

# **James City Service Authority**

## ***Backflow Prevention & Cross Connection Control Program***

### Program Summary

The James City Service Authority (JCSA) administers a program of surveying, inspection, and testing of all backflow prevention devices and assemblies within the JCSA water distribution systems. This Backflow Prevention and Cross Connection Control Program is ongoing in nature and was devised and implemented with security of the potable water supply and the health of our citizens in mind. Accordingly, this program was created and is administered by the JCSA, in conjunction with the Virginia State Department of Health and the Environmental Protection Agency. This program, and its terms and conditions, are in place to illustrate the requirements for installation of approved backflow devices or assemblies, and the related responsibilities for regular maintenance, inspection and testing. A vital part of this program is the annual inspection and testing of all backflow assemblies by a Virginia State certified tester with test results being forwarded to the JCSA Cross Connection Control Manager. The authority for this program comes directly from the JCSA Board of Directors and its Regulations Governing Utility Service. Since the JCSA follows a containment policy, all backflow devices are located on the private side of the community potable water system. The property owner is responsible for the maintenance, inspection, and testing of the assemblies and/or devices, and to ensure compliance with the JCSA Backflow Prevention and Cross Connection Control Program requirements. It is essential to the betterment of our overall community health that as a community we remain vigilant to possible backflow events and maintain all cross connection control devices.

For questions or comments, contact:

JCSA Regulatory Compliance Office  
Cross Connection Control Manager  
109 Tewing Road  
Williamsburg, VA. 23188  
757-259-4138

# **JAMES CITY SERVICE AUTHORITY**

## **BACKFLOW PREVENTION & CROSS CONNECTION CONTROL PROGRAM**



# TABLE OF CONTENTS

## Title

### Introduction

#### Section 1 Overview

1.1 Purpose

1.2 Authority

1.3 Violations

#### Section 2 Causes of Backflow

#### Section 3 Administration and Enforcement

3.1 JCSA

3.2 Building Safety and Permits Office

3.3 Property Owner and/or Customer

3.4 Virginia Department of Health

3.5 Virginia DPOR Certified Backflow Prevention Device Worker

3.6 Backflow Prevention Assembly and Device Installer

#### Section 4 Inspections and Notice to Correct Defects

4.1 Frequency

4.2 Proposed Construction

4.3 New and Existing Facilities

#### Section 5 Preventive and Control Measures

5.1 Containment Policy and Service Line Protection

5.2 Special Conditions

5.3 Backflow Prevention Assemblies and Devices

5.4 Existing Facilities

5.5 Commercial Fire Sprinkler Systems

5.6 Irrigation Systems

5.7 Other Cross Connection Hazards

#### Section 6 Testing of Backflow Preventers

#### Section 7 Customer Surveys and Questionnaires

#### Section 8 Appendix of Backflow Terms and References

Appendix A Backflow Testers List and BPA Test Form

Appendix B Waiver Request for Alternate BPA Location

Appendix C BPA Installation Property Owner Acknowledgement Form

## INTRODUCTION

A cross-connection is a physical connection of piping or fixtures between two separate systems. One system would contain potable water and the other nonpotable, through which backflow or backsiphonage could occur into the potable water system. Bypass arrangements, jumper connections, removable sections, and other devices through which backflow could occur are also considered cross connections by the James City Service Authority (JCSA). To better protect the public water system, the JCSA needs to eliminate cross connections and the possibility of backflow.

Under Public Law 99-339, the Safe Drinking Water Act Amendments of 1986 and the adoption of these public statues by the Virginia Department of Health, all public water systems are required to have a Backflow Prevention and Cross Connection Control Program. Part II, Article 3 of the Virginia Waterworks Regulations states that:

“It is the responsibility of the purveyor to establish and operate a cross-connection control and backflow prevention program consistent with the extent of the system and the type of consumer served. This program shall include at least one designated individual who shall be responsible for the inspection of the waterworks for cross-connection and backflow prevention control. This program shall be carried out in accordance with the International Plumbing Code, Uniform Statewide Building Code and shall be a continuing program.”

In compliance with these regulations, the following is the James City Service Authority's program for Backflow Prevention and Cross Connection Control (BP & CCC).

## **SECTION 1      OVERVIEW**

### **1.1 Purpose**

The purpose of this program is to provide guidelines for the protection of the JCSA potable water supply from pollution or contamination by:

- 1) Promoting the elimination or control of any existing cross connections, actual or potential, between customers and the JCSA potable water supply.
- 2) Providing for on-going programs of cross connection control that will systematically and effectively ensure the protection of all relevant JCSA potable water supply infrastructure.
- 3) Supporting the Commonwealth of Virginia's policy to contain potentially contaminated water by isolating, within the customer's internal distribution system, pollutants that could backflow into the JCSA potable water system.

### **1.2 Authority**

The authority for this BP & CCC Program derives from the JCSA's Regulations Governing Utility Services, which can be accessed at: [www.jamescitycountyva.gov/1375/Regulations-Governing-Utility-Service](http://www.jamescitycountyva.gov/1375/Regulations-Governing-Utility-Service). It provides for establishment and enforcement of a program of cross-connection control and backflow prevention in accordance with the Virginia Department of Health's (VDH) Virginia Administration Code (VAC) for Waterworks Regulations 12VAC 5-590, Part II, Article 4 Cross Connection Control and Backflow Prevention in Waterworks (as amended), and the Virginia Department of Professional and Occupational Regulation (DPOR) Code of Virginia Title 54.1, Chapter 11 (as amended).

### **1.3 Violations**

Any customer and/or property owner found to be in violation of any provision of this section shall be served a written notice of violation, sent certified mail to the water supply system owner's last known address, stating the nature of the violation, corrective action required and providing a reasonable time limit, not to exceed 30 days, from the postmarked date of the notice of violation, to bring the water supply system into compliance with this BP & CCC Program. Failure to have the backflow prevention assembly (BPA) tested at time of installation, whenever repaired or relocated, and at least annually within 30 days of the due date scheduled by the JCSA also constitutes a violation of this section and shall also be subject to the actions and fines per this section. BPA's that fail to meet testing standards, are damaged, or in a state of inoperable condition must be repaired or replaced and retested within 20 days. Upon failure of the owner to have the defect corrected or test performed by the end of the specified time, the General Manager shall cause the water service to the premises to be terminated. The costs of all disconnection and reconnection shall be paid by the owner or occupant of the premises. If water service was terminated and the water meter remains in place, the DPOR certified backflow prevention device worker (BPDW) may turn on the water service to conduct the required test and inspection. If the assembly passes the test and the tester can submit the report to the JCSA Regulatory Compliance Office the day of the test, the water service may be left on for the customer. If the assembly fails the required testing, the water service may be left on, but the BPA and the downstream water supply from the BPA shall be turned off and secured. The BPDW must

notify the JCSA immediately (day of test) of the test results. If the test fails, the customer will have 20 days to have the BPA repaired and retested, or have water service re-terminated. The 20-day grace period for a failed BPA shall only be granted one time for a water service that has been terminated due to a failed BPA test.

Any owner of properties served by a connection to the waterworks found guilty of violating any of the provisions of this section, or any written order of the General Manager in pursuance thereof, may be charged with a Class 1 misdemeanor and, upon conviction thereof shall be punished by a fine of not less than \$500 or more than \$2,500, and/or sentenced to 30 days in jail, either or both, as directed by the court for each violation. Each day upon which a violation of the provisions of this Chapter shall occur shall be deemed a separate and additional violation for the purposes of this section.

## **SECTION 2      CAUSES OF BACKFLOW**

There are two forms of backflow: backsiphonage and backpressure. Backflow cannot be totally eliminated, as it is normally caused by accident or unexpected circumstances. However, most causes of backflow can be controlled by good design, proper protection and professional maintenance. Given below are discussions of the two causes of backflow.

Backsiphonage is the result of reduced or negative pressure in the water supply pipe. The principal causes of backsiphonage are:

- a) Water line repair or break, which is at a lower elevation, creates a negative pressure when water in the line flows to the lower point in the system.
- b) Undersized piping. When water is withdrawn from a pipe at a very high velocity, the pressure in the pipe is reduced. The pressure differential can cause contaminated water to flow into the pipe thru a siphoning effect.
- c) Reduced pressure in JCSA potable water system infrastructure due to high water withdrawal rate such as fire flow, water main flushing, mainline water system breaks, or peak system use for turf irrigation (by nature, a seasonal event).
- d) Reduced supply main pressure on suction side of a booster pump (local event).

Back Pressure may occur where a potable water system is cross connected to a nonpotable system of piping, and the pressure in the nonpotable system exceeds that of the potable system. The principal causes of back pressure are:

- a) Booster pump system designed without backflow prevention devices.
- b) Potable water connections to boilers and other pressure systems without backflow prevention devices.
- c) Connections with another system that may, at times, have a higher pressure.

- d) Water stored in tanks or plumbing systems, which due to their higher elevations, would create pressure sufficient to cause backflow if pressure were lowered in the public water system.
- e) Incorrect new construction or existing system refit that unintentionally creates a potential cross connection scenario.

### **SECTION 3**      **ADMINISTRATION AND ENFORCEMENT**

This Program shall be administered and enforced in accordance with the International Plumbing Code, the Uniform Statewide Building Code (USBC) as adopted, the VDH's Waterworks Regulations 12VAC 5-590 and all applicable Working Memorandums. The General Manager, the Director of Building Safety and Permits, the customer and/or property owner, and the backflow prevention device worker shall cooperate with each other for effective implementation of this program.

#### **3.1 JCSA**

The General Manager shall develop a Cross Connection Control Program and designate a Cross Connection Control Manager who shall administer and enforce the provisions of this section.

The JCSA has established and operates the Backflow Prevention and Cross Connection Control Program to:

- a) Protect the JCSA potable water distribution system from contamination or pollution due to the backflow of contaminants or pollutants through a water service connection.
- b) Eliminate or control cross connections between the customers' potable and nonpotable water system(s), plumbing fixtures and piping systems.
- c) Provide for the maintenance of a continuing program of cross connection control which systematically and effectively prevents contamination or pollution of the JCSA potable water system.

The Cross Connection Control Manager or their designee may enter, survey, and inspect all premises served by the Authority as they deem necessary to ensure the safety and security of the water supply system.

The Cross Connection Control Manager shall ensure that thorough inspections and operational tests are made at least annually of backflow prevention assemblies. Copies of results of these inspections and tests shall be kept on file and made available to the Virginia Department of Health if requested. The assemblies and devices shall be repaired, overhauled, or replaced by the property owner as directed by the Cross Connection Control Manager. Nothing in this section shall prevent the JCSA from installing and operating approved BPA's or making repairs, the costs of which shall be borne by the property owner and/or customer.

Where, in the opinion of the Cross Connection Control Manager, the complexity of the consumer's water system warrants, the Cross Connection Control Manager may require the property owner and/or customer to install and maintain appropriate backflow prevention assemblies or devices to carry out the requirements of the JCSA BP & CCC Program.

### **3.2 Building Safety and Permits Office**

The Director of Building Safety and Permits reviews building plans and inspects new plumbing as it is installed. When the review of building plans or the inspection of a water supply system suggests or detects an actual or potential cross connection the Director of Building Safety and Permits shall ensure that such cross connections are either eliminated or controlled with approved backflow prevention devices as outlined in the International Plumbing Code, the Uniform Statewide Building Code USBC as adopted, and the JCSA's BP & CCC Program. The Cross Connection Control Manager shall provide technical assistance to the Director of Building Safety and Permits.

The Cross Connection Control Manager and the Director of Building Safety and Permits shall work together to ensure all connections served by the waterworks (including fire service connections, domestic, industrial, and irrigation systems) to determine if the cross connection control and backflow prevention measures are acceptable. If unacceptable, the designer and or the Cross Connection Control Manager shall consult with the JCSA Engineering Division for technical assistance if needed. The revised designs shall be resubmitted for additional review. Only after final approval by both the JCSA and the Director of Building Safety and Permits shall construction commence. All plans shall be submitted to the Director of Building Safety and Permits with sufficient copies for the Director of Building Safety and Permits to forward two copies of the plans to the JCSA Engineering Division.

BPA's shall only be installed by persons meeting the requirements of the Virginia Department of Professional and Occupational Regulation (DPOR) Code of Virginia Title 54.1, Chapter 11 (as amended).

### **3.3 Property Owner and/or Customer**

The property owner and/or customer have the responsibility of preventing pollutants and contaminants from entering the public potable water supply system(s) or the JCSA water system. The water supply customer's responsibility starts at the point of delivery (downstream end of service connection).

The property owner and/or customer, at their own expense, shall ensure that approved backflow prevention assemblies or devices are installed at the appropriate location(s) in their system. The water supply customer shall operate, maintain, and ensure the backflow prevention assemblies and device(s) are tested as directed by this program.

The property owner and or customer shall not remove, make piping changes, or other arrangements to bypass backflow prevention assemblies or devices.

Tests, maintenance, and repairs of backflow prevention assemblies shall be performed by Virginia DPOR board certified backflow prevention device workers.



The property owner and/or customer shall maintain accurate records of tests and repairs made to backflow prevention assemblies or devices, and provide the Cross Connection Control Manager with copies of such records on request. The records shall be on forms approved by the Cross Connection Control Manager which can be downloaded at [www.jamescitycountyva.gov/backflow](http://www.jamescitycountyva.gov/backflow). At the time of installation, following any repair, overhaul, re-piping, or relocation of an assembly, the water supply customer shall have the backflow prevention assembly tested to ensure that it is operating properly.

In the event of pollution or contamination of the James City Service Authority water system or a water supply system due to backflow into the water supply system, the property owner and/or customer shall promptly take steps to confine further spread of the pollution or contamination within the system, and shall immediately notify the James City Service Authority, James City Dispatch, or 911 of the hazardous condition. The property owner and or customer shall take appropriate measures to free their water supply system(s) of any pollutants or contaminants.

### **3.4 Virginia Department of Health**

The VDH is responsible for approving the Cross Connection/Backflow Prevention Program, providing technical assistance, clarification of regulations, and assisting with unique situations.

### **3.5 Virginia DPOR Board Certified Backflow Prevention Device Worker**

The certified Department of Professional and Occupational Regulation (DPOR) Backflow Prevention Device Worker (BPDW) is responsible for making inspections, testing, and for repairing or overhauling backflow prevention assemblies and devices per these regulations, and the JCSA BP & CCC Program. The BPDW shall utilize a testing procedure or method identified by the AWWA's Backflow Prevention and Cross Connection Control Manual of Water Supply Practices. The BPDW shall make reports of such test and repairs to the Cross Connection Control Manager and the water supply customer on forms approved by the Authority. The BPDW shall include the list of materials or replacement parts used in the repair, or replacement, of parts in a backflow prevention assembly or device. The BPDW shall not change the design or operational characteristics of an assembly or device during repair or maintenance without prior written approval of the water supply customer and Cross Connection Control Manager.

The BPDW shall be equipped with, and be competent in the use of, all the necessary tools, gauges, manometers, and other equipment necessary to properly test, repair, and maintain backflow prevention assemblies or devices. Only manufacturer's approved parts should be utilized for repairs if needed. The backflow prevention assembly shall never be changed or modified in any manner that would change the assembly from its original USC's – FCCCHR approved and complete assembly. The BPDW shall submit completed copies of the BPA test report in a timely manner (within 30 days of test date). Due to potentially hazardous condition posed by an inoperable BPA, a copy of any failed BPA test results shall be submitted to the JCSA as soon as possible. The submission of a failed test result shall never exceed 7 days. A total of 3 copies shall be produced by the BPDW. One copy shall be provided to the JCSA Cross Connection Control Manager, one copy for the home, business, or property owner as applicable, and the BPDW shall maintain one copy for their own records. All testers performing backflow assembly testing for new installations, annual testing of existing assemblies, or repaired assembly testing, shall furnish the test results (including failed test results) along with the information listed below to the Cross Connection Control Manager. This will be accomplished using the approved JCSA test sheet and should include at a minimum:

- 1) Address where device is located;
- 2) Owner address and telephone number;
- 3) Description of usage, location and size;
- 4) Date of installation;
- 5) Type of assembly;
- 6) Manufacturer;
- 7) Model number;
- 8) BPDW name, company, cert number, and address,
- 9) A current calibration date for testing equipment (testing gauges must be calibrated annually),
- 10) Whether the assembly passed or failed the inspection.

**Note** - All of the above-referenced data fields can be found on the official JCSA Backflow test form which is available online for download at [www.jamescitycountyva.gov/backflow](http://www.jamescitycountyva.gov/backflow).

The required testing information shall be emailed to [jcsa.bpatest@jamescitycountyva.gov](mailto:jcsa.bpatest@jamescitycountyva.gov) or sent to:

James City Service Authority  
ATTN: Regulatory Compliance Office  
109 Tewning Road  
Williamsburg, VA 23188

The BPDW shall ensure the backflow prevention assembly is tagged with a waterproof tag. The tag should include at a minimum, the following:

- 1) Description of usage, location and size;
- 2) Date of test;
- 3) Type of assembly;
- 4) Manufacturer, Model & Serial number
- 5) Testing Company name, address and phone number;
- 6) Tester's name & certification number;
- 7) Whether the assembly passed or failed the inspection

The BPDW shall ensure their DPOR certification is valid, their test instruments calibration is current (less than one year old), and that they have the appropriate license and certification(s) for the license classification they are working in as defined in Virginia DPOR Code of Virginia Title 54.1, Chapter 11 (as amended). The BPDW will be signing a Certification Statement on the report that states the following: "I have completed the above test and certify that this backflow device performed satisfactorily and meets all Federal, State, and Local codes and regulations as required." This includes proper installation. BPA's with bypass arrangements, jumper connections, removable sections, and other devices through which backflow could occur are considered cross connections by the JCSA, and are prohibited. The BPDW should not sign or submit a passing report that doesn't meet these standards as they will be expected to correct the condition(s) if it is found that the assembly did not meet these set standards.

BPDW's found to be in violation of this section, or submitting test reports that are in violation of this Program, or any of the referenced regulatory guidance may be removed from our tester's list, and denied their privilege to submit test reports to the JCSA.

### 3.6 Backflow Prevention Assembly and Device Installer

Backflow prevention assemblies and devices shall only be installed by persons meeting the requirements of the Virginia Department of Professional and Occupational Regulation (DPOR) Code of Virginia Title 54.1, Chapter 11 (as amended). The installer's responsibility is to make proper installation of approved backflow prevention devices, in accordance with the manufacturer's installation instructions, the Uniform Statewide Building Code, and any additional instructions offered by JCSA. Approved backflow prevention devices and assemblies are those that meet AWWA standards, and are approved by ASSE and the USC-FCCCHR (University of Southern California Foundation for Cross Connection Control and Hydraulic Research). Flow orientation and installation of backflow preventers shall be provided in accordance with USC-FCCC guidelines. Thermal expansion and/or water hammer downstream of the assembly can cause excessive pressure. To avoid possible damage to the system and assembly, the installer will use water hammer arresters, surge protectors, relief valves and expansion tanks as appropriate. Backflow prevention assemblies must be located not only in well ventilated spaces to allow air to enter them, but also where water discharge from them will not cause damage or create a hazard. Backflow prevention assemblies must not be installed in locations subject to flooding, such as underground vaults. The assemblies shall be located so that it can be reached for inspection, testing, repair, and replacement without removing a wall, floor, ceiling or other permanent portions of the buildings structure. Backflow prevention assemblies shall not be located in attics or crawl spaces. Outdoor enclosures for backflow preventers shall comply with ASSE 1060. The installer shall ensure the assembly is tested at the time of installation to ensure the assembly is in proper working order. Backflow prevention assemblies shall not be installed in areas subject to freezing except where they can be removed by means of unions, or are protected from freezing by heat, insulation, or both.

All commercially sited reduced pressure principle backflow preventers (RP), double check valve assemblies (DCVA) or pressure vacuum breakers (PVB) shall be tested immediately after installation and annually thereafter, beginning one year from the date of installation by a Commonwealth of Virginia certified backflow prevention device technician.

**NOTE:** Exception of DCVA's that were installed prior to October 1, 2008. If the DCVA becomes damaged to the extent it must be replaced, or if the location contains high hazards, replacement with an RP assembly installed appropriately above grade will be required.

## **SECTION 4      INSPECTIONS AND NOTICE TO CORRECT DEFECTS**

### 4.1 Frequency

Inspections shall be conducted as required by the JCSA's BP & CCC Program and more often if deemed necessary due to a highly hazardous condition. The Cross Connection Control Manager shall have the right to enter premises served by a connection to the waterworks at any reasonable time for inspecting, observing, sampling, and testing the water supply system(s) for cross connection(s). Upon request, the property owner or occupants of the property served shall furnish to the Cross Connection Control Manager pertinent information regarding the water supply system(s) on such property. The refusal of such information or refusal of access, when requested, shall be deemed evidence of the presence of a cross

connection and require installation of an approved BPA at the service connection. The cost of which is to be borne by the property owner. Failed backflow prevention assembly test must be corrected and retested within 20 days. Additionally, the regulatory guidance, actions and fines as described in Section 1.3, Violations, will be applicable.

All installed Reduced Principle (RP), Double Check Valve Assembly (DCVA), and Pressure Vacuum Breaker (PVB) backflow prevention assemblies shall have a detailed test and inspection performed by a Commonwealth of Virginia certified BPDW at the customer's expense at least annually. Annual mailings by the JCSA will be used to notify commercial and industrial consumers of when their annual inspections and tests are to be performed. The absence of an annual reminder letter does not void the requirement of the annual inspection required by the JCSA Backflow Prevention and Cross Connection Control Program.

The results of the inspection shall be forwarded to [jcsa.bpatest@jamescitycountyva.gov](mailto:jcsa.bpatest@jamescitycountyva.gov) or:

James City Service Authority  
ATTN: Regulatory Compliance Office  
109 Tewning Road  
Williamsburg, VA 23188

The Cross Connection Control Manager shall maintain records (electronic or written) of all backflow preventer devices and subsequent inspection reports for no less than 10 years. These records shall be located within the Regulatory Compliance Office.

## **4.2 Proposed Construction**

All new construction plans and specifications for industrial and commercial facilities shall be reviewed by the James City County Building Safety and Permits office to determine the likelihood of a potential cross connection hazard. Site plans shall also be reviewed by the JCSA's Engineering Department and or the Cross Connection Control Manager. Backflow prevention and cross connection control requirements, in accordance with this policy will be made at that time.

## **4.3 New and Existing Facilities**

A potable water supply shall be designed, installed, and maintained in such a manner as to prevent contamination from nonpotable liquids, solids or gases, either harmful or benign, from being introduced into the potable water supply through cross connections or any other piping connections to the system. This is accomplished by protecting every water outlet from the potable water system that poses a possible cross connection.

In order to determine the degree of potential hazard to the JCSA potable water supply, a survey may be made of all existing customers' water systems. This survey need not be a detailed inspection of the location and disposition of the water lines. The survey can be confined to establishing the water users on the premises, the existence of cross connections, and the availability of auxiliary or used water supplies and will normally be performed by the JCSA CCC Manager or designee. Assessments may not necessarily require an on-site inspection. On-site inspections, interviews, or questionnaires may be conducted for new

and/or existing facilities. Should any devices or plumbing changes be necessary, a follow-up inspection will be made at an agreed upon date.

## **SECTION 5      PREVENTIVE AND CONTROL MEASURES**

### **5.1      Containment Policy and Service Line Protection**

On October 1, 2008, the JCSA began operating a containment program approved by the VDH for backflow prevention. This program ensures a high level of protection for our water distribution system, and requires a containment BPA be installed at the service connection for all commercial and non-residential service connections, as well as all connections served by a master meter. Customers wishing to install their BPA at a location other than the service connection is subject to the approval of the JCSA and the customer must sign a waiver and make this request in writing to the General Manager of the JCSA. If approval to install the BPA at a location downstream of the service connection is granted, the BPA shall be installed prior to any unprotected takeoffs. Residential irrigation system BPA's may be located at the point of connection between the water supply and the irrigation system, but before any irrigation system outlets, controls, or openings. This isolation in lieu of containment method of protection is permitted so that the customer can be protected from potential contamination by their own irrigation system. Under this scenario, the irrigation BPA serves as the JCSA's required containment BPA, and is therefore subject to all regulatory guidance directed by this program. In addition, the JCSA or the Director of Building Safety & Permits may also require additional backflow prevention assemblies or devices to provide isolation protection for spaces inside of multi-use properties to ensure a potential hazard to the potable water system is not spread to the water system utilized by other occupants of the building. These include facilities identified by the VDH regulations as requiring a backflow prevention assembly at the service connection, but have been located within a multi-use building. Additional examples would also include but not limited to restaurants, medical facilities, veterinarian facilities, nail or hair salons, dry cleaners and commercial laundry equipment, reclaimed or recycled water, solar hot water systems, grocery stores, breweries or beverage processing plants, film laboratories, etc.

### **5.2      Special Conditions**

1. Approved backflow protection shall also be installed for any additional condition outlined by VDH regulations as requiring a service line connected BPA that is not specifically mentioned in this regulation or the JCSA BP & CCC program.
2. Premises where, because of security requirements or other prohibitions or restrictions, it is impossible or impracticable to make a complete cross connection survey.
3. Premises having a repeated history of cross connections being established or reestablished.
4. Other premises specified by the Cross Connection Control Manager where causes can be shown that a potential cross connection hazard not enumerated above exists. Examples may include multiple use commercial, office, warehouse, or other premises where the degree of hazard is subject to change without knowledge of the Cross Connection Control Manager.

5. Effective the date of this regulation, water from auxiliary water sources (wells, ponds, streams, springs, etc.) may not enter homes or buildings that are served by the JCSA water supply. Due to the high potential for cross connections, water from auxiliary water sources, and all of its associated equipment (piping, pumps, pressure tanks, etc.) must remain outside of the building or its foundation. Existing auxiliary water systems installed prior to this regulation may be kept in place providing there is no cross connection with the JCSA water supply. If a system is suspected to be, or is found to be cross connected with the JCSA water supply, the General Manager shall cause the water service to the premises to be terminated. Additionally, based on the history of the property being cross connected to the JCSA water supply, a service line connected BPA meeting the requirements of these regulations may be required to be installed.

6. A current backflow inspection must be submitted with your submeter registration form in order for the submeter to be activated and receive submeter credit. Additionally, failure to submit a required annual BPA inspection shall void submeter credit(s) and cause termination of the submeter account. A failed BPA inspection report does not satisfy this requirement.

### **5.3 Backflow Prevention Assemblies and Devices**

Effective the date of these regulations, all new BPA installations and replacement BPA installations shall be a reduced pressure detector assembly for fire sprinkler systems, and a reduced pressure principle assembly for all other connection types. On a case-by-case basis, existing fire sprinkler systems may be exempt from this requirement and may utilize a double check valve assembly or double check detector assembly due to the frictional losses across the reduced pressure principle assembly. The exemption is subject to the approval of the General Manager. A waiver for the type of BPA required may be provided based on the level of hazard involved, and is also subject to the approval of the General Manager. Any BPA required herein shall be properly approved. Approved backflow prevention devices and assemblies utilized for containment, or isolation in lieu of containment are those that meet American Water Works Association standards, and are approved by American Society of Safety Engineers (ASSE) and the USC-FCCC (University of Southern California Foundation for Cross Connection Control and Hydraulic Research). Flow orientation, access, and installation of backflow preventers shall be provided in accordance with USC-FCCC guidelines. Further information and guidance regarding proper approval may be found in the JCSA BP & CCC Program.

Whenever the existing device is moved from the present location, or requires more than minimum maintenance, or when the Cross Connection Control Manager finds that the maintenance constitutes a hazard to health, the unit shall be replaced by an approved backflow prevention assembly meeting the requirements of this section.

Backflow prevention devices such as ASSE 1011 hose connection vacuum breakers, ASSE 1012 backflow preventers with intermediate atmospheric vent, ASSE 1022 backflow preventers for carbonated mixed beverage machines, ASSE 1024 dual check valves, and ASSE 1052 hose connection backflow preventers are utilized in some cases for isolation protection. They are non-testable and are not a substitute for the backflow prevention assemblies required by this JCSA backflow prevention and cross connection control program. They are however, required for certain water usages, and should be installed as required. A backflow prevention device should be overhauled or replaced every 5 years, or more frequently if required due to leaks, failure, or as recommended by the manufacturer.

## 5.4 Existing Facilities

As part of the high level of distribution system protection that our containment program affords, commercial buildings undergoing additions, alterations, change of use, relocation, or repair that requires permitting and/or approval shall be required to install a service line protection assembly as directed by this section. This requirement will also apply to all plumbing, fire sprinkler, and irrigation permits, as well as any mechanical or HVAC permits for improvements or alterations involving the water supply.

Any of the following types of existing facilities must also have an approved containment backflow prevention assembly at the water service connection even if they were constructed or built prior to October 1, 2008. This list is presented as a reference and shall not be considered complete.

TYPE OF FACILITY OR USAGES	MINIMUM TYPE OF PROTECTION
Breweries, Distilleries, Bottling Plants	RP
Buildings over 3 stories (If any high hazard exist an RP must be used)	DCVA / RP
Buildings served through a master meter	RP
Car Wash with recycling system and/or Wax Educator	RP
Chemical Plants	RP
Dentist Office	RP
Facilities & Vehicles that blend, store, package, transport, or treat chemicals	RP
Fertilizer Plants	RP
Film Laboratory or Processing Plant	RP
Food or Beverage Plants	RP
Hospitals, Clinics, and all Medical Buildings	RP
Irrigation Systems	RP
Laboratories	RP
Laundries & Dry Cleaning Plants	RP
Machine Tool Plants	RP
Metal and/or Metal Plating Processing Plant	RP
Metal Processing Plant	RP
Mortuaries / Funeral Homes	RP
Multiuse commercial, office, or warehouse facilities	RP
Nursing Homes	RP
Packing Houses or Rendering Plants	RP
Paper Products Plant	RP
Pesticide or exterminating companies & their vehicles with storage or mixing tanks	RP
Petroleum Processing Plant	RP
Petroleum Storage Yard	RP
Pharmaceutical or Cosmetic Plant	RP
Piers, Docks, or Waterfront Facilities (commercial & residential)	RP
Power Plants	RP
Radioactive Material Plants	RP
Reclaimed Water Building or Site	AG / RP
Restaurants and Food Service Establishments	RP

Sand and Gravel Plants (If high hazard exist an RP must be used)	DCVA / RP
Schools with Laboratories	AVB
Swimming Pools with Piped Fill Line	AG at pool
Swimming Pool Chemical Treatment Plant Supply Line	RP
Sewage Treatment Plants	RP
Sewage Pumping Stations	AG / RP
Veterinary Establishments	RP
Water Powered Sump Pumps	RP
Water Closets	AG
Water Filters, Treatment, and Softener Equipment	RP

In addition to the types of facilities listed above, an approved backflow prevention device of the type designated shall be installed on each domestic water service connection to any premises containing the following real or potential hazards.

### **MINIMUM TYPE OF PROTECTION**

Premises having an auxiliary water system connected to public water systems (booster pumps qualify).	RP
Premises having a water storage tank, reservoir pond, or similar appurtenance.	RP
Premises having a steam boiler, cooling system, or hot water heating system where chemical water conditions are used.	RP
Premises having submerged inlets to equipment.	RP
Premises having self-draining yard hydrants, fountains, hose boxes or similar devices presenting a health or system hazard (i.e. chemical storage plants, tank farms, bulk storage yards).	RP
Premises having self-draining yard hydrants, fountains, hose boxes or similar devices presenting a pollution hazard (i.e. parks, play fields, cemeteries).	RP
Premises where, because of security requirements or other prohibitions or restrictions, it is impossible or impractical to make a complete cross connection survey.	RP
Premises with auxiliary water piped into foundation or building.	RP
Others as specified by the James City Service Authority (based on the degree of hazard).	DCVA / RP

**Note:** When an existing backflow assembly is to be relocated or fails and replacement becomes necessary, customers shall replace the existing device with an approved RP assembly, to meet the current



backflow prevention requirements of the JCSA. Proper installation guidelines shall be adhered to and an existing backflow assembly should not be replaced by a RP assembly if the installation would not meet USC-FCCC and the approved manufacturer's installation instructions (example, a DCVA in a vault or pit should not be replaced by a RP assembly installed inappropriately below grade). See Section 3 for additional installation requirements.

**Note:** Fire suppression systems being retrofitted with an RP assembly will generally reduce the available fire flow. Customers must ensure that a complete and thorough hydraulic and engineering analysis is performed to ensure proper system performance prior to the exchange and/or replacement of any fire sprinkler or fire suppression system backflow device. Any retrofitted fire sprinkler or fire suppression system will require recertification to verify adequate capacity and/or proper code compliance.

## 5.5 Commercial Fire Sprinkler Systems

Fire Protection systems, because of their varying degree of hazard, must be separated from the JCSA potable water supply by a backflow prevention device. Because of this necessity, the JCSA shall be the approving authority for the type and installation of the backflow device. Some hazards relating to fire systems are:

1. The growth of offensive microorganisms that can cause taste and odor problems.
2. The leaching of heavy metals from pipes and fittings such as zinc, cadmium, iron, or lead into water that stands in pipelines for long periods of time.
3. The additions of corrosion inhibitors or antifreeze compounds to protect the piping systems.
4. Dry systems containing compressed air.
5. A loss of pressure (backsiphonage) on the public water supply main or an increase in pressure (backpressure) on the consumer's system which would allow water from these systems to enter the JCSA potable water supply.

If a backflow event occurs from these systems, the hazard could vary from a non-health to a high health hazard.

### TYPE OF BACKFLOW PROTECTION REQUIRED – COMMERCIAL FIRE SPRINKLER SYSTEMS

A properly installed Reduced Pressure Detector Assembly (RPDA) backflow preventer is required for all commercial fire sprinkler systems. Existing systems (installed prior to October 1, 2008) that have a high hazard, such as the addition of nontoxic antifreeze or a connection to the JCSA potable water system from a non-JCSA auxiliary water supply, are also required to have a properly installed Reduced Pressure Principle (RP) backflow preventer. If an existing system fire sprinkler system does not have any additives, and has no chance for a non-JCSA auxiliary water supply to be connected to the JCSA potable water system exist, then the system may continue to utilize a previously installed Double Check Valve Assembly (DCVA).

**Note:** When an existing backflow assembly is to be relocated or fails and replacement becomes necessary, customers should replace any existing device or assembly that is not currently a RP assembly with an approved RPDA assembly. This would be done in order to meet the current backflow prevention requirements of the JCSA. Proper installation guidelines shall be adhered to and an existing backflow assembly shall not be replaced by a RP assembly if the installation would not meet USC-FCCC and the approved manufacturer's installation instructions (example, a DCVA in a vault or pit should not be replaced by a RP assembly installed inappropriately below grade). See section 3 for additional installation requirements.

**Note:** Fire suppression systems being retrofitted with an RP assembly will generally reduce the available fire flow. Customers must consult an appropriately licensed engineer to ensure that a complete and thorough engineering analysis and hydraulic recalculation is performed to ensure proper system performance prior to the installation, exchange and/or replacement of any fire sprinkler or fire suppression system backflow device. Any retrofitted fire sprinkler or fire suppression system will require recertification to verify adequate capacity and/or proper code compliance.

**Note:** Through meetings and discussions with the JCC Fire Marshal's Office, it was determined that when they connect to a Fire Department Connection (FDC) with a fire pumper truck, it is the normal routine to only use JCSA potable water. A flushing/disinfection program has also been implemented for use in fire pumper trucks in the event that a non-potable water source is introduced to the pumper trucks. Therefore, for definition, unless a situation develops to suspect differently, connections of this type will not be considered to be a non-JCSA auxiliary water source.

In addition, the following conditions and circumstances shall also be adhered to:

- 1) Where non-JCSA systems contain chemical additives or antifreeze, the JCSA potable water system shall be protected by a RP backflow preventer. If chemical additives or antifreeze are added to only a portion of the automatic fire sprinkler or standpipe system, the RP backflow preventer shall be located so as to isolate that portion of the system. At a minimum, a DCVA should be installed on the remaining portion of the sprinkler system that contains no additives. This applies only to existing systems, as any system installed after October 1, 2008 will require a properly installed RP assembly to protect the entire system. All antifreeze additives utilized in any system, new or existing, must be nontoxic and meet the requirements of the National Fire Protection Association if the fire protection system is connected to the JCSA potable water supply. JCSA does not allow any toxic chemicals such as ethylene glycol (automotive antifreeze) to be connected to the JCSA potable water supply.
- 2) All backflow assemblies shall be an approved assembly and shall be tested and inspected annually by a State of Virginia certified tester. Approved backflow prevention assemblies are those that meet AWWA standards, and are approved by ASSE and the USC-FCCC (University of Southern California Foundation for Cross Connection Control and Hydraulic Research). Results of the test shall be sent to:

James City Service Authority  
ATTN: Regulatory Compliance Office  
109 Tewning Road  
Williamsburg, VA 23188

- 3) Fire protection systems shall not be operated in a manner other than for which the manufacturer originally designed it. (Examples include but are not limited to: operating a dry pipe system inappropriately as a wet system or adding antifreeze to a wet system designed to operate without added chemicals).

## 5.6 Irrigation Systems

Irrigation systems include but are not limited to agricultural, residential, and commercial applications. The Virginia Department of Health classifies lawn sprinkler systems and irrigation systems as a high hazard for several reasons. Sprinklers, bubbler outlets, emitters, drip hoses, and other equipment are exposed to substances such as fertilizers, fecal material from pets or other animals, pesticides, and other chemical and biological contaminants. Sprinklers may remain submerged under water after use or storms, and can also have various design and operational configurations. They may be subject to various onsite conditions such as additional water supplies, chemical injection, booster pumps, and elevation changes. All of these conditions must be considered when determining backflow protection. Some hazards relating to irrigation systems are:

- 1) Fertilizers: Ammonia salts, ammonia gas, phosphates, potassium salts.
- 2) Herbicides: 2,4-D, dinitrophenol, 2,4,5-T, T-pentachlorophenol, sodium chlorate, borax, sodium arsenate, methyl bromide.
- 3) Pesticides: TDE, BHC, lindane, TEPP, parathion, malathion, nicotine, MH, and others.
- 4) Fecal matter: Animal (domestic and non-domestic).

### TYPE OF PROTECTION REQUIRED – IRRIGATION SYSTEMS

The appropriate protection for irrigation systems is a Reduced Pressure Principle (RP) backflow prevention assembly. It is the recommended and preferred type of BPA for irrigation systems as it provides the highest level of protection. A Pressure Vacuum Breaker (PVB) may be used for service protection if the JCSA potable water service is the sole source of supply to the premises or property, if it is used strictly for irrigation, and there is no means or potential for backpressure (IE: PVB's protect against backsiphonage only). The PVB must be installed at least 12" above all downstream outlets and piping, and cannot be installed at a height above 5 feet (60"). If the PVB cannot be installed to meet these conditions, then the RP assembly must be used. BPA's cannot be installed in crawl spaces or garages. Any irrigation system that has a means to introduce chemicals into the JCSA potable water system shall always be protected against backflow by a RP backflow preventer. Residential irrigation system BPA's may be located at the point of connection between the water supply and the irrigation system, but before any irrigation system outlets, controls, or openings. This isolation in lieu of containment method of protection is permitted so that the customer can be protected from potential contamination by their own irrigation system. Under this scenario, the irrigation BPA serves as the JCSA's required containment BPA, and is therefore subject to all regulatory guidance directed by this program. All irrigation systems shall be installed and tested in accordance with this Backflow and Cross Connection Control Program.

A copy of the JCSA Backflow Assembly Test Report and a list of certified testers can be found at the end of this document, and at the JCSA website: [www.jamescitycountyva.gov/jcsa](http://www.jamescitycountyva.gov/jcsa) Customers shall inquire of the

proper State approved backflow inspection credentials of these testers, as certifications are subject to suspension and expiration. The results of the test shall be sent to [jcsa.bpatest@jamescitycountyva.gov](mailto:jcsa.bpatest@jamescitycountyva.gov) or:

James City Service Authority  
ATTN: Regulatory Compliance Office  
109 Tewning Road  
Williamsburg, VA 23188

## 5.7 Other Cross Connection Hazards

- 1) Fixture Inlets or Valve Outlets – with hose attachments, which may constitute a cross connection, shall be protected by the proper approved vacuum breaker (AVB, HBVB, etc.) installed at least 6 inches above the highest point of usage and located in the discharge side of the last valve. Fixtures with integral vacuum breaker manufactured as a unit may be installed in accordance with their approved requirements.
- 2) Air Conditioning Cooling Towers – Potable water inlet shall have an air gap separation of twice the inside diameter of the inlet line or a minimum of two inches above the flood rim.
- 3) Aspirators and Ejectors – Shall have an AVB or PVB, depending upon the degree of Hazard, on the faucet from which these devices are attached or operated.
- 4) Booster Pumps – All booster pumps shall be provided with a low suction pressure cut-off in accordance with 12 VAC 5-590-610D and 12 VAC 5-590-1050A3, unless other acceptable provisions are made to prevent the creation of low or negative pressures in the piping system.
- 5) Auxiliary Water Supplies (any source which is not under the control of the water system operator including but not limited to: wells, springs, and surface water sources such as ponds, lakes, rivers, reservoirs, etc.) – shall not enter a facility or structure, and shall not be interconnected with the JCSA potable water system.
- 6) Portable Spray and Cleaning Equipment – Any portable pressure spray or cleaning units that have the capability of connecting to any potable water system, and do not have a built-in approved air gap, shall be fitted with an RP or DCVA depending upon the degree of health hazard. Under no circumstances shall a hose connected to a domestic line be utilized without having at least the minimal protection provided by a functional hose bibb vacuum breaker.
- 7) Miscellaneous Use of Water from Fire Hydrants – The operation of a fire hydrant by anyone other than those authorized by the JCSA is prohibited. The JCSA may permit the use of water from a fire hydrant for construction or other purposes provided the applicant properly applies for, and adheres to backflow prevention requirements on hydrant permits. See the JCSA Regulations section on public fire hydrants for more information on hydrant meter usage requirements. The applicant must apply for, and adhere to the backflow requirements of the permit.

- 8) Drip Irrigation Systems – All irrigation systems must be separated from the JCSA potable water supply by a backflow prevention assembly. This includes drip irrigation systems that have hoses, pipes, or other parts of the system covered by soil, mulch, stones or other materials. Due to their high health hazard nature, they must have either a properly installed Pressure Vacuum Breaker assembly, correctly installed 12" above the highest system water outlet and piping, or a properly installed Reduced Pressure device (RP) located between system and the JCSA potable supply. AVB's, hose bib connections, and Dual Check devices are unacceptable for use in this situation. This is a high health risk, private water system, and must be adequately/appropriately protected.
- 9) Hose connections – Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type or pressure-type vacuum breaker or a permanently attached hose connection vacuum breaker.
- 10) Valves and outlets prohibited below grade – Potable water outlets and combination stop-and-waste valves shall not be installed underground or below grade. Standard freeze proof yard hydrants that drain the riser into the ground are considered to be stop and waste valves. An ASSE 1057 approved sanitary yard hydrant installed at the appropriate depth must be used if freeze protection is desired.
- 11) Heat Exchangers – Based on their degree of hazard, heat exchangers should have an air gap or RP assembly in the water supply pipe and should maintain a physical separation between the two fluids. Where a transfer fluid other than potable water is used, double-wall construction should be used in conjunction with the air gap or RP assembly. The opening between the double walls should be drained to the atmosphere.
- 12) Leaks – An unrepaired leak below ground which allows a potential for contamination to enter the JCSA water supply may also require the property owner to install and maintain an approved BPA at the service connection as required by the JCSA BP & CCC program.

**Note:** any device, equipment, or situation not covered by this cross connection policy, and which may constitute a potential health hazard, will be examined for appropriate disposition by the JCSA.

## **SECTION 6      TESTING OF BACKFLOW PREVENTERS**

At any premises where reduced pressure backflow prevention assemblies, double check valve assemblies, and pressure vacuum breakers are installed, it is the responsibility of the user to have thorough inspections and operational tests made once a year, or more often in those instances where it is deemed necessary. These inspections shall be at the expense of the consumer and be performed by a Commonwealth of Virginia certified BPDW. The JCSA will send an annual notification to the customer when tests are required and supply the necessary forms. The lack of a notification letter will not void the need to have the annual test and inspection performed as required. Each annual test and inspection date shall not exceed more than 12 months from the date of installation or previous test date. The forms can also be found at [www.jamescitycountyva.gov/backflow](http://www.jamescitycountyva.gov/backflow) and shall be completed and returned to the JCSA as required.

## **SECTION 7 CUSTOMER SURVEYS AND QUESTIONNAIRES**

Periodically, the JCSA may perform customer surveys by sending out questionnaires to inquire about water usage and to provide education to the customer about the hazards associated with backflow prevention and cross connections. The questionnaires will be random in nature and will contain the following:

- Owner and address of residence
- Occupant if different from owner
- Phone number
- Brief explanation of the program
- Brief explanation of causes of backflow and control measures
- Some likely cross connections:
  - a garden hose with its outlet submerged
  - kitchen sink spray hose with its spray head submerged
  - hand-held shower massager with its head submerged
  - garden hose used as an aspirator to spray soap or garden chemicals
  - spring, hot-tub, cistern, ponds, or swimming pool connected to the house water supply
  - water softeners improperly connected
- Specific questions which will include but not be limited to:
  - individual wells, springs or cisterns on the property
  - pressure booster pumps
  - water storage tanks
  - water treatment systems
  - outside hose bibs used in conjunction with:
    - chemical sprayers
    - power washers
    - swimming pools, hot tubs, saunas, etc.
    - lawn sprinkler and/or irrigation systems
  - utility sinks with hoses extending below sink rim
  - auto-filling animal watering bowls or troughs
- Existing cross connection control devices:
  - working properly (IE: leaking or noisy)
  - any modifications or repairs made
  - date of last test (if applicable)
  - any problems with hot water tank relief valve or faucet washers not lasting very long
- Also included with the questionnaire:
  - educational material
  - contact information for the Regulatory Compliance Office for questions or if contamination is ever suspected
  - a respond by date for the questionnaire

## **SECTION 8 APPENDIXES OF BACKFLOW TERMS AND REFERENCES**

Terms and references utilized in this document by the JCSA for the purpose of defining the scope and nature of backflow prevention were derived from: The American Waterworks Association text, *Recommended Practice for Backflow Prevention and Cross-Connection Control, Manual of Water Supply Practices, M-14, 4th Edition*; the 2015 International Plumbing Code; the University of Florida TREEO Center text, *Backflow Prevention Theory and Practice Manual, 3rd edition*; and the University of Southern California text, *Manual of Cross-Connection Control, 10th edition*. (All updated or newer editions of these stated reference materials will supersede and replace the editions previously listed). All material meets with EPA and the Commonwealth of Virginia Department of Health requirements.

The definitions listed below supersede all other terms and/or definitions to be found in JCSA literature. Those interested in further research can access the AWWA website at <https://www.awwa.org/>, the Environmental Protection Agency's website at <https://www.epa.gov/dwsixyearreview/drinking-water-distribution-systems> to access and download their cross-connection control manual, or the Commonwealth of Virginia Department of Health's Office of Drinking Water homepage at <http://www.vdh.virginia.gov/odw/>.

**AIR-GAP SEPARATION (AG):** The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet conveying water to a tank, plumbing fixture, receptor, or other assembly and the flood level rim of the receptacle. An approved air-gap separation shall be a distance of at least two (2) times the diameter of the supply pipe measured vertically above the top rim of the vessel – with a minimum distance of one (1) inch, using whichever measurement is greater.

**APPROVED:** Accepted as meeting the applicable specification of the James City Service Authority and approved by the Commonwealth of Virginia Waterworks Regulations, Uniform Statewide Building Code, and the International Plumbing Code.

**ATMOSPHERIC VACUUM BREAKER (AVB):** An approved device consisting of a check valve and an air inlet to relieve a vacuum. It shall effectively shut off the reverse flow of water when a negative pressure exists on the supply side of the device. (Note\* The JCSA does not approve of the use of AVB's on irrigation systems under any circumstances.)

**AUXILIARY WATER SUPPLY:** Any water supply on or available to the premises other than the purveyor's approved public potable water supply. These auxiliary waters may include water from a private nonpotable water supply or any natural source(s) such as a well, spring, river, stream, harbor, etc., or "used waters" or "industrial fluids". These waters may be contaminated or they may be objectionable, and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

**BACKFLOW:** The undesirable reversal of flow of water or other liquids, mixtures, or substances under pressure into the distribution pipes of a potable water supply system, as the result of a cross connection, from any source or sources other than its intended source.

**BACKFLOW PREVENTION DEVICE:** A backflow prevention device shall mean any effective device, method, or construction used to prevent backflow into a potable water system. The type of device used should depend on the degree of hazard, either existing or potential.

**BACKFLOW PREVENTION ASSEMBLY/DEVICE – APPROVED:** The term “approved backflow prevention assembly or device” are those that meet AWWA standards, and are approved by ASSE and the USC-FCCC (University of Southern California Foundation for Cross Connection Control and Hydraulic Research). NOTE: USC approval is specific to orientation, horizontal or vertical, device model number and size. Approvals are continuously verified and can be rescinded.

**BACKSIPHONAGE:** The backflow of a fluid or other liquids, mixtures, or substances into the distributing pipes of a potable water supply system by negative or reduced pressure from any source other than its intended source.

**BACKPRESSURE:** Any elevation of pressure in the downstream piping system (by pump, elevation of piping, or steam and/or air pressure) above the supply pressure at the point of consideration which may cause or tend to cause, reversal of the normal flow.

**CROSS CONNECTION CONTROL MANAGER:** The James City Service Regulatory Compliance Supervisor or as designated by the General Manager, JCSA.

**CONTAMINATION:** An impairment of the quality of the potable water by the introduction of any solid, liquid, or gaseous compounds or mixtures to a degree which would create an imminent danger to the public health, degrade the water quality and create a health hazard.

**CROSS CONNECTION:** Any physical or potential connection or arrangement of piping or fixtures between two otherwise separate piping systems, one of which contains potable water and the other non-potable water or industrial fluids of questionable safety, through which, or because of which, backflow or backsiphonage may occur into the potable water system. A water service connection between a public potable water distribution system and a customer’s water distribution system, which is cross-connected to a contaminated fixture, industrial fluid system or with potentially contaminated supply or auxiliary water system, constitutes one type of cross connection. Other substances may be gases, liquids, or solids, such as chemicals, wastes products, steam, water from sources (potable or nonpotable), or any matter that may change the color or add odor to the water.

**CROSS CONNECTION – CONTROLLED:** A connection between a potable water system and a nonpotable water 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.

**DOUBLE CHECK VALVE ASSEMBLY (DCVA):** An assembly composed of two single, internally loaded, independently acting, check valves, installed as a unit between two tightly closing resilient seated shutoff valves and fittings with properly located resilient seated test cocks. The check valve shall permit no leakage in a direction reverse to the normal flow. This assembly shall only be used to protect against a low non-health hazard.

**HAZARD-DEGREE OF:** The term “degree of hazard” is a qualification of what potential and actual harm may result from cross-connection within a water using facility. Establishing the degree of hazard is directly related to the type and toxicity of contaminants that could feasibly enter the public water supply system and is determined by the James City Service Authority Cross Connection Control Manager.



**HAZARD–HEALTH.** A cross connection or potential cross connection involving any substance which could, if introduced into the potable water supply, cause death or illness, spread disease, or have a high probability of causing such effects.

**HAZARD–PLUMBING.** A plumbing-type cross connection in a consumer's potable water system that has not been properly protected by an approved air gap or an approved backflow prevention assembly.

**HAZARD–NON-SYSTEM.** A cross connection or potential cross connection involving any substance that generally would not be a health hazard but would constitute a nuisance or be aesthetically objectionable, if introduced into the potable water supply.

**HAZARD–SYSTEM.** An actual or potential threat of severe damage to the physical properties of the public potable water system or the consumer's potable water system or of a pollution or contamination that would have a protracted effect on the quality of the potable water in the system.

**INDUSTRIAL FLUIDS SYSTEM:** Any system containing a fluid or solution that may be biologically, chemically, or otherwise contaminated or polluted in a form or concentration, such as would constitute a health, system, pollution, or plumbing hazard, if introduced into an approved water supply. This may include, but not limited to, polluted or contaminated waters; all types of process waters and used waters originating from the public water system that may have deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalies; circulating cooling towers 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 wells, springs, streams, rivers, bays, harbors, irrigation systems, and so forth; oils, gases, glycerin, paraffin, caustic or acid solutions, and other liquid and gaseous solutions used in industrial or other purposes for fire-fighting purposes.

**REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY (RP):** The approved reduced pressure principle backflow prevention assembly consists of two independently acting, approved check valves, together with a hydraulically operating pressure differential relief valve located between the two check valves, and below the first valve. The first check valve reduces the supply pressure a predetermined amount so that during normal flow and at cessation of normal flow the pressure between the check valves shall be less than the supply pressure. In case of leakage of either check valve, the differential relief valve, by discharging to atmosphere, shall operate to maintain the pressure between the check valves less than the supply pressure. The unit shall include tightly closed shut-off valves located at each end of the device, and each device shall be fitted with properly located test clocks.

**PRESSURE VACUUM BREAKER ASSEMBLY (PVB):** A pressure vacuum breaker is similar to an atmospheric vacuum breaker except that the checking unit "poppet valve" is activated by a spring. This type of vacuum breaker does not require a negative pressure to react and can be used on a pressure side of a valve.

**WATER PURVEYOR / WATER SYSTEM OPERATOR:** The James City Service Authority. As used herein the terms water purveyor, water system operator and James City Service Authority may be used synonymously.

**WATER SYSTEM – CUSTOMER’S:** The term “customer’s water system” shall include any water system located on the customer’s premises, whether supplied by a public potable water system or an auxiliary water supply. The system or systems may be either a potable water system or an industrial piping system.

**WATER-USED:** Any water supplied by the James City Service Authority water system to a customer’s water system after it has passed through the point of delivery and is no longer under the sanitary control of the Service Authority.

**ABBREVIATIONS UTILIZED:**

AG	Air Gap
AVB	Atmospheric Vacuum Breaker
ASSE	American Society of Sanitary Engineering
AWWA	American Water Works Association
BPA	Backflow Prevention Assembly
BP & CCC	Backflow Prevention & Cross Connection Control
BPDW	Backflow Prevention Device Worker
DCVA	Double Check Valve Assembly
DPOR	Virginia Department of Professional and Occupational Regulations
HBVB	Hose Bibb Vacuum Breaker/Hose Connection Vacuum Breaker
HVAC	Heating, Venting, and Air Conditioning
IPC	International Plumbing Code
JCSA	James City Service Authority
PVB	Pressure Vacuum Breaker
RP, RPA, RPZ	Reduced Pressure Principle Backflow Prevention Assembly
RPDA	Reduced Pressure Detector Assembly
USBC	Uniform Statewide Building Code
USC-FCCC	University of Southern California Foundation for Cross Connection Control & Hydraulic Research
VAC	Virginia Administrative Code
VDH	Virginia Department of Health

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## Appendix A – Testers List and BPA Test Form

### **List for Testing Backflow Preventers**

JCSA offers the following list and information to our customers only as a convenient reference list and may not be all inclusive of DPOR certified testers in the local region.

The JCSA does not endorse, guarantee, or warrant any work performed by contractors listed here. All interactions between customers and contractors are private business transactions between these two entities.

**PLEASE SEE ADDITIONAL INFORMATION ON PAGE 2**

<b><u>NAME</u></b>	<b><u>PHONE</u></b>	<b><u>ADDRESS</u></b>	<b><u>CITY &amp; STATE</u></b>	<b><u>ZIP</u></b>
Colonial Backflow Preventers, Inc	603-1244	115 Colonial Ave.	Williamsburg, VA	23185
Colonial Gardens	565-3648	320 Ewell Rd	Williamsburg, VA	23188
Delightful Gardens Landscape Co.	253-1933	7242 Merrimac Trail	Williamsburg, VA	23188
Plumb Perfection	(757)204-1415	P.O. Box 5363	Williamsburg, VA	23188
River Oaks Landscape Co.	220-0099	P.O. Box 3676	Williamsburg, VA	23187
Irrigation Doctor Ltd.	790-9137	P.O. Box 467	Lightfoot, VA	23090
Williamsburg Irrigation	291-9892	1221 Colony Trail	Lanexa, VA	23089
World Wynne Plumbing, LLC	358-8867	2915 Snuggles Court	Toano, VA	23168
Atlantic Constructors, Inc	926-4567	6163 Jefferson Ave, Unit B	Newport News, VA	23605
Clean Slate Commercial	897-8901	864 Elder Rd	Newport News, VA	23608
Colonial Webb Contractors	855-3006	740C Blue Crab Rd	Newport News, VA	23606
Knight-Scapes LLC	898-3053	143 Herman Melville Ave	Newport News, VA	23606
Mason & Son Plumbing & Heating	596-5166	13646 Warwick Blvd.	Newport News, VA	23602
National Turf Irrigation	873-2424	11843 Tugboat Lane	Newport News, VA	23606
Peninsula Lawn Sprinkler	928-2619	60 Patton Drive	Newport News, VA	23606
Ziegler Plumbing	877-2054	15324 A Warwick Blvd.	Newport News, VA	23602
Hampton Rds Irrigation & Landscape	877-3748	2413 Wolf Trap Rd, Suite 1	Yorktown, VA	23692
Kenny's Plumbing & Mechanical	243-8308	P.O. Box 2562	Yorktown, VA	23692
Just Plumbing	877-8540	325 Redoubt Rd/P.O. Box 1548	Yorktown, VA	23692
Southwell Irrigation LLC	846-6012	P.O. Box 2022	Yorktown, VA	23692
Aqua Pro Irrigation	(757)739-3228	P.O. Box 1400	Gloucester Point, VA	23062
Backflow Services	565-3648	7992 Sunset Drive	Hayes, VA	23072
Blau Plumbing & Heating	722-1858	1905 Hurst Drive	Hampton, VA	23663
Chris Plumbing & Backflow Co.	325-7191	760 E. Little Back River Rd.	Hampton, VA	23669
Landscapes by Eric Bailey	358-2101	101 Aberdeen Road	Hampton, VA	23669
April Showers, Inc.	875-0105	14296 John Clayton Memorial Highway	North VA	23128
A. B. Parker & Son	587-0316	814 Norman Avenue	Norfolk, VA	23518
Beasley Backflow Service	583-5434	412 Dune Street	Norfolk, VA	23503
McCoy Plumbing & Heating, Inc.	461-3550	5121 E. VA Beach Blvd., #C-1	Norfolk, VA	23502
Raindrop Irrigation, Inc	(804)921-7515	9315 Shelton Pointe Drive	Mechanicsville, VA	23116
Checkmark Services Company LLC	(804)586-3367	17501 Thornwood Lane	S. Chesterfield, VA	23803
Stemmle Plumbing Repair, Inc	(804)744-6401	P.O. Box 35680	Richmond, VA	23235
Fire & Life Safety America	485-7486	804 Port Center Parkway	Portsmouth, VA	23704
VA H2O Leaks Inc	675-9143	P.O. Box 6733	Portsmouth, VA	23703
Lanthorn Const & Plumbing LLC	729-4775	1708 Pitchkettle Rd	Suffolk, VA	23434
S & M Pump and Well	986-2213	5151 Carolina Rd	Suffolk, VA	23434
Eagle Fire Inc.	(804)743-2500	7459 White Pine Rd	North Chesterfield, VA	23237
Richmond Sprinkler Company	(804)275-6800	7628 White Pine Rd	North Chesterfield, VA	23237
AAA Backflow Prevention	560-6726	509 Bonsack Court	Chesapeake, VA	23322
Coastal Fire Protection	488-8471	921-A Corporate Lane	Chesapeake, VA	23320
Fire Tech Services, Inc.	523-7330	820 Greenbrier Circle, Suite 9	Chesapeake, VA	23320
Heads Up Sprinkler Systems, Inc.	485-7353	3716 Cook Blvd	Chesapeake, VA	23324
John D. Lucey & Son Plbg. & Htg.	543-9441	3203 Bainbridge Blvd.	Chesapeake, VA	23324
Mid Atlantic Fire Protection Inc.	455-8888	5596 Greenwich Rd	VA Beach, VA	23462
Virginia Backflow Service	635-3001	P.O. Box 62751	VA Beach, VA	23466
VSC Fire & Security, Inc.	213-3660	1417 Miller Store Rd, Suite C	VA Beach, VA	23455
Riley Fire Protection, LLC	(804)335-8257	P.O. Box 1150	Goochland, VA	23063
Backflow Test Pro, LLC	(804)873-8061	3348 Medway Lane	Powhatan, VA	23139
Collier Companies	(804)378-1414	1500 Oakbridge Terrace	Powhatan, VA	23139
Anytime Plumbing	(410)300-5375	7906 Spring Manor Drive	Greenbelt, Maryland	20770

\*\*\* Please see next page for additional information \*\*\*

- **Only Commonwealth of Virginia Department of Professional & Occupational Regulation (DPOR) certified backflow device workers may test backflow preventers in the JCSA Service Area.** Other licensed backflow contractors, not listed, may also test backflow preventers provided they are VA DPOR certified. The JCSA does not accept backflow testing certifications issued by local municipalities.
- **Backflow Preventer test are required annually and the test results are to be recorded on the JCSA test form(s) and original is to be returned to the address supplied on the test form.** JCSA Backflow Prevention Assembly Test Forms and the most current list of certified testers are also available on the Internet at: [www.jamescitycountyva.gov/jcsa](http://www.jamescitycountyva.gov/jcsa) (utilizing the links below the "Program Summary").
- Please include the **customer's address and phone number or email address** on each test form.
- The JCSA highly recommends that whenever customers prepare to hire someone to test their assemblies they should inquire of the proper State DPOR approved backflow inspection credentials of those being considered as certifications are subject to suspension, revocation and expiration. Approved testers will have a 10 digit certification number beginning with the numbers 2717 issued by the DPOR (EX: 2717XXXXXX). Customers may also check the current status of the contractor's license at the Commonwealth's DPOR website (click on "License Lookup" at [www.dpor.virginia.gov](http://www.dpor.virginia.gov)) or by calling (804) 367-8511.
- Virginia licensed backflow testing contractors with the appropriate credentials for testing backflow prevention assemblies, whom are interested in being listed here should contact the Cross Connection Control Manager for the JCSA, at (757) 259-4138.

IF THIS IS A NEW INSTALLATION PLEASE ENTER PLUMBING PERMIT# \_\_\_\_\_



### Backflow Assembly Test Report

Mail original completed form, one for each assembly, to:  
JAMES CITY SERVICE AUTHORITY  
Regulatory Compliance Office  
Attention: Cross Connection Control Manager  
109 Tewning Road, Williamsburg, Virginia 23188 (757) 259-5417  
Reports may be emailed to: [jcsa.bpatest@jamescitycountyva.gov](mailto:jcsa.bpatest@jamescitycountyva.gov)

Name of Homeowner or Premises: \_\_\_\_\_  
Service Address: \_\_\_\_\_  
Mailing Address:(if different) \_\_\_\_\_

Use and location of the assembly: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Model : \_\_\_\_\_  
Serial #: \_\_\_\_\_ Size: \_\_\_\_\_  
Line pressure at time of test: \_\_\_\_\_

New Installation  Replacement Assembly  Existing Assembly  Retest?   
RPA/RPDA  DCVA/DCDA  PVB  SVB

Check Valve #1	Check Valve #2	Differential Pressure Relief Valve	Pressure Vacuum Breaker
<input type="checkbox"/> Leaked <input type="checkbox"/> Closed Tight	<input type="checkbox"/> Leaked <input type="checkbox"/> Closed Tight	Opened at _____ PSI <input type="checkbox"/> Did Not Open	Air Inlet opened at _____ PSI <input type="checkbox"/> Did Not Open
Drop Across CV #1 _____ PSI	Drop Across CV #2 _____ PSI	Buffer _____ PSI	Check Valve _____ PSI <input type="checkbox"/> Leaked

Condition of outlet control valve: Closed Tight  Leaking

Remarks: \_\_\_\_\_

**CERTIFICATION: I have completed the above test and hereby certify that this backflow device performed satisfactorily and meets all Federal, State, and local codes and regulations as required.**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Tester Certification #: \_\_\_\_\_

Name of Tester (Print): \_\_\_\_\_

Company Name: \_\_\_\_\_ Company Telephone: \_\_\_\_\_

Signature of Tester: \_\_\_\_\_

Gauge Manufacturer and Model: \_\_\_\_\_ Serial #: \_\_\_\_\_

Date of Last Calibration of Test Gauges: \_\_\_\_\_

**THIS ASSEMBLY TEST:** PASSED  FAILED

Appendix B – Request for Waiver

JCSA Backflow Prevention & Cross Connection Control Program  
Waiver Request for Alternate BPA Installation Location

Applicant: \_\_\_\_\_ Telephone No: \_\_\_\_\_

Installation Address: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

Project information (if applicable):

Project Name: \_\_\_\_\_ Project No: \_\_\_\_\_

Project Location: \_\_\_\_\_

Project Engineer: \_\_\_\_\_ Telephone No: \_\_\_\_\_

Detailed description of waiver request (attach drawing if applicable):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Justification / Reason for Request:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

By submitting this request, the undersigned accepts the risk associated with an interior installed RP backflow prevention assembly, and as such, the JCSA shall be indemnified and held harmless for any flooding or moisture damages resulting from locating the RP backflow prevention assembly in the interior of the building.

\_\_\_\_\_  
Property Owner: Print

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

JCSA Cross Connection Control Comments:

\_\_\_\_\_  
\_\_\_\_\_

JCSA Plan Review Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_ Approved \_\_\_ Disapproved

\_\_\_\_\_  
General Manager

\_\_\_\_\_  
Date

Appendix C - BPA Installation Property Owner Acknowledgement Form

Acknowledgement by Property Owner of the James City Service Authority's backflow prevention assembly installation requirement:

To meet the requirements of the Virginia Department of Health's Waterworks Regulations, the James City Service Authority (JCSA) operates a full containment program for commercial properties in regards to backflow prevention and cross connection control. This program has been in effect since 2008, and helps to ensure the highest level of safety and security for our water distribution system. This program has required that a backflow prevention assembly (BPA) be installed for all newly constructed commercial properties when the building was constructed, and under the program's guidelines, existing properties that were built prior to 2008 are to bring their properties up to this level of protection when submitting a permit application. The undersigned acknowledges that they will be required to install a service line protection BPA as directed by Section 5 of the JCSA's Backflow Prevention and Cross Connection Control Program. Additionally, the Property Owner shall contact the JCSA Regulatory Compliance Office at (757) 259-4138 within 90 days of this acknowledgment to clarify the proper type and location for the BPA, and to discuss any additional inquiries about the installation. Approval criteria for the BPA can be found in Section 5 of the JCSA's Backflow Prevention and Cross Connection Control Program which can be reviewed online at: [www.jamescitycountyva.gov/backflow](http://www.jamescitycountyva.gov/backflow)

This signed form from the Owner acknowledging this requirement shall be sent to:

Doug Powell, JCSA General Manager  
Attention: Plan Review  
119 Tewning Road  
Williamsburg, VA 23188

Alternatively, it may be sent via email to: [JCSA@JamesCityCountyVA.gov](mailto:JCSA@JamesCityCountyVA.gov)

Installation Address: \_\_\_\_\_

Permit Number: \_\_\_\_\_

Property Owner: Print

Signature

Date