

Appendix F
Cross-Connection Control Policy Manual



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EXECUTIVE SUMMARY

Congress passed the “Safe Drinking Water Act” to protect the public health and welfare of all public water supply users in the United States. The Environmental Protection Agency (EPA) interpreted this mandate to mean that certain contaminants should not be found in water “delivered to the free-flowing outlet of the ultimate user.” Thus, protecting the water system from these contaminants became the responsibility of the water purveyor.

The Public Utility District No. 1 of Skagit County (District) relies on a multiple barrier approach to protect the public water supply and, subsequently, public health. An active and effective cross-connection control program is one of the most critical aspects of the multiple-barrier approach. Introducing a contaminant into the public water supply system is the greatest public health risk. The water distribution system can provide the conduit for spreading the contaminant to a large population. Once water leaves the control of the distribution system, the District must consider the possibility that the water could become contaminated. Accordingly, the District must consider the plumbing system of all customers to be a potential health hazard. The hazard, and the health risk, may vary from minor to severe.

Under certain hydraulic conditions, water can flow in the opposite direction from the intended direction of flow (“backflow”). Two conditions that can cause backflow are reduced pressure in a supply line or a source of pressure on the customer side that exceeds the supply pressure. The opening of a fire hydrant or a break in the water main can cause reduced pressure. Sources of pressure that can exceed the supply pressure include booster pumps, thermal expansion, and elevated piping. If a cross-connection exists or is created, chemicals, gases, or substances other than potable water could be introduced into the distribution system.

There are numerous backflow incidents where cross-connections have been responsible for contaminating drinking water. This occurs when the potable water supply piping is connected to pipes carrying another fluid or gas, such as an air conditioner containing chemicals to kill algae. A garden hose submerged in a swimming pool, a water trough for farm animals, a car’s radiator to flush out antifreeze, or attached to a fertilizer sprayer, could siphon contaminants back into the public water system. Other cross-connections include irrigation systems, private wells, and recirculating water systems.

Inconsistent reporting and documentation procedures make assessing the full scope of contamination and illness outbreaks due to backflow incidents difficult. Around 80 incidents have been reported to the Washington State Department of Health (DOH) since 1996. One example is when an unprotected irrigation system with untreated water back flowed into the domestic water lines and caused 11 cases of giardiasis. Another example is when a city’s residents were without water for four days after herbicide 2,4-D was back-siphoned into the community’s water system.

Numerous District customers conduct activities that could contaminate the public water system if cross-connections and a backflow event occur. Examples include wastewater treatment plants, dairy farms, car washes, and food processing plants. The District has experienced minor backflow incidents of air being introduced into the distribution system. Irrigation systems are common and, if not appropriately winterized, can backflow air and any water remaining in the system. Compressed air is used to purge the system, and if the correct valves are not closed to isolate the system, backflow can occur. Another backflow incident happened at a hospital served by the District. A pump was installed to increase pressure in another building. Unknown

to facility staff, the pump was repeatedly turning on and off, causing significant water hammer. Backflow occurred, but fortunately, subsequent water quality samples tested negative for contamination.

This Cross-Connection Control Program Manual (CCCPM) documents the District's compliance with the requirements of DOH and the Washington Administrative Code to implement a cross-connection control program. The purpose of the program is to protect the public water system from contamination via cross-connections and, therefore, the health and safety of the District's customers. The District often requires existing services to install a new backflow prevention assembly. These requirements can cause unexpected customer costs, leading to conflict and confusion.

The minimum required elements of a Cross-Connection Control Program are:

Element 1: Establishment of legal authority and program policies.

Element 2: Evaluation of premises for cross-connection hazards.

Element 3: Elimination and/or control of cross-connections.

Element 4: Provision of qualified personnel.

Element 5: Inspection and testing of backflow preventers.

Element 6: Quality control of the testing process.

Element 7: Response to backflow incidents.

Element 8: Public education about cross-connection control.

Element 9: Recordkeeping.

1. INTRODUCTION

Washington Administrative Code (WAC) 246-290-490 establishes the minimum requirements for the District to protect its public water systems from contamination via cross-connections. In accordance with these requirements, this Cross-Connection Control Program Manual (CCCPM) documents the District's policies related to cross-connection control.

The CCCPM describes how the District administers the minimum requirements of WAC 246-290-490 and includes specific requirements, clarifications, and procedures that are not explicitly defined in the law. The CCCPM provides a clear and concise description of District policy in most circumstances. In rare cases, the District may refer to additional resources related to cross-connection control in implementing the CCCPM. If determined necessary by the District, the following resources may be used as a reference while administering this program:

- Washington Administrative Code (WAC)
- Department of Health Guidance Documents

- Seventh Edition (or any superseding edition) Cross-Connection Control Manual Accepted Procedure and Practice, Pacific Northwest Section American Water Works Association
- Tenth Edition (or any superseding edition) Manual of Cross-Connection Control, University of Southern California

The District's responsibility for cross-connection control includes all public water treatment, storage, and distribution facilities and ends at the point of delivery to the customer's water system. The point of delivery to the customer's private water system begins at the downstream end of the service connection. This is often the outlet of the water meter or a valve.

The District is not responsible for eliminating or controlling cross-connections within the customer's water system. Under chapter 19.27 RCW, the responsibility for cross-connection control within the consumer's water system lies with the Authority Having Jurisdiction (AHJ) or Building Official. Based on these requirements, the District's CCCPM is focused on protecting the public water system and is not intended to prevent cross-connections within the premises. The CCCPM will be provided to the applicable AHJ within the District's service area.

The District works to ensure that cross-connections between the distribution system and a customer's premises are eliminated or controlled by installing an approved backflow preventer or approved air gap commensurate with the assessed degree of hazard. The CCCPM describes how the District will determine the required protection.

The customer is required to install, maintain, and test backflow protection assemblies (or approved air gaps) as determined by the District. The customer's responsibility is the cost of assembly design, installation, maintenance, replacement, and testing. Backflow protection assemblies and approved air gaps are the property and responsibility of the customer. District representatives may inspect such equipment periodically.

Customers who fail to cooperate in the installation, maintenance, repair, inspection, or testing of backflow preventers or approved air gaps as required by the District, will not receive a water service or will have service disconnected. Water service disconnection will occur as described in the enforcement section of the CCCPM.

2. DEFINITIONS

AGRICULTURAL (farms and dairies) – specific land areas on which agricultural activities are conducted. Agricultural uses and practices include, but are not limited to, producing, breeding, or increasing agricultural products; rotating and changing agricultural crops; conducting agricultural operations; maintaining, repairing, and replacing agricultural equipment; maintaining, repairing, and replacing agricultural facilities. Another potential indicator of agricultural uses may be properties approved as “farm and agricultural” land under open space laws (chapter 84.34 and chapter 458-30 WAC).

APPROVED AIR GAP (AG) – a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. To be approved, the separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch when unaffected by vertical surfaces (sidewalls);
- Three times the diameter of the supply piping if the horizontal distance between

the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe. Or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and, in no case, less than one and one-half inches.

APPROVED BACKFLOW PREVENTION ASSEMBLY – an RPBA, RPDA, DCVA, DCDA of make, model, and size approved by the District. Assemblies must appear on the currently approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research.

AUTHORITY HAVING JURISDICTION (AHJ) – the local official, board, department, or agency authorized to administer and enforce the provisions of the plumbing codes as adopted under chapter 19.27 RCW. This includes the Building Official from Burlington, Mount Vernon, Sedro-Woolley, and Skagit County.

AUXILIARY WATER SUPPLY – a water supply (other than the District’s water supply) on or available to the consumer’s premises. A well is an example of an auxiliary water supply.

BACKFLOW – the undesirable reversal of the flow of water or other substances through a cross-connection into the District’s water system or consumer’s potable water system.

BACKFLOW ASSEMBLY TESTER (BAT) – a person holding a valid BAT certificate issued under chapter 246-292 WAC.

BACKFLOW PREVENTION DEVICE – a backflow preventer not designed for in-line testing.

BACKPRESSURE – a pressure caused by a pump, elevated tank or piping, boiler, or other means, on the consumer’s side of the service connection that is greater than the pressure provided by the public water system, and which may cause backflow.

BACKSIPHONAGE – backflow due to reduced system pressure in the purveyor’s distribution and/or consumer’s water systems.

CROSS-CONNECTION – any actual or potential physical connection between a public water system or the consumer’s water system and any source of non-potable liquid, solid, or gas that could contaminate the potable water supply by backflow.

CROSS-CONNECTION CONTROL SPECIALIST (CCS) – a person holding a valid CCS certificate issued under chapter 246-292 WAC.

DEGREE OF HAZARD – the type of potential risk or hazard, such as pollution or contamination, determined through an evaluation of the conditions within a consumer’s water system.

DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) – a backflow prevention assembly consisting of two approved double check valve assemblies, set in parallel, equipped with a meter on the bypass line to detect small amounts of water leakage or use.

DOUBLE CHECK VALVE ASSEMBLY (DCVA) – a backflow prevention assembly composed of two single, independently acting check valves, spring-loaded to the closed position, and installed as a unit with, and between, two resilient seated shutoff valves and having four properly located resilient seated test cocks.

FACILITY SURVEY – an on-site review to assess the degree of hazard. A survey of the customer’s premises is not intended to be an inspection of the entire plumbing system; it allows a District cross-connection control specialist to determine the degree of hazard and commensurate backflow prevention requirements. The District may waive an on-site review depending on information received from the customer or when related to proposed new service connections.

FIRE PROTECTION SERVICE CONNECTION – a water service for fire protection that is fitted with such fixtures only as are needed for fire protection and is entirely disconnected from those used for other purposes.

HIGH HEALTH HAZARD – Any physical, chemical, biological, or radiological substance that may enter the drinking water supply, impair the potable water quality, and may result in injury, poisoning, or the spread of disease.

IN-PREMISES ISOLATION – the practice of installing backflow prevention assemblies, devices, or methods at the point of hazard.

IRRIGATION SERVICE CONNECTION – a meter installed solely to meter non-agricultural irrigation water to a customer’s premises.

LOW HEALTH HAZARD – those contaminants which, at the levels found in the water, could cause adverse aesthetic problems to the drinking water supply, such as taste, odor, and color of the water but do not present a danger to public health.

NON-POTABLE – any water, liquid, gas, or other substance not intended for human consumption.

NON-RESIDENTIAL SERVICE CONNECTION – all service connections that do not meet the definition of residential, fire protection, or irrigation service connections.

POTABLE WATER – water safe for human consumption and free from harmful or objectionable materials that could cause injury, disease, or harmful physiological effects.

PREMISES – any property where water service is provided, including all buildings, improvements, and moveable and permanent structures.

PREMISES ISOLATION – a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection, or an alternative location acceptable to the purveyor, to isolate the consumer’s water system from the purveyor’s distribution system.

REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) – a backflow prevention assembly composed of two independently acting check valves spring loaded to the closed position and an automatically opening differential relief valve between the two check valves. Installed as a unit with, and between, two resilient seated shutoff valves and four properly located resilient seated test cocks.

REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) – a backflow prevention assembly incorporated of two approved reduced pressure backflow assemblies, set in parallel, equipped with a meter on the bypass line to detect small amounts of water leakage or use.

RESIDENTIAL SERVICE CONNECTION – a meter serving a single-family dwelling or

residential building consisting of three or fewer units. The meter may serve associated uses such as agricultural, home-based businesses, or approved accessory dwelling units (ADU).

SEVERE HEALTH HAZARD – a cross-connection that could impair potable water quality and create an immediate, severe health hazard through poisoning or spread of disease by contaminants from radioactive material processing plants, nuclear reactors, or wastewater treatment plants.

3. AUTHORITY HAVING JURISDICTION (AHJ)

Washington Administrative Code requires water purveyors and local administrative authorities to coordinate on cross-connection issues. A successful Cross-Connection Control Program depends on cooperation and collaboration between the purveyor and AHJ. The local authorities in the District's service area include the city of Burlington, city of Mount Vernon, city of Sedro-Woolley, and Skagit County.

The District's responsibility for cross-connection control ends at the point of delivery to the consumer's water system. The responsibility for cross-connection within the consumer's water system lies with the AHJ.

The District's policy for non-residential connections is to implement a premises isolation program that protects the public water system. The AHJ establishes requirements for the customer's premises in accordance with plumbing codes. The District monitors backflow preventers that protect the public water system. When premises isolation is established at a service connection, the District will only monitor the assembly(s) that isolate the public water system from the consumer's water system. In these situations, the District will discontinue monitoring of other in-premises backflow preventers. For residential connections, the District will allow and monitor backflow protection at the point of hazard allowed by this CCCPM.

The District will continue to strive for improved coordination and collaboration with the AHJs. The District relies on communication from an applicable AHJ regarding permit-driven activity to help identify existing services that may require backflow protection. If the District cannot obtain this information, public record requests may be necessary.

4. PREMISES AND IN-PREMISES ISOLATION REQUIREMENTS

The District implements a combination program that relies on premises isolation and in-premises isolation to protect the public water system. Customers shall comply with the minimum protection requirements specified in subsections (4)(A) and (4)(B) of this section. All other uses will require a facility survey by the District to determine requirements for backflow protection.

All backflow prevention assemblies required by the District shall be installed and approved in accordance with the District's Engineering Standard Details, which are located on the District's website.

A. PREMISES ISOLATION

The control or elimination of cross-connections shall be no less stringent than the following. Premises with activities or water uses that may create a potential, or actual cross-connection require the premises owner to provide backflow prevention methods, as

determined by the District, commensurate with the degree of hazard. The following list includes, but is not limited to, the type of premises and/or the type of water use, at or within a premise, that require backflow prevention and the District's minimum allowable method for each.

Description of Hazard or Premises	Minimum Protection at Service Connection
Agricultural (farms and dairies)	RPBA
Agricultural rate customers	RPBA
Auxiliary supply	RPBA
Fire protection system With chemical injection Without chemical injection	RPDA DCDA
Hydroponics	RPBA
Irrigation service connection (including irrigation service through a deduct meter branch line at the service connection)	DCVA
Irrigation system with chemical injection	RPBA
Large parcels (5+ acres)	DCVA
Non-residential service connection	RPBA
Residential booster pump	DCVA
Residential sewage pump, lift station, and/or grinder pump	RPBA
Solar heating systems, heat exchangers	RPBA
Survey access denied or restricted	RPBA
All other premises listed in Table 13 WAC-246-290-490	RPBA

B. IN-PREMISES ISOLATION

Backflow protection is allowed at the point of hazard for residential hazards such as, but not limited to, the following:

Description of Fixture, Equipment, or Use of Water	Minimum Protection at Fixture
Dialysis equipment	RPBA
Recirculating pumps	RPBA
Swimming pool	AG or RPBA
Irrigation system without chemicals	DCVA
Fire protection system* With chemical injection Without chemical injection	RPBA DCVA

*Backflow prevention is not required on residential flow-through fire protection systems constructed entirely of approved potable water piping, materials, and fixtures.

5. FACILITY SURVEY SCHEDULE

A. The District will prioritize its facility surveys based on the degree of hazard and the minimum DOH requirements. Once the District is made aware of a service connection that does not have proper cross-connection control, the priority of the enforcement process will be on those categorized as a higher risk by the District. The District shall ensure that the customer installs approved backflow preventers commensurate with the degree of hazard within 30-90 days of the District notifying the customer. The District reserves the right to deviate from this schedule. Once the District has completed a facility survey and determined the level of protection required, if any, the customer will be notified in writing of the requirements and schedule. Enforcement procedures for non-compliance with backflow prevention requirements are described in Section 7.

B. Facility surveys will occur as follows:

1. New Service Connection:

Upon application for water service, the District will interview the customer about the proposed use and determine the appropriate level of backflow prevention required. These requirements will be communicated to the customer before processing the application. The service shall not be activated until backflow protection requirements have been approved by the District. Temporary activation is allowed to facilitate testing, but service will be disconnected if testing is not completed in a timely manner.

2. Existing Service Connection:

The District may require a facility survey when made aware of the proposed permit-

driven activity or other similar communication from the AHJ or when a customer inquiry to the District initiates an investigation. Proposed permit-driven activity includes, but is not limited to, new construction, remodeling, additions, revised plumbing, and land divisions or changes in use. Facility surveys may also be required if a customer proposes changes to existing water services or new water system improvements at a Pre-Application/Pre-Development Meeting with the AHJ.

Facility surveys shall assess both existing and proposed uses. The District does not otherwise proactively search for or enforce requirements for new backflow protection on existing service connections.

6. ANNUAL BACKFLOW PREVENTION ASSEMBLY TESTING

- A.** All backflow prevention assemblies will be tested upon installation, after repair, reinstallation, or relocation, and annually after that. The District will notify customers annually by mail in the month before their annual due date that an annual test of their backflow prevention assembly is required. The test must be completed, and the associated test report must be received by the District before the last day of their annual due date month of the same year. It is the customer's responsibility to ensure that the District has received the test report. The District will not acknowledge that a test has been completed until the test report has been received.
- B.** A Backflow Assembly Tester (BAT) holding a valid Washington State BAT certification is required to complete all testing of backflow prevention assemblies. Testers will be required to furnish a current Washington State Department of Health certification and verification of test equipment calibration to the District prior to the District's acceptance of backflow prevention assembly test reports.
- C.** The customer will be responsible for replacing or repairing the backflow prevention assembly if the assembly fails to test satisfactorily. The replacement, repair, and successful testing shall be accomplished before the customer's annual due date.
- D.** The District utilizes an online-only backflow test entry system. Certified testers and testing companies shall submit test results online.

7. ENFORCEMENT

A. General Enforcement

Existing or future water service to premises will not be allowed by the District or be "grandfathered" if a backflow prevention assembly required by the District is not documented in writing to be permanently installed, maintained, and tested annually.

Section 2.4.7 of the District's Water Policy Manual describes the District's authority to disconnect service when a customer fails to meet cross-connection control requirements. The following circumstances may result in the disconnection of water service:

- Refusal to install a backflow prevention assembly when required by the District.
- Failure to replace an improper type and/or replace or repair a defective or improperly installed backflow prevention assembly.
- Failure to have the backflow prevention assembly tested per District requirements.

Advanced notification will be provided before disconnection of the water service for non-

compliance unless the degree of hazard, or potential degree of hazard, is so severe that it could cause immediate contamination and/or health risk. All costs incurred enforcing the action shall be borne by the property's responsible party.

The progressive enforcement process, as described below, details how the District will enforce non-compliance when new protection is required on existing services or when customers fail to comply with backflow assembly testing requirements.

Removal, replacement, or relocation of a backflow prevention assembly requires District approval and inspection and may require a new facility survey. The removal of an assembly is allowed once a facility survey is completed, and a determination is made that the hazard is eliminated. If there are other assessed hazards at the time of the facility survey, a new assembly installation will be required commensurate with the degree of hazard.

B. Enforcement Process - New Installations on Existing Services

After a facility survey has been completed on an existing service, the required backflow prevention assemblies must be installed within ninety (90) days of the District notifying the customer. A reminder notice shall be mailed thirty (30) days prior to the due date.

If requirements have not been satisfied by the due date, a past due notice will be mailed to the customer one (1) working day after the original due date, allowing the delinquent customer fifteen (15) additional calendar days to complete the installation.

If requirements are not satisfied by the revised due date, a final notice shall be mailed to the customer, notifying them that their water service will be disconnected if requirements are not completed. The final notice will provide (10) ten calendar days' notice of the scheduled disconnection. Service may be disconnected at that time if the requirements are not satisfied.

The District reserves the right to deviate from this schedule. Before turn on/reconnection, the Customer will be advised of current charges for service turn on/reconnection. (See Appendix A, Table A-9 in the District's Water Policy Manual).

C. Enforcement Process - Annual Testing

As a courtesy, the District sends reminder notices when backflow assemblies are due for annual testing. If the annual backflow assembly test has not been received by the customer's established due date, a second notice will be mailed fifteen (15) days after the original due date. The second notice will state that the annual backflow assembly test is Past Due and must be completed and submitted within thirty (30) days.

If requirements are not satisfied following the second notice and an additional 30-day period, a third notice will be mailed fifteen (15) days after the second due date. The third notice will state that testing must be completed and submitted within fifteen (15) days.

If requirements are not satisfied by the revised due date, a final notice shall be mailed to the customer, notifying them that their water service will be disconnected if requirements are not completed. The final notice will provide (10) ten calendar days' notice of the scheduled disconnection. Service may be disconnected at that time if requirements have not been satisfied.

The District reserves the right to deviate from this schedule. Before turn on/reconnection,

the Customer will be advised of current charges for service turn on/reconnection. (See Appendix A, Table A-9 in the District's Water Policy Manual).

D. Appeal Process

Any Customer or other person who believes they have been wrongfully treated by a decision of the District related to this CCCPM may request an appearance before the Commission in accordance with Section 2.8 (Dispute Resolution) of the District's Water Policy Manual. The customer's written notification to initiate the Dispute Resolution process must be received prior to the scheduled disconnection date to stay the scheduled disconnection.

8. PROGRAM ADMINISTRATION

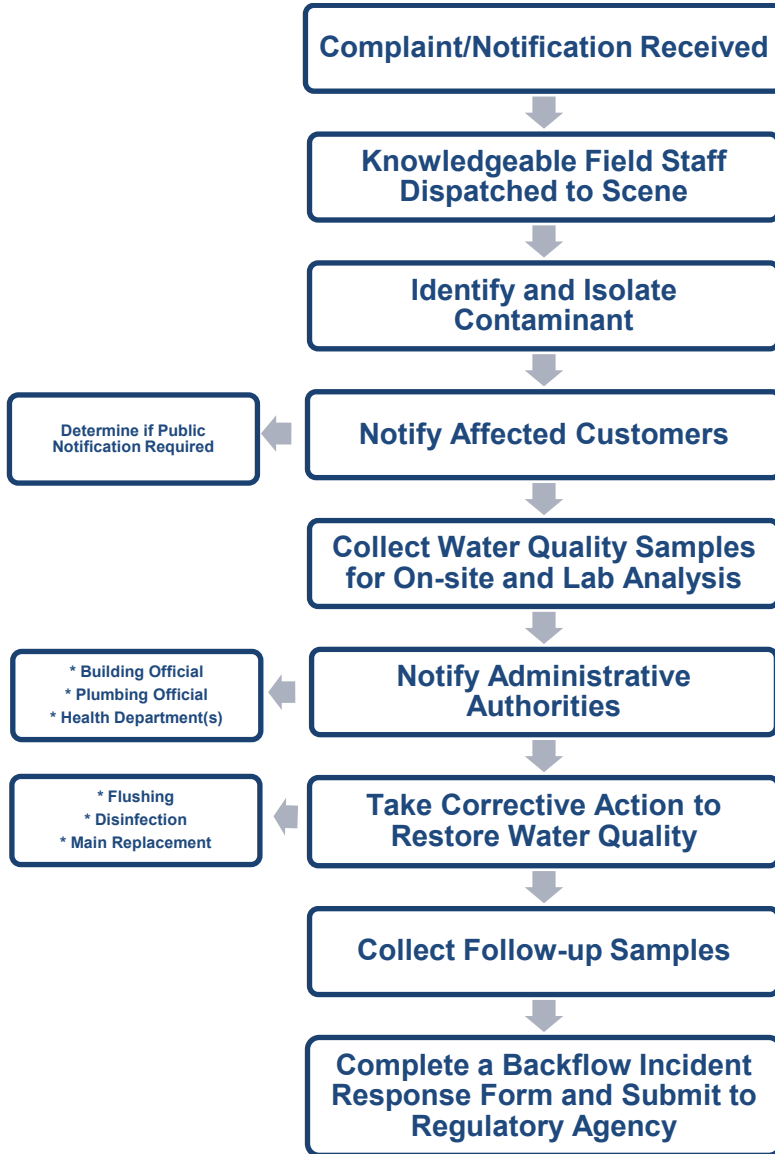
The District is responsible for developing and implementing the Cross-Connection Control Program. The District employs multiple certified cross-connection control specialists in support of the Program. Program administration duties are the responsibility of the Engineering Department.

Public education will include periodic pamphlet distribution, newsletter articles, website updates, and continued discussion with existing and new customers.

The District maintains cross-connection control records. Technology is utilized to keep a master list of service connections where backflow preventers protect the public water system from contamination. Specialized tracking software programs keep inventory information on approved air gaps and backflow assemblies, including location, assembly description, assessed degree of hazard, and history of inspections and testing.

9. BACKFLOW INCIDENT RESPONSE

In the event of a possible or suspected backflow incident, the following general steps will be taken:



10. INCENTIVE PROGRAM

Overview

Due to the long history of the District’s water systems, evolving regulations and practices related to cross-connection control, and changes to uses on a given property over time, the District may require an existing customer to install backflow preventers where they did not exist in the past. This requirement may be unexpected to the customer and can result in unanticipated costs.

The incentive program described below provides financial assistance to a limited number of customers who are required to install backflow preventers at an existing water service location. Providing financial assistance to customers in these situations can benefit the District’s efforts to protect the public water system. This assistance can result in reduced staff time enforcing cross-connection policy and may expedite the installation of backflow preventors at unprotected service locations. In this manner, the incentive program is within the District’s public charge and mission to provide our customers with high-quality water services at an affordable price.

The Board of Commissioners shall establish funding levels for the assistance program during each annual budgeting process.

Application process

Existing customers that require cross-connection control (DCVA or RPBA) would be eligible to apply, except for the following customers who do not qualify for the incentive program:

- customers requesting to upsize an existing water service
- customers with premises requiring new backflow protection for more than the initial 90-day period.

The District will consider applications on a “first come, first served” basis. When the District budget for a given year is fully allocated to approved applications, the District will cease approving allocations until the following year and pending budget approval.

Assistance details

A lump sum reimbursement would be provided by the District to the customer upon successful installation, successful testing of the new backflow prevention assembly, and submittal of required cost documentation. Reimbursed costs shall be associated with the basic scope of backflow prevention assembly installation as depicted on District standard details, excluding expenses related to surface restoration, electrical components, and non-contracted labor. A conceptual design or sketch of the proposed installation shall be supplied by the customer with the application. Reimbursements shall be in accordance with the following table.

Cross-Connection Control Incentive Program funding limits:

	Double-Check Assembly	RPBA Assembly
Maximum funding limit per assembly	\$1,500	\$ 3,500