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621 Preliminary Considerations

Cross Connection Control is the use of in-line testable backflow prevention assemblies, non in-line testable backflow prevention devices, methods and procedures to prevent contamination of a potable water supply. A cross-connection is any physical connection between two otherwise separate piping systems, one of which contains potable water and the other, water of unknown or questionable quality.

622 General Installation Requirements

A. Permits

Any person planning to install, remove, or relocate a backflow prevention assembly shall first obtain a Plumbing Permit from the *Building Inspections & Permitting Department*. As part of the application for the plumbing permit, a completed Town of Apex Right-of-Way encroachment agreement shall be attached to allow placement of any portion of an irrigation system in the Town's Right-of-Way. (All irrigation system installations in the Right-of-Way of the Town of Apex, NCDOT, or in any other utility easement is prohibited without prior written consent.) The backflow preventer shall be tested by a certified tester when first placed in service. A current list of Town approved certified backflow testers is available on the Water Resources Cross Connection Control webpage.

B. Inspections

- 1) Any backflow preventer assembly that is installed, removed, or relocated shall be inspected by a Town of Apex Code Enforcement Officer. It is the responsibility of the installer of a backflow preventer assembly to secure the inspection or re-inspection by the Code Enforcement Officer. Certified test reports must be completed and submitted by the approved certified backflow tester via the Town's

designated electronic reporting system AquaResource, before the system is approved or put into use and within 10 days of the completed test.

- 2) Trenches for water lines, from their connection at the water service to the irrigation backflow assembly, must be left open until the inspection is completed. **Refer to the Town of Apex *Building Inspections & Permitting Department* publication “Installation Requirements for Privately Owned Irrigation Systems”. All other connections not related to irrigation shall meet the current North Carolina State Plumbing Code and Town of Apex Standard Specifications.**

C. Testing of Backflow Prevention Assemblies

The list below identifies the backflow preventer assemblies that require annual backflow testing:

- 1) Pressure & Spill Resistant Vacuum Breaker Assemblies (PVB or SVB)
- 2) Double Check Valve Assemblies (DCVA)
- 3) Double Check Detector Type 1 and Type II Assemblies (DCDA I and II)
- 4) Reduced Pressure Assemblies (RPA)
- 5) Reduced Pressure Detector Type I and Type II Assemblies (RPDA I and II)

The Town of Apex requires that an approved certified backflow tester perform testing of backflow preventer assemblies. *Certified backflow tester* means a person who has proven their competency to the satisfaction of the Town by successful completion of an approved Cross-Connection Control (CCC) ORC or Backflow Tester Certification school.

Town of Apex accepts CCC ORC and Backflow Tester Certifications from the following approved schools:

- Charlotte Mecklenburg Utilities Department
- Greenville Utilities Commission
- City of Durham
- City of Raleigh
- NC Rural Water
- Training Research and Education for Environmental Occupations (TREEO)
- University of Southern California (US FCCCHR)
- NC American Water Works Association (AWWA)

Certified Backflow Testers must register on the Town’s designated electronic reporting system, AquaResource. The tester must upload the school certificate and pressure gauge calibration certificate to their profile on AquaResource for review and approval by the Town’s CCC ORC. Certified Backflow Testers that do not complete these steps will be prohibited to test in the Town and access to the electronic reporting system will not be approved.

Only passing backflow preventer tests may be submitted to the Town's designated electronic reporting system. The tester is responsible for notifying the consumer regarding any failed test and a quote to make the repair shall be provided to the consumer for approval.

Backflow preventer test reports must be submitted to the Town's designated electronic reporting system within 10 days of the completed report.

D. Authorized Installers

Any assembly required to be installed or repaired by the provision of this article or by a corrective order issued by the Town of Apex Code Enforcement Officer shall be installed by a licensed plumbing contractor in the State of North Carolina or current home owner.

The contractor shall only be allowed to install backflow preventers on applications covered under their license. Homeowners shall only be allowed to install backflow(s) pertaining to their property. All fire backflow preventers shall be tested and installed by an approved/certified fire contractor.

E. Backflow Preventer Approvals

All in-line testable backflow prevention assemblies shall be LEAD FREE by the definition stated under Section 622 (G) and meet or exceed standards set forth by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USCFCCHR) and the American Society of Sanitary Engineering (ASSE) by being on both agencies' approval list. All in-line testable fire backflow prevention assemblies must meet or exceed standards set forth by the ASSE. Backflow prevention assemblies to be used in fire suppression systems must have the additional approval of Factory Mutual (FM) and comply with the National Fire Protection Association (NFPA) Code. To determine whether a particular size and model is approved by the above agencies, contact the Town of Apex Water Resources department.

F. Facilities and Applications Requiring Backflow Prevention

The Town of Apex has identified the following types of facilities or services as having a potential for backflow of non-potable water into the public water supply system. Therefore, an approved backflow prevention assembly may be required on all such services according to the degree of hazard present. Other types of facilities or services not listed below may also be required to install approved backflow prevention assemblies if determined necessary by the Town of Apex. As a minimum requirement, all commercial services will be required to install a double-check valve assembly, unless otherwise listed below.

Abbreviations used below:

DCVA = Double-Check Valve Assembly

RDC = Residential Dual Check

RPA = Reduced Pressure Assembly

DCDA = Double-Check Detector Assembly

RPDA = Reduced Pressure Detector Assembly

AG = Air Gap

PVB = Pressure Vacuum Breaker

- 1) Automotive Services Stations, Dealerships, etc.:
 - a. Non-Health Hazard: DCVA
 - b. Health Hazard: RPA
- 2) Auxiliary Water Systems:
 - a. Approved/Un-approved Public/Private Water Supply: RPA
- 3) Used Water and Industrial Fluids: RPA
- 4) Bakeries: RPA
- 5) Beauty Shops/Barber Shops
 - a. Non-Health Hazard: DCVA
 - b. Health Hazard: RPA
- 6) Beverage Bottling Plants: RPA
- 7) Breweries, Wineries, Distilleries: RPA
- 8) Buildings - Hotels, apartment houses, public and private buildings, or other structures having unprotected cross connections.
 - a. (Under five stories) Non-Health Hazard: DCVA
 - b. (Under five stories) Health Hazard: RPA
 - c. (Over five stories) All: RPA
- 9) Bulk Water: AG / RPA
- 10) Canneries, packing houses, and rendering plants: RPA
- 11) Commercial car wash facilities: RPA
- 12) Commercial greenhouses: RPA
- 13) Commercial sales establishments (Division stores, malls, etc.)
 - a. Non-Health Hazard: DCVA
 - b. Health Hazard: RPA
- 14) Concrete/asphalt plants: RPA
- 15) Dairies and cold storage plants: RPA
- 16) Dye works: RPA
- 17) Film laboratories: RPA
- 18) Fire Systems 2-1/2-inch or larger
 - a. Non-Health Hazard (No FDC): DCDA
 - b. Health Hazard: (Booster Pumps, Foam, Antifreeze Solution, FDC, etc.): RPDA
- 19) Fire Trucks: RPA
- 20) Hospitals, medical buildings, sanitariums, morgues, mortuaries, autopsy facilities, nursing and convalescent homes, medical clinics, and veterinary hospitals: RPA
- 21) Laundries:
 - a. Non-Health Hazard: DCVA
 - b. Health Hazard: (i.e.: Dry Cleaners): RPA
- 22) Lawn irrigation systems: RPA
- 23) Metal manufacturing, cleaning, processing, and fabricating- plants: RPA
- 24) Mobile home parks:
 - a. Non-Health Hazard: DCVA

- b. Health Hazard: RPA
- 25) Oil and gas sales (bulk wholesale, or retail) distribution, production, storage or transmission properties: RPA
- 26) Pest control (exterminating and fumigating): RPA
- 27) Electrical power plants: RPA
- 28) Restaurants:
 - a. Non-Health Hazard (no cooking / kitchen facilities): DCVA
 - b. Health Hazard: RPA
- 29) Residential (single family homes; individually metered duplexes, triplexes, multiplexes, apartments, Townhouses, condominiums, etc.): RDC
- 30) Restricted, classified, or other closed facilities: RPA
- 31) Sand and gravel plants: RPA
- 32) Schools and colleges: RPA
- 33) Sewage and storm drain facilities: RPA
- 34) Swimming Pools – pools connected to Town water system: RPA
- 35) Waterfront facilities and industries: RPA
- 36) Reclaim Water:
 - a. Residential domestic connections: RPA
 - b. Commercial domestic connections: RPA
 - c. Irrigation connections / potable water: RPA
- 37) Temporary construction connections: RPA
- 38) Yard Hydrants: RPA

All assemblies and installations shall be subject to inspection and approval by the Town of Apex.

Notes:

- 1) Under no circumstances may a potable water line be directly or indirectly connected to any unapproved water source and piping or equipment that conveys sewage.
- 2) An approved double check detector assembly (DCDA) is required on a low hazard fire system and an approved reduced pressure detector assembly (RPDA) is required on a high hazard fire system. A high hazard fire system is any system that is boosted (fire department connection (FDC)), fire truck, booster pump, processed, or chemical. No commercial or industrial fire system shall have less than a 2.5-inch supply line and backflow preventer into the intended site or structure from the Town's water main.
- 3) This is not an exhaustive list.

G. Definitions

Atmospheric Vacuum Breaker - (AVB) (ASSE Approval #1001) – This device may be used at the discharge of the control valve when located at least six inches above the flood rim of the container. It shall not be subject to continuous pressure or backpressure backflow and shall not include contact with toxic chemicals or liquids that may be a health hazard.

Continuous Pressure – 12 or more hours of water usage in any 24-hour period.

Double Check Valve Assembly - (DCVA) (ASSE Approval #1015) – This assembly may be used singly or in parallel with any flow requirements. It shall not include contact with toxic chemicals or liquids that may be a health hazard.

Double Check Detector Assembly Type I - (DCDA I) (ASSE Approval #1048) – This assembly may be used singly or in parallel with any flow requirements. It shall not include contact with toxic chemicals or liquids that may be a health hazard. This device will have a water meter and an in-line double-check bypass.

Double Check Detector Assembly Type II (DCDA II) (ASSE Approval #1048) – This assembly may be used singly or in parallel with any flow requirements. It shall not include contact with toxic chemicals or liquids that may be a health hazard. This assembly will have a water meter and an in-line single check valve bypass.

Hose Bibb Vacuum Breaker - (HBVB) (ASSE Approval #1011) – May be used on hose bibbs and hose hydrants except when usage would be at a point 6 inches higher than the vacuum breaker and when usage would include contact with toxic chemicals or liquids which may be a health hazard.

Lead Free Backflow Preventer - The maximum lead content (weight) in the backflow preventer shall be less than 0.25% and meet the current EPA Lead Free Amendment 1417 enacted on January 4, 2014; under the current EPA “Safe Drinking Water Act”.

Low Hazard (Non-Health Hazard) – One that presents foreseeable and significant potential for pollution, nuisance, aesthetically objectionable or other undesirable alterations of the drinking water supply.

Pressure Vacuum Breaker - (PVB) (ASSE Approval # 1020) – This assembly must be installed at a minimum of 12 inches above all downstream piping and shall not be subjected to backpressure backflow. It may be used under continuous pressure applications.

Ready-accessible – Having direct access to a backflow preventer without the need of removing any panel, door, or similar covering of the item described, and without requiring the use of portable ladders, chairs, etc.

Reduced Pressure Assembly (RPA) (ASSE Approval #1013) – This assembly may be used singly or in parallel with any flow requirements.

Reduced Pressure Detector Assembly (RPDA Type I) (ASSE Approval #1047) – This assembly may be used singly or in parallel with any flow requirements. It shall have a water meter and an in-line reduced pressure bypass.

Reduced Pressure Detector Assembly (RPDA Type II) (ASSE Approval #1047) – This assembly may be used singly or in parallel with any flow requirements. It shall have a water meter and an in-line single check valve bypass.

High Hazard (Health Hazard) – Actual or potential threat of contamination that presents an imminent danger to the public health with consequence of serious illness or death.

University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USCFCCCHR) – An educational and research facility.

Irrigation System – A mechanical apparatus or piping installed below ground to provide an artificial application of water to land or vegetation.

623 Backflow Prevention Assembly Installation Requirements

A. Support

Backflow preventers shall be properly supported so that stress on surrounding piping does not occur. Mount enclosures such as concrete or a fiberglass pad shall be installed per current Town of Apex cross connection details.

B. Location

Backflow preventer installations are not allowed in public rights-of-way (Town or NCDOT), under structures or within foundations.

Backflow preventers cannot exceed 50-feet from the potable water main.

Backflow preventers for irrigation must be within 25-feet of the meter and not exceed 10-feet past the front corner of the permanent structure.

All backflow preventers are considered private and shall be located outside of the Town's utility easements.

C. Materials

All materials used in conjunction with a backflow preventer installation shall conform to the specifications of the North Carolina State Plumbing Code, section 605.3 and ASSE 1013, and AWWA C511.

D. Accessibility

All backflow preventers must be installed where the Water Resources staff, Inspector, or Code Enforcement Officer deems them to be ready-accessible. All RPA, RPDA, DCVA and DCDA backflow preventers are required to be installed at least 12 inches and no more than 60 inches above the floor (the vertical distance measured from the lowest point of the backflow preventer to the floor or grade). Approved minimum clearance above and around the backflow preventer must also be provided (refer to Town Standard Details for minimum installation clearance). Lawn irrigation backflow preventers must be installed

outside any building, structures, or foundation crawl space and must meet clearance requirements as shown in the Town Standard Details.

E. Orientation

All RPA, RPDA, DCVA, and DCDA backflow preventers shall be installed in the approved USCFCCHR position..

F. Freeze Protection

The NC Plumbing Code prohibits the installation of RPAs where they may be exposed “to freezing except where they can be removed by means of unions or are protected from freezing by heat, insulation, or both.” Backflow preventers installed outside, require an ASSE 1060 insulated enclosure. The enclosures are rated to maintain 40°F in as low as -30°F weather, (a minimum R value of 8.0 (unless the backflow preventer is designed to be removed each winter and the enclosure is understood to be for decorative purposes only). For fire protection installed outside, the NFPA requires the ASSE 1060 enclosure to include permanent, hard piped electrical service, and a thermostatically controlled heater or heat trace. Freeze protection is not required for lawn irrigation where RPAs are installed outside and can be removed with unions and an upstream SOV not subject to freezing. All underground piping must be installed a minimum of 12 inches below grade and must meet the requirements of underground water service piping.

G. Alterations

No backflow preventer shall be modified from its approved factory configuration.

H. Shut-Off Valves

All backflow prevention assemblies with in-line testing capabilities shall include approved shut-off valves attached to both the inlet and outlet side of the backflow preventer. Shut-off valves are broken into the following categories:

- 1) Assemblies ≤ 2 inches (Non-Fire System Use):
Backflow prevention assemblies are required including quarter turn, full port, and resilient seated, bronze ball shut-off valves.
- 2) Assemblies ≤ 2 inches (Residential Townhome Fire System Use):
These systems shall use quarter turn, full port, and resilient seated, bronze ball shut-off valves with the additional requirement that the valve handles be locked in the fully open position using a pad lock and aviation cable as approved by the Fire Marshal’s office.
- 3) Assemblies ≥ 2½ inches (Non-Fire System Use):
Backflow prevention devices are required to include “resilient wedge” gate valves.

4) Assemblies \geq 2½ inches (Fire System Use):

Backflow prevention devices used on fire suppression systems are required to include Factory Mutual approved resilient wedge OS&Y (outside stem and yoke) gate valves.

I. Wye Strainers

Wye Strainers shall not be allowed on fire protection systems. Wye strainers are required on all other backflow preventer assemblies (RPA, DCVA, PVB). Wye strainers specified by the manufacturer are required to be installed immediately upstream of the backflow preventer's number one shut-off valve (SOV) and after the isolation SOV. All internal or confinement (isolation) backflow preventer assemblies will have a wye strainer upstream of the assembly with the exception of fire protection systems.

J. Water Hammer

All backflow preventers subject to water hammer (hydraulic shock) shall be protected by adequate water hammer arrestors.

K. Backflow Preventer Sizing

In no case shall a backflow preventer be smaller in line size than its outlet or downstream piping.

L. Identification Tag

No one shall remove any manufacturers tag or stamp that bears pertinent information about the unit.

Property addresses shall be displayed on the outside of the approved enclosure or inside on the backflow preventer with 6 mm or ¼ inch lettering. The properties / sites affected are townhomes, multifamily, commercial, and industrial uses / applications.

M. Labeling of Non-Potable Piping

Where non-potable water systems are installed, the piping conveying the non-potable water shall be identified either by color marking, metal tags or tape. Non-potable water outlets, such as hose connections, open ended pipes and faucets, shall be identified with signage in accordance with NC Plumbing Code 608.8.1 through 608.8.2.3. that reads

Non-potable distribution piping shall be purple in color and shall be embossed, or integrally stamped or marked, with the words: "CAUTION NONPOTABLE WATER – DO NOT DRINK" or the piping shall be installed with a purple identification tape or wrap. Pipe identification shall include the contents of the piping system and an arrow indicating the direction of flow in accordance with Plumbing Code 608.8.1 through 608.8.2

N. Bypasses

Facilities that by the nature of their business cannot shut down their water systems to provide for backflow preventer testing, repairs, etc. shall be required to install a bypass backflow preventer of the same hazard level as the main-line unit. The bypass unit must be properly sized to keep critical building services online while the main-line unit is shut down for annual maintenance.

Bypasses are broken into the following categories:

1) Unapproved

No backflow prevention assembly shall be installed in a manner as to allow the assembly to be looped around or bypassed either temporarily or permanently (except when in compliance with the section below).

2) Approved

All backflow preventers in bypasses shall be equal in hazard level (not necessarily in size) to the unit on the main line. All assemblies in the bypass shall meet all of the requirements of an assembly that is installed in a main line.

O. Relief Outlet Piping

When RPA and RPDA assemblies are installed inside buildings they shall be in accordance with NC Plumbing code. RPAs and RPDA's capable of experiencing a full port discharge that are installed inside shall flow by gravity to a sanitary waste floor drain designed to handle a full port discharge from these assemblies or be routed outside so long as the discharge does not create a hazard or nuisance in accordance with NC Plumbing Code. When drains from the relief valve outlets are utilized they must include the following:

1. An approved, prefabricated, appropriately sized Air Gap drain (factory Air Gap adapters are generally available from the manufacturer).
2. Drain lines to direct flow towards indirect waste floor drains.
3. All relief port drain lines shall be piped, full size, to their point of termination.
4. When run horizontally, install the drain line with a slope conforming with the NC Plumbing code 704.1.

P. Pressure Protection

All backflow preventers shall be protected by a pressure reducing valve when water pressure exceeds the maximum design pressure. The pressure reducing valve shall be installed downstream of the backflow preventer unless waterline pressure exceeds the

maximum rated capacity of the backflow preventer (this capacity will be listed on the backflow preventer). In this situation, the pressure reducing valve (PRV) must be installed upstream of the backflow preventer to protect the unit.

Q. Test Cocks

All backflow prevention assemblies with in-line testing capabilities shall have bronze test cocks of the ball valve type. All Reduced Pressure, Double Check Valve, Reduced Pressure Detector, and Double Check Detector assemblies shall have a number one test cock located on the supply side of the number one shut-off valve. When installed in this manner, the number one test cock can be utilized even when the number one shutoff valve is closed.

R. Culinary Use

Backflow preventers and wye strainers used for culinary purposes such as canned food preparation or in dairies shall have an FDA (Food and Drug Administration) approved coating and shall be stamped with the appropriate seal.

624 Drainage Requirements for Backflow Prevention Assemblies

A. Reduced Pressure and Reduced Pressure Detector

No RPA or RPDA assemblies will be allowed to be installed below ground. The assemblies installed in above ground enclosures or inside buildings shall be installed so that the relief outlet of the assembly does not become submerged.

1) Above Ground Installation:

All above ground protective enclosures shall incorporate or be equipped with drains that are sized to handle a full port discharge from the assembly.

2) Building Installation:

An approved, prefabricated, appropriately sized Air Gap drain (factory Air Gap adapter generally available from the manufacturer).

Drain lines to direct flow towards indirect waste floor drains.

All relief port drain lines shall be piped, full size, to their point of termination.

When run horizontally, install the drain line with a slope conforming with the NC Plumbing code 704.1.

3) Below Ground Installation:

All existing assemblies shall be raised above ground at the time the assembly can no longer be repaired and requires replacement to meet Town of Apex

Cross-Connection Standards and Ordinance.

B. Double Check and Double Check Detector

Existing DCVA and DCDA backflow prevention assemblies that are subject to flooding conditions must have adequate drainage. However, a permanent sump pump with a hard-piped electrical service may be allowed on an existing DCVA or DCDA assembly if the installation preempted the Town of Apex's Cross Connection Control Ordinance and a gravity drain is not obtainable.

625 Backflow Prevention Assembly Enclosures

No backflow prevention assembly shall be installed in a traffic area or public right of way.

A. Above Ground Enclosures

All backflow prevention assemblies installed above ground in a location where freezing conditions could occur shall be protected by an approved insulated protective enclosure. All enclosures must have ASSE standard 1060 "Freeze Retardant" with a minimum R value of 8.0 (unless the backflow preventer is designed to be removed each winter and the enclosure is understood to be for decorative purposes only). For fire protection assemblies installed outside, the NFPA requires the ASSE 1060 enclosure to include permanent, hard piped electrical service, and a thermostatically control heater or heat trace.

626 Fire Protection Backflow Preventer Requirements

There shall not be any unprotected interconnection between potable water and fire lines. All backflow prevention assemblies installed on fire suppression systems shall be either a Double Check Detector Assembly Type I or Type II (DCDA I or II) for low hazard installations or a Reduced Pressure Detector Assembly Type I or Type II (RPDA I or II) for high hazard installations. All meters on the detector by-pass must read in gallons per minute. Backflow prevention assemblies on fire lines shall be installed as received from the manufacturer with no modifications. All assemblies used in fire protection systems must have USCFCCCHR, ASSE, and FM approvals.

A. High Hazard Systems (Health) requiring RPDA

- 1) Systems with booster pumps
- 2) Systems with transfer pumps
- 3) Systems with storage tanks
- 4) Systems with compressors
- 5) Systems with antifreeze solutions
- 6) Systems serving 5 or more stories above ground level
- 7) Fire Department Connections—FDC

8) Line extensions greater than 50' to serve a fire hydrant

B. Low Hazard Systems (Non-Health) requiring DCDA

- 1) Systems that do not have a fire department connection (FDC)
- 2) Dry pipe systems
- 3) Less than 5 stories above ground level
- 4) Without booster pumps
- 5) Without chemical additives
- 6) Line extension less than 50 feet from a potable water line for the purpose of serving a fire hydrant.

C. Dead End Lines

All fire systems and fire hydrant lines extending **more than 50 feet** from the Town water main are considered to be dead end systems. To avoid accumulation of stagnant water in the Town main, an approved reduced pressure detector backflow prevention assembly shall be installed within 50 feet of the Town water main. Each change of direction greater than 45 degrees shall reduce the maximum allowed unprotected footage by 25 percent.

D. Modification of DCDA/RPDA Units

When the DCDA / RPDA bypass needs replacement, the defective parts must be replaced with factory approved parts (i.e. the bypass backflow preventer or bypass meter must be replaced with a unit of the same size, manufacturer, and model number) since the detector assembly and main line unit are a matched set from the factory.

E. Fire System Shutdown Protocol

- 1) Have facility owner contact their monitoring agency to inform them that the supervisory switches on backflow preventer shut-off valves will be tripped.
- 2) Owner or tester must contact Apex Emergency Communications at (919) 249-3441 to advise them that the system will temporarily be out of service. Relay the following information:
 - a) Street address and business name.
 - b) Time and date system will be taken out of service.
 - c) Time and date system will be put back in service.
- 3) Contact both Emergency Communications and the monitoring company to confirm that the system is back in service.

627 Lawn Irrigation Backflow Preventer Requirements

A. Irrigation Meter Fed Systems

Lawn irrigation systems have the potential to allow contaminated water to backflow into the potable water system. The Town of Apex requires the installation of an approved RPA (ASSE 1013). On properties platted after July 1, 2009, all new lawn irrigation systems are required to install a separate water meter per NCAC §143-355.4. All backflow

preventers shall be installed per Town of Apex Standard Details. To obtain information for purchasing an “irrigation only” meter, contact the *Building Inspections & Permitting Department*.

B. Irrigation Systems Tied to Outside Hose Bibbs

Irrigation systems, piping, fittings, sprinklers, drip tubing, valve, timers, and all associated components installed for the delivery and application of water for the purpose of irrigation that are connected to outside hose bibbs shall be prohibited and are in violation of the CCC Ordinance.

The only approved method for watering from an outside hose bibb with an approved AVB or hose bibb vacuum breaker (HBVB) is an open-ended water source above grade, without valves.

C. Location and Accessibility

The location of the installed RPA shall meet the following criteria:

RPA shall be installed between the meter and the first sprinkler head (or yard hydrant).

Distance from the water main to the RPA shall not exceed 50 feet

Distance from the water meter to the RPA shall not exceed 25 feet

RPA shall not be located more than 10 feet from the front corner of the home.

RPA shall not be installed behind a fence, under a deck, crawl space, or other structure accessory.

Installation within Town right-of-way or Town easement is prohibited. The RPA must be located outside the 5-foot utility easement.

RPA must be located with a minimum clearance of 12 inches from lowest part of the assembly above final grade.

D. Backflow Preventer Orientation

All reduced pressure assemblies shall be installed in the horizontal position or per the current USCFCCHR manual.

E. Freeze Protection

All underground piping must be installed a minimum of 12 inches below grade and must meet the requirements of underground water service piping.

All enclosures must meet ASSE 1060 “Freeze Retardant” with a minimum R value of 8.0, unless the backflow preventer is designed to be removed each winter (lawn irrigation installed with unions and an upstream shut off valve not subject to freezing) and the enclosure is understood to be for decorative purposes only.

F. Inspections

Water Tap Inspection is required for contractor installed taps.

The Irrigation Rough-in Inspection is an open trench inspection from the water meter to the RPA. The trench must remain open until the inspection has passed.

Final Irrigation Inspection verifies that the concrete pad, rain sensor (if applicable), and backflow enclosure is installed and meets the requirement based on installation of the system.

G. Accessories

Rain sensor installation is required for all automatically controlled irrigation installations. The device must be set to ¼ inch or less per Town of Apex Ordinance.

628 Backflow Preventer Inspections and Repairs

Backflow prevention devices shall be retested and recertified on a yearly basis, and maintenance on all rubber parts is to be performed every 5 years. All testing and maintenance must be performed by a certified professional. Recertification is also required after any maintenance is performed on the reduced pressure assembly. Backflow preventers are required to be repaired or replaced within 10 days once they are determined to be failing. Backflow preventers are required to be brought up to current installation standards when the backflow preventer failure occurs. This section also applies to backflow preventers that are installed in a manner that can create a health risk to the water system. Since the *Water Resources Department* regulations are primarily health code based, existing backflow preventers are not grandfathered as they are subject to the plumbing code. Any backflow preventer that cannot be repaired and cannot pass the annual test certification shall be replaced with a lead-free assembly. Contact the *Water Resources Department, Water & Sewer Utility Operations Division* to determine if an installation meets present cross connection control specifications. If the installation does not meet requirements, the INSPECTOR will inform the property owner or their agent of any deficiencies and discuss options available for remedy.

Current code requires that backflow preventers are:

- 1) ready-accessible
- 2) installed so that they are not submerged in liquid or soil,
- 3) equipped with a wye strainer installed immediately before the #1 shutoff valve of the backflow preventer (on every application except fire system use), and
- 4) installed according to their listing in USCFCCHR manual.

Refer to the Standard Details for strainer location and installation clearances.

629 Certified Backflow Prevention Assembly Tester

Certified backflow prevention assembly tester (tester) means a person who has proven

their competency to the satisfaction of the Town of Apex. Each person who is certified to conduct tests, complete repairs, and produce reports on backflow prevention assemblies shall:

- 1) Be knowledgeable of applicable laws, rules, and regulations applying to backflow prevention assemblies in the State of North Carolina and in the Town of Apex;
- 2) Be a licensed plumber or have at least two years experience under and be employed by a North Carolina licensed plumber or plumbing contractor, or have equivalent qualifications acceptable to the Town;
- 3) Hold a certificate of completion from a Town-approved North Carolina Cross Connection School in the testing of backflow prevention assemblies.
- 4) Meet all State requirements for testing backflow preventers.

When employed by the consumer to test, repair, overhaul, or maintain backflow prevention assemblies, a tester will have the following responsibilities:

- 1) Each person wishing to test, repair, overhaul, or maintain backflow prevention assemblies shall provide a certificate to the Town which sets forth that he/she has met the minimum qualification standards established by the Town for certification as a backflow preventer assembly tester.

The tester will be responsible for making competent inspections, repairing or overhauling backflow prevention assemblies, and making reports of such repair to the consumer and the Town via the designated electronic reporting system. The tester shall include the list of materials or replacement parts used. The tester shall be equipped with and be competent to use all the necessary tools, gauges, manometers, and other equipment necessary to properly test, repair, and maintain backflow preventer assemblies. It will be the tester's responsibility to ensure that original manufactured parts are used in the repair of or replacement of parts in a backflow prevention assembly. It will be the tester's further responsibility not to change the design, material, or operational characteristics of an assembly during repair or maintenance without prior approval of the Town. A tester shall perform the work and be responsible for the competency and accuracy of all tests and reports. The tester shall provide a copy of all test and repair reports to the consumer and to the Town within 10 business days of any completed test or repair work. Testers shall maintain such records for a minimum period of 3 years.

- 2) All certified backflow prevention assembly testers must obtain and employ backflow prevention assembly test equipment that has been evaluated and/or approved by the Town. All test equipment shall be registered with the Town. All test equipment shall be checked for accuracy annually (at a minimum), calibrated, if necessary, and certified to the Town as to such calibration, employing an accuracy/calibration method acceptable to the Town.

Contact the *Water Resources Department* for a list of approved testers and for tester information forms, or access the Town website.

630 Summary of Backflow Prevention Methods

METHOD⇒	AVB	PVB	SVB	DCVA	RPA	AIR GAP
HAZARD (HIGH / LOW)	HIGH	HIGH	HIGH	LOW	HIGH	HIGH
BACKPRESSURE (Bp) / BACKSIPHONAGE (Bs)	Bs	Bs	Bs	Bp / Bs	Bp / Bs	Bp / Bs
PRESSURE LOSS SIGNIFICANT	NO	NO	NO	NO ¹	NO ¹	YES
CONTINUOUS PRESSURE ALLOWED	NO	YES	YES	YES	YES	N/A
VENTS TO ATMOSPHERE	YES	YES	YES	NO	YES	YES
PIT / VAULT INSTALLATION ALLOWED	NO	NO	NO	NO	NO	NO
VERTICAL INSTALLATIONS ALLOWED	YES	YES	YES	YES/ NO ²	YES/ NO ²	N/A
ISOLATION / CONTAINMENT	I	I	I	C	C	I
PARALLEL INSTALLATION COMMON	NO	NO	NO	YES	YES	N/A

N/A = Not Applicable

1. The maximum allowable pressure loss through a DCVA is 10.0 psi. The pressure loss through an RPA is 7.0 to 14.0 psi.
2. Refer to approval manual (USCFCCHR).