Guidance and Suggested Format

For the Development of a

Cross Connection Control Program

Revised June 2023

Nevada Division of Environmental Protection

Bureau of Safe Drinking Water

NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

Acronym/Abbreviation		Definition
µg/L		micrograms per liter
ABPA		American Backflow Prevention Association
AVB		Atmospheric Vacuum Breaker
AWWA		American Water Works Association
BSDW		Bureau of Safe Drinking Water
BWPC		Bureau of Water Pollution Control
BWO		Boil Water Order
CCCP		Cross Connection Control Program
CFR		Code of Federal Regulations
CFS		Cubic Feet per Second
CPWS		Community Public Water System
DC		Double check valve assembly
DCDA		Double check detector assembly
E. coli		Escherichia coli
EPA		United States Environmental Protection Agency
ERP		Emergency Response Plan
GPM		Gallons per Minute
MCL		Maximum Contaminant Level
mg/L		Milligrams per liter
NAC		Nevada Administrative Code
NCWS		Non-Community Water System
NDEP		Nevada Division of Environmental Protection
NFPA		National Fire Protection Association
NRS		Nevada Revised Statute
NTNC		Non-transient/Non-community Water System
O&M		Operations and Maintenance
OSHA		Occupational Health and Safety Administration
PVB		Pressure Vacuum Breaker
PWS		Public Water System
RP		Reduced Pressure Principle Assembly
RPDA		Reduced Pressure Principle Detector Assembly
SCADA		Supervisory Control and Data Acquisition
SDWA		Safe Drinking Water Act
SMCL		Secondary Maximum Contaminant Levels
SNHD		Southern Nevada Health Department
USC FCCCHR		University of Southern California Foundation for Cross-Connection Control and Hydraulic Research
WCHD		Washoe County Health Department

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Introduction

A Cross Connection Control Program (CCCP) is to protect the water system distribution network from hazards resulting from conditions or actions beyond the point of connection, on the customer's premises, outside the control of the water system operator. Consequently, when it comes to implementing, it is much more interactive with the customer.

A CCCP is intended be a helpful tool to achieve this as well as satisfy regulatory compliance. A water system's CCCP is a "living document" modified based on experience and practical application. It should be reviewed and updated at a minimum of five years after approval or when there is a modification to rules and regulations, or when a practice proves to be a liability or a benefit that should be clarified or documented.

This "Guidance and Suggested Format for the Development of a Cross Connection Control Program" (referred to as CCCP Guidance from hereon) is to assist water system representatives to complete and customize the "Template for the Development of a Cross Connection Control Program" (referred to as CCCP Template from hereon). The CCCP Template is intended to provide a consistent format which can be used by small to medium sized drinking water systems. Both the CCCP Guidance and CCCP Template (in Microsoft Word) are available from the Nevada Division of Environmental Protection, Bureau of Safe Drinking Water's website: https://ndep.nv.gov/water/drinking-water/forms

How to start your Cross Connection Control Program

Begin by reviewing this CCCP Guidance, with a goal of completing each section of the "CCCP Template" as it pertains to your system. Take your time, break the process down into sections and work through each thoroughly.

Consider the first attempts draft versions of the CCCP. Have others review the draft to see if the plan is clear or needs improvement. Eventually, you will have a completed CCCP.

You are required to add the CCCP as an appendix to your Manual of Operations and Maintenance (Manual of O&M), but it can also be a standalone document.

CCCP Template Guidance and Examples

This CCCP Guidance discusses implementation considerations with suggested formatting of how you may present information.

Having a CCCP in a consistent format assists regulatory agencies conduct their reviews for compliance. Additionally, consistent formatting also aids operators that operate more than one public water system or have experience working elsewhere.

The CCCP Guidance text and examples will be shown in red. Names, locations, water system references, and businesses used in the examples are fictitious. There is no intention to endorse any businesses used in the examples.

Suggested penalties and compliance timeframes are highlighted in yellow. It is recommended you consult with your legal counsel about implementing fees, penalties and compliance timeframes to your customers.

The CCCP Template is available for your use to customize and complete in Microsoft Word at the NDEP link: https://ndep.nv.gov/water/drinking-water/forms

This CCCP Guidance document and the associated CCCP Template have been prepared and periodically updated under the direction of staff of NDEP BSDW. If you have questions or comments, please call the Facility Manager assigned to your water system. The general number for NDEP BSDW is (775) 687-9521. Feedback is beneficial for future updates of this guidance.

Requirements for a Cross Connection Control Program

In Nevada, all public water systems are subject to requirements set forth in the Nevada Administrative Code (NAC 445A). For revised regulations that have not yet been codified, please see the *Engineering Review Update* webpage.

The sections specifically pertinent to the development of a CCCP are:
State of Nevada Administrative Code for the Design, Construction, Operation and Maintenance of Public Water Systems sets forth requirements for the development and implementation of program for the control of cross-connections (NAC 445A.6663, NAC 445A.67185. through NAC 445A.67195 have been updated by R104-22).

Section NAC 445A.67185 states in part:

A supplier of water shall:

1. Ensure that there are no unprotected connections between the supplies of water, systems for the pumping, storage and treatment of water and distribution system of the public water system and any source of pollution or contamination pursuant to which any unsafe water or other degrading material can be discharged or drawn into the public water system as a result of backsiphonage or back pressure.

2. Develop and carry out a program for the control of cross-connections that is approved by the Division or the appropriate district board of health.

So, what does that mean and what does it involve?

Each public water system must develop a cross connection control program that includes these elements:

- Adoption of operating rules, policies or ordinances to implement a cross-connection program.
- Establish a schedule of implementation.
- Conduct surveys to identify the type of water uses on the premises where cross-connections are likely to occur.
- Identify a list of backflow prevention assemblies that are acceptable for use to protect the water system.
- Establish a procedure or system to ensure a primary backflow prevention assembly is appropriately installed to protect the water distribution system.
- Inventory of primary backflow assemblies intended to protect the water system.
- Create a means to ensure the primary backflow assemblies are tested for proper operation (at least annually) and repaired or replaced if necessary.
- Maintain records of locations, tests, and repairs of backflow prevention devices.
- Establish measures the water system will take in the event the customer fails to comply with the program.

There are numerous resources on the Internet for education regarding cross connection control, backflow prevention assemblies, testing and examples of backflow incidents. Some you may consider:

University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC has been a leader in the field of Cross Connection Control providing education and providing technical evaluation of backflow prevention assemblies)

Working Together for Safe Water (YouTube video - basic education regarding Cross-Connections and Backflow Prevention)

American Water Works Association M14 Backflow Prevention and Cross Connection Control Recommended Practices, 4th Edition (AWWA is a leader and resource for water supply professionals)

US EPA Cross Connection Control: Best Practices Guide (This document has several examples of significant cross connection contamination events)

American Backflow Prevention Association (ABPA is an organization dedicated to education and technical assistance pertaining to cross-connection control)

Submitting Documents

After completing your CCCP, it must be submitted to the Nevada Division of Environmental Protection, Bureau of Safe Drinking Water or the appropriate District Board of Health for review. Since the ERP and the CCCP are to be included in the Appendix of your Manual of Operations and Maintenance, it is acceptable to be submitted together.

Submit the following documents:

- Two (2) paper copies of the Application for Approval of a Water Project available at https://ndep.nv.gov/water/drinking-water/engineering-reviews/applications-forms
  - Typically, if submitting just the CCCP or Manual of O&M with the ERP and Manual of O&M as attachments, only the first two pages need to completed.
- 1 USB drive with a complete copy of the documents in PDF. If that is not possible, Microsoft Word is sufficient.
- Two (2) paper copies of these documents. Including appendices.

Deliver the above documents to the Bureau of Safe Drinking Water at the following address:

NDEP Bureau of Safe Drinking Water
Attn: Project Coordinator
901 S. Stewart Street, Suite 4001
Carson City, Nevada 89701

OR to the appropriate District Board of Health.

Cross Connection Control Program

Section 1.0 Purpose

1.1 System and Contact Information

To easily identify the system, provide the system identification number, system name, address and other specific identifiers like city, location, population, and the number of service connections.

System Number or Reference (SDWIS ID)	PWS ID# NV000XXXX
Distribution Classification Required (D1, D2, etc.)	D1
Treatment Classification Required (T1, T2, etc.)	T1
System Name and Address	Nevada Water System
Location/Town	Rural Nevada
Population Served and Service Connections	Population: 200 Connections No. of Residential Connections:____80_____ No. of Commercial Connections:____0_____ No. of Other Connections:_____0___
Name, Title, and Phone Number of Person Responsible for Maintaining and Implementing the **Cross Connection Control Program**	Name: John Doe Title: Operator Phone: (775) Cell: (775) Email: email@email.com
Seasonal Operation? Operational dates?	Year-round operation

A Cross Connection Control Program is intended to protect a water system's distribution network from potential contamination resulting from back pressure or back siphonage events. This is primarily accomplished by installing appropriate backflow prevention assemblies at the point of connection. It's essentially a device that stops water from flowing backward in pipes from customer's premises back into the public water distribution system.

Plumbing cross-connections, defined as actual or potential connections between a potable and non-potable water supply, constitute a serious public health hazard. The return of any water to the public system after the water has been delivered to the customer at the point of connection is considered unacceptable. There are many examples of cross connection events adversely impacting drinking water. One might think these hazards only happened in the past, but in fact, there are plenty of current examples affecting public water supplies throughout the country.

How and why do such cross-connections exist?

Sometimes:

- Plumbing is installed by people who are unaware of the principles of cross-connection or the potential hazards that could be created.
- People knowledgeable of such connections choose to install the plumbing out of convenience without regard to the dangerous situation that might be created.
- It is believed a single valve or other mechanical device will provide adequate protection.
- Approved devices are installed correctly, tested annually, but still may fail during the intervening period.

Control of cross-connections is possible, but only through thorough knowledge and vigilance. Education is essential, even those who are experienced in piping installations sometimes fail to recognize cross connection possibilities and dangers.

Section 2 Legal Authority

State of Nevada Administrative Code for the Design, Construction, Operation and Maintenance of Public Water Systems sets forth requirements for the development and implementation of a program for the control of cross-connections (NAC 445A.6663, NAC 445A.67185. through NAC 445A.67195 have been updated by R104-22).

Pursuant to this requirement, we have developed this Cross Connection Control Program.

Depending on the administrative structure of your public water system, the Cross Connection Control Program may need to be adopted as a policy or adopted by a Board as regulations. Whatever the structure may be, the proposed program will need to be reviewed by the Nevada Division of Environmental Protection, Bureau of Safe Drinking Water or the appropriate District Board of Health. It is recommended you consult with your legal counsel about implementing fees, penalties and compliance timeframes to your customers. Public hearings on the proposed rules should be viewed as an opportunity for the education of the customer. Customers can express their questions and concerns as to how the program will be administered. While you may be prepared to respond to most issues, there may be situations unique to your locality that may need to be addressed. However, recognize that the requirements for a CCCP in NAC 445A are quite prescriptive and must be incorporated.

Please identify by what means your water system has formalized the requirements of your CCCP and date of adoption.

2.1 Implementation Schedule

	Date	Frequency
Adoption of Cross Connection Control Policy or Ordinance	6/15/2021 by the Board of County Commissioners	Update as needed
Initial Survey of Existing Customers	08/30/21	Upon implementation
Customer Notification of Level of Backflow Protection Required and Compliance Timeframe (if needed)	10/30/21	Following Initial Survey
Inspection of New Installation on Existing Customers (Retrofits)	1/2/2022	As installed
New, Remodel, or Addition Construction Plan Review	08/30/21	Upon implementation

Inventory of Backflow Prevention Assemblies and Test Frequency	08/30/21	Upon implementation
Assembly Test TrackingStructure	11/30/2021	Annually, following inspection/testing date
Customer Notification of the Need for Assembly Testing and Timeframe for Compliance	1/2/2022	
Enforcement Actions:		
Failure to Install	Following Warning Notices - Termination of Water Service	
Failure to Test	Late fee and warning … Termination of service if 60 days past test date	
Failure to Repair	Late fee and warning … Termination of service if 60 days past test date	

Section 3 Responsibilities

3.1 Water Purveyor Responsibility

As a water purveyor, it is our responsibility to supply potable water that meets drinking water standards to our customers. The term “Customers” applies to all connections receiving water service including residential, commercial, industrial properties, municipal facilities and including connections associated with our water system facilities. To reduce the risk of contamination in the distribution system from actual or potential hazards originating on the premises of customers (downstream of the point of connection to the public water supply), we will implement, administer, and maintain our CCCP. We will also protect our public water system from temporary connections that could possibly impair or alter the water.

Water system purveyors should designate an individual as the Cross Connection Control administrator. This individual must have the basic knowledge to:

- Assess actual or potential cross connections.
- Understand conditions that can cause back-pressure or back siphonage.
- Prescribe the appropriate backflow prevention assembly consistent with the provisions of NAC and commensurate with the degree of hazard.

Training may be needed to ensure the responsible individual has accurate and up-to-date information about backflow related concerns and technologies. In the event a property is

suspected to have a cross-connection, or a property warrants a formal “shut down test”, there may be a need to either have on staff or contract with, a Certified Cross Connection Control Specialist. A Specialist has received training to administer cross connection control programs and inspect facilities for potential cross connection control hazards.

There is flexibility as to how a CCCP can be administered. Each Cross Connection Control Program should be tailored to meet the needs of the water purveyor and the communities served.

Some water systems are hands on; choosing to dictate specific details as to how backflow prevention assemblies are to be installed, conduct routine testing and make repairs or replacements.

However, many water purveyors do not have the available time, personnel, and overall capacity to install, maintain, and test backflow prevention devices themselves. In this case, it is common for purveyors to conduct a review of services, identify level of protection necessary, require that each customer be responsible for the installation of the specified cross connection control device in accordance with the requirements specified in NAC 445A and the manufacturer’s recommendations. The customer is responsible to arrange to have the required testing of the assemblies performed by a certified Backflow Assembly Tester and any needed maintenance. Customers are also responsible for paying all associated costs. This process alleviates some of the burden on the water purveyor. The water purveyor must still track and ensure the testing of the assemblies is performed at the necessary frequency. If the customer is responsible for the testing of the assembly, they may be more aware of its location, purpose, access needs and any damage or vandalism. This is the most common method for carrying out CCCP requirements for small to medium sized water systems.

Generally, the installation of a backflow prevention assembly at the point of service is the primary means of protection to the water supply distribution system. This is commonly known as “Meter Protection” or “Containment”. That way, regardless of what happens inside the customer's property or what changes are made to private plumbing, the public water supply is protected. However, many existing water systems have customers with space limitations, pressure issues or other constraints. In some cases, meter protection may not be viable, and alternatives may need to be considered.

3.1.1 Public Education

As a responsible water purveyor, we will endeavor to educate our customers on the potential hazards resulting from cross connections and how to avoid them.

Customer’s may not know how to avoid creating cross connections or best practices unless they are educated. Depending upon the size of your water system and the type of customer base, public education about the potential hazards resulting from cross-connections may be very different. There are a variety of resources from ABPA and AWWA California-Nevada Section that may be of assistance for your staff and customers.

3.1.2 Plan Review

Our water system personnel will engage with Building Department officials in the selection of the cross-connection control requirements for construction for both retrofits of existing facilities and in the planning stages of new construction. For new construction, the required backflow prevention assembly should be installed at the time utility work is performed.

Our water system personnel will coordinate with Building Department officials on Certificate of Occupancy approvals.

3.2 Customer Responsibility

The customer is responsible for ensuring appropriate backflow prevention assemblies are installed on their premises where potential hazards exist to protect users within. Further, the customer is responsible for ensuring that water-using equipment on the premises is installed in accordance with plumbing code requirements and good practice.

Even though plumbing code provisions may be rigidly enforced on new construction, experience has shown that "on-site" modifications and alterations of private plumbing are common. Possible hazards to the public water supply can be created due to cross-connections in private plumbing.

For example:

- Water mains will break causing a loss in pressure, setting up a scenario for back siphonage
- There are homeowners who may use an aspirator attached to a hose to apply herbicides
- Janitors may attach hoses to the service sink that extend into their wash buckets
- Water using equipment check valves may fail
- Internal backflow preventers may not get tested on a regular basis and fail
- A landscaper may inadvertently tap into a drinking water line instead of the irrigation line

Public outreach and education will go a long way to help customers understand the cross-connection risks. But, even then, there will be people with the attitude that there is so little risk of a backflow event occurrence, they will ignore the recommended procedures.

Customers, together with authorities, must take reasonable measures to prevent contamination of the public water supply due to cross connections with their plumbing systems and to maintain all associated backflow prevention assemblies and devices.

Section 4 Surveys and Inspections

4.1 Initial Surveys and Inspections

Our water system personnel will conduct initial surveys to identify the types of customers within our water system. A secondary survey may involve a site inspection to identify if appropriate backflow prevention assemblies exist on the water service.

Cross-connection control methods for various types of customer uses are prescribed in NAC 445A.67195 has been updated by R104-22 Revised Engineering Regulations — The new regulatory changes to the Nevada Administrative Code (NAC) governing the Design, Construction, Operation and Maintenance of Public Water Systems were presented to the State Environmental Commission (SEC) in September 2022 and were given final approval by the Nevada Legislative Commission on December 28, 2022.

Assuming there are existing water customers (as opposed to all new construction), there may be a need to consider a retrofit program to install appropriate backflow assemblies. Generally, a review of the types of service connections is a good starting point. Are the services typical residential, single-family homes? Apartments or condominiums? Is it an irrigation service? What type of commercial services; Restaurant? Medical facility? Fire sprinkler system? The referenced NAC 445A.67195 updated by R104-22 is prescriptive as to the type of backflow preventer required for various types of service.

In the event a service does not fall into a specific category, or it is suspected to have a plumbing scenario warranting a higher level of protection, a thorough inspection of these types of facilities by an AWWA or ABPA certified Cross Connection Control Specialist shall be conducted. Selection of the certified Cross Connection Control Specialist to perform the inspection and prepare a report will be the responsibility of the customer and at the customer's expense. The report recommendations must be submitted to the attention of our CCCP administrator. It is recommended you consult with your legal counsel regarding implementing the charging of fees, imposing penalties and compliance timeframes for customers.

A water purveyor can take the stance that the customer must install a Reduced Pressure Backflow Prevention Assembly (RP) immediately following the meter unless it can be demonstrated lesser protection is acceptable.

Once the water purveyor has sufficient information to determine what level of backflow protection is needed, the customer must be advised. Consider reasonable timeframes for the customer to budget, evaluate the implications, design the installation, provide device freeze or theft protection, and actual installation. In considering those timeframes, recognize the water purveyor has the responsibility to adhere to requirements and protect the distribution system from possible backflow events.

4.2 Follow-up Surveys and Inspections

Our CCCP administrator or other authorized representative, will follow up to ensure the required backflow prevention assemblies are:

- Installed properly in accordance with NAC 445A provisions.
- Backflow assemblies are tested for proper operation by a certified Backflow Prevention Assembly Tester.
- The assemblies are documented and tracked in the water purveyor's inventory of devices intended to protect the distribution system.

4.3 Non-residential Inspections

Water service connections to non-residential, e.g. commercial or industrial businesses, municipal operations or similar, may have complicated plumbing configurations, dangerous chemicals, sewage, irrigation with reclaimed water or other potential contaminants on site. A thorough inspection of these types of facilities by an AWWA or ABPA certified Cross Connection Control Specialist shall be conducted.

Selection of the certified Cross Connection Control Specialist to perform the inspection and prepare a report will be the responsibility of the customer and at the customer's expense. The report recommendations must be submitted to the attention of our CCCP administrator. It is recommended you consult with your legal counsel regarding implementing the charging of fees, imposing penalties and compliance timeframes for customers.

If the customer chooses not to have an inspection conducted by a certified Cross Connection Control Specialist or it is not feasible to conduct inspections of the property, our CCCP administrator will specify the installation of an air gap or reduced pressure principal assemblies to ensure the greatest protection of the potable water supply NAC 445A.6721 (3).

4.4 Fire Protection

Our water service connections to fire sprinkler systems must be protected by the appropriate backflow prevention assembly and in accordance with NAC 445A.67215 – NAC 445A.67225.

Our water system personnel will engage with Fire Department officials in the selection of the cross-connection control requirements for fire sprinkler systems for both retrofits of existing facilities and in the planning stages of new construction. The addition of a backflow preventer in a retrofit scenario will result in head/pressure loss across the device. It is critical to engage fire department officials to ensure the selection of backflow preventer does not render the sprinkler system ineffective.

Backflow prevention assemblies installed on fire sprinkler systems shall be tested by a certified backflow prevention assembly tester. It is recognized that any individual doing work or performing tests on a backflow prevention assembly on a fire sprinkler system must also hold the appropriate fire protection certification.

The various classes of fire sprinkler systems are defined in NAC445A as follows:

Class 1 fire sprinkler system (NAC 445A.65725)
1. Has a direct connection to a water main and no physical connection to any source of pollution or contamination.
2. Uses no pumps, tanks or reservoirs.
3. Uses no antifreeze or other additives of any kind.

Class 2 fire sprinkler system (NAC 445A.6573)
1. Has a direct connection to a water main and no physical connection to any source of pollution or contamination;
2. Has a booster pump installed at the connection to the water main;
3. Uses no tanks or reservoirs; and
4. Uses no antifreeze or other additives of any kind.

Class 3 fire sprinkler system (NAC445A.65735)
1. Has a direct connection to a water main;
2. Uses no antifreeze or other additives of any kind; and
3. Uses one or more of the following:
    a. An elevated tank for the storage of water.
    b. A pump that takes suction from a tank or covered reservoir located above ground.
    c. A pressure tank.

Class 4 fire sprinkler system (NAC 445A.6574)
1. Has a direct connection to a water main;
2. Has available an auxiliary supply of water which is located on the premises or within 1,700 feet of a pumping connection for the system; and
3. Uses no antifreeze or other additives of any kind.

Class 5 fire sprinkler system (NAC 445A.65745) means a fire sprinkler system that has a direct connection to a water main and:
1. An interconnection with an auxiliary supply of water, including, without limitation:
    a. A prohibited water well;
    b. A water system used for industrial purposes; or
    c. A pump that takes suction from a river, pond or reservoir; or
2. Uses antifreeze or another additive.

Class 6 fire sprinkler system (NAC 445A.6575)
1. Is combined with a water system used for industrial purposes; and

2. Has a direct connection to a water main and no physical connection to any other supplies of water, except that the system may have gravity storage or a pump that takes suction from a tank.

Pursuant to NAC 445A.67195 updated by R104-22 we require that Class 1, Class 2 or Class 3 fire sprinkler system must be protected with a minimum of a double check valve assembly. (DC). A Class 4, Class 5 or Class 6 fire sprinkler system must be protected with a reduced pressure principle assembly (RP).

4.5 Reclaimed Water

For customers utilizing reclaimed water for irrigation or other on-site use, we as the public water supplier must take extra precautions to ensure there is no connection between the potable water supply and the reclaimed water distribution system.

Reclaimed water (NAC 445A.27445) means sewage that has been treated by a physical, biological or chemical process, which is intended for use and regulated by Nevada Division of Environmental Protection Bureau of Water Pollution Control (BWPC).

Sewage or reclaimed water must be isolated from any public water supply and separated at minimum with an air gap (NAC 445A.6723 Air Gap).

For your background information, BWPC administers requirements and restrictions on the use of reclaimed water. Prior to allowing the use of reclaimed water, the BWPC must conduct a complete review of the plans for the reclaimed water use project. An Effluent Management Plan (EMP) must be submitted to BWPC and approved prior to the use of reclaimed water. The permit will typically include verbiage to minimize risks of the reclaimed water system becoming cross connected with drinking water supply. These are conditions such as:

- *Prior to the use of reclaimed water at any reuse location, the Permittee shall provide documentation to the Division that notification has been made to the local water purveyor and the local health agency of the Permittee's intent to use reclaimed water at that site.*
- *Prior to the use of reclaimed water at any site, the permittee shall submit documentation showing that a cross-connection control inspection, performed by a certified cross-connection control specialist, has been completed at the site. Thereafter, an annual inspection shall be performed at each active reuse site.*
- *Drinking water fountains shall be covered during effluent irrigation.*
- *To minimize the potential for cross-connection with any potable water system, the Permittee shall provide appropriate identification (purple color, signage, tags, etc.) for all reclaimed water conveyance system components, including spray irrigation systems, hand lines dedicated for reuse water, and water truck fill stands.*

- *If possible, the reclaimed water should be delivered at a pressure 10 psi less than the on-site public water supply.*

Another concern with reclaimed water or non-potable water for common areas or parks within in proximity of residences, is the risk that the homeowner may accidentally connect a home irrigation system to a reclaimed water system, contaminating the community's water supply. This further supports the need for inspections and proper shut-down tests.

4.6 Auxiliary Water Source

If a customer premises has an "Auxiliary supply of water" NAC 445A.65585 it should be treated similar to reclaimed water. For the public water supplier, there is no means of knowing the quality of that source. If our public water supply is not protected by an air gap, our water system is at risk. Water service to a property with an auxiliary water supply will have conditions imposed such as periodic inspections and shut down tests. At a minimum, the shutdown test must be performed by a certified Cross Connection Control Specialist, and may need to be repeated every three years with a visual inspection conducted annually.

Auxiliary water sources are not permitted or regulated as reclaimed water is, therefore potentially being an even greater risk. While this is not required by regulation, you as the water purveyor should provide the authority to impose water service with conditions to protect your water distribution system.

4.7 Temporary Connections

Temporary water use taken through:

- Public fire hydrants except for firefighting purposes may be metered and may require a double check valve assembly (at a minimum) or as required by our cross-connection control administrator. The backflow prevention assembly must be installed and tested in accordance with NAC 445A specifications.
- Water supply for truck fill stands may be metered and a backflow prevention assembly is required if the stand tank does not have an approved air gap.
- Temporary Irrigation –common areas, roadway slopes or similar needing water for the establishment of vegetation may be metered and coupled with a pressure vacuum breaker or double check valve assembly (at a minimum) or as required by our cross-connection control administrator. The backflow prevention assembly must be installed and tested in accordance with NAC 445A specifications.
- Other water uses using temporary connections may warrant meters, backflow prevention assemblies, air gap, and/or inspection by our designated cross connection control program administrator to ensure there is not a threat of backflow.

Any backflow prevention assembly installed, tested, and approved on a temporary connection only applies to the one location. If the meter and backflow prevention assembly is relocated to a

new temporary location, the installation must be approved by our cross-connection control administrator and the assembly tested for proper operation by a certified cross connection control tester.

Construction water for the management of dust control and compaction is commonly needed. Potable water supplies are sometimes used for this purpose.

Water fills may be temporary or sometimes permanent. However, long term truck fills typically use non-potable water.

This elevated truck fill has an air gap in accordance with NAC 445A.

4.8 Single Family Residential Properties

Residential customers present a risk, primarily through:

- Improper of no backflow prevention on home irrigation systems
- Inadequate air gaps on swimming pools/spas
- Inadequate air gaps on decorative ponds
- Inadequate air gaps on swamp coolers
- Submerging hoses into buckets or using hose attachments as aspirators for fertilizers, herbicides or pesticides.

Cross connection control for residential properties is typically managed by compliance with building codes and building inspections.

4.9 Stop and Waste Valves

NAC 445A.67255 Restrictions on use of certain valves and piping assemblies specifically identifies stop and waste valves as a potential source of contamination to a distribution system and prohibits their use upstream of a backflow prevention assembly. Any existing irrigation system with a stop and waste valve between the meter (or point of connection) and the backflow

prevention assembly shall be changed to meet current as a requirement for continued water service.

Section 5 General Backflow Prevention Requirements

5.1 Types and Methods of Backflow Prevention

Our primary goal is to protect our water supply distribution system from potential cross connections on the premises of the customer. For that reason, we require a backflow preventer commensurate with the degree of hazard to be installed immediately after the meter. This is known as “meter protection” or “Containment”.

This is not to diminish the value of cross connection control internal to a customer’s premises. Typically, it is the building departments who administer the locally adopted plumbing code. The implementation of internal backflow prevention practices is known as “Isolation” and protects the water supply on the premises.

In the case of backflow prevention retrofits of existing facilities, there may be a need to implement a combination of Containment and Isolation practices to achieve acceptable protection to the water distribution system. As the water purveyor, we may consider alternatives to requiring the backflow assembly to be installed immediately following the meter on retrofit applications.

Selection of the type of assemblies for the prevention of backflow depends upon the potential degree of hazard and regulatory restrictions. Key to making that distinction, is the assessment of the type of potential backflow from a customer. Consideration must be given to the type of activities on-site that may result in an impairment causing:

- Aesthetic alterations to the water, it is regarded as Pollution NAC 445A.6623
- Adverse health alterations to the water it is regarded as Contamination NAC 445A.65795

We shall specify the required type of protection based on NAC 445A.67195 updated by R104-22 and water system policy. In situations that are not covered in NAC 445A, we shall evaluate each situation on a case-by-case basis and determine the required type of backflow prevention commensurate with the assessed degree of hazard on the customer’s premise.

As the water purveyor, we reserve the right to require more stringent requirements than that set forth in NAC 445A per NAC 445.6721. The water customer may choose a higher level of protection than the minimum required.

5.2 List of Approved Assemblies and Devices

The water purveyor CCCP administrator reserves the right to prescribe the type of backflow prevention assembly necessary to protect public health. However, the make, model, size

and orientation of the backflow prevention assemblies identified for the purpose of the protection of our distribution system must be included in the list of approved assemblies compiled by the USC Foundation for Cross-Connection Control Hydraulic Research. The complete list is available in Microsoft Excel and as a PDF.

Existing, new, and replaced assemblies must be included in the USC Foundation for Cross-Connection Control Hydraulic Research (USC) list of approved assemblies in effect on the date of the installation. Property owners must provide documentation showing the assembly is or was included in the USC list of approved assemblies on the original installation date."

5.3 Design Considerations

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

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

5.4 Installation Requirements

Installation of cross-connection control measures must be consistent with the provisions included in NAC 445A, and the following documents that have been adopted by reference by NAC 445A.6663 (updated by R104-22): AWWA Manual of Water Supply Practices M14 Backflow Prevention and Cross-Connection Control, Recommended Practices, 4th edition and the USC Foundation for Cross Connection Control and Hydraulic Research Manual for Cross Connection Control, 10th edition.

If your water system is experiencing or expects to experience growth of commercial or industrial development, engineers preparing plans for new development, tenant improvement or retrofit should include details as to how the cross-connection control measures will be installed. If you have a professional engineer on staff or on contract, consider having your engineer prepare standard details of cross-connection control devices illustrating the minimum requirements. These standards can be made available to the developer's engineer in AutoCAD or as a pdf.

5.4.1 Air Gap

NAC 445A.6553 defines “Air gap”: as a physical separation between a point of free-flowing discharge from a pipe that supplies liquid to an open or non-pressurized vessel and the overflow rim of that vessel which is:

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

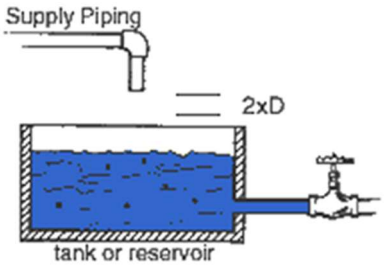
NAC 445A.6723 Installation of an Air Gap –

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

An air gap is the most protective method of preventing backflow. Air gaps are specified to protect water distribution against sewage, reclaimed water or other severe sources of contamination.

Air gaps are used extensively as a simple method for backflow prevention. We see them throughout our homes.

Every sink faucet is (or should be) mounted so the water enters the sink above the fill line of the sink with a separation of at least two pipe diameters. Fill spouts for swimming pools, spas and decorative ponds have (or should have) air gaps.



However, an air gap to be used as meter protection (containment) is unusual. If there is the potential for a piping arrangement cross connected with sewage or reclaimed water, the service will need to have an air gap, an RP is not considered sufficient.

Most properties rely on system pressure for the uses on the property. If protected by an air gap and there is a need for water to flow through the internal piping system, it will need to be pressurized by a pump or elevation.

Air gaps are also easily and commonly circumvented. It is not unusual to look in a janitor closet and see a hose extending from the hose bib into the mop sink or bucket. If there is reliance on an Air Gap for backflow prevention, visual verification must be conducted at least annually.

5.4.2 Reduced Pressure Principle Assembly

NAC 445A.66315 defines a Reduced Pressure Principle Assembly as an assembly that:
Contains:

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

NAC 445A.67235 Installation of Reduced Pressure Principle Assembly – Except as otherwise authorized by the Division or the appropriate district board of health, if a reduced pressure principle assembly is installed on a service connection:
The reduced pressure principle assembly must be installed:

1. In a horizontal and level position, except that the reduced pressure principle assembly may be installed in a vertical position if the assembly has been:
    a. Specifically designed for operation in that position; and
    b. Tested and certified to be suitable for operation in that position by an approved backflow testing laboratory.
    c. As closely as practicable to the service connection, on the opposite side of the service connection from the public water system.
    d. Above ground and, to the extent possible, not less than 12 inches nor more than 36 inches above the finished grade, as measured from the bottom of the assembly.
    e. At a site with adequate drainage, or with drain piping, for any fluid that is discharged when the assembly is activated.

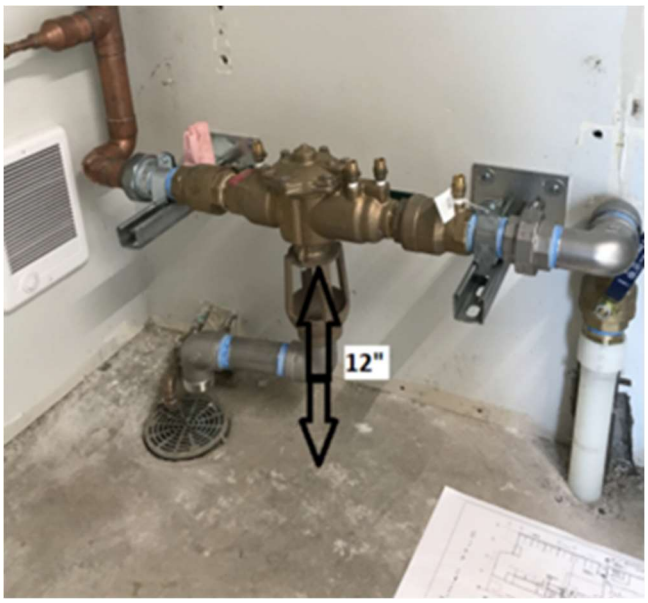
   f. In such a manner that no part of the assembly will be submerged during normal conditions of operation and weather.
   g. In such a manner as to be readily accessible for maintenance and testing.
2. The reduced pressure principle assembly must not be installed below grade, in any subsurface vault, or in any vault, chamber or pit where there is any potential that the relief valve could become submerged.
3. The reduced pressure principle assembly must have a free-flowing drain with an air gap.
4. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the reduced pressure principle assembly.
5. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.
6. The reduced pressure principle assembly may be installed indoors if the installation complies with subsections 1 to 5, inclusive, and has a clearance of at least:
   a. 12 inches on top;
   b. 24 inches on the side with test cocks; and
   c. 12 inches on the other sides.

An RP or RPDA is considered suitable protection for most applications to protect against pollution or contamination except for sewage or reclaimed water. They may be used under continuous pressure and protect against both back siphonage and backpressure conditions.

This RP is on a dedicated irrigation service line. It is installed immediately following the meter minimizing the risk of inadvertent taps into the line prior to the backflow prevention assembly. There are shut off valves and unions before and after the assembly to facilitate winterizing and replacement in the future.

This service line to a business has an RP installed immediately following the meter. However, because of the freezing winter temperatures, this device is covered with this “fake rock”, a commercially available enclosure, to protect and insulate the assembly. Note the opening at the base is intended to allow for discharges from the RPA relief port to flow out.

This example of installation of an RP for meter protection on an irrigation line. While it may not be at risk of freezing, the brass in backflow preventers have been a target for thieves. Consequently, it is good practice to provide locked enclosure covering assemblies.



This RP was installed as retrofit application inside a building at the water riser just as it comes into the building. There are no connections allowed upstream of this assembly. The assembly is 12 inches from the wall and 12 inches above the finished floor. It is positioned such that it can be easily tested and no part of the assembly will be submerged.

During normal operation, the pressure between the two check valves, referred to as the zone of reduced pressure, is maintained at a lower pressure than the supply pressure. If either check valve should leak, the relief valve is designed to open and discharge water to the outside. Sometimes this can be a large amount of water depending on the service and assembly size. If the RP assembly is allowed inside as meter protection, the property owner should be advised to provide adequate drainage for potential discharge.

5.4.3 Reduced Pressure Detector Assembly (RPDA)

NAC 445A.6631 defines a Reduced pressure detector assembly as an assembly designed to protect against pollution and contamination which is composed of a line-sized, reduced pressure principle assembly and a bypass that contains a water meter and another reduced pressure principle assembly.

This type of assembly is acceptable for use on Class 4, Class 5 or Class 6 fire sprinkler systems.

This reduced pressure backflow assembly equipped with a bypass arrangement containing a smaller reduced pressure backflow assembly, and water meter. Fire systems are not usually metered as they typically only have flow when it is activated or being tested, the detector assembly monitors for low flows. This assists in determining if there have been leaks or taps downstream of the assembly.

This installation of a reduced pressure detector assembly was lowered to facilitate access for testing and repair.

5.4.4 Double Check Valve Assembly (DC)

NAC 445A.6586 Double check valve assembly is defined as an assembly that:

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

NAC 445A.6724 Installation of Double Check Valve Assembly –
Except as otherwise authorized by the Division or the appropriate district board of health, if a double check valve assembly is installed on a service connection:

1. The double check valve assembly must be installed:
    a. In a horizontal and level position, except that the double check valve assembly may be installed in a vertical position if the assembly has been:
    b. Specifically designed for operation in that position; and
    c. Tested and certified to be suitable for operation in that position by an approved backflow testing laboratory.
    d. As closely as practicable to the service connection, on the opposite side of the service connection from the public water system.
    e. Above ground and, to the extent possible, not less than 12 inches nor more than 36 inches above the finished grade, as measured from the bottom of the assembly.
    f. In such a manner as to be readily accessible for maintenance and testing.
2. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the double check valve assembly.

3. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.
4. The double check valve assembly may, if above-grade installation is impracticable and the Division or the appropriate district board of health approves of the installation, be installed in a below-grade vault in such a manner that:
    a. The top of the double check valve assembly is not more than 8 inches below grade.
    b. There is:
        i. At least 12 inches of clearance between the bottom of the vault and the bottom of the double check valve assembly;
        ii. At least 24 inches of clearance between the side of the vault and the side of the double check valve assembly with test cocks; and
        iii. At least 12 inches of clearance between the side of the vault and the other sides of the double check valve assembly.
    c. To the extent warranted by climatic conditions, the double check valve assembly is protected from freezing.
    d. The vault has adequate drainage to prevent the accumulation of water, which drains to daylight, to free-draining soil or to a sufficient amount of gravel placed under the vault to provide for free drainage and prevent the accumulation of water under the vault. A vault that does not have an integrated bottom must be placed on a layer of gravel which is not less than 3 inches deep.
    e. The vault is protected from vandalism.
    f. The vault is not located in an area subject to vehicular traffic.
5. The double check valve assembly may be installed indoors if:
    a. The installation complies with subsections 1 to 4, inclusive; and
    b. The double check valve assembly has a clearance of:
        i. At least 12 inches on top;
        ii. At least 24 inches on the side with test cocks; and
        iii. At least 12 inches on the other sides.

The double check valve assembly (DC) is commonly used to protect against backflow hazards that do not pose a health risk. They may be used under continuous pressure and protect against both backsiphonage and backpressure conditions.

A double check valve assembly installed vertically on a riser inside the building from the water meter. This retrofit allowed for the installation of a DC that is approved by the USCFCCHR to be mounted vertically.

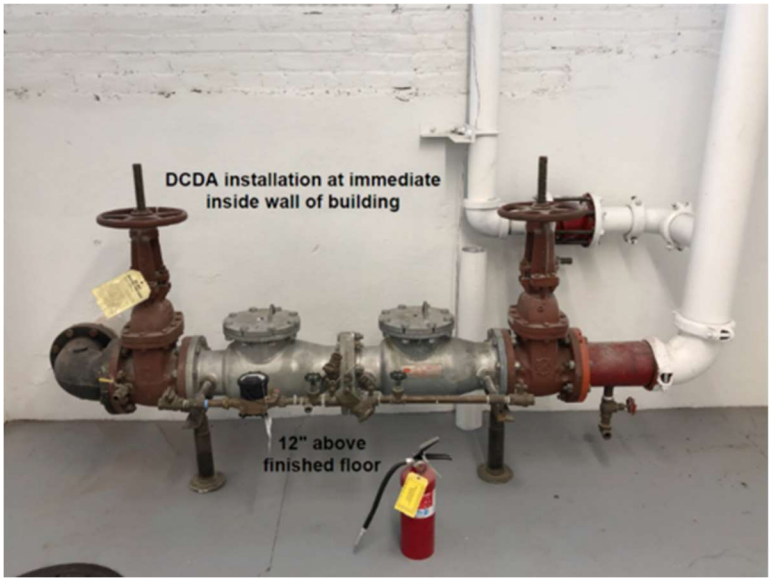
Below grade installation in vaults may result in a confined space posing hazards to anyone servicing the assembly.

5.4.5 Double Check Detector Assembly (DCDA)

NAC 445A.65855 Double check detector check assembly defined as an assembly composed of a line-sized double check valve assembly and a bypass that contains a water meter and another double check valve assembly.

This type of assembly is acceptable for use on Class 1, Class 2 or Class 3 fire sprinkler systems.

A double check detector assembly equipped with two resilient seated indicating shutoff valves, a bypass arrangement containing a smaller double check backflow assembly, and water meter. Fire systems are not usually metered as they typically only have flow when it is activated or being tested, the detector assembly monitors for low flows. This assists in determining if there have been leaks or taps downstream of the assembly.



This double check backflow assembly equipped with a bypass arrangement containing a smaller double check backflow assembly, and water meter. Fire systems are not usually metered as they typically only have flow when it is activated or being tested, the detector assembly monitors for low flows. This assists in determining if there have been leaks or taps downstream of the assembly.

5.4.6 Vacuum Breaker Assemblies

NAC 445A.65575 Atmospheric vacuum breaker is defined as:
"Atmospheric vacuum breaker" means a vacuum breaker that contains an air inlet valve, a check seat and one or more air inlet ports, in which:

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

NAC 445A.6625 Pressure vacuum breaker is defined as:

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

NAC 445A.6725 Use of vacuum breakers

1. An atmospheric vacuum breaker or pressure vacuum breaker may be used only for protection against pollution or contamination under conditions of backsiphonage.
2. If an atmospheric vacuum breaker is used:
   a. The vacuum breaker must be installed not less than 6 vertical inches above the highest point of the downstream piping.
   b. Any associated shutoff valve must be installed upstream from the vacuum breaker.
   c. The vacuum breaker must not be subjected to operating pressure for more than 12 hours in any 24-hour period.
   d. Flow from the protected fixture must be to the atmosphere.
3. If a pressure vacuum breaker is used, the vacuum breaker:
   a. Must be installed:
      i. Upstream from the terminal shutoff valve; and
      ii. Not less than 12 vertical inches above the highest point of the downstream outlet, valve or piping.
   b. Must not be installed at a location where backpressure will occur.

A PVB must be installed at least 12” above the highest downstream point. A PVB does not protect against back pressure. If the irrigation piping is higher downstream, the elevation causes back pressure. This PVB is installed at the highest point on the property achieving the minimum 12 inch elevation difference.

Section 6 Testing and Tracking

Each backflow prevention assembly must be tested at least annually by a certified backflow prevention assembly tester. Pursuant to NAC 445A.6569 A "Certified backflow prevention assembly tester" means a person who is certified to test assemblies for the prevention of backflow by the California/Nevada section of the American Water Works Association, the American Backflow Prevention Association or an equivalent organization approved by the Division.

NDEP does not maintain a list, but the certifying agencies have lists. When seeking backflow assembly testing services, have the individual claiming to be certified, present a current certificate from one of the certifying agencies.

Depending upon the certifying organization, individual tester's certification can be verified. AWWA California-Nevada Section provides a Credential Lookup function on their website. American Backflow Prevention Association (ABPA) provides a list of certified Backflow Prevention Assembly Testers by each state.

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

1. After installation of a new assembly.
2. After repair, replacement, or relocation of an assembly.
3. After a backflow incident.
4. Annually, or more frequently as required.

Sixty days prior to the annual anniversary date for air gap inspection or testing of each backflow prevention assembly, notification (by mail and by email) of the need to test will be sent to each customer with cross connection control measures intended as service protection. The customer or property owner will be responsible for arranging the testing and possible repair services. The test results, repair (if needed) and/or assembly replacement documentation must be submitted to our office, attention CCCP administrator within thirty days of the annual test date. Failure to provide documentation of required testing and repairs may result in penalties. It is recommended you consult with your legal counsel regarding implementing the charging of fees, imposing penalties and compliance timeframes for customers.

All records of testing, repairs, air gap inspection reports, and assembly replacements shall be maintained for a minimum of 3 years.

Alternatively, the water purveyors can install, maintain, and test (providing they are "Certified backflow prevention assembly testers) backflow prevention devices, or directly hire contract employees to perform these activities. The water purveyor (or designated representative) reserves the right to enter any premises needed to perform the required testing and repairs of backflow prevention devices.

With this approach, customers may be billed for the service of testing and repairs for all backflow prevention devices.

Sample customizable notification forms reminding property owners of upcoming testing dates can be sent out via mail and it is recommended to be supplemented by email notification.

The complexity of tracking backflow prevention assemblies, test dates, customer notifications depend on the size of your system and the number of assemblies to be tracked. A simple spreadsheet may suffice and calendar reminders. As a system expands and there are more backflow prevention assemblies to track, there are commercially available tracking software that can be very helpful.

6.1 Repair or Replacement

All assemblies which fail testing shall be repaired or replaced within five working days. Documentation shall be provided to the water purveyor of the repair or replacement. The replacement must be an assembly consistent with the degree of hazard, on the list of approved assemblies compiled by the USC Foundation for Cross-Connection Control Hydraulic Research and installed consistent with the provisions of NAC 445A. Test results performed by a certified backflow prevention assembly tester to confirm the repair or replacement is performing properly shall also be provided.

Section 7 Enforcement and Penalties

In the event a customer fails to comply with the provisions of this Cross Connection Control Program and Nevada Administrative Code, the following actions will be taken.

These are suggested timeframes and penalties. As stated at the outset of this CCCP Guidance, the Program should be tailored to meet the needs of the water purveyor and the communities served. It is recommended you consult with your legal counsel regarding implementing the charging of fees, imposing penalties and compliance timeframes for customers.

7.1 Failure to Comply

New construction must incorporate the backflow provisions prior to approval of the Certificate of Occupancy (CofO). No water service will be allowed until the appropriate backflow prevention assembly has been installed and tested in accordance with the requirements of NAC 445A and to the satisfaction of our CCCP administrator.

If it has been determined an existing customer must install backflow prevention for meter protection, we recognize there will be time required to:

1. Identify funding.
2. Design and secure approval for the installation of the appropriate assembly.
3. Install and test by a certified Backflow Prevention Assembly Tester to insure proper operation.

We will work with the customer to develop a mutually agreed upon timeline depending upon the degree of hazard posed on the property.

- If an air gap or RP backflow prevention assembly is required for meter protection, it is considered a high potential for hazardous backflow. Therefore, a maximum of six to nine months may be considered to meet these requirements.
- If a DC backflow prevention assembly for meter protection, it is considered a low to medium potential for pollution backflow. Therefore, a maximum of nine to twelve months may be considered to meet these requirements.

Failure to comply with the requirements of this program, water service will be subject to termination. It is recommended you consult with your legal counsel regarding implementing the charging of fees, imposing penalties, and compliance timeframes for customers.

7.2 Failure to Test or Repair

Failure to receive test results, repair and/or assembly replacement documentation within thirty days of the required test date will result in a late charge consistent with our rate structure. We will work with the customer to develop a mutually agreed upon timeline (no greater than one month) for the customer to arrange for the assembly to be tested, repaired, and replaced (if needed). Alternatively, if approved by the customer, our CCCP administrator will arrange for the assembly to be tested, repaired and replaced (if needed) and the customer will be responsible for all associated costs. It is recommended you consult with your legal counsel regarding implementing the charging of fees, imposing penalties, and compliance timeframes for customers.

Should any customer fail to comply with the requirements of this program, water service will be subject to termination.

7.3 Other

Unauthorized replacement, tampering, removal, bypassing, or other activities that render the backflow prevention devices inoperable is grounds to discontinue service.

Any deviation, modification, or changes from standard or approved methods and material must be authorized by the water system purveyor.

If the water purveyor's CCCP administrator (or their authorized representative) is unable to enter properties to identify possible cross connections for any reason, the property owner will be required to install reduced pressure principal assemblies and provide the system purveyor with appropriate documentation.

Failure to abide by these standards will result in possible cross connections and water service will be subject to termination.

Appendix

Cross Connection Control Program
Sample Letters & Documents

Sample Customer Notice of Need to Install a Backflow Prevention Assembly for Meter Protection

[System Name] Water System Letterhead

[Today's Date]

[Customer Name]

[Customer Address]

[Customer Address]

Dear: [Customer Name]

Subject: Cross Connection Assessment

As a public water supply, we are regulated by the State of Nevada, Division of Environmental Protection, Bureau of Safe Drinking Water. To ensure safe drinking water is delivered to the customer, there are requirements to protect the distribution piping from potential cross connections.

A cross connection is an unprotected plumbing arrangement through which backflow can occur. An example of a cross-connection is an irrigation system that is connected to the water supply without a proper backflow prevention assembly. This could allow contaminated water from the irrigation system to flow back into the water supply under certain conditions. There are two conditions in which reversal of flow can occur, backpressure and back-siphonage.

Your facility is considered a [type of business] and is required by the Nevada Administrative Code 445A and our Cross Connection Control Program (CCCP) to have a [type of backflow of assembly] immediately following the water meter to protect the public water supply. For your reference, our CCCP is posted on our website: [list website]

Since you are an existing water customer, we understand to retrofit your water service to include the proper backflow prevention assembly, will take some time and effort to identify funding, secure the design and approval for the installation of the appropriate assembly, and line up a contractor for the installation and testing by a certified Backflow Prevention Assembly Tester to insure proper operation.

Since your type of business must install a [type of backflow of assembly], it is considered to present a [high, medium, or low] potential for hazardous backflow. Consequently, your facility may have up to [6 months, 9 months,or 12 months] to comply. Failure to comply with the requirements of this program, water service will be subject to termination.

Please contact me at [Phone Number] to confirm understanding and initiation of this process.

Sincerely,

[Water System Owner Name] , [Title]

Sample Customer Notice of Failure to Comply with Requirements to Install a Backflow Prevention Assembly for Meter Protection

[System Name] Water System Letterhead

[Today's Date]

[Customer Name]

[Customer Address]

[Customer Address]

Subject: Failure to Install the Specified Cross Connection Control Method

Dear: [Customer Name]

Your facility is considered a [type of business] and is required by the Nevada Administrative Code 445A and our Cross Connection Control Program (CCCP) to have a [type of backflow of assembly] immediately following the water meter to protect the public water supply. For your reference, our CCCP is posted on our website: [list website]

Since your type of business must install a [type of backflow of assembly], it is considered to present a [high, medium, or low] potential for hazardous backflow.

Pursuant to our letter [Dated], your facility was given [6 months, 9 months,or 12 months] to comply. The specified [type of backflow of assembly] has yet to be fully installed at your facility.

Immediately contact this office to advise when the assembly will be fully installed and tested by a certified Backflow Assembly Tester to confirm proper installation and function. This must be completed within 30 days of the date of this letter unless we approve an alternative timeframe. Failure to comply with the requirements of this program, water service will be subject to termination by [Date of this letter plus 30 days].

Thank you for your attention to this matter. Contact me at [Phone Number] if you have any questions.

Sincerely,

[Water System Owner Name] , [Title]

Sample Customer Notice of Need to Test a Backflow Prevention Assembly Intended for Meter Protection

[System Name] Water System Letterhead

[Today's Date]

[Customer Name]

[Customer Address]

[Customer Address]

Dear: [Customer Name]

Subject: Backflow Prevention Assembly Test Notification

Your facility has a backflow prevention assembly installed to protect our water distribution system from any potential cross connections on your property should a backflow event occur.

The installed assembly:

[Brand] (ex.Wilkins), [Size] (ex. 1"), [Type] (ex. RP), [Model]. (ex. 007??), [Serial No.] (ex#1234567) is located [describe location] and is due for its [semi-annual or annual] testing by a certified backflow assembly tester by [Date]. In accordance with our cross-connection control program (CCCP), the test results, repair and/or assembly replacement documentation must be submitted to this office within thirty days of the required test date.

If not received within thirty days of the required test date, you will be assessed a late charge consistent with our rate structure.

If the assembly is not tested, repaired, and replaced (if needed) within one month, water service will be subject to termination by [Original required test date plus 60 days]. Alternatively, you may coordinate with our CCCP administrator to arrange for the assembly to be tested, repaired and replaced (if needed) and you will be responsible for all associated costs.

Thank you for your attention to this matter. Contact me at [Phone Number], if you have any questions.

Sincerely,

[Water System Owner Name] , [Title]

Sample Customer Notice of Failure to Comply with Requirements to Test a Backflow Prevention Assembly for Meter Protection

[System Name] Water System Letterhead

[Today's Date]

[Customer Name]

[Customer Address]

[Customer Address]

Dear: [Customer Name]

Subject: Failure to Receive Required Cross Connection Control Assembly Test

We have sent [a notice/ two notices] advising you of your responsibility to test the referenced backflow prevention assembly(s) by [Date to have been tested]

[Brand] (ex.Wilkins), [Size] (ex. 1"), [Type] (ex. RP), [Model]. (ex. 007??), [Serial No.] (ex#1234567) is located [describe location] and was due for its [semi-annual or annual] testing by a certified backflow assembly tester by [Date]. We have yet to receive a test result by a certified backflow prevention tester to comply with the [System Name] water system cross connection control program.

Failure to receive test results, repair and/or assembly replacement documentation within thirty days of the required test date results in a late charge consistent with our rate structure.

Immediately contact this office to advise when the assembly will be tested, repaired, and replaced (if needed). This must be completed within 30 days of the date of this letter. Alternatively, you may coordinate with our CCCP administrator to arrange for the assembly to be tested, repaired and replaced (if needed) and you will be responsible for all associated costs.

Should you fail to comply with the requirements of this program, water service will be subject to termination by [Original required test date plus 60 days].

Contact me at [Phone Number] to make arrangements.

Sincerely,

[Water System Owner Name] , [Title]

Sample Customer Notice of Water Shutdown

[System Name] Water System Letterhead

[Today's Date]

[Customer Name]

[Customer Address]

[Customer Address]

Dear: [Customer Name]

Subject: Temporary Water Service Shut Down

Please be advised of the necessity for shut down of [Specific Water Service]

due to:

- ❑ Backflow assembly testing
- ❑ Code compliance
- ❑ Emergency repairs
- ❑ Preventative maintenance

This shut down will affect [Specific Water Service] on [Date]

from [hour to hour].

This work is essential and must be implemented. However, if this schedule is too disruptive to your work schedule, a postponement may be possible. If you have a need for rescheduling please contact [Water System Contact Name] [Phone Number] before [Date].

Thank you for your attention to this matter. Contact me at [Phone Number] if you have any questions.

Sincerely,

[Water System Owner Name] , [Title]

Sample Customer Complaint Form

It is recommended that your utility establish a protocol to respond to all customer complaints. It is frequently through the customer complaints that a backflow event can be identified. This is the Customer Complaint Form also included in the Manual of Operations and Maintenance Guidance.

[Water System Name]	
Water Quality/Consumer Complaint Report Form	
Instructions: This form is provided to guide the utility while evaluating water quality data or consumer complaints.	
Complaint is based on:	☐ Quality ☐ Quantity ☐ Color ☐ Odor ☐ Other:
What is the water quality complaint?	
What are the specifics of the color, odor, pressure or taste associating the complaint?	
Do other consumers have the same complaint?	
Are the unusual water quality observations sporadic over a wide area, or are they clustered in a particular area?	
What is the extent of the area?	☐ A pressure zone ☐ A neighborhood ☐ A city block ☐ A street ☐ A building
Based on recent complaints, does the unusual water quality appear to be part of a trend (i.e., occurring over several days or longer)?	
Internal Questions for System Operators:	
What is the baseline of "normal" water quality for…?	Quality: Quantity: Color: Odor:
Have there been any operational changes at the plant or in the affected area of the system?	☐ Yes ☐ No
Has there been any flushing or distribution system maintenance in the affected area?	☐ Yes ☐ No
Has there been any repair or construction in the area that could impact water quality?	☐ Yes ☐ No
Is the property protected by a cross connection control device?	☐ Yes ☐ No
Name of person completing form:	Date/time:
Name of person reviewing complaint:	Date/time:
What was the outcome?	Date/time:

NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

Sample Backflow Incident Report Form

It is recommended that your utility establish a protocol to respond to all backflow events. By documenting the event and subsequent actions, the problem may be mitigated.

[Water System Name]	
Backflow incident Report	
Instructions: This form is provided to assist documenting a backflow event and a remediation course	
Backflow is suspected based on:	☐ Quality ☐ Taste ☐ Color ☐ Odor ☐ Other:
Location of Origin	
What are the specifics of the color, odor, pressure or taste associating the complaint?	
Do other consumers have the same complaint?	
Are the unusual water quality observations sporadic over a wide area, or are they clustered in a particular area?	
Based on recent complaints, does the unusual water quality appear to be part of a trend (i.e., occurring over several days or longer)?	☐ Yes ☐ No
What is the extent of the area?	☐ A pressure zone ☐ A neighborhood ☐ A city block ☐ A street ☐ A building
Specific Actions:	
Actions Taken	
Backflow Prevention Assembly Present? If yes, identify make/model and location	☒ Yes ☐ No
If there is a backflow prevention assembly, when was it tested last? Tester's name and license #?	☐ Yes ☐ No
Type of Hazard?	☐ Health/Contamination ☐ Non-health / Pollution
Agencies/people notified? Identify agencies/names	☐ Yes

	☐ No
Identify Follow Up Actions Taken	

Name of person investigating incident:	Date/time:
Supervisor	Date/time:

Sample Ordinance for the Control of Backflow and Cross-Connections

ORDINANCE FOR THE CONTROL OF BACKFLOW AND CROSS-CONNECTIONS

Amendments to the **(local or state authority)** Code of **(city or state)**

Section 1. CROSS-CONNECTION CONTROL — GENERAL POLICY

1.1 Purpose. The purpose of this Ordinance is:

1.1.1 To protect the public potable water supply of (**political jurisdiction**) from the possibility of contamination or pollution by isolating within the consumer's internal distribution system(s) or the consumer's private water system(s) such contaminants or pollutants which could backflow into the public water systems; and,

1.1.2 To promote the elimination or control of existing cross-connections, actual or potential, between the consumer's in-plant potable water system(s) and non-potable water system(s), plumbing fixtures and industrial piping systems; and,

1.1.3 To provide for the maintenance of a continuing Program of Cross-Connection Control which will systematically and effectively prevent the contamination or pollution of all potable water systems.

1.2 Responsibility. The (**Water Commissioner or State Health Official**) shall be responsible for the protection of the public potable water distribution system from contamination or pollution due to the backflow of contaminants or pollutants through the water service connection. If, in the judgment of said (**Water Commissioner or Health Official**) an approved backflow prevention assembly is required (at the consumer's water service connection; or, within the consumer's private water system) for the safety of the water system, the (**Water Commissioner or Health Official**) or his designated agent shall give notice in writing to said consumer to install such an approved backflow prevention assembly(s) at a specific location(s) on his premises. The consumer shall immediately install such an aproved backflow prevention assembly(s) at the consumer's own expense; and, failure, refusal or inability on the part of the consumer to install, have tested and maintained said assembly(s), shall constitute grounds for discontinuing water service to the premises until such requirements have been satisfactorily met.

Section 2. DEFINITIONS

Include applicable Definitions

Section 3. REQUIREMENTS

3.1 Water System

3.1.1 The water system shall be considered as made up of two parts: The Water Supplier's System and the Consumer's System.

3.1.2 Water Supplier's System shall consist of the source facilities and the distribution system; and shall include all those facilities of the water system under the complete control of the utility, up to the point where the consumer's system begins.

3.1.3 The source shall include all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system.

3.1.4 The distribution system shall include the network of conduits used for the delivery of water from the source to the consumer's system.

3.1.5 The consumer's system shall include those parts of the facilities beyond the termination of the water supplier distribution system which are utilized in conveying potable water to points of use.

3.2 Policy

3.2.1 No water service connection to any premise shall be installed or maintained by the Water Supplier unless the water supply is protected as required by (**political jurisdiction**) laws and regulations and this (**name of legal document**). Service of water to any premises shall be discontinued by the Water Supplier if a backflow prevention assembly required by this (**name of legal document**) is not installed, tested and maintained, or if it is found that a backflow prevention assembly has been removed, bypassed, or if an unprotected cross-connection exists on the premises. Service will not be restored until such conditions or defects are corrected.

3.2.2 The consumer's system should be open for inspection at all reasonable times to authorized representatives of the (**Water or Health agency name**) to determine whether unprotected cross-connections or other structural or sanitary hazards, including violations of these regulations, exist. When such a condition becomes known, the (**Water Commissioner or Health Officer**) shall deny or immediately discontinue service to the premises by providing for a physical break in the service line until the consumer has corrected the condition(s) in conformance with the (**political jurisdiction**) statutes relating to plumbing and water supplies and the regulations adopted pursuant thereto.

3.2.3 An approved backflow prevention assembly shall also be installed on each service line to a consumer's water system at or near the property line or immediately inside the building being served; but, in all cases, before the first branch line leading off the service line wherever the following conditions exist:

a. In the case of premises having an auxiliary water supply which is not or may not be of safe bacteriological or chemical quality and which is not acceptable as an additional source by the (**Water Commissioner or Health Officer**), the public water system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line commensurate with the degree of hazard.

b. In the case of premises on which any industrial fluids or any other objectionable substance is handled in such a fashion as to create an actual or potential hazard to the public water system, the public system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line commensurate with the degree of hazard. This shall include the handling of process waters and waters originating from the water supplier's system which have been subject to deterioration in quality.

c. In the case of premises having (1) internal cross-connections that can not be permanently corrected or protected against, or (2) intricate plumbing and piping arrangements or where entry to all portions of the premises is not readily accessible for inspection purposes, making it impracticable or impossible to ascertain whether or not dangerous cross-connections exist, the public water system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line.

3.2.4 The type of protective assembly required under subsections 3.2.3a, b, and c shall depend upon the degree of hazard which exists as follows:

a. In the case of any premise where there is an auxiliary water supply as stated in subsection 3.2.3.a of this section and it is not subject to any of the following rules, the public water system shall be protected by an approved air gap or an approved reduced pressure principle backflow prevention assembly.

b. In the case of any premise where there is water or substance that would be objection-able but not hazardous to health, if introduced into the public water system, the public water system shall be protected by an approved double check valve backflow prevention assembly.

c. In the case of any premise where there is any material dangerous to health, which is handled in such a fashion as to create an actual or potential hazard to the public water system, the public water system shall be protected by an approved air gap or an approved reduced pressure principle backflow prevention assembly. Examples of premises where these conditions will exist include sewage treatment plants, sewage pumping stations, chemical manufacturing plants, hospitals, and mortuaries and plating plants.

d. In the case of any premise where there are unprotected cross-connections, either actual or potential, the public water system shall be protected by an approved air gap or an approved reduced pressure principle backflow prevention assembly at the service connection.

e. In the case of any premise where, because of security requirements or other prohibitions or restrictions, it is impossible or impractical to make a complete in-plant cross-connection survey, the public water system shall be protected against backflow from the premises by either an approved air gap or an approve reduced pressure principle backflow prevention assembly on each service to the premise.

3.2.5 Any backflow prevention assembly required herein shall be a make, model and size approved by the (**Water Commissioner or Health Official**). The term "Approved Backflow Prevention Assembly" shall mean an assembly that has been manufactured in full conformance with the standards established by the American Water Works Association entitled: AWWA/ANSI C510-2007 Standard for Double Check Valve Backflow Prevention Assemblies; AWWA/ANSI C511-2007 Standard for Reduced Pressure Principle Backflow Prevention Assemblies; and, have met completely the laboratory and field performance standard of the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (USC FCCCHR) established in: Standards of Backflow Prevention Assemblies Chapter 10 of the most current edition of the Manual of Cross-Connection Control. Said AWWA and USC FCCCHR standards have been adopted by the (**Water Commissioner or Health Official**). Final approval shall be evidenced by a "Certificate of Compliance" for the said AWWA standards; or the appearance of the specific model and size on the List of Approved Backflow Prevention Assemblies published by the USC FCCCHR along with a "Certificate of Approval" for the said USC FCCCHR Standards; issued by an approved testing laboratory. The following testing laboratory has been qualified by the (Water Commissioner or Health Officer) to test and approve backflow prevention assemblies:

Foundation for Cross-Connection Control and Hydraulic Research
University of Southern California
Los Angeles, California 90089-2531

Testing laboratories other than the laboratory listed above will be added to an approved list as they are qualified by the (**Water Commissioner or Health Officer**).

Backflow preventers, which may be subjected to backpressure or backsiphonage, that have been fully tested and have been granted a Certificate of Approval by said qualified laboratory and are listed on the laboratory's current list of approved backflow prevention assemblies may be used without further test or qualification.

3.2.6 It shall be the duty of the consumer at any premise where backflow prevention assemblies are installed to have a field test performed by a certified backflow prevention assembly tester upon installation and at least once per year. In those instances where the (**Water Commissioner or Health Officer**) deems the hazard to be great enough he may require field tests at more frequent intervals. These tests shall be at the expense of the water user and shall be performed by (**Water Supplier**) personnel or by a certified tester approved by the (**Water Commissioner or Health Officer**). It shall be the duty of the (**Water Commissioner or Health Officer**) to see that these tests are made in a timely manner. The consumer shall notify the (**Water Commissioner or Health Officer**) in advance when the tests are to be undertaken so that an official representative may witness the field tests if so desired. These assemblies shall be repaired, overhauled or replaced at the expense of the consumer whenever said assemblies are found to be defective. Records of such tests, repairs and overhaul shall be kept and made available to the (**Water Commissioner**

or Health Officer).

3.2.7 All presently installed backflow prevention assemblies which do not meet the requirements of this section but were approved devices for the purposes described herein at the time of installation and which have been properly maintained, shall, except for the field testing and maintenance requirements under subsection 3.2.6, be excluded from the requirements of these rules so long as the (**Water Commissioner or Health Officer**) is assured that they will satisfactorily protect the water purveyor's system. Whenever the existing device is moved from the present location or requires more than minimum maintenance or when the (**Water Commissioner or Health Officer**) 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.

3.2.8 The (Water Commissioner or Health Officer) is authorized to make all necessary and reasonable rules and policies with respect to the enforcement of this ordinance. All such rules and policies shall be consistent with the provisions of this ordinance and shall be effective (**number**) days after being filed with the (**clerk or secretary**) of the (**political jurisdiction**).

The foregoing ordinance was first read at the meeting of the (name of governing body) of the (political jurisdiction) of _____ on the _____ day of_____, 20_____ and adopted by the following called vote on motion of (Official).

Ayes:
Noes:
Abstaining: Approver_____
Absent: (Official Title)

Attest:

_____
(Clerk or Secretary)

Add Tester & Specialist Certification Info
& Incident Report Form.
Sample List with Orientations.

SAMPLE RECORD OF BACKFLOW ASSEMBLIES & DEVICES

[Water System Name]

Location Address	Account No.	Make/Model	Serial No.	Date of last test	Next Test Date	Notifi-cation sent	Date Test result rec'd	Test result Pass or Fail	Comments (Include repairs or other observations)

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