

COMMUNITY WATERWORKS**MODEL ORDINANCE****CROSS CONNECTION CONTROL****I. Purpose of the Ordinance**

Purpose of this ordinance is to abate or control actual or potential cross connections and protect the public health. This ordinance provides for establishment and enforcement of a program of cross connection control and backflow prevention in accordance with the Commonwealth of Virginia, State Board of Health, *Waterworks Regulations* 1995, or as amended. **THIS ORDINANCE IS DIRECTED AT SERVICE LINE PROTECTION (CONTAINMENT).**

II. Authority for Ordinance

Commonwealth of Virginia, Department of Health
Waterworks Regulations, Part II, Article 3:
Cross Connection Control and Backflow Prevention in Waterworks

III. Administration of the Ordinance

- A. The ____ (**Note 1**) shall administer and enforce the provisions of this ordinance under the direction of the (**Town Manager, County Administrator, Mayor, or other chief administrative officer**).
- B. It shall be the duty of the ____ (**Note 1**) to cause assessment to be made of properties served by the waterworks where cross connection with the waterworks is deemed possible. The method of determining potential cross connection with the waterworks and the administrative procedures shall be established by the ____ (**Note 1**) in a Cross Connection Control Program (Program) approved by the Commonwealth of Virginia, Department of Health, Division of Water Supply Engineering.
- C. The responsibility to carry out the Program lies with ____ (**Note 2**).

IV. Enforcement of the Ordinance

- A. Upon request, the owner or occupants of property served shall furnish to the ____ (**Note 2**) pertinent information regarding the consumer's water supply system or systems on such property for the purpose of

assessing the consumer's water supply system for cross connection hazards and determining the degree of hazard, if any. The refusal of such information, when requested, shall be deemed evidence of the presence of a high degree of hazard cross connection.

B. Notice of Violation

Any consumer's water supply system owner found to be in violation of any provision of this ordinance shall be served a written notice of violation sent certified mail to the consumer's 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 date of receipt of the notice of violation, to bring the consumer's water supply system into compliance with this ordinance or have water service terminated.

C. Penalties

Any owner of properties served by a connection to the waterworks found guilty of violating any of the provisions of this ordinance, or any written order of the **(Town Manager, County Administrator, Mayor, or other chief administrative officer)** in pursuance thereof, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not less than **(\$____)** or more than **(\$____)** for each violation. Each day upon which a violation of the provisions of this act shall occur shall be deemed a separate and additional violation for the purposes of this ordinance.

V. Responsibilities of the Town of _____(Note 3), _____ (Note 1), and _____ (Note 2)

Effective cross connection control and backflow prevention requires the cooperation of the **Town of _____(Note 3), _____ (Note 1), _____ (Note 2)**, the owner(s) of the property served, the Local Building Official **(Note 4)** and the backflow prevention device tester.

A. The Program shall be carried out in accordance with the Commonwealth of Virginia, State Board of Health, *Waterworks Regulations* and shall as a minimum provide containment of potential contaminants at the consumer's service connection.

B. The **Town of _____** has full responsibility for water quality and for the construction, maintenance and operation of the waterworks beginning at the water source and ending at the service connection.

- C. The owner of the property served and the **Town of _____** have shared responsibility for water quality and for the construction, maintenance, and operation of the consumer's water supply system from the service connection to the free flowing outlet.
- D. The _____ **(Note 1)** shall, to the extent of their jurisdiction, provide continuing identification and evaluation of all cross connection hazards. This shall include an assessment of each consumer's water supply system for cross connections to be followed by the requirement, if necessary, of installation of a backflow prevention assembly, device, or separation. Assessments shall be performed at least annually.
- E. In the event of the backflow of pollution or contamination into the waterworks, the _____ **(Note 1)** shall promptly take or cause corrective action to confine and eliminate the pollution or contamination. The _____ **(Note 1)** shall report to the appropriate Commonwealth of Virginia, Department of Health, Office of Water Programs Field Office in the most expeditious manner (usually by telephone) when backflow occurs and shall submit a written report by the 10th day of the month following the month during which backflow occurred addressing the incident, its causes, effects, and preventative or control measures required or taken.
- F. The _____ **(Note 1)** shall take positive action to ensure that the waterworks is adequately protected from cross connections and backflow at all times. If a cross connection exists or backflow occurs into a consumer's water supply system or into the waterworks or if the consumer's water supply system causes the pressure in the waterworks to be lowered below 10 psi gauge, the _____ **(Note 1)** may discontinue the water service to the consumer and water service shall not be restored until the deficiencies have been corrected or eliminated to the satisfaction of the _____ **(Note 1)**.
- G. In order to protect the occupants of a premises, _____ **(Note 2)** should inform the consumer's water supply system owner(s) of any actual or potential cross connection beyond the service connection that should be abated or controlled by application of an appropriate backflow prevention assembly, device, or separation. Appropriate backflow prevention assembly, device, or separation should be applied at each point-of-use and/or applied to the consumer's water supply system, isolating an area which may be a health or pollutional hazard to the consumer's water supply system or to the waterworks.

- H. Records of backflow prevention assemblies, devices, separations, and consumer's water supply systems, including inspection records, records of backflow incidents, and records of device tests shall be maintained by _____ **(Note 1)** for ten years.

VI. Responsibilities of the Consumer's Water Supply System Owner

- A. The consumer's water supply system owner(s), at their own expense, shall install, operate, test, and maintain required backflow prevention assemblies, devices or backflow prevention by separations.
- B. The consumer's water supply system owner(s) shall provide copies of test results, maintenance records, and overhaul records to the _____ **(Note 1)** within 30 days of completion of testing or work. Such testing or work shall have been performed by individuals, which have been certified under the Commonwealth of Virginia, Department of Professional and Occupational Regulation, Board for Contractors, Backflow Prevention Device Worker Certification program.
- C. All new residential service connections shall be fitted with a residential dual check (ASSE #1024). **(Note 6, residential containment is optional).**
- D. All existing residential service connections shall be fitted with a residential dual check (ASSE #1024) by (date)____ **(Note 8 for location of device).**

VII. Preventative and Control Measures for Containment

- A. Service Line Protection

A backflow prevention assembly or separation shall be installed at the service connection to a consumer's water supply system where, in the judgment of the _____ **(Note 1)** a health or pollutional hazard to the consumer's water supply system or to the waterworks exists or may exist unless such hazards are abated or controlled to the satisfaction of the _____ **(Note 1)**

- B. Special Conditions

1. When, as a matter of practicality, the backflow prevention assembly or separation cannot be installed at the service connection, the assembly or separation may be located

downstream of the service connection but prior to any unprotected takeoffs.

2. Where all actual or potential cross connections can be easily correctable at each point-of-use and where the consumer's water supply system is not intricate or complex, point-of-use isolation protection by application of an appropriate backflow prevention assembly, device, or backflow prevention by separation may be used at each point-of-use in lieu of installing a containment device at the service connection.
- C. A backflow prevention assembly or backflow prevention by separation shall be installed at each service connection to a consumer's water supply system serving premises where any of the following conditions exist:
1. Premises on which any substance is handled in such a manner as to create an actual or potential hazard to a waterworks (this shall include premises having auxiliary water systems or having sources or systems containing process fluids or waters originating from a waterworks which are no longer under the control of the waterworks owner).
 2. Premises having internal cross connections that, in the judgment of the _____ **(Note 1)** may not be easily correctable or having intricate plumbing arrangements that make it impracticable to determine whether or not cross connections exist.
 3. Premises where, because of security requirements or other prohibitions or restrictions, it is impossible or impractical to make an evaluation of all cross connection hazards.
 4. Premises having a repeated history of cross connections being established or reestablished.
 5. Other premises specified by the _____ **(Note 1)** where cause can be shown that a potential cross connection hazard not enumerated above exists.
- D. Premises having booster pumps or fire pumps connected to the waterworks shall have the pumps equipped with a pressure sensing device to shut off or regulate the flow from the booster pump when the pressure in the waterworks drops to a minimum of 10 psi gauge at the service connection.

- E. An approved backflow prevention assembly or backflow prevention by separation shall be installed at each service connection to a consumer's water supply system or installed under Special Conditions, Section VII.B. serving, but not necessarily limited to, the following types of facilities:
1. Hospitals, mortuaries, clinics, veterinary establishments, nursing homes, dental offices and medical buildings;
 2. Laboratories;
 3. Piers, docks, waterfront facilities;
 4. Sewage treatment plants, sewage pumping stations, or storm water pumping stations;
 5. Food and beverage processing plants;
 6. Chemical plants, dyeing plants and pharmaceutical plants;
 7. Metal plating industries;
 8. Petroleum or natural gas processing or storage plants;
 9. Radioactive materials processing plants or nuclear reactors;
 10. Car washes and laundries;
 11. Lawn sprinkler systems, irrigation systems;
 12. Fire service systems;
 13. Slaughter houses and poultry processing plants;
 14. Farms where the water is used for other than household purposes;
 15. Commercial greenhouses and nurseries;
 16. Health clubs with swimming pools, therapeutic baths, hot tubs or saunas;
 17. Paper and paper products plants and printing plants;

18. Pesticide or exterminating companies and their vehicles with storage or mixing tanks;
 19. Schools or colleges with laboratory facilities;
 20. High-rise buildings (4 or more stories);
 21. Multi-use commercial, office, or warehouse facilities;
 22. High density, multi-use residential complexes served through a master meter.
 22. Others specified by the _____ **(Note 1)** when reasonable cause can be shown for a potential backflow or cross connection hazard.
- F. Where lawn sprinkler systems, irrigation systems or fire service systems are connected directly to the waterworks with a separate service connection, a backflow prevention assembly or backflow prevention by separation shall be installed at the service connection or installed under Special Conditions, Section VII.B.1.

VIII. Type of Protection Required

The type of protection required shall depend on the degree of hazard, which exists or may exist.

The degree of hazard, either high, moderate, or low, is based on the nature of the contaminant; the potential health hazard; the probability of the backflow occurrence; the method of backflow either by backpressure or by backsiphonage; and the potential effect on waterworks structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water.

Table 1 shall be used as a guide to determine the degree of hazard for any situation.

- A. An air gap or physical disconnection gives the highest degree of protection and shall be used whenever practical to do so in high hazard situations subject to backpressure.
- B. An air gap, physical disconnection and a reduced pressure principle backflow prevention device will protect against backpressure when operating properly.

- C. Pressure vacuum breakers will not protect against backpressure, but will protect against backsiphonage when operating properly. Pressure vacuum breakers may be used in low, moderate or high hazard situations subject to backsiphonage only.
- D. A double gate - double check valve assembly shall not be used in high hazard situations.
- E. Backflow prevention devices consisting of dual independent check valves with or without an intermediate atmospheric vent shall only be used in low hazard situations.
- F. Barometric loops are not acceptable.
- G. Interchangeable connections or changeover devices are not acceptable.

IX. Backflow Prevention Assemblies and Backflow Prevention by Separation for Containment

- A. Backflow prevention assemblies for containment include the reduced pressure principle backflow prevention assembly, the double gate - double check valve assembly, and the pressure vacuum breaker assembly.
- B. Backflow prevention by separation shall be an air gap or physical disconnection. The minimum air gap shall be twice the effective opening of a potable water outlet unless the outlet is a distance less than three times the effective opening away from a wall or similar vertical surface, in which case the minimum air gap shall be three times the effective opening of the outlet. In no case shall the minimum air gap be less than one inch.
- C. Backflow prevention assemblies shall be of the approved type and shall comply with the most recent American Water Works Association Standards and shall be approved for containment by the University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research.
- D. Backflow prevention assemblies shall be installed in a manner approved by the _____ **(Note 1)** and in accordance with the University of Southern California, Foundation for Cross-Connection Control and Hydraulic Research recommendations and the manufacturer's installation instructions. Vertical or horizontal positioning shall be as approved by the University of Southern

California, Foundation for Cross-Connection Control and Hydraulic Research.

- E. Existing backflow prevention assemblies approved by the _____ **(Note 1)** prior to the effective date of this ordinance shall, except for inspection, testing, and maintenance requirements, be excluded from the requirements of Section IX. C. and D. if the _____ **(Note 1)** is assured that the devices will protect the waterworks.
- F. For the purpose of application to Special Conditions, Section VII.B.2., point-of-use isolation assemblies, devices, or separations shall be as specified by the _____ **(Note 1)** where reasonable assurance can be shown that the assembly, device, or separation will protect the waterworks. As a minimum, point-of-use devices should bear an appropriate American Society of Sanitary Engineering Standard Number. See the Cross Connection Control Program, Appendix A, for Isolation Device Application.
- G. Backflow prevention assemblies or devices with openings, outlets, or vents that are designed to operate or open during backflow prevention shall not be installed in pits or areas subject to flooding nor shall they be installed in such a manner to allow submergence.

X. Maintenance and Inspection Requirements

- A. It shall be the responsibility of the consumer's water supply system owner(s) to maintain all backflow prevention devices or separations installed in accordance with Section VII in good working order and to make no piping or other arrangements for the purpose of bypassing or defeating backflow prevention devices or separations.
- B. Operational testing and inspection schedules shall be established by the _____ **(Note 1)** as outlined in the Cross Connection Control Program for all backflow prevention assemblies, devices, and separations which are installed at the service connection or installed under Special Conditions, Section VII. The interval between testing and inspection of each assembly, device, or separation shall be established in accordance with the age and condition of the assembly, device or separation and the assembly or device manufacturer's recommendations. Backflow prevention assembly, device, and separation inspection and testing intervals shall not exceed 1 year.

- C. Backflow prevention assembly and device overhaul procedures and replacement parts shall be in accordance with the manufacturer's recommendations.
- D. Backflow prevention assembly testing procedures shall be in accordance with the American Society of Sanitary Engineering, Professional Qualification Standards, Backflow Prevention Assemblies - Series 5000 instructions.

XI. Definitions

Air Gap — means the unobstructed vertical distance through the free atmosphere between the lowest point of the potable water outlet and the flood level rim of the receiving vessel.

Auxiliary water system - means any water system on or available to the premises other than the waterworks. These auxiliary waters may include water from a source such as wells, lakes, or streams. They may be polluted, contaminated, objectionable, or of questionable quality, or constitute an unapproved water source or system over which the owner does not have control

Backflow — means the reversed flow of nonpotable water or other liquids, mixtures, or substances of questionable quality into a waterworks.

Backflow Prevention Assembly - means a mechanical unit, designed to stop the reversal of flow, which includes an inlet and outlet shut-off valve and test cocks to facilitate testing of the assembly. Backflow prevention assemblies include the reduced pressure principle backflow prevention assembly, double gate-double check valve assembly, and the pressure vacuum breaker assembly.

Backflow Prevention Device - means a mechanical unit designed to stop the reversal of flow, which is not testable because it does not have inlet and outlet shut-off valves or test cocks. Backflow prevention devices are not generally designed or constructed to withstand significant backpressure. Backflow prevention devices generally include the atmospheric type vacuum breakers and the dual check valve type devices.

Backflow Elimination Method - means the air gap separation or physical disconnection, which will eliminate the cross connection.

Backpressure Backflow — means backflow caused by pressure in the downstream piping which is superior to the supply pressure at the point of consideration.

Backsiphonage Backflow — means backflow caused by a reduction in pressure which causes a partial vacuum creating a siphon effect.

Consumer — means person who drinks water from a waterworks.

Consumer's Water Supply System ("Consumer's System") — means the water service pipe, water distributing pipes, and necessary connecting pipes, fittings, control valves, and all appurtenances in or adjacent to the building or premises.

Containment — means the safeguard against backflow into a waterworks from a consumer's water supply system by a backflow prevention assembly or backflow elimination method at the service connection.

Contaminant — means any objectionable or hazardous physical, chemical, biological, or radiological substance or matter in water.

Cross Connection — means any actual or potential link, connection, or physical arrangement, direct or indirect, between used water, an auxiliary water system, or other source of contamination and the waterworks whereby backflow can occur.

Degree of Hazard — means either a high, moderate or low hazard based on the nature of the contaminant; the potential health hazard; the probability of the backflow occurrence; the method of backflow either by backpressure or by backsiphonage; and the potential effect on waterworks structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water.

Distribution Main — means a water main whose primary purpose is to provide treated water to service connections.

Division — means the Commonwealth of Virginia, Virginia Department of Health, Office of Water Programs, Division of Water Supply Engineering.

Domestic Use or Usage — means normal family or household use, including drinking, laundering, bathing, cooking, heating, cleaning and flushing toilets (see Appendix A for Title 32.1, Article 2, *Code of Virginia*, 1950, as amended).

Double Gate-Double Check Valve Assembly — means an approved assembly designed to prevent backsiphonage or backpressure backflow and used for moderate or low hazard situations, composed of two independently operating, spring-loaded check valves, tightly closing shutoff valves located at each end of the assembly and fitted with properly located test cocks.

Entry Point — means the place where water from the source is delivered to the distribution system.

Health Hazard — means any condition, device, or practice in a waterworks or its operation that creates, or may create, a danger to the health and well being of the water consumer.

Isolation — means the safeguard against backflow into a waterworks from a consumer's water supply system by installing an appropriate backflow prevention assembly or device or by a backflow elimination method at the sources of potential contamination in the consumer's water supply system. This is also called point-of-use isolation. Isolation of an area or zone within a consumer's water supply system confines the potential source of contamination to a specific area or zone. This is called area or zone isolation.

Maximum Contaminant Level — means the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a waterworks, except in the cases of turbidity and VOCs, where the maximum permissible level is measured at each entry point to the distribution system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition. Maximum contaminant levels may be either "primary" (PMCL) meaning based on health considerations or "secondary" (SMCL) meaning based on aesthetic considerations.

Plumbing Fixture — means a receptacle or device which is either permanently or temporarily connected to the water distribution system of the premises, and demands a supply of water therefrom; or discharges used water, waste materials, or sewage either directly or indirectly to the drainage system of the premises; or requires both a water supply connection and a discharge to the drainage system of the premises.

Pollution — means the presence of any foreign substance (chemical, physical, radiological, or biological) in water that tends to degrade its

quality so as to constitute an unnecessary risk or impair the usefulness of the water.

Pollution Hazard — means a condition through which an aesthetically objectionable or degrading material may enter the waterworks or a consumer's water system.

Physical Disconnection - means the removal or absence of pipes, fittings, or fixtures that connect a waterworks directly or indirectly to a nonpotable system or one of questionable quality.

Premises — means a piece of real estate; house or building and its land.

Pressure Vacuum Breaker Assembly — means an approved assembly designed to prevent backsiphonage backflow and used for high, moderate, or low hazard situations, composed of an independently operating, spring-loaded check valve; an independently operating, spring-loaded air-inlet valve; tightly closing shutoff valves located at each end of the assembly; and fitted with properly located test cocks.

Process Fluids — means any kind of fluid or solution which may be chemically, biologically, or otherwise contaminated or polluted which would constitute a health, pollutional, or system hazard if introduced into the waterworks. This includes, but is not limited to:

1. Polluted or contaminated water,
2. Process waters,
3. Used waters,
4. Cooling waters,
5. Contaminated natural waters taken from wells, lakes, streams, or irrigation systems,
6. Chemicals in solution or suspension, and
7. Oils, gases, acids, alkalis, and other liquid and gaseous fluid used in industrial or other processes

Pure Water or Potable Water — means water fit for human consumption and domestic use which is sanitary and normally free of minerals, organic substances, and toxic agents in excess of reasonable amounts for domestic

usage in the area served and normally adequate in quantity and quality for the minimum health requirements of the persons served.

Reduced Pressure Principle Backflow Prevention Assembly (RPZ assembly) — means an approved assembly designed to prevent backsiphonage or backpressure backflow used for high, moderate, or low hazard situations, composed of a minimum of two independently operating, spring-loaded check valves together with an independent, hydraulically operating pressure differential relief valve located between the two check valves. During normal flow and at the cessation of normal flow, the pressure between these two checks shall be less than the supply pressure. The assembly must include tightly closing shutoff valves located at each end of the assembly and be fitted with properly located test cocks.

Service Connection — means the point of delivery of water to a consumer's water supply system, fire protection system, or irrigation system and to all temporary or emergency water service connections as follows:

1. If a meter is installed, the service connection is the downstream side of the meter;
2. If a meter is not installed, the service connection is the point of connection to the waterworks;
3. When the water purveyor is also the building owner, the service connection is the entry point to the building.

System Hazard — means a condition posing a threat of or actually causing damage to the physical properties of the waterworks or a consumer's water supply system.

Used Water — means potable water supplied by the owner from the waterworks to a consumer's water supply system after it has passed through the service connection and is no longer under the control of the owner and has become nonpotable or of questionable quality.

Water Supply — means the water that shall have been taken into a waterworks from all wells, streams, springs, lakes, and other bodies of surface water (natural or impounded), and the tributaries thereto, and all impounded groundwater, but the term "water supply" shall not include any waters above the point of intake of such waterworks.

Waterworks — means a system that serves piped water for drinking or domestic use to (1) the public, (2) at least 15 connections, or (3) an average

of 25 individuals for at least 60 days out of the year. The term "waterworks" shall include all structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water except the piping and fixtures inside the building where such water is delivered (see Title 32.1, Article 2, *Code of Virginia*, 1950, as amended).

Waterworks Owner — means an individual, group of individuals, partnership, firm, association, institution, corporation, government entity, or the Federal Government which supplies or proposes to supply water to any person within this State from or by means of any waterworks (see Title 32.1, Article 2, *Code of Virginia*, 1950, as amended).

TABLE 1 — DETERMINATION OF DEGREE OF HAZARD

Premises with the following conditions shall be rated at the corresponding degree of hazard.

**High
Hazard**

- The contaminant is toxic, poisonous, noxious or unhealthy.
- In the event of backflow of the contaminant, a health hazard would exist.
- A high probability exists of a backflow occurrence either by backpressure or by backsiphonage.
- The contaminant would disrupt the service of piped water for drinking or domestic use.
- Examples — Sewage, used water, nonpotable water, auxiliary water systems and toxic or hazardous chemicals.

**Moderate
Hazard**

- The contaminant would only degrade the quality of the water aesthetically or impair the usefulness of the water.
- In the event of backflow of the contaminant, a health hazard would not exist.
- A moderate probability exists of a backflow occurrence either by backpressure or by backsiphonage.
- The contaminant would not seriously disrupt service of piped water for drinking or domestic use.
- Examples — Food stuff, nontoxic chemicals and nonhazardous chemicals.

Low
Hazard

- The contaminant would only degrade the quality of the water aesthetically.

- In the event of backflow of the contaminant, a health hazard would not exist.

- A low probability exists of the occurrence of backflow.

- Backflow would only occur by backsiphonage.

- The contaminant would not disrupt service of piped water.

- Examples — Food stuff, nontoxic chemicals and nonhazardous chemicals.