City of Rio Rancho

Backflow Prevention and Cross Connection Control Manual

Manual and Revisions Adopted by
UTILITIES DIVISION

Revised July 27, 2011

Table of Contents

Introduction

This manual assumes that the user knows and understands cross connection control, the principles of backflow prevention, and the technical specifications and use of backflow prevention assemblies. This manual is to be used as a guide for the staff whose responsibilities include enforcement of the Backflow Prevention and Cross Connection Control Ordinance.

Ordinance

The Backflow Prevention and Cross Connection Control Ordinance (No. 54) was enacted by the Governing Body of the City of Rio Rancho in 2006 with a subsequent revision in 2011. The purpose of the ordinance is to protect the health and welfare of the citizens by safeguarding the public drinking water supply from contaminants and pollutants that may flow back into the water supply.

Per the ordinance, customers of new non-residential premises and customers of "home-based" businesses may be required to install containment backflow prevention assemblies during construction depending on the type of facility or business conducted and actual or potential cross connections will exist.

The customers of existing non-residential premises are subject to inspection and may be required to install containment backflow prevention assemblies depending on the type of facility or business conducted and actual or potential cross connections that exist.

The customers of residential premises, who operate a "home-based" business from their residence, may be subject to inspection and may be required to install containment backflow prevention assemblies depending on the type of business conducted and actual or potential cross connections that exist.

All non-residential irrigation systems are required to have a testable containment backflow prevention assembly on the irrigation system.

All non-residential private fire suppression systems are required to have a reduced pressure principle backflow prevention assembly on the water line to the fire suppression system.

Responsibilities

City of Rio Rancho

City of Rio Rancho (City) is responsible to provide drinking water that is usable and safe to drink and take reasonable precautions to protect its public drinking water supply against backflow of contaminants and pollutants. To that end, the City has adopted the Uniform Plumbing Code (UPC) as its guide and for regulations of plumbing installation and inspection.

Building Inspection Division

The Building Inspection Division of the City of Rio Rancho has the authority to review building plans and inspect the installed plumbing and is responsible for design and installation of plumbing to prevent cross connections from occurring in a premises, as well as subsequent water systems such as irrigation lines or fire protection. Where the

review of building plans suggest or detect the potential for a cross connection in the plumbing system, the City plumbing inspector has the responsibility under applicable building codes to assure that the cross connection be eliminated or provided with an approved backflow prevention device. Under these provisions, the City plumbing inspector or the City code enforcement division shall report any violations to the Utilities Division for corrective action.

Right of Entry

A representative of the City, upon the presentation of the proper credential and after receiving consent from the customer, may enter at reasonable times upon or through the premises subject to the ordinance, and during such inspection or investigation:

1. Have access to and copy any records required by ordinance,
2. Inspect backflow prevention assemblies required by ordinance,
3. Sample or otherwise make the necessary test of the water within the customer's water system,
4. Conduct inspections to determine compliance with the ordinance.

If the customer denies permission to the City representative to enter the premises or otherwise allow an inspection or investigation to occur, the customer's water service will be terminated. The Manager of the City of Rio Rancho, or his representative, may apply to a court of competent jurisdiction for an inspection order allowing for such entry or the making of such inspection or investigation.

Containment verses Isolation Applications

Cross Connection Control by Containment

Containment is the primary protection for a water system. The intent of this type of control is to restrict the backflow of pollutants or contaminants from the consumer's premises back into the water system. Backflow prevention assemblies used for containment purposes fall under the purview and responsibilities of the Utilities Division and are subject to the requirements of Ordinance No. 54.

When required by the City, all water connections with the exception of irrigation connections must install an approved reduced pressure principle backflow prevention assembly at each water service connection to the customer's water systems.

In the case premises where there is an auxiliary water supply, an approved air gap or an approved reduced pressure principle backflow prevention assembly shall be installed.

All irrigation water systems connected to the public water system must install an approved pressure vacuum breaker, approved spill-resistant pressure vacuum breaker, or an approved reduced pressure principle backflow prevention assembly at the potable water service connection based on the application.

Where the possibility of cross connection between potable and reclaimed water lines exists, an approved reduced pressure principle backflow prevention assembly shall be installed.

All fire hydrants used for drawing water for filling tanks and tank trucks and for temporary irrigation systems must have an approved reduced pressure principle backflow prevention assembly or air gap.

Cross Connection Control by Isolation

Isolation is secondary protection provided by the customer to protect the on-site portion of a water system. An unprotected cross connection is prohibited between the customer's potable and non-potable water system. The United Plumbing Code governs the construction of this part of the water system with Plumbing Inspectors inspection and approval. For private systems, the owner/operator is responsible for the protection of the employees and customers by protecting the potable system from backflow of pollutants and/or contaminants.

The Utilities Division is not responsible for any part of cross connection control by isolation.

New Mexico Construction and Industries Division

In those areas serviced by the City water system but outside the jurisdiction of the City of Rio Rancho Building Inspection Division, the New Mexico Construction and Industries Division, a bureau of the New Mexico Regulation and Licensing Department has the authority to review, approve, and inspect plumbing installations. They are also obligated to prevent the design and installation of any cross connection that may pose a potential or actual threat to the municipal water system.

Utilities Division

The City Utilities Division is responsible for the Backflow Prevention Program including:

1. Obtaining initial registration of the backflow prevention assembly from the customer,
2. Sending annual testing reminder letters to customer,
3. Updating the City-certified tester and repairman list,
4. Data entry and record keeping.

Termination of Water Service

The City of Rio Rancho Utilities Division may deny or discontinue water service to the customer's premises if:

1. A health- hazard water contamination exists at the customer's premises without installation of a proper backflow prevention assembly.
2. The backflow prevention assembly was removed or by-passed.
3. The customer has not properly tested and maintained the assembly.

Water services to the premises shall not be restored until the discrepancies have been corrected or eliminated, in accordance with City ordinance, to satisfy the Utilities Division.

Customer

The customer's responsibility lies from point of entry through the entire length of the water system within his premises. The customer shall be responsible for preventing contaminants, pollutants and/or outside water sources from entering the customer's water system and the City's public water supply within the customer's premises. The customer shall provide approved backflow prevention assemblies or air gaps as required by the

City at all existing and potential cross connections. The customer shall install, operate, test and maintain all backflow prevention assemblies or air gap separations. The customer shall keep accurate records of all inspections, tests, repairs, overhauls and replacement of backflow prevention assemblies.

Registration

The customer is responsible for payment of the initial registration fees for the backflow prevention assemblies located at the customer's premises.

Initial/Annual Testing

The customer must send copies of these records the Utilities Division within seven (7) calendar days of the repair or test. The customer shall maintain these records for a period no less than two (2) years.

Failure to Comply

The customer, at his own expense, is responsible for:

- Installation of a required backflow prevention assembly,
- Payment of the initial registration fee to the City,
- Initial testing of the backflow prevention assembly,
- Repairs/replacement and retesting of the backflow prevention assembly, as needed,
- Annual testing of the backflow prevention assemblies, and
- Reporting all testing results to the City Utilities Division.

Any person who violates any of the rules and regulations within the City of Rio Rancho Utilities Backflow Prevention and Control Program shall be guilty of either a misdemeanor or felony for willfully contaminating the public water supply, and upon conviction shall be punished with a fine and/or imprisonment not to exceed the maximum penalty of the law. Each offense will be treated separately.

Monetary penalties for non-compliance are listed in the Water and Wastewater Rules and Rates Ordinance § 51.12. Non-compliance may also result in termination of water service.

New Construction

Plan Review

Prior to building, the customer shall submit plan sets to the City of Rio Rancho per Development Services Department policies. The Building Inspection Division of the City has the authority to review building plans and inspect the installed plumbing. Depending on the potential hazards and cross connections at the premises, the customer may be required to install an approved backflow prevention assembly on the domestic water line. All irrigation water lines and fire suppression systems are required to install approved backflow prevention assemblies.

Inspection

The City Plumbing Inspectors are responsible for inspection of the installed backflow prevention assemblies. When the assembly passes City inspection, the Plumbing Inspectors notify the Utilities Division.

Existing Premises

Tenant Improvement Plan Review, Business Change, Ownership change

Per ordinance, the customer is required to notify the City (Utilities Division) when:

- There is an operational or process change at the business,
- There is a change of ownership of the premises,
- There is change of tenants at the premises,
- There is a tenant improvement requiring remodeling.

Tenant Improvement Plan Review

Prior to remodeling, the customer shall submit plan sets to the City of Rio Rancho per Development Services Department policies. The Building Inspection Division of the City has the authority to review building plans and inspect the installed plumbing. Depending on the potential hazards and cross connections at the premises, the customer may be required to install an approved backflow prevention assembly on the domestic water line. All irrigation water lines and fire suppression systems are required to install approved backflow prevention assemblies.

Inspection

The City Plumbing Inspectors are responsible for inspection of the installed backflow prevention assemblies. When the assembly passes City inspection, the Plumbing Inspectors notify the Utilities Division.

Irrigation Systems

Potable water supplies to irrigation systems having no pumps or connections for pumping equipment, and no chemical injection or provisions for chemical injection, shall be protected from backflow by one of the following devices:

1. Spill-resistant pressure vacuum breaker,
2. Pressure vacuum breaker, or
3. Reduced pressure principle backflow assembly.

A reduced pressure principle backflow assembly shall be installed to protect the potable water supply when sprinkler and irrigation systems have pumps, connections for pumping equipment, auxiliary air tanks or are otherwise capable of creating backpressure.
A reduced pressure principle backflow assembly shall be installed to protect the potable water supply where systems include a chemical injector or any provisions for chemical injection.

Fire Suppression Systems

Per ordinance, all newly installed water connections must install an approved reduced pressure principle backflow prevention assembly when fire protection systems are connected to the public water supply.
A reduced pressure principle detector assembly will be installed when the City Plumbing Inspectors require such for detecting any leakage or any unauthorized use of water. The meter of the detector assembly will register in U.S. gallons.

Documentation of Backflow Prevention Assemblies

Data Entry into CMMS (put details on how to in an appendix)

Initial Documentation of Assemblies (forms in appendix)

The Utilities Division will send an invoice form to the customer to register all backflow prevention assemblies used for containment purposes. The customer is required to pay a one-time registration fee of $100 for each assembly within 60 days of receipt of the invoice form. The registration fee is for matriculation of the assembly into the database accounting system and for yearly reminder letters to the customer to test the assembly.

Annual Testing of Assemblies (letter in appendix)

The Utilities Division will send a reminder letter to the customer approximately 30 days prior to the yearly anniversary date of the backflow prevention assembly's prior test. A current list of certified testers and repairmen will accompany the reminder letter. The letter will designate a date to have the testing completed and returned to the Utilities Division.

Certified Backflow Testers and Repairmen

The Utilities Division will keep and update a list of certified backflow testers and repairmen.

Certified Repairman

When employed by the customer to repair, maintain, or overhaul any backflow prevention devices, a backflow prevention assembly repairman has the following responsibilities:

- Shall make competent repairs on backflow prevention assemblies,
- Shall not change the design, material or operation characteristics of a backflow prevention assembly without prior approval of the Utilities Division,
- Shall complete and submit accurate, timely reports to the customer,
- Shall report any discovered discrepancies associated with an existing backflow prevention assembly to the customer and the Utilities Division.

Certified Tester

When employed by the customer to test backflow prevention assemblies, a tester has the following responsibilities:

- Shall inspect and test backflow prevention assemblies in accordance with the City's approved methods and procedures,
- Shall be equipped with, be competent to use, all the necessary tools and gauges required to properly conduct testing of backflow prevention assemblies,
- Shall complete, and submit accurate, timely reports to the customer; and report any discovered discrepancies associated with an existing backflow prevention assembly to the customer and to the Utilities Division.

Initial Certification

To initially certify as a backflow prevention assembly tester, a person shall attend a 40-hour training course that has been approved by the Utilities Division and the person must successfully complete the written and performance examinations administered as part of the approved training course.

A person who is employed by the appropriate licensed contractor in accordance with the New Mexico Construction Industries Licensing Act, attends, and successfully completes the approved training course may be certified as a backflow prevention assembly repairman.

To certify as a tester or repairman, the person or company employing the person must have a current business license with the City. The Utilities Division will issue a certificate to any person who meets the requirements.

Recertification

A certified tester or repairman who wishes to remain an active backflow prevention assembly tester must renew his/her certification every three years. To re-certify, testers and repairmen must either:

1. Complete an approved 40-hour backflow prevention training course; or
2. Complete an approved eight (8) hour backflow prevention refresher training course and accrue sixteen (16) hours of approved continuing education credits related to backflow prevention.

Testers or repairmen shall provide proof of training credits earned and training course attended to the Utilities Division. To re-certify as a tester or repairman, the person or company employing the person must have a current business license with the City. The Utilities Division will re-certify any person who meets the above requirements.

Approved Backflow Testing Laboratory

Any backflow prevention assembly required by Ordinance No. 54 shall be a make, model, and size approved by the City of Rio Rancho. To be approved, the assemblies must meet the laboratory and field performance specifications of the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (USC FCCCHR) Specification of Backflow Prevention Assemblies—Section 10 of the most current edition of the Manual of Cross-Connection Control.

The following testing laboratory has been qualified by the City of Rio Rancho to test and approve backflow prevention assemblies;

Foundation for Cross-Connection Control and Hydraulic Research
University of Southern California

KAP-200 University Park MC-2531
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 City's Utilities Division. Assemblies that 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.

Appeals and Penalties

Violations and Penalties for Failure to Comply

Any person who violates any of the rules and regulations within the City of Rio Rancho Utilities Backflow Prevention and Control Program shall be guilty of either a misdemeanor or felony for willfully contaminating the public water supply, and upon conviction shall be punished with a fine and/or imprisonment not to exceed the maximum penalty of the law. Each offense will be treated separately.

Monetary Penalties

Monetary penalties for non-compliance are listed in the Water and Wastewater Rules and Rates Ordinance § 51.12.

Water Service Termination

Non-compliance that does not result in immediate water service termination

In the event no contamination hazard or substantial dangers are determined to exist, but actual or potential cross connection require control by containment, the City shall give written notice to install an approved reduced pressure principle backflow prevention assembly at the service connection at the customer's own expense. Within thirty (30) days of written notification by the City of Rio Rancho of the violation, the customers must install an approved backflow prevention assembly. A City representative may re-inspect the premises to verify compliance with the City ordinance. In such instances where non-compliance still exists after re-inspection, a ten (10) day termination notice will be given in writing to the customer prior to termination of water services and the notice shall disclose the right to appeal such action.

Non-compliance resulting in immediate water service termination

The City of Rio Rancho has the right to discontinue water service if it is found that the necessary backflow prevention assembly required by ordinance is not installed, tested and maintained in accordance to applicable requirements; or if it is found that a backflow prevention device or assembly has been removed or by-passed. The City has the right to refuse restoration of water service until defects have been corrected.

Appeals

1. If at any time during any of the appeals processes, the Utilities Division determines a contamination hazard condition may exist, the Utilities Division shall immediately terminate water service to the premises, thereby protecting public health and safeguarding the City's potable water supply.
2. Appeal of any action or decision by the Utilities Division may be filed by the customer with the Utilities Commission within 30 days after the date of the determination by the Utilities Division. The Utilities Commission shall have a public hearing and shall give written notice of the time and place to the customer and Utilities Division at least 15 days before the date of the hearing. The customer appeal must be heard by the Utilities Commission within three months after the date of filing by the customer.
3. Appeal of any action or decision by the Utilities Commission may be filed by the customer with the governing body within 30 days after the date of the determination by the Utilities Commission. The governing body shall have a public hearing and shall give written notice of the time and place to the customer and Utilities Commission at least 15 days before the date of the hearing. The customer appeal must be heard by the governing body within three months after the date of filing by the customer.

Definitions

AIR-GAP SEPARATION – means the unobstructed, vertical distance through the free atmosphere between the lowest free-flowing outlet from a potable water system and the flood level rim of a tank, plumbing fixture, receptor or other device. An "Approved air-gap separation" shall be at least the diameter of the outlet measure vertically above the flood level rim of the receptacle, but in no case less than one (1) inch. An air-gap separation shall be used to provide protection against a contamination hazard and shall be used to provide protection in containment applications.

APPROVED –

1. In reference to a water supply shall mean a water supply that has been approved by the New Mexico Environment Department.
2. In reference to backflow prevention assemblies or methods that meet the approval of the City of Rio Rancho.

ATMOSPHERIC VACUUM BREAKER (AVB) – means an assembly containing a float-check seat and an air inlet port. The assembly shall include a tightly closing (resilient seat) shutoff valve immediately upstream of the valve body. An atmospheric vacuum breaker shall be used to provide protection against contamination hazards under backsiphonage conditions only. This device is not approved for containment applications.

AUXILIARY WATER SYSTEM – any water system on or available to the premises other than the public water system and includes the water supplied by the system. Auxiliary waters may include water from another purveyor's public water system; or water from a source such as wells, lakes or streams, process fluids or used water. They may be polluted, contaminated, objectionable, or constitute a water source or system over which the water purveyor does not have control.

BACKFLOW – the reverse flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable water supply from an unapproved source.

1. **BACKPRESSURE -** is a form of backflow due to an elevated pressure that creates a flow reversal into the distribution pipes of a potable water system. Backpressure can cause backflow to occur when the potable water system line is connected to a system or fixture that exceeds the operating pressure within the potable water system. If these connections are not properly protected, contaminants, pollutants or other substances can be forced into the potable water system. Booster pumps can causes backpressures.
2. **BACKSIPHONAGE -** is backflow caused by negative or sub-atmospheric pressure in a portion of the distribution system or the supply piping which creates a flow reversal into the distribution lines of a potable water system. Backsiphonage can be caused by water main breaks, fire fighting or fire hydrant flushing, and reduced water system pressure.

BACKFLOW PREVENTION AND CROSS CONNECTION CONTROL MANUAL – the manual of procedures for the City of Rio Rancho and the Backflow Prevention and Cross Connection Control Program. The manual includes standardized backflow prevention assembly testing, installation and maintenance criteria for the protection of the public water supply. The manual shall be published and enforced by the City of Rio Rancho.

CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTER – means a person who is currently certified by the City of Rio Rancho to test backflow prevention assemblies.

CERTIFIED BACKFLOW PREVENTION ASSEMBLY REPAIRMAN - means a person who is certified, tested and licensed by the appropriate mechanical classification in accordance with the New Mexico Construction Industries Licensing Act and holds a current certificate issued by the City of Rio Rancho.

CITY – The City of Rio Rancho.

CONSTRUCTIONS INDUSTRIES DIVISION – is a division of the Regulation and Licensing Department charged with governing contracted work in New Mexico. See NMSA § 60-13-9.

CONTAMINANT - is an actual or potential threat of a physical or toxic nature to the public potable water system or the customer's potable water system that would be a danger to health.

CONTAMINATION - an actual or potential impairment of a potable water system by the introduction of any substance that could cause a health hazard.

CROSS CONNECTION – an actual or potential connection between any part of a potable water system and any other environment containing other substances in a manner that, under any circumstances, would allow such substances to enter the potable water system. Other substances may be gases, liquids, or solids, such as chemicals, waste products, steam, water from other sources (potable or non-potable), or any matter that may change the taste, color, or odor of the water.

   a. **DIRECT CROSS CONNECTION -** means a cross connection, which is subject to both backsiphonage and backpressure.
2. **INDIRECT CROSS CONNECTION -** means a cross connection, which is subject to backsiphonage only.

a. **CROSS CONNECTION CONTROLLED –** a connection between a potable water system and a non-potable system with an approved backflow prevention assembly properly installed and maintained so that it will continuously afford the protection commensurate with the degree of hazard.
b. **CROSS CONNECTION CONTROL BY CONTAINMENT –** means the installation of an approved backflow prevention assembly or physical separation at the water service connection to the customer's water system in instances where unprotected cross connection within a customer's premise pose a threat of contamination or pollution to the municipal water system. This type of protection may also be prescribed where it is physically or economically infeasible to find and permanently eliminate or control all actual or potential cross connections within the customer's water system.

3. **CROSS CONNECTION CONTROL BY ISOLATION –** the installation of an approved backflow prevention assembly or physical separation within the customer's water system to effectively isolate that portion of the customer's water system where unprotected cross connections occur. This type of protection may also be prescribed where it is physically or economically infeasible to find and permanently eliminate or control all actual or potential cross connections within a portion of the customer's water system.

CUSTOMER – means the person responsible for payment of fees as determined pursuant to the City of Rio Rancho's Water and Wastewater Rules and Rates Ordinance as it may be amended.

CUSTOMER WATER SYSTEM – customer's water system shall include any water system located on the customer's premises whether supplied by a public potable water system or an auxiliary water supply. The system may be either a potable water system or an industrial piping system.

HEARING OFFICER – the person designated by the City of Rio Rancho and authorized to conduct hearings as provided in the ordinance rules and regulations established by the City of Rio Rancho.

HAZARD, DEGREE OF– means the condition of risk created by an actual or potential threat of contamination or pollution resulting from a cross connection. Hazards are classified as follows:

a. **HAZARD HEALTH –** an actual or potential threat of contamination of a physical or toxic nature to the municipal water system that could be a danger to public health.
b. **HAZARD – NON-HEALTH** – an actual or potential threat of pollution of a physical nature to the municipal water system but which would not constitute a health hazard. The maximum degree or intensity of pollution to which the potable water system could be degraded under the definition would be that which would cause a nuisance or be aesthetically objectionable.
c. **HAZARD – PLUMBING –** means an internal or plumbing type cross connection in a customer's potable water system that may be either a pollution type or a contamination type hazard. This includes, but is not limited to; cross connections to toilets, sinks, lavatories, wash trays and lawn sprinkling

systems. Plumbing type cross connections can be located in many types of structures including homes, apartment houses, hotels and commercial or industrial establishments. If such a connection exists, the connection must be properly protected by an appropriate type of backflow prevention assembly.

HAZARD – SYSTEM – means an actual or potential threat of severe danger to the physical properties of the public or the customer's potable water system or of a pollution or contamination, which would have a protracted effect on the quality of the potable water in the system.

HIGH HAZARD RISK - is that which may introduce a *contaminant* into the potable water system.

INDUSTRIAL FLUID – any chemically, biologically or otherwise contaminated fluid or solution in a form or concentration that would constitute a contamination or pollution hazard if introduced into the municipal water system or the customer's potable water system. This may include, but is not limited to: all types of process waters and used waters originating from the municipal potable water system that may have deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalies: circulating cooling waters connected to an open cooling tower and/or cooling towers that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters, such as wells, springs, streams, rivers, irrigation canals or system, and so forth; oils, gases, glycerin, paraffin, caustic and acid solutions, and other liquids and gaseous fluids used in industrial areas for purposes of suppressing fires.

INTERCHANGEABLE CONNECTION – interchangeable connection means an arrangement or device that will allow alternate but not simultaneous use of two sources of water.

LOW HAZARD RISK - is that which may introduce a *pollutant* into the potable water system.

MUNICIPAL WATER SYSTEM – the potable water system owned and operated by the City of Rio Rancho to supply residential and non-residential water users within and beyond the municipal limits of the city.

NEW MEXICO ENVIRONMENT DEPARTMENT – is a state agency charged with preserving, protecting and improving New Mexico's drinking water quality of present and future generations. See NMSA §§ 74-1-8 and 74-1-13.1.

NON-POTABLE WATER – means water that is not safe for human consumption and exceeds the maximum contaminant levels specified by the New Mexico Environmental Improvement Boards' Drinking Water Regulations.

NON-RESIDENTIAL WATER CUSTOMER – any water customer who is served by the public water system and is classified in Chapter 51: Water and Wastewater Rules and Rates (R.O. 2003).

POLLUTANT - is an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health hazard. The maximum degree or intensity of pollution degradation to which the potable water system under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

POLLUTION – an actual or potential impairment of a potable water system by the introduction or admission of any substance that does or tends to degrade the taste, color, odor or other aesthetic quality of the water system but does not constitute a health hazard.
POTABLE WATER – water that is free from contaminants, safe for human consumption and does not exceed the maximum contaminant levels as specified in the New Mexico Environmental Improvement Boards' Drinking Water Regulations.
PRESSURE VACUUM BREAKER – means an assembly containing independently operating-spring loaded check valve(s) and an independently operating-spring loaded air inlet valve located on the discharge side of the check valve. The assembly shall include tightly closing (resilient seat) shut-off valves located at each end and must have properly located test cocks. To be approved, these assemblies must be installed as prescribed within this manual and be readily accessible for in-line testing and maintenance. A pressure vacuum breaker shall be used to provide protection in irrigation containment applications that are not subjected to backpressure.
RECLAIMED WATER – is the treated effluent generated by domestic wastewater treatment facilities and considered a nonpotable water source.
REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY – means an assembly of two independently operating approved check valves together with a hydraulically operating, mechanically independent differential pressure relief valve located between the check valves. The assembly shall include tightly closing (resilient seat) shut-off valves at each end and must have properly located test cocks. To be approved, these assemblies must be installed as prescribed within this manual and be readily accessible for in-line testing and maintenance. A reduced pressure principle backflow prevention assembly shall be used to provide protection in containment applications.
RESIDENTIAL SERVICE OR USE – is the provision of or use of water for household or domestic purposes.
SERVICE CONNECTION – the terminal end of a service line from the public water system and a point of delivery to the customer's water system, more particularly defined as follows:

1. The service connection for a metered water service the downstream end of the water meter or meter setter;
2. The service connection for un-metered water services and fire lines which serve private fire protection systems is located at the property boundary or at the City easement boundary to a customer's premises; and
3. The service connection for a fire hydrant and all other temporary or emergency water services is located at the point of connection to the public water system.

SPILL-RESISTANT PRESSURE VACUUM BREAKER – means an assembly containing one independently operating spring-load air inlet valve located on the discharge side of the check valve, two full-ported, resilient seated shut-off valves and equipped with properly located resilient seated test cock and vent valve. A spill-resistant pressure vacuum breaker shall be used to provide protection in irrigation containment applications that are not subjected to backpressure.
SURGE TANK – the receiving, non-pressure vessel part of the air gap separation between a potable and an auxiliary supply.

THERMAL EXPANSION – is the resulting effect when water is heated in a closed system. In effect, the heat causes the water volume to expend, but since the system is closed, the pressure increase.
UTILITIES COMMISSION – The Charter-created body whose duties are to establish policies concerning the operations and management of the Utilities Division and other activities authorized by the governing body.
UTILITIES DIVISION – is the Utilities Division of the Department of Public Works of the City of Rio Rancho.
UTILTIIES DIVISION MANAGER – is the manager of the Utilities Division or his designee.
WATER SERVICE CONNECTION – is the terminal end of a service connection from the City's potable water system (i.e., where the water system may lose jurisdiction and sanitary control of the water at its point of delivery to the customer's water system). If a meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the meter.
WATER SUPPLY – APPROVED – means public water system and any other water sources regulated by the New Mexico Environment Department.
WATER SYSTEM – the water system shall be considered as means up of two parts: The City of Rio Rancho Water System and the Customer's water system. The City of Rio Rancho Water 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 City of Rio Rancho up to the point where the customer's system begins. The source shall include all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system. The distribution system shall include the network of conduits used for the delivery of water from the source to the customer's system. The customer's system shall include those parts of the facilities beyond the termination of the City of Rio Rancho's distribution system, which are utilized in conveying potable water to points of use.
WATER, USED – any water supplied by a water purveyor from a public potable water system to the customer's water system after it has passed through the service connection and is no longer under the control of the water purveyor.

Appendix A – Backflow Prevention Assemblies

There are six types of approved backflow assemblies, devices or methods in common use by the industry and several specialty items allowed under certain conditions. The Uniform Plumbing Code is very specific in the terms of the type of preventer that can be used under varied backflow and hazard conditions. The City's Utilities Division has approved only four mechanical assemblies and one physical separation for the purpose of containment.

Reduced Pressure Principle Assembly (RP)

The Reduced Pressure Principle Backflow Prevention Assembly (RP) should be installed with adequate space to facilitate maintenance and testing. An RP should be inspected

and tested as soon as possible after installation to insure proper installation and operation and at least yearly thereafter.

The RP must be installed twelve (12) inches, plus nominal size of the device above the floor level of a permanent structure or bottom of an above ground vault or hot-box because the removal of the pressure relief valve requires a minimum of twelve (12) inches clearance. In addition, some devices require a minimum clearance for driving the pins from the check valves.

An RP larger than two (2) inches diameter in size installed more than five (5) feet above floor level, within an enclosure or a building must have a permanent platform under it for the maintenance person or tester to stand on. The platform must meet all applicable safety standards.

The RP should be installed above finished grade and must not be subject to flooding, a submerged relief valve or a leaky test cock could result in a direct cross connection. The RP should never be installed within a pit or semi-buried pit. RP enclosures must be located above the maximum flood level and must have a daylight drain. The daylight drain must:

- Be visible and provide a minimum air gap separation,
- Be installed twelve (12) inches above the ground or the maximum flood level, whichever is greater,
- Be able to handle the volume of water that can be discharged from the relief valve port.

The RP must be protected against freezing. The assembly can be heated by a heating element (electric) where power is available, but should be grounded properly to prevent electrical shock hazards. Pipe insulation can also be an effective way in preventing freezing of the assembly. When using insulation materials, they must be easily removable for maintenance and testing. The device can be further protected by using an approved hot-box or another approved enclosure for outside installation.

RPs can be installed horizontally or vertically as long as the orientation was approved by the testing laboratory and must meet all manufacturer specifications.

Care must be taken to ensure that water line pressure does not exceed the rating of the devices. In case of water hammering or thermal expansion on the downstream side of the devices, surge protectors may be installed to prevent damage to the device.

When RPs are installed inside a building, they must be installed in locations where occasional spitting and the possibility of constant discharge from the relief valve port will not cause a problem.

A drainage system must be installed that will handle the volume of water that could be discharged from the relief valve. An approved air gap funnel assembly will either be provided by the manufacturer or constructed for a specific installation, and must be installed to handle spitting from the relief valve due to pressure changes. A line from the funnel may be routed to an adequately sized floor drain of equal or greater size. The air gap funnel assembly is only installed to handle spitting and will not accommodate the volume of water that could occur during continuous discharge of the relief valve.

Larger size assemblies, 2 ½ inch diameter or larger, must have support blocks or stands to help support the device and help prevent flange damage.

Existing installations that do not comply with these standards must be inspected for actual or potential hazards and if they exist, upgraded as prescribed by Ordinance 54 for containment.

Overview of a Reduced Pressure Principle Backflow Prevention Assembly

1. High hazard application (contaminant).
2. Approved for backpressure and backsiphonage.
3. No limit on period of time pressurized.
4. No rule on being higher than what is being protected.
5. Will discharge minor to major amounts of water.
6. Is testable.
7. Enclosure required with adequate drain.
8. Approved for containment applications.

Double Check Valve Assembly (DC)

Existing DCs must have adequate space to facilitate maintenance and testing. DCs must be inspected and tested by a certified backflow prevention assembly tester to ensure satisfactory operation.

DCs larger than 2-inch diameter in size and installed more than five (5) feet above flow level within a building or enclosure must have a permanent platform under them for the tester or maintenance person to stand on. The platform must meet all applicable safety standards and codes.

DCs must be protected from freezing. Various heating elements are effective where power is available. Such installations must be grounded to preclude electrical shock hazards. Pipe insulation and other insulation materials can also provide effective protection from freezing. Where insulation materials are placed around the DC, they must be easily removable to facilitate testing and inspection. If the water system can be drained and shut off during freezing periods, additional "freeze-proofing" can be accomplished by consulting the manufacturer of the specific assembly for recommendation on how to drain each water-entrapping cavity of the assembly.

DCs can be installed either horizontally or vertically as long as the orientation was approved by the testing laboratory and must meet all manufacturer specifications.

The DC must not be installed where the pressure will be maintained above the assembly's rated and labeled capacity.

Thermal water expansion and/or water hammer downstream of the assembly can cause excessive pressure. This type of situation can be eliminated by installation of water-hammer arrestors or surge protectors to avoid possible damage to the system and assembly.

DCs should be placed above grade and must not be subject to flooding because a leaky test cock could result in a direct cross connection. DCs must not be installed below grade. DC enclosures should be located above the maximum flood level and must have a daylight drain. Plugs shall be installed in test cock tapings to lessen the cross connection hazard should the assembly become submerged.

DC vaults must provide sufficient clearance for testing maintenance. Vault access ports must provide sufficient clearance for personnel and equipment. Ladder access or steps

must be provided at larger installations. Provisions must also be made for removal and installation of larger assemblies.
Larger size assemblies (2-1/2" and larger) must have support blocks to prevent flange damage.
Water lines should be flushed prior to installation of the DC. A large majority of "failure of test" results in new installation are due to debris fouling either the first or second check valve seats.
Existing installations that do not comply with these standards must be inspected for actual or potential hazards and if they exist, upgraded as prescribed by Ordinance 54 for containment.

Overview of a Double Check Valve Assembly

1. Low hazard application only (pollutant).
2. Approved for both backpressure and backsiphonage.
3. No limit on time pressurized.
4. No rule on being higher than what is being protected.
5. Will not discharge any water.
6. Is testable.
7. Enclosure required.
8. Not approved for containment applications.

Pressure Vacuum Breaker Assembly (PVB)

Overview of a Pressure Vacuum Breaker Assembly

1. High hazard application (contaminant).
2. Irrigation containment.
3. No backpressure.
4. Backsiphonage only.
5. Pressurized for long periods of time.
6. Water discharge may occur.
7. Twelve (12) inches above everything protected.
8. Horizontal installation only.
9. Is testable.
10. Protect from freezing; enclosure optional.

Spill-Resistant Pressure Vacuum Breaker Assembly (SPVB)

Overview of a Spill-Resistant Pressure Vacuum Breaker Assembly

1. High hazard application (contaminant).
2. Irrigation containment.
3. No backpressure.
4. Backsiphonage only.
5. Pressurized for long periods of time.
6. Occasional spitting or discharge will occur.
7. Twelve (12) inches above everything protected.

8. Horizontal installation only.
9. Is testable.
10. Protect from freezing; enclosure is optional.

Air Gap

Appendix B – Data Entry into CMMS

Initial Registration Data

Query for Annual Testing Reminder Letter

Annual Testing Data

Reports

Weekly Report to Supervisor

Other??

Appendix C – Facilities or Businesses that Require Containment Backflow Prevention Assemblies

Based on the possible degree of hazard, the customer may be required to install an approved backflow prevention device at the premises.

Buildings and facilities that may introduce harmful substances to a public water system include, but are not limited to:

- Hospitals, morgues, mortuaries, medical clinics, dental clinics, and autopsy facilities
- Laboratories and all types of research facilities
- Sewage treatment plants of facilities
- Food and beverage processing plants
- Chemical plants
- Petroleum refineries
- Metal plating industries
- Electric and electronic component manufacturers
- Radioactive material processing plants
- Car and truck wash facilities
- Hydraulic testing facilities
- Packing houses, rendering plants, tanneries, and stock yard facilities
- Steam generating facilities
- Laundries, dry cleaners, and laundromats
- Photographic film processing facilities
- Swimming pools and health spas

- Greenhouses
- Multi-story building in excess of 30 feet
- Taxidermy shops
- Battery shops
- Kennels, pet stores, and zoos
- Printing shops and screen printing shops
- Jewelry manufacturers
- Radiator shops
- Warehouses
- Sand and gravel facilities
- Power plants
- Breweries
- Restaurants
- Veterinary offices
- Hotels and motels
- Schools and colleges
- Golf courses
- Recycled water systems
- Salons