



**GOOSE CREEK  
PUBLIC WORKS**

**Cross-Connection Control  
And Backflow Prevention  
Program Manual**

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# Cross-Connection Control Program Backflow Prevention

The City of Goose Creek Cross-Connection Control and Backflow Prevention Program was established to protect the municipal potable water system from contamination due to backflow. Depending on the degree of hazard, all commercial, all irrigation and all fire sprinkler system customers will be required to install, test and maintain a backflow prevention assembly on their water service.

Backflow prevention assembly installations must meet requirements set by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USC-FCCC & HR), South Carolina Department of Health and Environmental Control (SC-DHEC), The International Code Council's (ICC) International Plumbing Code, and the City of Goose Creek.

A list of approved backflow prevention assemblies is included in this manual. The City will consider for use on a case-by-case basis other USC-FCCC & HR approved backflow devices.

**We strongly recommend** contacting the City of Goose Creek Cross-Connection Control Program Coordinator to obtain approval of the backflow prevention assembly and requirements for installation prior to putting the device in place.

**In response to the changes in water safety regulations, the City of Goose Creek's backflow prevention requirements are subject to change. These requirements are updated periodically and it is the customer's responsibility to comply with the most current revision of these requirements.**

**Policy Effective Date:** \_\_\_\_\_ **June 5, 2003**

## **Revisions:**

### **Date:**

**February 26, 2004**  
**October 25, 2005**

### **Subject(s):**

**Fires Service Lines: Detector Assembly Requirements**  
**Low Hazard Definition, Residential Irrigation Requirements**

## **City of Goose Creek Department of Public Works New Service Backflow Prevention Assembly General Information**

### **Initial Installation:**

1. Customer applies and pays for a water service.
2. The City provides customer with the City of Goose Creek Cross-Connection Control and Backflow Prevention Program Manual and Questionnaire contained within the manual (page 23).
3. Customer and/or contractor for the customer completes the City of Goose Creek Backflow Prevention Questionnaire and returns it to the City of Goose Creek Cross-Connection Control Program Coordinator.
4. Cross-Connection Control Coordinator determines if a backflow prevention assembly is required and notifies the customer in writing of the type of backflow prevention device required.
5. If a backflow prevention device is required, use the City of Goose Creek's List of Approved Backflow Prevention Assemblies to make appropriate selection (pages 17, 18).
6. Installer or customer notifies the City of Goose Creek Cross-Connection Control Program Coordinator of the scheduled installation of a backflow prevention device.
7. Once installation is complete, installer provides the Cross-Connection Control Program Coordinator with the make, model, size, serial number, and location in reference to the meter of the installed device.
8. A SCDHEC Certified Tester schedules the testing of the new device with the City of Goose Creek Cross-Connection Control Program Coordinator. (NOTE: If the installer is a certified tester, installation and testing may be scheduled at the same time.) The City will provide water for testing purposes.
9. Water service initiated for testing purposes may remain activated provided the backflow prevention device tested successfully and all appropriate fees for service have been paid. If the assembly does not meet requirements, or the customer has not paid the appropriate fees, water service will be terminated at the conclusion of the test.

**Phone Number for Notifications and Test Scheduling:  
843-824-2200, Extension 4261**

### **Backflow Prevention Device Test:**

1. A SCDHEC Certified Backflow Prevention Assembly Tester must perform the test. A complete listing of certified testers for South Carolina may be obtained from SC DHEC's website, <http://www.scdhec.net/water/html/dwbflow.html>.
2. The Certified Tester must schedule testing of the device with the City so that water may be provided for that purpose.
3. If the backflow prevention device fails, device must be repaired or replaced and testing re-scheduled.
4. Once the backflow prevention device passes testing, the tester must return the test report with any repair work done indicated on the form to the City of Goose Creek Cross-Connection Control Program Coordinator within seven (7) days of testing in order to conform to all City requirements. This will place the service in compliance for a period of one (1) year.

# Rules and Regulations for Cross-Connection Control and Backflow Prevention

## City of Goose Creek, South Carolina

### 1. Cross-Connection Control

#### A. Purpose

- (1) **To protect** the potable water supply of the City of Goose Creek from the possibility of contamination or pollution by isolating any contaminants or pollutants which could backflow into the public water system; and,
- (2) **To eliminate** or control existing cross-connections, actual or potential, between its customers' water system(s) and the public water system; and,
- (3) **To maintain** a continuing program of cross-connection control.

B. **Responsibility.** The City of Goose Creek shall be responsible for the protection of the public potable water distribution system from contamination or pollution due to the backflow of contaminants or pollutants through the water service connection. If the City requires an approved backflow prevention assembly for the protection of the water system, the City shall give notice, in writing, to the customer to install an approved backflow prevention assembly(s) at each service connection to their premises. If the assembly(s) is not installed as required by the City, the water service may be disconnected until such assembly(s) has been properly installed.

### 2. Definitions

A. **Approved.** Accepted by the City as meeting an applicable specification stated or cited in these rules and regulations, or as suitable for the proposed use.

B. **Auxiliary Water Supply.** Any water supply on or available to the premises other than the City's approved public potable water supply. Auxiliary water supply may include water from another purveyor's public potable water supply or any natural sources(s) such as well, spring, river, stream, harbor, etc., or "used waters" or "industrial fluids". These waters may be polluted or contaminated or they may be objectionable and constitute an unacceptable water source over which the City does not have sanitary control.

C. **Backflow.** The reversal of the normal flow of water caused by either backpressure or backsiphonage.

- (1) **"Backpressure"** occurs when the downstream water pressure exceeds the supply pressure. This can occur through a rise in the downstream pressure, a drop in the supply pressure or a combination of both. Increases in downstream water pressure above supply water pressure can be created by booster pumps or temperature increases (e.g., in a boiler).

- (2) **“Backsiphonage”** occurs when the supply line pressure falls below atmospheric pressure (14.7 psi at sea level). In this situation, atmospheric pressure is creating a greater pressure on the downstream side in the reverse direction of flow, and the supply water system falls below atmospheric pressure. Decreases in the pressure of the supply water system may be caused by fire fighting, breaks in the water main, or water mains being shut down for maintenance.

D. **Backflow Prevention Device.** An assembly or means designed to prevent backflow.

- (1) **Air-Gap.** The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of said vessel. An approved air-gap shall be at least double the diameter of the supply pipe, measured vertically, above the overflow rim of the vessel; and in no case less than one inch.
- (2) **Reduced Pressure Principle Assembly.** The reduced pressure principle backflow prevention device consists of two independently acting, internally loaded, approved check valves, separated by a reduced pressure zone. This device must be installed as a unit, meaning all test cocks and gate or ball valves must be in place and properly located when installed. Due to the strength of the first check valve spring, the pressure in the zone between the two check valves is maintained at a lower pressure than supply pressure. The pressure in the zone must never come any closer than 2 psi to supply. To be approved, these assemblies must be readily accessible for in-line maintenance and testing and be installed horizontally in a location where no part of the device will be submerged. **Pit installations are NOT allowed.**
- (3) **Double Check Valve Assembly.** An assembly of two independently operating spring loaded check valves with full flow characteristic resilient seated shut-off valves or wedge gate valves (determined by size of device) on each side of the check valves, plus properly located resilient seated test cocks for the testing of each check valve. The entire assembly shall meet the design and performance specifications as determined by USC-FCCC & HR. To be approved, these assemblies must be installed horizontally and readily accessible for in-line testing and maintenance. Vertical installations must be approved in writing by the City prior to installation.
- (4) **Residential Dual Check.** An assembly of two independently operating spring loaded check valves, no test cocks, and no shut-off valves. This assembly is not approved for commercial use by the City of Goose Creek.

E. **Certified Tester.** An individual who has successfully completed the DHEC Cross-Connection Training course and testing, is certified by DHEC, and remains in good standing with DHEC.

F. **City System.** Consists of the source facilities and the distribution system; and includes all those facilities of the water system under the complete control of the City of Goose Creek, up to the point where the customer’s system begins.

G. **Contamination.** Means an impairment of the quality of the potable water by sewage, industrial fluids or waste liquids, compounds or other materials to a degree that creates an actual health hazard to the public through poisoning or through the spread of disease.

H. **Cross-Connection.** As defined in the State Primary Drinking Water Regulation, “means any actual or potential connection or structural arrangement between a public water

supply and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas or substance other than the intended potable water which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices and other temporary or permanent devices through which or because of which backflow can or may occur are considered to be cross-connections.”

- I. **Cross-Connections – Controlled.** A water service connection between a public potable water distribution system and a non-potable water distribution system with an approved backflow prevention assembly properly installed and maintained so that it will continuously afford the protection commensurate with the degree of hazard.
  
- J. **Cross-Connection Control by Containment.** The installation of an approved backflow prevention assembly at the water service connection to any customer’s premises where it is physically and economically infeasible to find and permanently eliminate or control all actual or potential cross-connections within the customer’s water system; or, it shall mean the installation of an approved backflow prevention assembly on the service line leading to and supplying a portion of a customer’s water system where there are actual or potential cross-connections which cannot be effectively eliminated or controlled at a point of cross-connection. The backflow prevention assembly would in this case be located immediately following the meter not greater than four (4) feet away from the meter.
  
- K. **Cross-Connection Control Manual.** Shall be defined as the latest revision of the City of Goose Creek “Cross-Connection Control and Backflow Prevention Program Manual”.
  
- L. **Cross-Connection Inspector.** Any employee of the City of Goose Creek designated by the Director of Public Works to administer and enforce the provisions of these Rules and Regulations.
  
- M. **Customer.** Any person or entity connected to the City of Goose Creek potable water system.
  
- N. **Customer’s System.** Beginning at the downstream of the City’s water meter and extending to the last point on the customer’s plumbing.
  
- O. **Distribution System.** The network of pipes used for the delivery of water from the City of Goose Creek source of supply to the customer’s system.
  
- P. **Hazard, Degree of.** A determination of the potential risk to public health through contamination of the public potable water system.
  - (1) **Hazard, Low.** Any condition where a connection exists between an approved public water system and another water source not hazardous to health but not meeting the standards of the approved public water system and not cross-connected within its system with a potentially dangerous substance.

Examples of “Low Hazards” include but are not limited to the following: home heating equipment, irrigation systems without chemical injection, hose bibs, trap primers, washing equipment, shampoo basins, fire protection sprinkler system without antifreeze injection or aspiration of chemicals, and restaurants.

- (2) **Hazard, High.** Any condition where a cross-connection would result in a danger to the health and well being of the water consumer; cause severe damage to the



physical properties of the public potable water system, or have an extended effect on the quality of the potable water in the system.

Examples of “High Hazards” include but are not limited to the following: hospitals, mortuaries, laboratories, petroleum processing facilities, commercial laundries / dry cleaners, plating or chemical plants, docks and dockside facilities, reclaimed water systems, car wash businesses, connection to or make-up feed water to boilers, condensers, cooling towers, salt water cooling systems, and industrial fluid systems, sewage treatment plants, sewer lift stations, radioactive material or substances, plants or facilities handling.

- Q. **Industrial Fluids System.** Any system containing a fluid or solution, which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration that would constitute a health, system, pollution or plumbing hazard if introduced into the public potable water supply. This may include, but not be limited to: polluted or contaminated waters; all types of process waters and “used waters” originating from the public potable water system which may have deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalis, circulated cooling waters connected to an open cooling tower and / or cooling towers that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, streams, rivers, bays, harbors, seas, irrigation canals or systems., etc.; oils, gases glycerin, paraffin, caustic and acid solutions and other liquid and gaseous fluids used in industrial or other purposes or for fire fighting purposes.
- R. **Notices.** Letters mailed specifying requirements for compliance.
- S. **Pollution.** The presence of any foreign substance (organic, inorganic, or biological) which tends to degrade water quality.
- T. **Service Connections.** The terminal end of a service connection from the public potable water system, i.e., where the City loses jurisdiction and sanitary control over the water at its point of delivery to the customer’s water system at the outlet of the water meter. If a meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the meter. There should be no unprotected takeoffs from the service line ahead of any meter or backflow prevention assembly located at the point of delivery to the customer’s water system. Service connection shall also include temporary or emergency water service connections from the public potable water system.
- U. **Source.** Includes all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system.
- V. **Water, Non-potable.** Water that is not safe for human consumption or which is of questionable potability.
- W. **Water, Potable.** Any water according to recognized standards that is safe for human consumption.
- X. **Water Purveyor.** The term water purveyor shall mean the owner or operator of the public potable water system supplying an approved water supply to the public. The purveyor shall be one that is operating under a valid permit from the South Carolina Department of Health and Environmental Control.

- Y. **Water, Used.** Any water supplied by a Water Purveyor from a public potable water system to a consumer's water system after it has passed through the point of delivery and is no longer under the sanitary control of the Water Purveyor.
- Z. **Water System.** Shall be considered as made up of two parts: the City's system and the customer's system.

### 3. Requirements

- A. No water service connection to any premises shall be installed or maintained by the City of Goose Creek unless the water supply is protected as required by Federal and State Laws and Regulations, and the City of Goose Creek Cross-Connection Control and Backflow Prevention Program Manual. Service of water to any premises shall be discontinued by the City if an approved backflow prevention assembly is not installed, tested and maintained per the Cross-Connection Control and Backflow Prevention Program Manual, or if it is found that a backflow prevention assembly has been removed, bypassed, or if an unprotected cross-connection exists on the premises. Service will not be restored until such conditions or defects are corrected in conformance with the Cross-Connection Control and Backflow Prevention Program Manual.
- B. The Customer's system will be open for inspection at all reasonable times to cross-connection inspectors to determine whether cross-connections or other structural or sanitary hazards, including violations of these regulations, exist. When such a condition becomes known, the City shall deny or immediately discontinue service to the premises by providing for a physical break in the service line until the customer has corrected the deficiency in compliance with the Cross-Connection Control and Backflow Prevention Program Manual. Should an inspection of the premises be refused, the City will install, at the customer's expense, a reduced pressure principle backflow prevention device behind the City's water meter. The City will bill the customer the cost of all labor and materials.
- C. When required, an approved backflow prevention assembly shall also be installed on each service line to a customer's water system at or near the property line; but in all cases, before the first branch line leading off the service line.
  - (1) Each backflow prevention assembly required by the City of Goose Creek Cross-Connection Control and Backflow Prevention Program Manual must be installed per manufacturer's specifications.
  - (2) Each backflow prevention assembly required by the City of Goose Creek Cross-Connection Control and Backflow Prevention Program Manual must be functioning properly when installed. Each assembly must be tested, maintained and repaired as required by the City of Goose Creek Cross-Connection Control and Backflow Prevention Program Manual. All field testing and maintenance reports for backflow prevention are entered into cross-connection permanent files on the date they are received; which may or may not be the date of the test. Reports received Monday through Friday will be entered into their respective backflow accounts and up to 10% will be randomly selected for a follow-up test. The City's cross-connection control personnel will perform these random tests no sooner than five business days and no later than fifteen business days after the test results are received. The random test will be performed at no cost to the customer.
  - (3) All backflow prevention assemblies installed on a new water service must be tested according to the Cross-Connection Control and Backflow Prevention Program Manual prior to service being established.

- (4) If a customer does not wish for water service to be interrupted when a backflow prevention assembly is tested, repaired, or replaced; a parallel installation of an approved backflow prevention assembly must be made in accordance with the provisions of the Cross-Connection Control and Backflow Prevention Program Manual.
- (5) Each backflow prevention assembly required by the Cross-Connection Control and Backflow Prevention Program Manual must be approved and accessible to City personnel. A list of approved backflow prevention assemblies is listed in the Cross-Connection Control and Backflow Prevention Program Manual and is available to the general public.
- (6) When a backflow prevention assembly is required to be installed, tested, or repaired in a customer's water system, the customer will be notified of the requirement, in writing, by the City. Each notice will have the following time period associated:

General Notice..... Thirty (30) Days  
 Internal Inspection ..... Ten (10) Days (or as deemed necessary by the Director)  
 Annual Test ..... Thirty (30) Days

The City may require the installation of the required backflow prevention assembly immediately or within a shorter time period than specified above or in the Cross-Connection Control and Backflow Prevention Program Manual in order to protect the public water system from a system hazard.

In the case where the City determines that a customer's water system constitutes an imminent hazard, water service will be terminated immediately.

- D. The water service will not be activated until the City has been provided with information necessary to determine the degree of hazards associated with the customer's water system and the appropriate backflow prevention assembly has been installed.
- E. No person may modify or permit to be modified a customer's water system in a manner that would affect the degree of hazard of such system. The City of Goose Creek will make all determinations as to the degree of hazard. If a different backflow prevention assembly is required, it must be installed in accordance with provisions of the Cross-Connection Control and Backflow Prevention Program Manual.
- F. A customer should immediately notify the City if the customer's water system is contaminated or polluted, or if the customer has a reason to believe that backflow has occurred from the customer's water system to the public water system.
- G. A written notice of violation will be issued to any person who is found to be in violation of any provision of the City of Goose Creek Cross-Connection Control and Backflow Prevention Program Manual. The notice will set forth the violation and time period to be corrected. The violation must be corrected within a reasonable time, not to exceed thirty (30) days from receipt of the notice. If the City determines that the violation is occurring on a customer's water system and has created or contributed to a system hazard, the customer may be required to correct the violation immediately. Water service will be discontinued if the customer fails in a timely manner to correct a violation.
- H. An administrative appeal may be requested to clarify any of the requirements of the Cross-Connection Control and Backflow Prevention Program Manual. The first level of

appeal will be made to the Cross-Connection Control Hearing Committee. All appeals must be in writing and will be heard within seven (7) days of receipt of the appeal by the City. The Hearing Committee consists of the Director of Public Works, the Cross-Connection Control Program Coordinator and the Water Division Supervisor. Additional specialists or technical experts may be consulted at the discretion of the Director of Public Works. Customers who do not accept the decision of the Hearing Committee may request a review of the decision by the City Administrator.

#### **4. Backflow Prevention Assemblies Selection Requirements**

A. All backflow prevention assembly selections must meet the requirements set by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC-FCCC & HR), South Carolina Department of Health and Environmental Control (SCDHEC), all local plumbing codes and regulations and the City of Goose Creek.

- (1) **Residential Domestic Service** - The City will equip all new domestic residential connections with a residential dual check device at the time of meter installation.
- (2) **Residential Irrigation Service** – The minimum acceptable device for low hazard residential lawn sprinkler systems is a residential dual check.
- (3) **Commercial Domestic Service** - Commercial customers are required to complete a City of Goose Creek Cross-Connection Control Questionnaire (page 19) for evaluation of potential degree of hazard posed by the proposed establishment. Low hazard will require a double check valve assembly. High hazard will require a reduced pressure principle assembly. No commercial service will be permitted until this evaluation has been completed.
- (4) **Commercial Irrigation Service** - Commercial customers are required to complete a City of Goose Creek Cross-Connection Control Questionnaire (page 19) for evaluation of potential degree of hazard posed by the proposed irrigation service. Low hazard will require a double check valve assembly. (If requested, a pressure vacuum breaker may be approved for low hazard.) High hazard will require a reduced pressure principle assembly. No commercial service will be permitted until this evaluation has been completed.
- (5) **Fire Line Service** - A separate service line with an approved backflow prevention device is required for fire lines. Commercial customers are required to complete a City of Goose Creek Cross-Connection Control Questionnaire (page 19) for evaluation of potential degree of hazard posed by the fire line service. Fire line backflow devices must be tested annually in accordance with the City of Goose Creek Cross-Connection Control and Backflow Prevention Program Manual.

B. Double Check Valve Assemblies and Reduced Pressure Principle Assemblies

- (1) All backflow prevention assemblies two inches (2”) and smaller must be equipped with full flow characteristic ball valves.
- (2) All backflow prevention assemblies larger than two inches (2”) must be equipped with full flow characteristic resilient wedge gate valves.
- (3) All backflow prevention assemblies must have four (4) test cocks.
- (4) The City recommends backflow prevention assemblies have epoxy-coated interiors with smooth bore valve seats to prevent corrosion build-up.

- (5) An approved backflow prevention assembly includes four (4) test cocks, two (2) independently operated, spring loaded check valves and two (2) shut-off valves, one on each the inlet and outlet side. The backflow prevention assemblies indicated on the tables shown on page 17 and 18 have been tested, evaluated and approved by the USC-FCCC & HR with a specific set of manufacturers shut-off valves as an integral part of the assembly. The installation of a backflow prevention device with valves other than those used by USC-FCCC & HR in the approval test(s) invalidates the USC-FCCC & HR approval rating. The City only approves the use of complete assemblies (device and valves) tested as a complete unit by USC-FCCC & HR. **Contractor should ensure that only complete USC-FCCC & HR approved backflow prevention assemblies are purchased for installation.**

## **5. Backflow Prevention Assemblies Installation Requirements**

- A. Backflow prevention assembly installation must be on private property side of the water meter and prior to the first service connection.
- B. Backflow prevention assemblies must be readily accessible for in-line maintenance and testing.
- C. Backflow prevention assemblies must be installed according to manufacturer's specifications and approved by the City of Goose Creek.
- D. **Backflow Prevention Assemblies** must be installed in the **horizontal** position unless otherwise approved. Any request for a vertical installation must be made in writing and must include manufacturer's specifications indicating the device is designed for vertical installation. **All exceptions to horizontal installation must be obtained in writing from the City prior to work being performed.**
- E. Backflow prevention assemblies installed above ground should be protected from freezing without obstructing the test cocks or relief valve vent opening.
- F. Only copper pipe, ductile iron pipe, or Schedule 40 PVC (1 ½" and smaller) is acceptable for backflow prevention assembly piping.
- G. Backflow prevention assemblies must be rigid and stable to provide maximum support and safety during testing and inspection. Appropriate thrust restraint measures, mechanical supports and concrete slab dimensions are to be determined by the owner / installer to provide rigid and stable support. The City reserves the right to require appropriate support and restraint measures as needed on a case-by-case basis.
- H. A minimum of one foot (12') of pipe must be extended on inlet and outlet sides of backflow prevention assemblies for rigid stability.
- I. Connections to any of the four (4) test cocks **shall not be permitted.** Connections include, but are not limited to: Hose bibs, pipe, wire, gauges, or any other fittings.
- J. All resilient wedge gate valves must be physically attached to the backflow prevention assembly for the operation at the assembly, not on an outside wall or appurtenance. Variations can be granted in the case of piping constraints. **Any variation must be obtained in writing from the City prior to work being performed.**

## **6. Two Inch (2") and Smaller Double Check Valve Assembly Installation**

- A. Installation may be above or below ground. Below ground installations shall have an appropriate enclosure.

**A traffic grade backflow prevention device enclosure box with a traffic grade cover is required in areas subject to vehicular traffic.**

- B. Below ground installations must provide for adequate gravity drain to the adjacent ground to ensure device is never submerged in water.

**7. Larger Than Two Inch (2") Double Check Valve Assembly Installation**

- A. Installation **must be above ground.**

**8. Reduced Pressure Principle Assembly Installation**

- A. Installation **must be above ground.**
- B. Relief valve vent shall never become submerged.
- C. Relief valve drain must meet approved air gap requirements. Air gap requirement is equal to two (2) times the supply pipe diameter or one (1) inch, whichever is greater.

An air gap and funnel is required for installations inside a building where water exiting the relief valve vent needs to be channeled to atmosphere or to a floor drain. This piping must be at least equal to the relief valve vent opening.

- D. If an above ground enclosure is used, two (2) drain holes, covered with screen and equal in size to the relief valve vent opening, shall be made at the base of the enclosure to ensure adequate drainage.
- E. A minimum of twelve (12) inches and a maximum of thirty-six (36) inches of clearance between the relief valve vent and the finished grade under the relief valve vent is required on all reduced pressure principle backflow assemblies.

**9. Fire Service Installation**

- A. The City requires an approved backflow prevention assembly on all fire sprinkler systems. This includes wet and dry systems.
  - (1) Simple fire line sprinkler systems must be protected with a minimum of an approved Double Check Valve Assembly.
  - (2) Fire line sprinkler systems where greater hazards exist must be protected with an approved Reduced Pressure Backflow Preventer. This would include, but not be limited to antifreeze systems, foam injection systems, systems charged from or tied into any water source other than the approved public supply.
  - (3) The City may require the installation of a detector assembly on a fire service line.
- B. Installation must be in accordance with USC-FCCC & HR, the City of Goose Creek, and the approved manufacturer's specifications.
- C. High temperature assemblies must be certified by the manufacturer as capable of withstanding elevated temperatures.
- D. There will be no connections between the City's connection at the water main and a fire service backflow prevention device.
- F. The resilient wedge gate valves must have an outside stem and yoke (OS & Y) or an approved indicating valve, as required by the National Fire Protection Association (NFPA).

## 10. Testing

### A. Frequency of Testing

- (1) Reduced Pressure Assemblies, Double Check Valve Assemblies, and Pressure Vacuum Breaker Assemblies must be tested by a certified tester immediately after installation and a minimum of once each subsequent year. The City reserves the right to require more frequent testing depending upon the degree of hazard.
- (2) Residential Dual Check Assemblies are not testable devices. The device will be visually inspected anytime the meter is serviced and/or whenever an occupant change occurs. If the device is found to be damaged or otherwise compromised, it will be replaced immediately. Minimally, replacement of the internal parts of the device will occur with the same frequency as replacement of the meter or no less than every fifteen years, whichever is sooner.

### B. Certified Tester

- (1) In order to be an approved Backflow Testers for devices on the City's system, the individual tester must have successfully completed the tester certification requirements administered by the South Carolina Department of Health and Environmental Control and meet the requirements of the City of Goose Creek Cross-Connection Control and Backflow Prevention Program Manual. A copy of the individual's DHEC issued license is required to be on file with the City. Certified Testers must also submit the certification paperwork on their test gauge each time the device is tested.
- (2) Certified Testers are required to obtain a City of Goose Creek business license in order to perform work in the City.
- (3) A **City of Goose Creek Backflow Device Certification Form** (page 21) with the tester's signature showing the **PASSING** test results must be sent to the City within seven (7) days after testing. Should the backflow prevention device fail the initial test, the tester's report should indicate the failing test, the repairs made, and the passing test. The tester shall provide a copy to the customer.

### C. Maintaining Approval as Certified Backflow Tester for the City

- (1) The City reserves the right to remove any certified tester as an approved tester if they are found to be falsifying records, making unauthorized repairs to a backflow assembly, failing to demonstrate proper test procedures, or demonstrating a lack of knowledge in testing backflow prevention assemblies. Any certified tester failing to conform to the City's Cross-Connection Control and Backflow Prevention Program rules, policies, or standards will also be removed from the list of certified testers. A certified tester will be suspended from testing backflow prevention assemblies when the accuracy of the tester's gauge being used is found to be out of tolerance as indicated by that particular gauge manufacturer's specifications. When the gauge has been replaced, repaired / calibrated as per the manufacturer's specifications, the tester will be allowed to continue to perform backflow tests. The results from the manufacturer's 'Approved Calibration Technician' must be forwarded, in writing, to the City at least annually. The tester is responsible for sending the calibration verification to the City. The tester is responsible for having their gauge checked / calibrated once annually.

### D. Certified Backflow Prevention Device Assembly Tester's Responsibility

- (1) The plumbing contractor / tester / repair technician will be responsible for the repairing or overhauling backflow prevention assemblies and making reports of such

repairs to the consumers and responsible authorities on forms approved by the City. The plumbing contractor / tester / repair technician shall include in the test report a list of all materials and replacement parts used. The plumbing contractor / tester / repair technician shall be equipped with and be competent to use all the necessary tools, gauges and other equipment necessary to properly test, repair and maintain backflow prevention assemblies. It will be the plumbing contractor / tester / repair technician's responsibility to insure that **ONLY ORIGINAL MANUFACTURERS' PARTS ARE USED IN THE REPAIR OF OR REPLACEMENT OF PARTS IN A BACKFLOW PREVENTION ASSEMBLY.** It will be the plumbing contractor / tester / repair technician's further responsibility not to change the design, material, or operational characteristics of an assembly during repair or maintenance without prior approval of the City. **IT IS THE TESTER'S RESPONSIBILITY TO PROVIDE THE CITY WITH THE ORIGINAL PASSING OR FAILING TEST REPORT WITHIN SEVEN (7) CALENDAR DAYS OF THE TESTING AND TO PROVIDE THE TEST REPORT TO THE OWNER / CUSTOMER. TESTERS FAILING TO CONFORM TO THESE POLICIES MAY BE REMOVED FROM OUR LIST OF CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTERS.**

E. City Backflow Prevention Device Follow-Up Testing

- (1) City personnel, or a tester contracted by the City, will conduct random follow-up testing of backflow prevention assemblies to insure proper operation. The customer will be given advance notification of testing. The City may perform follow-up testing at any time to verify system protection.

F. Test Following Backflow Prevention Device Repairs

- (1) All backflow prevention devices must be tested after **ANY REPAIR** is made to the assembly. The City must receive the test results within seven (7) days after testing. The number 1 and number 2 shut off valves are considered to be a part of the assembly.

## **11. REQUIREMENTS FOR EXISTING SERVICES**

A. Existing Backflow Prevention Assemblies Found to be in Non-Compliance

- (1) Any existing installed backflow prevention assembly that does not meet the requirements of this manual must be upgraded to the proper level of protection. Immediate replacement will be required if the City finds that the assembly no longer provides adequate protection for the degree of hazard present. Immediate replacement will also be required whenever an existing assembly malfunctions, fails to pass the annual, periodic, or random tests, or if the assembly cannot be repaired.

B. Change-out (Retro-fit)

- (1) The City of Goose Creek Cross-Connection Control Coordinator must be notified whenever the change-out of a backflow prevention device occurs. **This notification must be made within two (2) days and shall include the make, model, size and serial number of the new backflow prevention device. THE DEVICE MUST BE TESTED AFTER CHANGE-OUT.** City Cross-Connection Control personnel will then inspect the change-out for conformance and to verify the backflow prevention device's make, model, size and serial number. **The City will conduct an inspection within two (2) days to verify the installation.**

C. Compliance on Existing Water Services



- (1) Backflow prevention assemblies required by the City on any existing water service must be installed within thirty (30) days from the date of written notification. Failure to comply may result in the water service being disconnected. **HIGH HAZARDS MAY REQUIRE A MORE TIMELY INSTALLATION.**

## **12. OTHER REQUIREMENTS**

### D. By-Pass Piping

- (1) By-pass piping is not permitted unless it is equipped with an approved backflow prevention assembly. In some instances it may be desirable or necessary to install two (2) approved parallel backflow prevention devices in order not to interrupt service. Both devices are subject to Test Requirements.

### E. Vertical Installation

- (1) **Backflow Prevention Assemblies** must be installed in the **horizontal** position unless otherwise approved. Any request for a vertical installation must be made in writing and must include manufacturer's specifications indicating the device is designed for vertical installation. **All exceptions to horizontal installation must be obtained in writing from the City prior to work being performed.**

### F. Backflow Assembly Removal

- (1) **NO CONTRACTOR, PLUMBER, TESTER OR ANY OTHER INDIVIDUAL SHALL REMOVE OR STRAIGHT PIPE A BACKFLOW PREVENTION DEVICE.**

### City of Goose Creek Approved Double Check Valve Assemblies

This list includes only approved Double Check Valve Assemblies (DCVA) to protect the potable water system from backflow when a **Non-Health Hazard** is present. A non-health hazard may cause a potential threat to the physical properties of the public water system; however, the greatest degree or severity of contamination to which the potable water system could be subjected to is discoloration or distasteful water.

Company	Model(s)	Size								
		3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"
Ames	2000 2000SS	X	X			X	X	X	X	X
Conbraco	40-401 to 40-10AG	X	X	X	X	X	X	X	X	X
Febco	807Y 805YD	X	X	X	X	X	X	X	X	X
Febco	870					X	X	X	X	X
Wilkins	950XL	X	X	X	X	X	X	X		
Watts	709	X	X	X	X	X	X	X	X	X
Watts	007	X	X	X	X					

This is a partial list of DHEC, City of Goose Creek and USC-FCCC & HR Approved Backflow Prevention Assemblies.

Please call to check if a particular manufacturer's assembly has been approved, particularly for vertical installation.

**The City reserves the right to add or remove any backflow prevention device from the City's List of Approved Backflow Prevention Assemblies.**

**City of Goose Creek Approved Reduced Pressure Principle Assemblies**

This list includes only approved Reduced Pressure Principle Assemblies to protect the potable water system from backflow when actual or potential **Health Hazard** is present. The term “health hazard” shall mean an actual or potential threat of contamination of a physical or toxic nature to the public potable water system to such a degree of intensity that the result would be a danger to health.

Company	Model(s)	Size								
		3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"
Ames	4000						X	X	X	X
Conbraco	40-204 to 40-20G	X	X	X	X	X	X	X	X	X
Ferbco	825Y 825YD	X	X	X	X	X	X	X	X	X
Febco	880					X	X	X	X	
Wilkins	975XL	X	X	X	X	X	X	X	X	X
Watts	009	X	X	X	X	X				
Watts	909	X	X	X	X	X	X	X	X	X

This is a partial list of DHEC, City of Goose Creek and USC-FCCC & HR Approved Backflow Prevention Assemblies.

Please call to check if a particular manufacturer’s assembly has been approved, particularly for vertical installation.

**The City reserves the right to add or remove any backflow prevention device from the City’s List of Approved Backflow Prevention Assemblies.**

**City of Goose Creek  
Cross-Connection Control Questionnaire  
Page 1 of 2**

Please complete this form and return it to the City of Goose Creek Department of Public Works.  
**Failure to comply will result in a delay in the installation of your water service.**

Date \_\_\_\_\_

Account Number \_\_\_\_\_

Applicant's Name: \_\_\_\_\_

Service Address: \_\_\_\_\_

Proposed Account or Business Name: \_\_\_\_\_

Type of Service:(check one)

Duplex / Apartment Complex ( )    Commercial ( )    Irrigation ( )    Industrial ( )

Government / School ( )    Temporary Building / Construction ( )    Dock ( )

Other: \_\_\_\_\_

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**Irrigation:**    Above Ground System ( )    Below Ground System ( )

Type of Heads: Pop-Up ( )    Shrub ( )    Soaker ( )    Other ( ) \_\_\_\_\_

Will your irrigation system be designed to add fertilizer, weed control, or other additives by using pressure, injection, or aspiration methods either manually or automatically? Yes ( )    No ( )

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**Commercial:**

Define the type of business (i.e. medical office, professional office, restaurant, catering, retail/wholesale (specify items for sale), warehouse (specify items stored), gas station, laundromat, dry cleaner, etc.

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Water to be used for (check all that apply):    Cooking ( )    Drinking ( )    Sanitary ( )

Processing ( )    Boilers ( )    Chillers ( )    Equipment ( )    Other (Define) ( )

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Are corrosion inhibitors, chemical treatments or other additives used in processing, boilers, chillers, or cooling towers ? Yes ( )    No ( )

Check if plans include: Auxiliary water storage ( )    Swimming pool ( )    Hot Tub ( )    Spa ( )

**City of Goose Creek  
Cross-Connection Control Questionnaire  
Page 2 of 2**

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**Fire Service:** Yes ( ) No ( )

Type of System: Dry Sprinkler ( ) Wet Sprinkler ( ) Dry Riser ( ) Wet Riser ( )

Hose Cabinets ( ) Supply by Hydrant or Pumper Truck Only ( )

Foaming Agents: Yes ( ) No ( )

Anti-Freeze Agents: Yes ( ) No ( )

Auxiliary Water Storage: Yes ( ) No ( )

Fire Jockey Pump Used: Yes ( ) No ( )

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**Other Information:**

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I hereby certify that all information furnished is complete and correct. I further acknowledge that incomplete or incorrect information may result in additional or different requirements regarding Backflow Prevention Assemblies at the water service connection.

Signature of Applicant: \_\_\_\_\_

Date: \_\_\_\_\_ Telephone Number: \_\_\_\_\_

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**City Use Only:**

\_\_\_\_\_ Inch Reduced Pressure Principle Assembly

\_\_\_\_\_ Inch Air Gap

\_\_\_\_\_ Inch Double Check Valve Assembly

\_\_\_\_\_ Residential Dual Check

City Reviewer's Signature \_\_\_\_\_ Date \_\_\_\_\_

Additional Notes: \_\_\_\_\_

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**NO SERVICE MAY BE ESTABLISHED ON COMMERCIAL ACCOUNTS UNTIL THIS DOCUMENT HAS BEEN REVIEWED AND SIGNED BY DPW DIRECTOR, WATER DIVISION SUPERVISOR, OR CROSS-CONNECTION CONTROL COORDINATOR**

## City of Goose Creek Backflow Device Certification Form

Cross Connection Control Program / Field Testing and Maintenance Report Form / Backflow Prevention Devices  
**200 Button Hall Avenue**                      **Goose Creek, South Carolina**                      **(843) 824-2200**

Certified Tester

\_\_\_\_\_

Print Name

\_\_\_\_\_

Company Name

\_\_\_\_\_

Address

\_\_\_\_\_

Phone Number

Customer:

Type: \_\_\_\_\_

Service Address: \_\_\_\_\_

Size: \_\_\_\_\_

Make: \_\_\_\_\_

Model: \_\_\_\_\_

Billing Address: \_\_\_\_\_

Serial #: \_\_\_\_\_

Application: \_\_\_\_\_

Water Meter #: \_\_\_\_\_

Account #: \_\_\_\_\_

Comments:

	Check No. 1	Check No. 2	Air-Inlet Valve or Relief Valve	#1 Gate or Ball (Check One)	#2 Gate or Ball (Check One)
<b>Test Before Repairs</b>	Mark One:  Leaked:  Closed Tight:  Diff Press	Mark One:  Leaked:  Closed Tight:  Diff Press	Opened at  lbs.  Differential Pressure	Mark One:  Leaked:  Closed Tight:	Mark One:  Leaked:  Closed Tight:
<b>Repairs and New Materials</b>					
<b>Test After Repairs</b>	Mark One:  Leaked:  Closed Tight:  Diff Press	Mark One:  Leaked:  Closed Tight:  Diff Press	Opened at  lbs.  Differential Pressure	Mark One:  Leaked:  Closed Tight:	Mark One:  Leaked:  Closed Tight:

Tested By: \_\_\_\_\_

ABOVE DATA CERTIFIED TO BE CORRECT:

Method of Testing: \_\_\_\_\_

Test Kit Used: \_\_\_\_\_

Signature of Certifier: \_\_\_\_\_

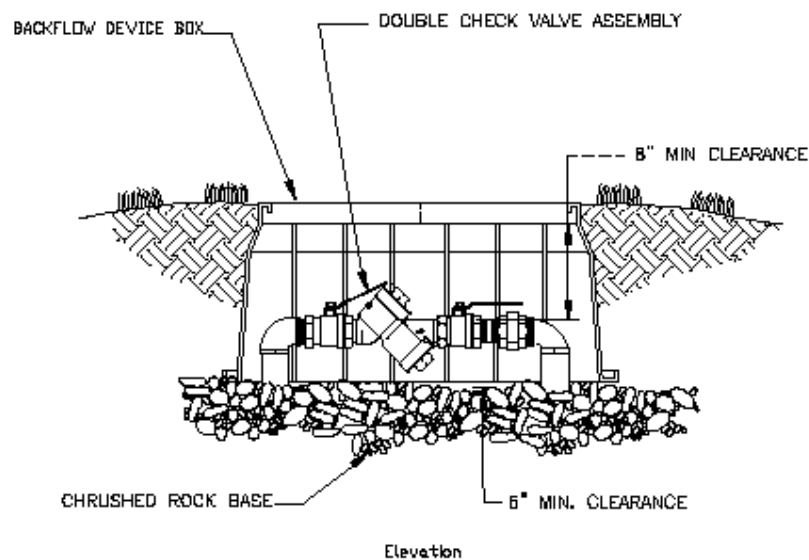
Date of Test: \_\_\_\_\_

Certification Number: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

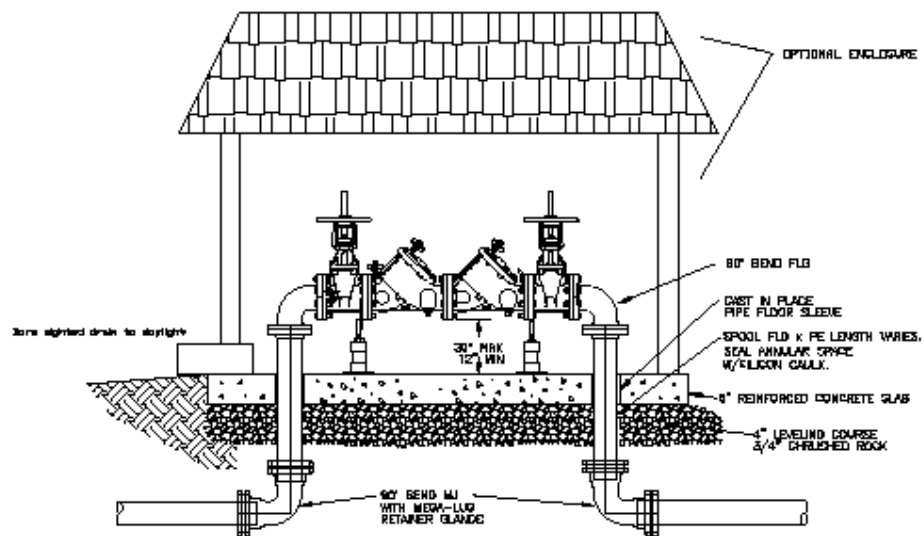
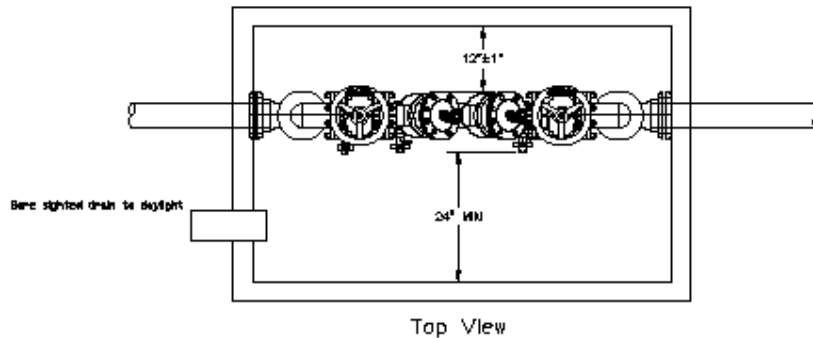
The Safe Drinking Water Act monitored by SC Department of Health and Environmental Control requires that all water purveyors in the State protect the water system from potential backflow and back siphonage by the installation of backflow devices on specified water customers. This document is the certification for the backflow device installed at the above named service address pursuant to these requirements.

Double Check Valve Assembly Up to 2"  
Typical Below Ground Installation  
(Devices larger than 2" must be installed above ground)



Device must be enclosed in a box; a traffic grade box with traffic grade cover is required in areas subject to vehicular traffic. Box must be sized to allow adequate room for testing and maintenance. Box should rest on a minimum of a 6" gravel base to ensure adequate drainage at all times.

# Double Check Valve Assembly 3" to 10" Typical Above Ground Installation



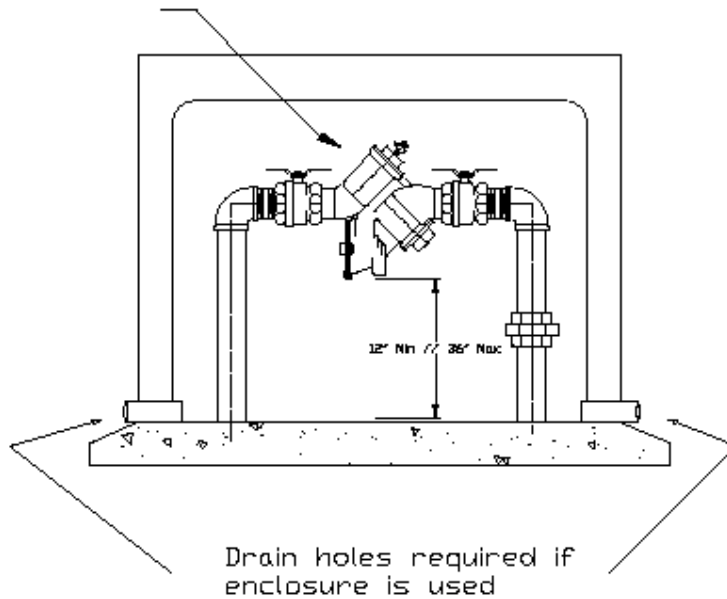
1. Installation must be above ground.
2. Backflow prevention assembly should be protected from freezing without obstructing the test cocks or relief valve opening.
3. Enclosed backflow prevention assemblies shall include a bore sighted drain to daylight.
4. A MINIMUM of one foot (1') of pipe must be extended on the inlet and outlet sides of the backflow prevention assembly for rigid stability.

City of Goose Creek Cross Connection Control and Backflow Prevention Program Manual



Reduced Pressure Principle Assembly  
Typical Installation  
3/4" to 2"

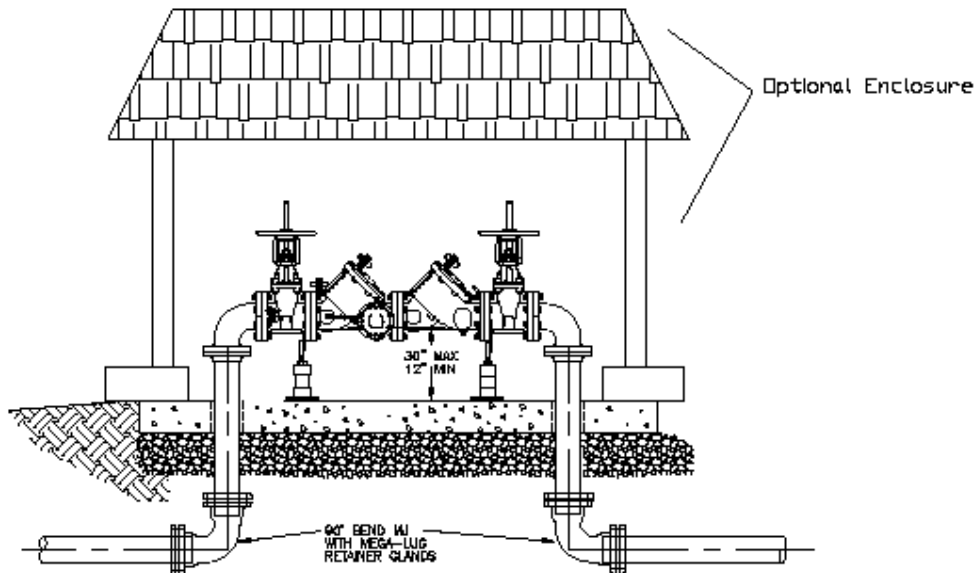
REDUCED PRESSURE PRINCIPLE ASSEMBLY



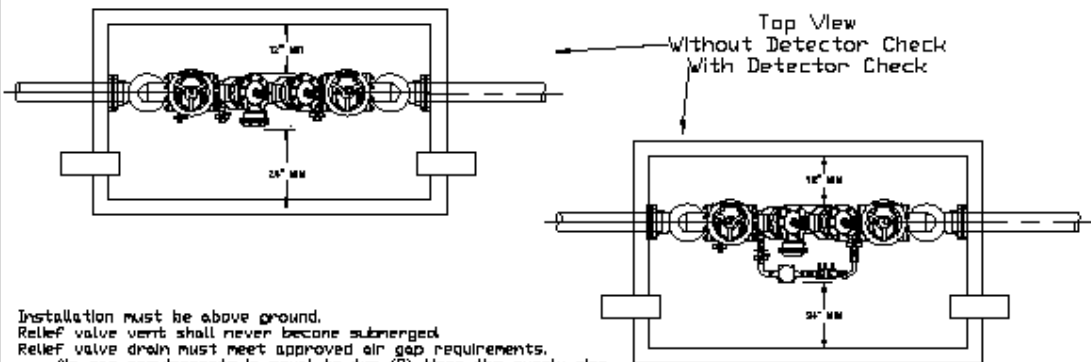
**Elevation**

- Installation must be above ground.
- Relief valve vent shall never become submerged.
- Relief valve drain must meet approved air gap requirements.
  - Air gap requirement is equal to two (2) times the supply pipe diameter or one (1) inch, whichever is greater.
- If an enclosure is used, two (2) drain holes, covered with screen and equal in size to the relief valve vent opening, shall be made at the base of the enclosure to ensure adequate drainage.
- A minimum of twelve (12) inches and a maximum of thirty-six (36) inches of clearance between the relief valve vent and the finished grade under the relief valve vent is required on all reduced pressure principle backflow assemblies.

# Reduced Pressure Principle Assembly Typical Installation 2 1/2" to 10"



ELEVATION



Installation must be above ground.  
 Relief valve vent shall never become submerged.  
 Relief valve drain must meet approved air gap requirements.  
 Air gap requirements is equal to two (2) times the supply pipe diameter or one (1) inch, whichever is greater.  
 If an enclosure is used, two (2) drain holes, covered with screen and equal in size to the relief valve vent opening, shall be made at the base of the enclosure to ensure adequate drainage.  
 A minimum of twelve (12) inches and a maximum of thirty-six (36) inches of clearance between the relief valve and the finished grade under the relief valve vent is required on all reduced pressure principle backflow assemblies.

# Irrigation System Typical Installation

Minimum requirement for an irrigation system with below ground 'pop-up' heads, shrub, or soaker hoses is a double check valve assembly. If chemical concentrates are aspirated or injected into lawn irrigation systems, and / or there is an unapproved auxiliary water system tied into the system, the required assembly shall be a reduced pressure principle assembly. Commercial customers are required to install reduced pressure principle assemblies.

