the source of the backflow until corrective actions are completed.
2. The owner of the premise allowing (or suspected of allowing) the backflow to occur shall be required to install or repair and test backflow prevention equipment on the water service. Backflow prevention measures will be specified by TMWA's Backflow Prevention Group. Such backflow prevention equipment will be installed and tested before service is restored.
3. TMWA will require the owner of the premise to complete a detailed cross-connection control survey of the premise by a Certified Specialist. TMWA and the District Health Department will determine the scope of the survey and will utilize the survey to determine additional internal backflow prevention measures required of the affected premise.

### **Backflow Event Caused By A System Loss Of Pressure**

1. TMWA will determine the extent of the incident and notify the District Health Department as soon as possible. After consultation with the District Health Department, a boil water order may be issued by TMWA to the media identifying the area affected by the event and those customers which should immediately boil their domestic water.

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2. TMWA will isolate the area affected by the backflow event and will notify the jurisdictional fire department of curtailment of fire protection service to the affected area. TMWA will continue to communicate with affected customers through use of the media, direct contact, telephone, door hangers and other methods.
  3. Immediately after isolating the area affected by the backflow event, TMWA will initiate corrective action to restore service. This will include system repairs, flushing of mains and services and water quality sampling and monitoring.
  4. After service is restored (mains and services are fully pressurized and flushed), the boil water order will be lifted upon receiving satisfactory results from water quality testing.

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## **SECTION 11      NON-POTABLE WATER USAGE & AUXILIARY WATER**

Non-potable water includes water from ditches, surface water, unapproved wells, reclaimed water, recycled water, gray water or any non approved water supply.

Any premise on which both TMWA water supply and a non-potable water supply exist will be subject to an annual shutdown test.

TMWA will not provide potable irrigation to a premise that is supplied with non-potable water for that use.

### **Type Of Backflow Prevention Required**

1. An RP backflow prevention assembly is required at the TMWA meter or point of connection on all domestic water services which enters a property in which a non-potable water supply is used.
2. A DC assembly is required at the point of connection on all fire services in a vault just inside the curb/sidewalk. TMWA may, at its discretion, allow the DC to be installed in the fire riser room. Where the backflow assembly installation is allowed in the fire riser room, the fire service must have a concrete slurry encasement with warning tape along the entire length of the fire service trench.
3. An Air Gap backflow prevention method is required at the TMWA meter or point of connection for any plumbing system which will have a direct or indirect cross-connection between both TMWA water and a non-potable water supply.
4. For a potable water service which enters a RESIDENTIAL property which is adjacent to a property where non-potable water is used for irrigation: See Section 8A of TMWA'S Engineering and Construction Standards for separation and backflow requirements.

### **Construction Requirements**

Requirements during the construction phase of both potable and non-potable facilities include the following:

1. TMWA will require "special inspection" of the on-site facilities to ensure that design/facility requirements are being met. Special inspection services will be paid for by the developer. The developer shall select the inspector from a list of Certified Specialists provided by TMWA. If available, TMWA may provide special inspection from staff personnel who are Certified Specialist. The special inspector will coordinate with TMWA's normal on-site facilities inspector and will provide a report to TMWA at the conclusion of construction confirming that all design facility requirements have been met.

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2. An initial shutdown test will be completed before the occupancy of any structure or residence.

### **Operation And Maintenance Requirements Of Non-potable Systems**

The on-site non-potable system shall have a dedicated supervisor (or contractor) who is a Certified Specialist and certified Backflow Prevention Assembly Tester. The supervisor shall be responsible for maintaining these certifications and will also be responsible for the following:

1. Performing annual shutdown tests with coordination and communication of shutdown tests with TMWA's Backflow System Administrator and other jurisdictional entities.
2. Maintaining non-potable system records and reports and making them available for viewing and inspection by TMWA and any other jurisdictional agency at any time.
3. Performing annual tests of backflow prevention assemblies just prior to seasonal reactivation of the on-site non-potable system.
4. The implementation of a developer/owner-sponsored "resident education" program concerning non-potable water.

### **Declaration Of Use Of Reclaimed Or Non-potable Water**

The potential non-potable water customer will provide to TMWA's Backflow Prevention Group a copy of the application for non-potable water usage within a week after the application has been made.

The potential non-potable water customer will provide to TMWA's Backflow Prevention Group a written declaration of the intent to use non-potable water on the premise where TMWA will supply potable water.

Failure to declare intentions to use reclaimed or non-potable water may result in additional expenses to the customer due to TMWA's backflow prevention requirements for potable versus non-potable water use.

### **Temporary Potable Water Supply**

TMWA may provide temporary potable water to a system designed to distribute non-potable water. The following are requirements for this service to be provided:

1. The water service shall be a separate tap on TMWA's distribution system.
2. The time frame for the service to be retired shall be provided to TMWA in writing.
3. Backflow prevention shall be through an Air Gap between the existing non-potable system and the proposed system that is to be served temporarily by the potable

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water system. In addition, the temporary water service shall have a reduced pressure backflow assembly.

4. When non-potable water service is connected to the non-potable water system, the TMWA temporary water service shall be retired at the main. A cash deposit shall be provided to TMWA for the amount estimated to retire the service. The customer shall be responsible for paying for all applicable permit fees.
5. TMWA will require the water customer to designate a water user supervisor for this premise.

### **Shutdown Tests**

All tests shall be attended by TMWA as purveyor of the potable water.

The following requirements shall be followed for a shutdown test:

1. Shutdown tests of the on site potable and non-potable systems shall be performed annually.
2. The customer shall bear all costs of the test. This test is in addition to the periodic (usually annual) functional test of the backflow prevention assemblies on the premises.
3. Performance and coordination of the shutdown test shall be the responsibility of the end user of non-potable water supply. End user shall coordinate such tests with TMWA as potable water purveyor, the non-potable water purveyor, the water customer's water user supervisor, and the District Health Department.
4. The shutdown test director will be TMWA, the District Health Department or the non-potable water purveyor.

### **Qualifications For Water User Supervisor**

The water user supervisor of a premise shall be a Certified Specialist through CA-NV AWWA.

### **Qualifications For Director Of Shutdown Test**

The director of a shutdown test shall be a Certified Specialist through CA-NV AWWA.

### **Water Service Termination**

If any cross-connections are detected between the potable water supply and the non-potable water during the shutdown test, potable water service will be terminated to the facility immediately and remain off until the cross-connection problem is located and removed to the satisfaction of TMWA.

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### **Auxiliary Approved Water Supply**

If TMWA supplies water to a premise with an approved auxiliary water supply, backflow prevention shall be required at the point of connection. TMWA's Backflow Prevention Group will specify the required type and location of backflow prevention assemblies for all TMWA water supply.

### **Well Abandonment**

When a well is abandoned, the owner shall submit to TMWA's Backflow Prevention Group a certified copy of the well plugging report prepared by the licensed driller in accordance with NAC 534.420. This report shall be recorded by the District Health Department.

### **References To Other Sections Of This Policy**

Enforcement Action

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## **APPENDIX A RESIDENTIAL FIRE SPRINKLER SYSTEMS**

### **Background**

Local fire jurisdictions may require the installation of fire sprinkler systems for certain single family homes. Single family homes that are far removed from a hydrant, a fire station, or because of their size or nature, may require the installation of such a system.

Based on discussions with the District Health Department and the Reno and Sparks Fire Departments, the owner or developer of a single family residence requiring a fire sprinkler system shall install a backflow prevention assembly (double check valve assembly or a reduced pressure backflow prevention assembly) where the fire suppression system branches off of a single service line.

### **Backflow Prevention Assembly Requirements**

1. The backflow prevention assembly shall meet all requirements for installation noted in the TMWA Backflow Prevention Standards and this policy.
2. The type of assembly and location will be designated by TMWA's Backflow Prevention Group.
3. The installation shall be inspected by TMWA's Backflow Prevention Group.
4. The backflow prevention assembly shall be tested upon installation and annually thereafter.
5. The backflow prevention assembly shall be maintained in factory working condition.

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## **APPENDIX B    UNIFORM PLUMBING CODE: INTERNAL BACKFLOW PREVENTION REQUIREMENTS**

Refer to Chapter 6 of the UPC, Water Supply and Distribution, for internal backflow prevention requirements for the adopted version specific to the city or jurisdiction in question.

Backflow prevention and cross-connection requirements are detailed in sections 602 through 603.

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## **APPENDIX C    NAC 445A EXCERPT**

### **NEVADA ADMINISTRATIVE CODE**

Containing All Permanent Regulations of State Agencies  
Adopted under chapter 233B of NRS

Classified, Arranged, Revised, Indexed and Published  
(Pursuant to NRS 233B.062 to 233B.065 inclusive)

by the  
**LEGISLATIVE COUNSEL  
STATE OF NEVADA**

Please direct any questions or suggestions  
pertaining to NAC to:

Legislative Counsel Bureau  
401 S. Carson St.  
Carson City, Nevada 89701  
(775) 684-6830

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### **CHAPTER 445A WATER CONTROLS PUBLIC WATER SYSTEMS**

Design, Construction, Operation and Maintenance

- 445A.6553 "Air gap" defined.
- 445A.65555 "Approved backflow testing laboratory" defined.
- 445A.65575 "Atmospheric vacuum breaker" defined.
- 445A.65585 "Auxiliary supply of water" defined.
- 445A.65605 "Backflow" defined.
- 445A.6561 "Backpressure" defined.
- 445A.65615 "Backsiphonage" defined.
- 445A.6569 "Certified backflow prevention assembly tester" defined.
- 445A.65695 "Check valve" defined.
- 445A.65725 "Class 1 fire sprinkler system" defined.
- 445A.6573 "Class 2 fire sprinkler system" defined.

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- 445A.65735 “Class 3 fire sprinkler system” defined.
- 445A.6574 “Class 4 fire sprinkler system” defined.
- 445A.65745 “Class 5 fire sprinkler system” defined.
- 445A.6575 “Class 6 fire sprinkler system” defined.
- 445A.65795 “Contamination” defined.
- 445A.6581 “Cross-connection” defined.
- 445A.65855 “Double check detector check assembly” defined.
- 445A.6586 “Double check valve assembly” defined.
- 445A.65945 “Fire sprinkler system” defined.
- 445A.66055 “Health authority” defined.
- 445A.6623 “Pollution” defined.
- 445A.6625 “Pressure vacuum breaker” defined.
- 445A.6631 “Reduced pressure detector assembly” defined.
- 445A.66315 “Reduced pressure principle assembly” defined.
- 445A.66375 “Service connection” defined.
- 445A.6643 “Stop and waste valve” defined.
- 445A.6648 “Supplier of water” defined.
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- 445A.67185 Cross-connections and backflow: General requirements.
- 445A.6719 Cross-connections and backflow: Assemblies for prevention of backflow.
- 445A.67195 Cross-connections and backflow: Minimum types of protection for particular service connections.
- 445A.67205 Cross-connections and backflow: Minimum types of protection for service connection to auxiliary supply of water or irrigation system.
- 445A.6721 Cross-connections and backflow: Minimum types of protection for other service connections; resolution of conflicting requirements; imposition of more stringent requirements.
- 445A.67215 Cross-connections and backflow: Service connection to fire sprinkler system.
- 445A.6722 Cross-connections and backflow: Design of fire sprinkler system.
- 445A.67225 Cross-connections and backflow: Conditions to provision of service to certain fire sprinkler systems.
- 445A.6723 Cross-connections and backflow: Installation of air gap.
- 445A.67235 Cross-connections and backflow: Installation of reduced pressure principle assembly.
- 445A.6724 Cross-connections and backflow: Installation of double check valve assembly.
- 445A.67245 Cross-connections and backflow: Duties of certified backflow prevention assembly tester.

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445A.6725 Cross-connections and backflow: Use of vacuum breakers.

445A.67255 Cross-connections and backflow: Restrictions on use of certain valves and piping assemblies.

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**CHAPTER 445A  
WATER CONTROLS  
PUBLIC WATER SYSTEMS**

Design, Construction, Operation and Maintenance

**NAC 445A.6553 “Air gap” defined.** (NRS 445A.860) “Air gap” means a physical separation between a point of free-flowing discharge from a pipe that supplies liquid to an open or nonpressurized vessel and the overflow rim of that vessel which is:

1. At least twice the effective diameter of that pipe or, if the pipe is affected by side walls, at least three times the effective diameter of that pipe; and
2. In no case less than 1 inch.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65555 “Approved backflow testing laboratory” defined.** (NRS 445A.860) “Approved backflow testing laboratory” means:

1. The Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California; or
2. Any other person or entity who the health authority determines:
  - (a) Is competent and possesses the necessary facilities to investigate and evaluate assemblies for the prevention of backflow;
  - (b) Adheres to the procedures for testing and certification set forth in the American Water Works Association Standards; and
  - (c) Is independent of any manufacturers of assemblies for the prevention of backflow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65575 “Atmospheric vacuum breaker” defined.** (NRS 445A.860) “Atmospheric vacuum breaker” means a vacuum breaker that contains an air inlet valve, a check seat and one or more air inlet ports, in which:

1. The flow of water causes the air inlet valve to close the air inlet ports; and
2. When the flow of water stops:
  - (a) The air inlet valve falls and forms a check valve against backsiphonage; and
  - (b) The air inlet ports open to allow air to enter and satisfy the vacuum.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65585 “Auxiliary supply of water” defined.** (NRS 445A.860) “Auxiliary supply of water” means a supply of water or system for the supply of water which is available to the premises of a customer of a public water system, other than the supply

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or system of the public water system established to provide water to the premises, including another public water system or any natural source of water.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65605 “Backflow” defined.** (NRS 445A.860) “Backflow” means a hydraulic condition in which a relative difference in pressures causes a nonpotable liquid, gas or other substance to flow into a potable water system.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6561 “Backpressure” defined.** (NRS 445A.860) “Backpressure” means an elevation in the downstream pressure of a piping system above the supply pressure which:

1. Is caused by pumping, air pressure, steam or the elevation of piping; and
2. Could cause a reversal in the normal direction of flow at a particular point.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65615 “Backsiphonage” defined.** (NRS 445A.860) “Backsiphonage” means a backflow that results when a reduction in the pressure of a water system causes a subatmospheric pressure to exist at a particular site in the water system.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6569 “Certified backflow prevention assembly tester” defined.** (NRS 445A.860) “Certified backflow prevention assembly tester” means a person who is certified by the California/Nevada section of the American Water Works Association to test assemblies for the prevention of backflow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65695 “Check valve” defined.** (NRS 445A.860) “Check valve” means a valve designed to open in the direction of normal flow and close with the reversal of normal flow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65725 “Class 1 fire sprinkler system” defined.** (NRS 445A.860) “Class 1 fire sprinkler system” means a fire sprinkler system that:

1. Has a direct connection to a water main and no physical connection to any source of pollution or contamination;
2. Uses no pumps, tanks or reservoirs; and
3. Uses no antifreeze or other additives of any kind.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6573 “Class 2 fire sprinkler system” defined.** (NRS 445A.860) “Class 2 fire sprinkler system” means a fire sprinkler system that:

1. Has a direct connection to a water main and no physical connection to any source of pollution or contamination;
2. Has a booster pump installed at the connection to the water main;
3. Uses no tanks or reservoirs; and
4. Uses no antifreeze or other additives of any kind.

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(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65735 “Class 3 fire sprinkler system” defined.** (NRS 445A.860) “Class 3 fire sprinkler system” means a fire sprinkler system that:

1. Has a direct connection to a water main;
2. Uses no antifreeze or other additives of any kind; and
3. Uses one or more of the following:
  - (a) An elevated tank for the storage of water.
  - (b) A pump that takes suction from a tank or covered reservoir located above ground.
  - (c) A pressure tank.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6574 “Class 4 fire sprinkler system” defined.** (NRS 445A.860) “Class 4 fire sprinkler system” means a fire sprinkler system that:

1. Has a direct connection to a water main;
2. Has available an auxiliary supply of water which is located on the premises or within 1,700 feet of a pumping connection for the system; and
3. Uses no antifreeze or other additives of any kind.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65745 “Class 5 fire sprinkler system” defined.** (NRS 445A.860) “Class 5 fire sprinkler system” means a fire sprinkler system that has a direct connection to a water main and:

1. An interconnection with an auxiliary supply of water, including, without limitation:
  - (a) A prohibited water well;
  - (b) A water system used for industrial purposes; or
  - (c) A pump that takes suction from a river, pond or reservoir; or
2. Uses antifreeze or another additive.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6575 “Class 6 fire sprinkler system” defined.** (NRS 445A.860) “Class 6 fire sprinkler system” means a fire sprinkler system that:

1. Is combined with a water system used for industrial purposes; and
2. Has a direct connection to a water main and no physical connection to any other supplies of water, except that the system may have gravity storage or a pump that takes suction from a tank.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65795 “Contamination” defined.** (NRS 445A.860) “Contamination” means an impairment of water quality by chemical substances or biological organisms which the health authority determines to be sufficient to create a risk or threat to the public health.

(Added to NAC by Bd. of Health, eff. 2-20-97)

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**NAC 445A.6581 “Cross-connection” defined.** (NRS 445A.860) “Cross-connection” means an unprotected connection or structural arrangement, whether actual or potential, between a public water system and any other source or system, through which it is possible to introduce into any part of the public water system any used water, industrial fluid, gas or substance other than the potable water intended to supply the system. The term includes any bypass arrangements, jumper connections, removable sections, swivel or change-over devices or other temporary or permanent devices through which or because of which backflow can occur.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65855 “Double check detector check assembly” defined.** (NRS 445A.860) “Double check detector check assembly” means an assembly composed of a line-sized double check valve assembly and a bypass that contains a water meter and another double check valve assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6586 “Double check valve assembly” defined.** (NRS 445A.860) “Double check valve assembly” means an assembly that:

1. Is composed of two independently acting, approved check valves;
2. Has tightly closing, resilient seated shutoff valves attached at each end;
3. Is fitted with properly located, resilient seated test cocks; and
4. Has been tested and approved, in accordance with *American Water Works Association Standard C510*, by an approved backflow testing laboratory.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65945 “Fire sprinkler system” defined.** (NRS 445A.860) “Fire sprinkler system” means a system of piping which is connected to a public water system and has sprinklers that automatically discharge water over the area of a fire.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.66055 “Health authority” defined.** (NRS 445A.860) “Health authority” means the officers and agents of the district board of health of the health district in which the area of service of a public water system is located or, if none, the officers and agents of the Health Division.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6623 “Pollution” defined.** (NRS 445A.860) “Pollution” means an alteration of the chemical, physical, biological or radiological integrity of water that:

1. Impairs the quality of the water to such an extent that the impairment adversely and unreasonably affects those aesthetic qualities which would have made the water desirable for domestic use; and
2. Does not impair the quality of the water to such an extent that the health authority determines that the impairment creates a risk or threat to the public health.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6625 “Pressure vacuum breaker” defined.** (NRS 445A.860) “Pressure vacuum breaker” means a vacuum breaker that:

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1. Contains an independently operating, internally loaded approved check valve and an independently operating, loaded air inlet valve located on the discharge side of the approved check valve; and
  2. Is equipped with properly located, resilient seated test cocks and tightly closing, resilient seated shutoff valves which are attached at each end of the assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6631 “Reduced pressure detector assembly” defined.** (NRS 445A.860) “Reduced pressure detector assembly” means an assembly designed to protect against pollution and contamination which is composed of a line-sized, reduced pressure principle assembly and a bypass that contains a water meter and another reduced pressure principle assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.66315 “Reduced pressure principle assembly” defined.** (NRS 445A.860) “Reduced pressure principle assembly” means an assembly that:

1. Contains:
  - (a) Two independently acting approved check valves; and
  - (b) A hydraulically operating, mechanically independent pressure relief valve that is located between the approved check valves and below the upstream check valve;
2. Has properly located, resilient, seated test cocks and tightly closing, resilient, seated shutoff valves at each end of the assembly;
3. Is designed to protect against pollution and contamination under conditions of backsiphonage or backpressure; and
4. Has been tested and approved, in accordance with *American Water Works Association Standard C511*, by an approved backflow testing laboratory.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.66375 “Service connection” defined.** (NRS 445A.860) “Service connection” means:

1. The point of connection between a public water system and the water system used by a customer of the public water system, at which the public water system loses its authority and control over the water;
2. If a meter is installed at a connection between a public water system and the water system used by a customer of the public water system, the downstream end of the meter; or
3. At a park for mobile homes or recreational vehicles, the riser for water service.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6643 “Stop and waste valve” defined.** (NRS 445A.860) “Stop and waste valve” means a valve installed in a meter box or valve box that allows a supply of water to a service line to be shut off and subsequently allows water from pipelines in the building or other property where the water is used to drain into the meter box or valve box.

(Added to NAC by Bd. of Health, eff. 2-20-97)

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**NAC 445A.6648 “Supplier of water” defined.** (NRS 445A.860) “Supplier of water” means a person or other entity, including a governmental entity, which owns or operates a public water system.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67185 Cross-connections and backflow: General requirements.**  
(NRS 445A.860) A supplier of water shall:

1. Ensure that there are no unprotected connections between the supplies of water, systems for the pumping, storage and treatment of water, and distribution system of the public water system and any source of pollution or contamination pursuant to which any unsafe water or other degrading material can be discharged or drawn into the public water system as a result of backsiphonage or backpressure.
2. Develop and carry out a program for the control of cross-connections that is approved by the health authority. Except for a program that has been approved by a health authority before February 20, 1997, a program for the control of cross-connections must:
  - (a) Be submitted to the health authority for its approval no later than:
    - (1) January 1, 1999; or
    - (2) Eighteen months after the public water system begins operation,

➤ whichever is later.
  - (b) Include:
    - (1) A schedule for implementation.
    - (2) A plan for inspecting the properties served by the public water system to determine the potential risk of cross-connection and backflow.
    - (3) A plan for testing and tracking all primary assemblies for the prevention of backflow which are intended to protect the public water system upstream from a service connection. The plan must provide for the annual testing of those assemblies and for the retention of records from that testing.
    - (4) A list of the particular assemblies for the prevention of backflow which may be used in the public water system or on service connections to the public water system.
    - (5) A list of the measures the supplier of water will take to enforce the program if any customers of the system fail to comply with the program.
  - (c) Ensure compliance with NAC 445A.67185 to 445A.67255, inclusive.
  - (d) Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, comply with the provisions of:
    - (1) *The Uniform Plumbing Code*;
    - (2) *Recommended Practice for Backflow Prevention and Cross-Connection Control*; and
    - (3) *The Manual of Cross-Connection Control*.

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- If there is any conflict between any of the provisions described in this paragraph, the most stringent of those provisions prevails.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6719 Cross-connections and backflow: Assemblies for prevention of backflow.** (NRS 445A.860)

1. Each service connection must have an assembly for the prevention of backflow, of a type that is commensurate with the degree of hazard that exists on the property of the customer of a public water system. Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, the assembly may consist of any one of the following, as listed in the order of least to most protection:
  - (a) A double check valve assembly.
  - (b) A reduced pressure principle assembly.
  - (c) An air gap.
2. A reduced pressure principle assembly may be substituted for a double check valve assembly, and an air gap may be substituted for a reduced pressure principle assembly.
3. With the approval of the supplier of water:
  - (a) A double check detector check assembly may be substituted for a double check valve assembly; and
  - (b) A reduced pressure detector assembly may be substituted for a reduced pressure principle assembly.
4. A double check valve assembly or double check detector check assembly may be used only for protection against pollution.
5. A reduced pressure principle assembly or reduced pressure detector assembly may be used for protection against pollution or contamination, but a reduced pressure principle assembly must not be used for protection against sewage or reclaimed wastewater.
6. An assembly for the prevention of backflow must not be composed solely of a single check valve.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67195 Cross-connections and backflow: Minimum types of protection for particular service connections.** (NRS 445A.860) Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, or authorized by the health authority, the minimum type of protection from cross-connection required for a service connection to:

1. A public building or any building:
  - (a) That contains a hotel, motel, casino, condominium or town house, or any apartments;
  - (b) Used for commercial purposes where a specific business activity has not been identified; or
  - (c) In which one or more sewage pumps or sewage ejectors have been installed,
    - consists of a reduced pressure principle assembly.

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2. A building that:
    - (a) Has multiple stories and booster pumps or elevated tanks to distribute potable water; or
    - (b) Exceeds 40 feet in height, as measured from the service connection to the highest water outlet,
      - consists of a double check valve assembly.
  3. A class 1, class 2 or class 3 fire sprinkler system consists of a double check valve assembly.
  4. A class 4, class 5 or class 6 fire sprinkler system consists of a reduced pressure principle assembly.
  5. A hydronic heating system that contains any chemical additives consists of a reduced pressure principle assembly.
  6. A baptismal font of a church consists of a reduced pressure principle assembly.
  7. A facility for bottling beverages consists of a reduced pressure principle assembly.
  8. A brewery consists of a reduced pressure principle assembly.
  9. A cannery, facility for the processing of food, packing house or rendering facility consists of a reduced pressure principle assembly.
  10. A facility for cold storage consists of a reduced pressure principle assembly.
  11. A dairy processing facility consists of a reduced pressure principle assembly.
  12. A restaurant or other facility in which food is served consists of a reduced pressure principle assembly.
  13. A dental clinic consists of a reduced pressure principle assembly.
  14. A hospital, medical building or clinic consists of a reduced pressure principle assembly.
  15. A convalescent home or nursing home consists of a reduced pressure principle assembly.
  16. A sanitarium consists of a reduced pressure principle assembly.
  17. A morgue, mortuary or facility for conducting autopsies consists of a reduced pressure principle assembly.
  18. A laboratory, including, without limitation, a laboratory of a teaching institution or another biological or analytical facility, consists of a reduced pressure principle assembly.
  19. A facility of a school, college or university consists of a reduced pressure principle assembly.
  20. A facility for the production of motion pictures consists of a reduced pressure principle assembly.
  21. A facility for the publishing or printing of a newspaper consists of a reduced pressure principle assembly.
  22. A veterinary clinic, pet shop or facility for grooming pets consists of a reduced pressure principle assembly.

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23. A laundry or dry cleaning facility consists of a reduced pressure principle assembly.
  24. A dyeing facility consists of a reduced pressure principle assembly.
  25. A facility for mechanical, chemical or electrochemical plating consists of a reduced pressure principle assembly.
  26. Any portable spraying or cleaning equipment consists of an air gap.
  27. A pool or spa consists of a reduced pressure principle assembly.
  28. A park for mobile homes or recreational vehicles consists of a reduced pressure principle assembly.
  29. A facility located on a waterfront, including, without limitation, a fishery, fish hatchery, dock or marina, consists of a reduced pressure principle assembly.
  30. A facility for the production of power consists of a reduced pressure principle assembly.
  31. A facility for the production, storage or transmission of oil or gas consists of a reduced pressure principle assembly.
  32. A facility that handles, processes or stores radioactive materials or substances consists of a reduced pressure principle assembly.
  33. A facility for processing sand or gravel consists of a reduced pressure principle assembly.
  34. A system for storm drainage, the collection of sewage or the distribution of reclaimed wastewater consists of an air gap.
  35. A facility in which:
    - (a) Water is used to manufacture, store, compound or process chemicals for industrial purposes;
    - (b) Chemicals are added to water used in the compounding or processing of products;
    - (c) Chemicals are added to the supply of water; or
    - (d) The supply of water is used for the transmission or distribution of chemicals,➤ consists of a reduced pressure principle assembly.
  36. A facility for the manufacture of aircraft or missiles consists of a reduced pressure principle assembly.
  37. A facility for the manufacture, repair or washing of motor vehicles consists of a reduced pressure principle assembly.
  38. A facility for the manufacturing or processing of film consists of a reduced pressure principle assembly.
  39. A facility for the manufacturing of ice consists of a reduced pressure principle assembly.
  40. A facility for the manufacturing, processing or cleaning of metal consists of a reduced pressure principle assembly.
  41. A facility for the manufacturing of natural or synthetic rubber consists of a reduced pressure principle assembly.

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42. A facility for the manufacturing of paper or paper products consists of a reduced pressure principle assembly.

43. Any other facility for manufacturing, processing or fabricating consists of a reduced pressure principle assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67205 Cross-connections and backflow: Minimum types of protection for service connection to auxiliary supply of water or irrigation system.**

(NRS 445A.860) Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, the minimum type of protection required for a service connection to:

1. An auxiliary supply of water must consist of a double check valve assembly or reduced pressure principle assembly, as determined by the supplier of water and approved by the health authority.

2. An irrigation system, including a system for irrigating median strips, must consist of:

(a) A pressure vacuum breaker or double check valve assembly, as determined by the supplier of water and approved by the health authority; or

(b) Except as otherwise authorized by the health authority, if facilities have been installed for pumping, injecting or applying fertilizers, pesticides or other hazardous systems, a reduced pressure principle assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6721 Cross-connections and backflow: Minimum types of protection for other service connections; resolution of conflicting requirements; imposition of more stringent requirements.** (NRS 445A.860)

1. The health authority shall determine, on a case-by-case basis, the minimum type of protection from cross-connection required for any type of service connection which is not specified in NAC 445A.67185 to 445A.67255, inclusive.

2. If there is any conflict between any of the provisions of NAC 445A.67185 to 445A.67255, inclusive, regarding the type of protection from cross-connection required for a particular type of service connection, the most stringent of those provisions prevails.

3. The health authority or supplier of water may impose requirements regarding the installation and use of assemblies for the prevention of backflow which are more stringent than the provisions of NAC 445A.67185 to 445A.67255, inclusive.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67215 Cross-connections and backflow: Service connection to fire sprinkler system.** (NRS 445A.860)

1. A supplier of water shall ensure that:

(a) An appropriate assembly for the prevention of backflow is installed at each service connection between the public water system and a fire sprinkler system; and

(b) The assembly is:

(1) Tested upon installation; and

(2) Maintained and tested, and the results of those tests logged, annually.

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- The testing required by this subsection must be conducted by a certified backflow prevention assembly tester.
  - 2. An assembly for the prevention of backflow installed on a service connection between a public water system and a fire sprinkler system must:
    - (a) Be of such a type and installed in such a manner that the assembly:
      - (1) Protects the public water system; and
      - (2) Does not interfere with the capability of the fire sprinkler system, as engineered, to protect the safety of persons in the public or private facility in which the fire sprinkler system is located; and
    - (b) Prevent any pollution or contamination of drinking water, by any nonpotable water contained in the fire sprinkler system, which may be caused by any backpressure or backsiphonage that may occur during normal or abnormal operation of the fire sprinkler system or the public water system.
  - 3. The supplier of water shall determine the type of assembly required on a particular service connection between the public water system and a fire sprinkler system based upon the degree of risk posed by the fire sprinkler system to the supply of potable water, considering the chemical and biological contents of the fire sprinkler system, the materials used to construct the fire sprinkler system and the possibility that backflow will occur.
  - 4. Any reduced pressure principle assembly or reduced pressure detector assembly used on a service connection between a public water system and a fire sprinkler system must not have any holes drilled in the check valve clappers.  
(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6722 Cross-connections and backflow: Design of fire sprinkler system.** (NRS 445A.860) The designer of a fire sprinkler system shall ensure that, based upon the placement of any reduced pressure principle assembly or reduced pressure detector assembly:

- 1. An antifreeze loop or the total line of the fire sprinkler system is able to accommodate the thermal expansion of any antifreeze; or
- 2. If necessary, an expansion tank is provided to accommodate the thermal expansion of any antifreeze.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67225 Cross-connections and backflow: Conditions to provision of service to certain fire sprinkler systems.** (NRS 445A.860) If any backflow involving a fire sprinkler system threatens a public water system, the supplier of water shall require, as a condition to the provision of service to the fire sprinkler system:

- 1. The installation of an assembly for the prevention of backflow in accordance with the requirements of NAC 445A.67215.
- 2. An analysis to determine how the assembly will affect the pressure and rate of flow of water available to the fire sprinkler system.

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3. The modification of the fire sprinkler system, and the riser and water service lateral for the fire sprinkler system, in such a manner as necessary to ensure adequate fire flow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6723 Cross-connections and backflow: Installation of air gap.** (NRS 445A.860) Except as otherwise authorized by the health authority, if an air gap is installed on a service connection:

1. The air gap must be located as closely as practicable to the service connection, on the opposite side of the service connection from the public water system.
2. All piping from the service connection to the receiving tank must be above grade and visible.
3. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the air gap.
4. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67235 Cross-connections and backflow: Installation of reduced pressure principle assembly.** (NRS 445A.860) Except as otherwise authorized by the health authority, if a reduced pressure principle assembly is installed on a service connection:

1. The reduced pressure principle assembly must be installed:
  - (a) In a horizontal and level position, except that the reduced pressure principle assembly may be installed in a vertical position if the assembly has been:
    - (1) Specifically designed for operation in that position; and
    - (2) Tested and certified to be suitable for operation in that position by an approved backflow testing laboratory.
  - (b) As closely as practicable to the service connection, on the opposite side of the service connection from the public water system.
  - (c) Above ground and, to the extent possible, not less than 12 inches nor more than 36 inches above the finished grade, as measured from the bottom of the assembly.
  - (d) At a site with adequate drainage, or with drain piping, for any fluid that is discharged when the assembly is activated.
  - (e) In such a manner that no part of the assembly will be submerged during normal conditions of operation and weather.
  - (f) In such a manner as to be readily accessible for maintenance and testing.
2. The reduced pressure principle assembly must not be installed below grade, in any subsurface vault, or in any vault, chamber or pit where there is any potential that the relief valve could become submerged.
3. The reduced pressure principle assembly must have a free-flowing drain with an air gap.

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4. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the reduced pressure principle assembly.
  5. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.
  6. The reduced pressure principle assembly may be installed indoors if the installation complies with subsections 1 to 5, inclusive, and has a clearance of:
    - (a) At least 12 inches on top;
    - (b) At least 24 inches on the side with test cocks; and
    - (c) At least 12 inches on the other sides.(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6724 Cross-connections and backflow: Installation of double check valve assembly.** (NRS 445A.860) Except as otherwise authorized by the health authority, if a double check valve assembly is installed on a service connection:

1. The double check valve assembly must be installed:
  - (a) In a horizontal and level position, except that the double check valve assembly may be installed in a vertical position if the assembly has been:
    - (1) Specifically designed for operation in that position; and
    - (2) Tested and certified to be suitable for operation in that position by an approved backflow testing laboratory.
  - (b) As closely as practicable to the service connection, on the opposite side of the service connection from the public water system.
  - (c) Above ground and, to the extent possible, not less than 12 inches nor more than 36 inches above the finished grade, as measured from the bottom of the assembly.
  - (d) In such a manner as to be readily accessible for maintenance and testing.
2. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the double check valve assembly.
3. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.
4. The double check valve assembly may, if above-grade installation is impracticable and the health authority approves of the installation, be installed in a below-grade vault in such a manner that:
  - (a) The top of the double check valve assembly is not more than 8 inches below grade.
  - (b) There is:
    - (1) At least 12 inches of clearance between the bottom of the vault and the bottom of the double check valve assembly;
    - (2) At least 24 inches of clearance between the side of the vault and the side of the double check valve assembly with test cocks; and
    - (3) At least 12 inches of clearance between the side of the vault and the other sides of the double check valve assembly.

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- (c) To the extent warranted by climatic conditions, the double check valve assembly is protected from freezing.
  - (d) The vault has adequate drainage to prevent the accumulation of water, which drains to daylight, to free-draining soil or to a sufficient amount of gravel placed under the vault to provide for free drainage and prevent the accumulation of water under the vault. A vault that does not have an integrated bottom must be placed on a layer of gravel which is not less than 3 inches deep.
  - (e) The vault is protected from vandalism.
  - (f) The vault is not located in an area subject to vehicular traffic.
5. The double check valve assembly may be installed indoors if:
- (a) The installation complies with subsections 1 to 4, inclusive; and
  - (b) The double check valve assembly has a clearance of:
    - (1) At least 12 inches on top;
    - (2) At least 24 inches on the side with test cocks; and
    - (3) At least 12 inches on the other sides.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67245 Cross-connections and backflow: Duties of certified backflow prevention assembly tester.** (NRS 445A.860) A certified backflow prevention assembly tester shall:

- 1. Perform his field testing of assemblies for the prevention of backflow in accordance with the provisions of the Manual of Cross-Connection Control.
- 2. Use, for the testing of reduced pressure principle assemblies, double check valve assemblies and pressure vacuum breakers, a differential pressure gauge that has:
  - (a) A differential range of at least zero to 15 psi; and
  - (b) Graduations of not more than 0.2 psi.
- 3. Ensure that his testing equipment:
  - (a) Is calibrated to the manufacturers' specifications not less than annually; and
  - (b) Has all necessary hoses and fittings.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6725 Cross-connections and backflow: Use of vacuum breakers.** (NRS 445A.860)

- 1. An atmospheric vacuum breaker or pressure vacuum breaker may be used only for protection against pollution or contamination under conditions of backsiphonage.
- 2. If an atmospheric vacuum breaker is used:
  - (a) The vacuum breaker must be installed not less than 6 vertical inches above the highest point of the downstream piping.
  - (b) Any associated shutoff valve must be installed upstream from the vacuum breaker.
  - (c) The vacuum breaker must not be subjected to operating pressure for more than 12 hours in any 24-hour period.

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- (d) Flow from the protected fixture must be to the atmosphere.
  - 3. If a pressure vacuum breaker is used, the vacuum breaker:
    - (a) Must be installed:
      - (1) Upstream from the terminal shutoff valve; and
      - (2) Not less than 12 vertical inches above the highest point of the downstream outlet, valve or piping.
    - (b) Must not be installed at a location where backpressure will occur.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67255 Cross-connections and backflow: Restrictions on use of certain valves and piping assemblies. (NRS 445A.860)**

- 1. A stop and waste valve must not be used on a service line.
  - 2. If a valve or piping assembly, including a frost-free riser, has an opening that is subject to flooding, the valve or piping assembly must not be used on a service line unless:
    - (a) The valve or piping assembly is adequately protected by an assembly for the prevention of backflow; and
    - (b) If the piping assembly is a frost-free riser, the riser is equipped with appropriate valves and a connection for the introduction of compressed air, pursuant to which water may be purged and the system prepared for winter.
- (Added to NAC by Bd. of Health, eff. 2-20-97)