

PREPARED BY:



CITY OF REDLANDS

CROSS-CONNECTION CONTROL PLAN

IN ACCORDANCE WITH THE CROSS-CONNECTION
CONTROL POLICY HANDBOOK ADOPTED IN 2023

**JUNE
2025**

Cross-Connection Control Plan

Prepared for

City of Redlands Municipal Utilities and Engineering Department

Project No. 908-A1-24-10

I certify that the information submitted in this Cross-Connection Control Plan is accurate and drafted to be in compliance with the Cross-Connection Control Policy Handbook.



Public Water System Representative:
Paul Mariscal, Water Utilities Manager

June 30, 2025

Date



Prepared by: Courtney Rubin
AWWA Cross-Connection Control Specialist #01854

June 25, 2025

Date



QA/QC Review: Alex Bucher
AWWA Cross-Connection Control Specialist #10708

June 25, 2025

Date

REVISION LOG

Revisions to this Cross-Connection Control Plan will be maintained in the Revision Log provided below.

Revision No.	Section Reviewed, Revised, and Amended	Effective Date	Reviewer/ Author
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Table of Contents

1.0 INTRODUCTION	1
1.1 Policy Development Background	1
1.2 Purpose	1
1.3 Service Area	2
2.0 DEFINITIONS	3
3.0 PROGRAM ADMINISTRATION	9
3.1 Legal Authority (CCCPH 3.1.3)	9
3.2 Chain of Command	9
4.0 CERTIFICATION REQUIREMENTS (CCCPH Chapter 3 Article 4)	11
4.1 Backflow Prevention Assembly Tester Certification Requirements (CCCPH 3.4.1)	11
4.1.1 Approved Backflow Prevention Assembly Tester List (CCCPH 3.4.1)	11
4.2 Cross-Connection Control Specialist Certification Requirement (CCCPH 3.4.2)	12
5.0 CROSS-CONNECTION CONTROL PROTECTION REQUIREMENTS (CCCPH 3.2.2)	13
5.1 General Requirements (CCCPH 2.2)	13
5.2 Backflow Protection Requirements	13
5.2.1 BPA Minimum BPA Type by Degree of Hazard	14
5.2.2 Toxic, Sewage, or Hazardous Substances	14
5.2.3 Auxiliary Water Supplies	14
5.2.4 Commercial Fire System	14
5.3 Single Family Residential Fire Systems	15
5.4 Hazard Assessments (CCCPH Chapter 3 Article 2)	15
5.4.1 Access for Inspection	15
5.4.2 Initial Hazard Assessment	15
5.4.3 Initial Hazard Assessment for Existing Services	16
5.4.4 New Construction	16
5.5 Follow Up Hazard Assessments	17
5.5.1 Hazard Assessment Outcomes	18
5.5.1.1 Meets Requirements	18
5.5.1.2 Non-Complying Assembly	18
5.5.1.3 New Assembly Required	18
5.6 Non-Compliance Penalties	18
6.0 BACKFLOW PREVENTION ASSEMBLIES (CCCPH ARTICLE 3)	19
6.1 Approved BPAs (CCCPH 3.3.1)	19
6.2 Installation Requirements (CCCPH 3.3.2)	19
6.2.1 Air Gap Separation (AG)	19
6.2.2 Reduced Pressure Principle BPA (RP)	20
6.2.3 Reduced Pressure Principle Detector BPA (RPDA and RPDA II)	20
6.2.4 Double Check Valve BPA (DC)	20

Table of Contents

6.2.5 Double Check Detector BPA (DCDA and DCDA II)	20
6.2.6 Pressure Vacuum Breaker BPA (PVB)	20
6.3 Swivel-ElIs (CCCPH 3.2.2(d))	20
6.3.1 Design and Construction Requirements (CCCPH Appendix C)	21
6.3.2 Swivel-ElI Safety Procedures	21
7.0 TESTING AND MAINTENANCE OF BACKFLOW PREVENTION ASSEMBLIES (CCCPH 3.3.3)	23
7.1 BPA Testing	23
7.1.1 Frequency of Testing	23
7.1.2 Procedures for Testing	23
7.1.3 New Installations	23
7.1.4 Failed Test	23
7.1.5 Upgrading	24
7.2 Notifications	24
7.2.1 Notification Process	24
7.2.2 Yearly Testing Notifications	24
7.2.3 Notification of Imminent Hazard	24
8.0 RECORD MAINTENANCE (CCCPH 3.5.1)	25
8.1 Cross-Connection Control Plan	25
8.2 Hazard Assessments	25
8.3 Assembly Records	25
8.4 Testing Results	25
8.5 Repairs	25
8.6 Recycled Water Cross-Connection Control Shutdown Tests	25
8.7 User Supervisors	25
8.8 Incident Reports	26
8.9 Public Education Material	26
8.10 Contract and Agreements	26
9.0 INCIDENT RESPONSE AND NOTIFICATION	27
9.1 Incident Response Procedure (CCCPH 3.5.2)	27
9.1.1 Incident Investigation	27
9.1.2 Sources of Contamination Isolation	27
9.1.3 Notification and Coordination with Outside Agencies	28
9.1.4 Sampling Plan	28
9.1.5 Notification of Affected Customers	28
9.1.6 Backflow Incident Notification (CCCPH 3.5.3)	28

Table of Contents

10.0 PUBLIC OUTREACH, EDUCATION, AND COORDINATION	29
10.1 Public Outreach and Education	29
10.2 Internal Training	29
10.3 User Supervisors (CCCPH 3.2.2.-f)	29
10.4 Coordination.....	29
10.4.1 Inter-Department Coordination.....	29
10.4.2 Inter-Agency Coordination.....	30
11.0 RECYCLED WATER COMPLIANCE.....	31
11.1 Introduction.....	31
11.2 Recycled Water System Description.....	31
11.3 Service Connection Protection	31
11.4 Roles and Responsibilities	32
11.5 Site Compliance Monitoring.....	32
11.5.1 Design.....	32
11.5.2 New Construction Site Inspection.....	32
11.5.3 Annual Site Inspection	33
11.5.4 Cross-Connection Shutdown Test.....	33
11.5.5 Recycled Water Site Supervisor	34
11.5.6 Training	34
11.5.7 Responsibilities	34
11.5.8 Changes to the Site Supervisor	34

LIST OF TABLES

Table 5-1. City of Redlands Initial Hazard Assessments Timelines.....	17
---	----

LIST OF FIGURES

Figure 3-1. Organizational Chart for the Cross-Connection Control Program	10
---	----

LIST OF APPENDICES

Appendix A. Cross-Connection Control Policy Handbook (Amended June 17, 2025)	
Appendix B. Chapter 13.20 Cross-Connection and Backflow Prevention	
Appendix C. Backflow Test Report	
Appendix D. Standard Drawing A-20516 Typical Reduced Pressure Installation	
Appendix E. Standard Drawing A-20517 3-Inch to 10-Inch DC Fire Service (Above Ground)	

Table of Contents

LIST OF ACRONYMS AND ABBREVIATIONS

AG	Air Gap Separation
ANSI	American National Standard Institute
BPA	Backflow Prevention Assembly
BPA Tester	Backflow Prevention Assembly Tester
CCCP	Cross-Connection Control Plan
CCCPH	Cross-Connection Control Policy Handbook
CCR	California Code of Regulation
City MUED	City of Redlands Municipal Utilities and Engineering Department
DC	Double Check Valve Backflow Prevention Assembly
DCDA	Double Check Detector Backflow Prevention Assembly
DCDA-II	Double Check Detector Backflow Prevention Assembly – Type II
GIS	Geographic Information System
Program	City of Redland MUED’s Cross-Connection Control Program
PVB	Pressure Vacuum Breaker Backsiphonage Prevention Assembly
PWS	Public Water System
RMC	Redlands Municipal Code
RP	Reduced Pressure Principle Backflow Prevention Assembly
RPDA	Reduced Pressure Principle Detector Backflow Prevention Assembly
RPDA-II	Reduced Pressure Principle Detector Backflow Prevention Assembly – Type II
RW	Recycled Water
RWSS	Recycled Water Site Supervisor
SDWA	California’s Safe Drinking Water Act
SVB	Spill-Resistant Pressure Vacuum Breaker
WWTF	Wastewater Treatment Facility
RWQCB	Regional Water Quality Control Board
Swivel-Ell	Swivel-Ell Backflow Prevention Assembly
SWRCB	State Water Resource Control Board
Title 17	Title 17, Chapter V, Sections 7583-7622 under California Code of Regulations

Cross-Connection Control Plan

1.0 INTRODUCTION

The State Water Resources Control Board (SWRCB) adopted the Cross-Connection Control Policy Handbook (CCCPH) on December 19, 2023. The effective date for the CCCPH is July 1, 2024, replacing the previous regulations covered under Title 17, Chapter V, Sections 7583-7622 under California Code of Regulations (CCR) (Title 17). The 2023 adopted version of the CCCPH is included in Appendix A of this document. Title 17 became inoperative and repealed 90 days after July 1, 2024. The CCCPH expands on the previous Title 17 requirements for initial and follow-up hazard assessments, program training, backflow prevention testing and certification, maintenance of records, incident response, reporting and notification, public outreach and education, and local entity coordination. The CCCPH requires any Public Water System (PWS) to develop a Cross-Connection Control Plan (CCCP) to describe how the PWS will manage and administer their Cross-Connection Control Program (Program).

1.1 Policy Development Background

Through the adoption of the CCCPH, the SWRCB is exercising its authority, under California's Safe Drinking Water Act (SDWA), to establish enforceable standards applicable to California's PWSs. Failure to comply with the CCCPH may result in the issuance of compliance, enforcement, or other corrective actions against a PWS.

Through Assembly Bills 1671 and 1180, SDWA was amended and established the following:

- The SWRCB must adopt standards for backflow protection and cross-connection control by January 1, 2020.
- The SWRCB may establish standards for backflow protection and cross-connection control through the adoption of the CCCPH, with the CCCPH not being subject to the requirements of the California Administrative Procedure Act.
- If standards for backflow protection and cross-connection control are established via the CCCPH, the SWRCB must:
 - Consult with state and local agencies and persons, identified by the SWRCB, as having expertise on the subject of backflow protection and cross-connection control.
 - Hold at least two public hearings before adoption of the CCCPH.
 - Post the CCCPH on the SWRCB website.
- Upon the effective date of the CCCPH, the previous Cross-Connection Control Standards become inoperative, and are repealed 90 days later, unless the SWRCB determines not to repeal a specific existing regulation.
- A PWS must implement a Cross-Connection Control Program that complies with the standards adopted by the SWRCB.
- Use of a swivel-ell must be consistent with any notification and backflow protection provisions contained in the CCCPH.

1.2 Purpose

The intent of this document is to comply with the requirements of the CCCPH and describe the Program implemented and administered by the City of Redlands Municipal Utilities Engineering Department (City MUED).



Cross-Connection Control Plan

The purpose of this CCCP is to protect the PWS by establishing standards that preserve water quality and ensure the health of the water customers by:

1. Isolating within the premises contamination or pollution that may occur because of some undiscovered or unauthorized cross connection.
2. Proper installation and maintenance of backflow preventors. The presence of backflow preventers is intended to prevent the backflow or backsiphonage of contaminants or pollutants from a customer's premises into the PWS.
3. Promoting the elimination of existing or future cross-connections between drinking water systems and other sources of non-potable water through inspection and regulation of plumbing and water piping within or between a customer's premises and the PWS.

1.3 Service Area

The City MUED serves potable and recycled water to customers located within the City limits as well as the unincorporated community of Mentone and parts of Loma Linda and San Bernadino. The City MUED services single-family residential customers, commercial, multifamily, dedicated irrigation, and industrial customers. The City MUED operates two major water treatment plants which treat both surface and groundwater to meet drinking water standards.

The City MUED is approximately 36 square miles and is located in San Bernadino County northwest of Palm Springs and east of Los Angeles. The City MUED's water operations are governed by the City's elected City Council members. The City MUED is considered a public community water system with nearly 23,000 service connections. The City operates two surface water treatment plants, 23 wells, 44 booster pumps, 18 reservoirs, and approximately 450 miles of transmission and distribution lines.

Since the number and type of connections will vary over time, the exact number and types of services can be provided to the SWRCB upon request.



Cross-Connection Control Plan

2.0 DEFINITIONS

The following definitions describe terms and phrases pertinent to the various elements of this CCCP. The definitions presented in this section are derived from the CCCPH and listed alphabetically.

Air Gap Separation (AG)

The term “air gap separation” means a physical vertical separation of at least two (2) times the effective opening, as defined in Section 207.0 of the California Plumbing Code, between the free-flowing discharge end of a potable water supply pipeline and the flood level of an open or non-pressurized receiving vessel, and in no case less than one (1) inch.

Approved Water Supply

A water source that has been approved by the State Water Board for domestic use in a PWS.

Auxiliary Water Supply

A source of water, other than an approved water supply, that is either used or equipped, or can be equipped, to be used as a water supply and is located on the premises of, or available to, a water user.

Backflow

The undesired or unintended reversal of flow of water and/or other liquids, gases, or other substances into a public water system’s distribution system or approved water supply. Backsiphonage or backpressure are the two conditions that cause backflow to occur.

Backflow Prevention Assembly (BPA)

A mechanical assembly designed and constructed to prevent backflow, such that while in-line it can be maintained and its ability to prevent backflow, as designed, can be field tested, inspected, and evaluated.

Backflow Prevention Assembly Tester (BPA Tester)

A person who is certified as a backflow prevention assembly tester.

Backpressure

Any elevation of pressure in the downstream piping system (by pump, elevation of piping, steam pressure, air pressure, etc.) above the supply pressure at the point of consideration, which would cause or tend to cause a reversal of the normal direction of flow.

Backsiphonage

A form of backflow due to the reduction in system pressure, which causes a sub-atmospheric pressure to exist in the water system.



Cross-Connection Control Plan

City MUED Water System

The City MUED water system consists of the source facilities and distribution system under the control of the City MUED up to and including water meters. The City MUED water system may also be referred to as the public water system or the distribution system.

Contamination/Contaminant

Any impairment of the quality of the potable water by sewage, industrial fluids, recycled water, or waste liquids, compounds or other materials to a degree that creates an actual hazard to the public health through poisoning or through the spread of disease.

Cross-Connection

Any actual or potential connection or structural arrangement between a public water system, including a piping system connected to the public water system and located on the premises of a water user or available to the water user, and any source or distribution system containing liquid, gas, or other substances not from an approved water supply.

Customer's Onsite Water System

All facilities beyond the water meter. The customer's onsite system or systems may include both potable and non-potable water systems.

Distribution System

Shall include the network of conduits used for the delivery of water from the source to the customer's onsite water system. See also City MUED Water System.

"Distribution system" means any combination of pipes, tanks, pumps, etc., which delivers drinking water from a source or treatment facility to the consumer and includes:

- a) Disinfection facilities for which no Giardia or virus reduction is required pursuant to Section 64654 (a)
- b) The composite of all distribution systems of a public water system

Double Check Detector Backflow Prevention Assembly (DCDA)

A double check valve backflow prevention assembly that includes a bypass with a water meter and double check backflow prevention assembly, with the bypass water meter accurately registering flow rates up to two gallons per minute and visually indicating all rates of flow. This type of assembly may only be used for protection from backsiphonage and backpressure events (low hazard cross-connection). A schematic of this assembly is provided in Appendix C of the CCCPH (see Appendix A of this document).

Double Check Detector Backflow Prevention Assembly – Type II (DCDA-II)

A double check valve backflow prevention assembly that includes a bypass around the second check, with the bypass having a single check valve and a water meter accurately registering flow rates up to two gallons per minute and visually indicating all rates of flow. This type of assembly may only be used for



Cross-Connection Control Plan

protection from backsiphonage and backpressure events (low hazard cross-connection). A schematic of this assembly is provided in Appendix C of CCCPH (see Appendix A of this document).

Double Check Valve Backflow Prevention Assembly (DC)

An assembly consisting of two independently acting internally-loaded check valves, with tightly closing shut-off valves located at each end of the assembly (upstream and downstream of the two check valves), and fitted with test cocks that enable accurate field testing of the assembly. This type of assembly may only be used for protection from backsiphonage and backpressure events (low hazard cross-connection).

Hazard Assessment

An evaluation of a user premises designed to evaluate the types and degrees of hazard at a user's premises.

Hazard, Degree of

A hazard assessment must identify the degree of hazard (or no hazard) to the City MUED's distribution system through evaluation of user premises based on the following classifications:

High Hazard Cross-Connection

A cross-connection that poses a significant threat to the potability or safety of the public water supply. Materials entering the public water supply through a high hazard cross-connection are contaminants or health hazards. Appendix D of the CCCPH provides examples of high hazard premises (see Appendix A of this document).

Low Hazard Cross-Connection

A cross-connection that has been found to not pose a significant threat to the potability or safety of the public water supply but may adversely affect the aesthetic quality of the potable water supply. Materials entering the public water supply through a low hazard cross-connection are pollutants or non-health hazards.

Internal Protection

The appropriate type or method of backflow prevention within the customer's onsite water system at the point of use, commensurate with the degree of hazard.

Pollution/Pollutant

The presence of any foreign substance (organic, inorganic, or biological) in water that tends to degrade its quality so as to constitute a hazard or to impair the usefulness or quality of the water to a degree that does not create an actual hazard to the public health, but which does adversely and unreasonably affect such waters for domestic use.



Cross-Connection Control Plan

Premises Containment

Protection of a public water system's distribution system from backflow from a user's premises through the installation of one or more air gaps or BPAs, installed as close as practical to the user's service connection, in a manner that isolates the water user's water supply from the public water system's distribution system.

Pressure Vacuum Breaker Backflow Prevention Assembly (PVB)

An assembly with an independently-acting internally-loaded check valve and an independently-acting loaded air inlet valve located on the discharge side of the check valve; with test cocks and tightly closing shutoff valves located at each end of the assembly that enable accurate field testing of the assembly. This type of assembly may only be used for protection from backsiphonage (low hazard and high hazard cross-connection) events and is not to be used to protect from backpressure events. A schematic of this assembly is provided in Appendix C of the CCCPH (see Appendix A of this document).

Public Water System (PWS)

A system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. A public water system includes the following:

1. Any collection, treatment, storage, and distribution facilities under control of the operator of the system that are used primarily in connection with the system.
2. Any collection or pretreatment storage facilities not under the control of the operator that are used primarily in connection with the system.
3. Any water system that treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

Recycled Water (RW)

Wastewater which as a result of treatment is suitable for uses other than potable use. For the City of Redlands, tertiary treated recycled water is available through Redlands Wastewater Treatment Plant.

Recycled Water Site Supervisor (RWSS)

The person designated by the water user to oversee recycled water use at the site, ensuring it's used safely and in compliance with all applicable regulations. Acts as the main contact for inspections and cross-connection control.

Reduced Pressure Principle Backflow Prevention Assembly (RP)

An assembly with two independently acting internally-loaded check valves, with a hydraulically operating, mechanically independent differential-pressure relief valve located between the check valves and below the upstream check valve. The assembly shall have shut-off valves located upstream and downstream of the two check-valves, and test cocks to enable accurate field testing of the assembly. This type of assembly may be used for protection from backsiphonage and backpressure events (low hazard and high hazard cross-connection). A schematic of this assembly is provided in Appendix C of CCCPH (see Appendix A of this document).



Cross-Connection Control Plan

Reduced Pressure Principle Detector Backflow Prevention Assembly (RPDA)

A reduced pressure principle backflow prevention assembly that includes a bypass with a water meter and reduced pressure principle backflow prevention assembly, with the bypass's water meter accurately registering flow rates up to two gallons per minute and visually showing a registration for all rates of flow. This type of assembly may be used for protection from backsiphonage and backpressure events (low hazard and high hazard cross-connection). A schematic of this assembly is provided in Appendix C of CCCPH (see Appendix A of this document).

Reduced Pressure Principle Detector Backflow Prevention Assembly – Type II (RPDA-II)

A reduced pressure principle backflow prevention assembly that includes a bypass around the second check, with the bypass having a single check valve and a water meter accurately registering flow rates up to two gallons per minute and visually showing a registration for all rates of flow. This type of assembly may be used for protection from backsiphonage and backpressure events (low hazard and high hazard cross-connection). A schematic of this assembly is provided in Appendix C of CCCPH (see Appendix A of this document).

Spill-Resistant Pressure Vacuum Breaker Backsiphonage Prevention Assembly (SVB)

An assembly with an independently-acting internally-loaded check valve and an independently-acting loaded air inlet valve located on the discharge side of the check valve; with shutoff valves at each end and a test cock and bleed/vent port, to enable accurate field testing of the assembly. This type of assembly may only be used for protection from backsiphonage events (low hazard cross-connection) and is not to be used to protect from backpressure events. A schematic of this assembly is provided in Appendix C of the CCCPH (see Appendix A of this document).

Swivel-Ell Backflow Prevention Assembly (Swivel-Ell)

An assembly consisting of a reduced pressure principle backflow prevention assembly combined with a changeover piping configuration (swivel-ell connection) designed and constructed pursuant to Appendix C of the CCCPH (See Appendix A of this document).

User Premises

The property under the ownership or control of a water user and is served, or is readily capable of being served, with water via a service connection with a public water system.

User Service Connection

Refers to the point of connection of a user's piping to the PWS. If a meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the customer's meter. There should be no unprotected takeoffs from the service line on the City MUED's side of the meter or backflow prevention assembly located at the point of delivery to the customer's water system. Service connection shall also include water service connection from a fire hydrant and all other temporary or emergency water service connections from the PWS.

User Supervisor

A person designated by a water user to oversee a water use site and responsible for the avoidance of cross-connections.



Cross-Connection Control Plan

Water Supplier

The person who owns or operates the approved water supply system.

Water User

A person(s) or entity who is authorized by the PWS to receive water.



Cross-Connection Control Plan

3.0 PROGRAM ADMINISTRATION

This section describes the legal authority and chain of command for administering the Program.

3.1 Legal Authority (CCCPH 3.1.3)

The City MUED administers the Program in accordance with Redlands Municipal Code (RMC) Chapter 13.20 – Cross-Connections and Backflow Prevention. The original adoption was in 1967 in agreement with Title 17, Chapter V, Sections 7583-7622, CCR. The ordinance will be revised to include new elements presented in this CCCP and in compliance with CCCPH by January 2026.

Within the Redlands Municipal Code Chapter 13.20, the City MUED has the legal authority to implement corrective actions if a water user fails to comply in a timely manner with provisions regarding the installation, inspection, field testing, or maintenance of a backflow prevention assembly required by the CCCPH. The City MUED's corrective actions include the ability to discontinue water service until the correction has been made.

Redlands Municipal Code Chapter 13.20 is included in Appendix B of this document.

3.2 Chain of Command

The Program is administered within the City MUED and is responsible for administering other programs and initiatives such as citywide master plans, pollution prevention, storm water, and water conservation.

Regarding cross-connection control, the Program administration falls within the Water Distribution Division and includes cross-connection control reporting, backflow testing notification and tracking, and performing hazard assessments.

Figure 3-1 shows the current organizational chart for the MUED narrowed in on staff responsible for the Program. Additional Program activities spanning across other departments are discussed in more detail in Section 9 of this CCCP.

The Cross-Connection Control Inspector is required to hold a certified Cross-Connection Control Specialist certification and will be the Program Coordinator, responsible for carrying out the administrative responsibilities of the program.



Cross-Connection Control Plan

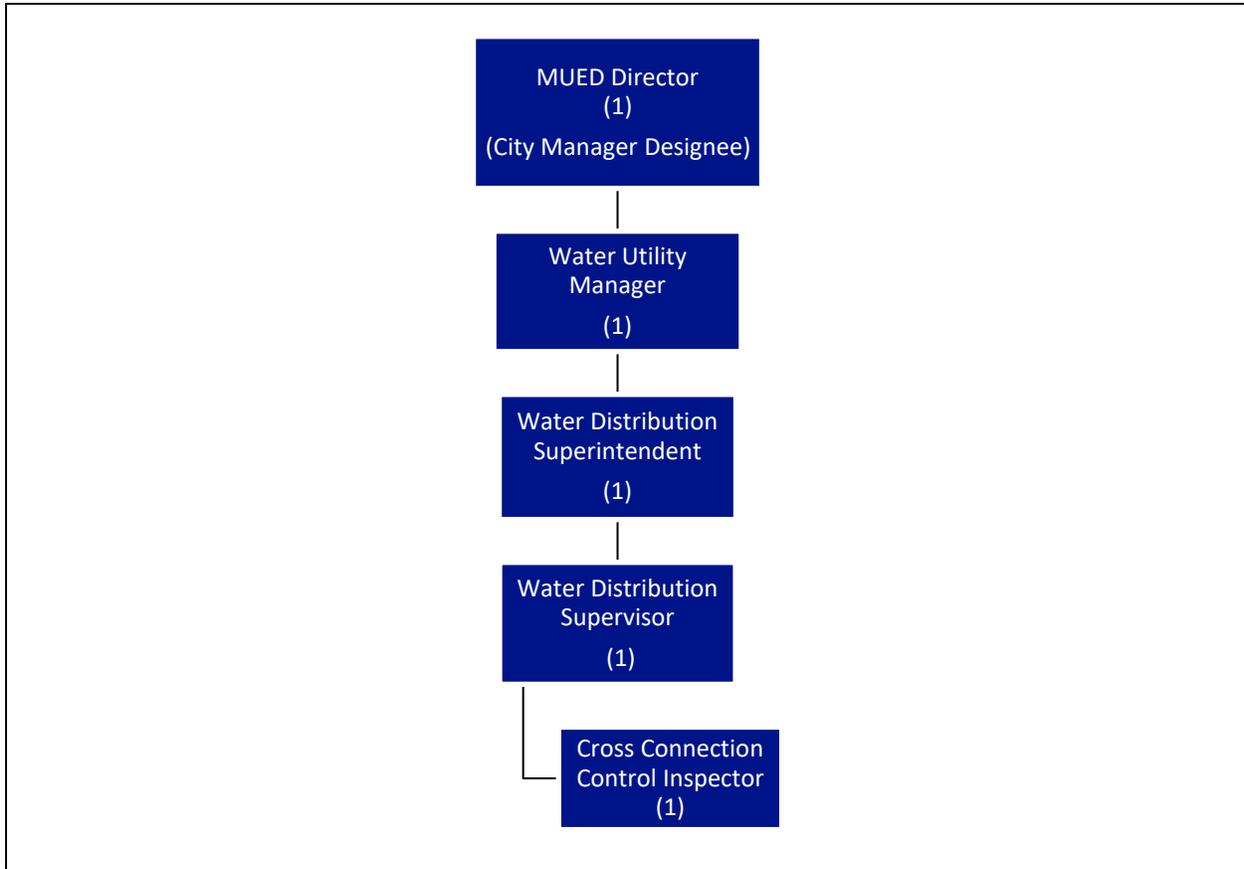


Figure 3-1. Organizational Chart for the Cross-Connection Control Program



Cross-Connection Control Plan

4.0 CERTIFICATION REQUIREMENTS (CCCPH CHAPTER 3 ARTICLE 4)

This section specifies the certification requirements for Backflow Prevention Assembly Tester (BPA Testers) and Cross-Connection Control Specialists.

4.1 Backflow Prevention Assembly Tester Certification Requirements (CCCPH 3.4.1)

Chapter 3, Article 4 of the CCCPH provides the requirements of a SWRCB recognized and American National Standards Institute (ANSI) accredited organization certifying BPA Testers. Within an accredited organization, the program must include provisions for revocation of a BPA, testers certification and a publicly available list of certified backflow prevention assembly testers. Certification from an accredited organization requires completion of a program that includes the following:

- Timed and proctored written exams with prescribed number of test questions and covering specified material.
- Performance of a hands-on exam demonstrating proficiency in accurately determining the operating condition of an RP, DC, PVB, and SVB.
- Recertification no less frequently than every three years including both a written and performance exam.
- Prerequisite of either two years prior experience or completion of an instructional training course.

4.1.1 Approved Backflow Prevention Assembly Tester List (CCCPH 3.4.1)

The City MUED will generate list of approved BPA Testers authorized to perform backflow related work within the City MUED service area. This list is available on the City MUED's backflow prevention webpage and a link to the webpage is also included in the City's backflow testing requirements notification letter.

The City MUED's requirements to be listed as an approved backflow tester are:

- Per the CCCPH requirement the tester must hold a valid certification for BPA testing from a recognized certification organization that is listed on the SWRCB list of recognized and accredited organizations. The tester must provide electronically, and on a yearly basis, a copy of their certification.
- The tester must provide electronically, and on a yearly basis (to the City MUED's online platform), a copy of their tester gauge(s) calibration report results including the make and model of field-testing equipment.
- The tester must hold a City of Redlands business license.
- The tester must register with and utilize the City MUED's online platform, BSI Online. The tester is not allowed to submit tests unless the tester information is updated and current. BSI Online confirms the information submitted.

The City MUED has a website with information related to backflow prevention and cross-connection control resources. Backflow tester information is present on the websites and will continue to be updated as needed.



Cross-Connection Control Plan

Testers may be removed from the City MUED's approved lists if any of the following conditions apply:

- Expiration of tester certification;
- Failure to maintain a calibrated gauge;
- Improperly testing or repairing assemblies;
- Falsifying results or documents;
- Failure to enter completed test reports into BSI Online; and
- Failure to maintain City of Redland's issued business license and when necessary, insurance requirements.

Appendix C includes a copy of the field test report required to be completed by BPA testers.

4.2 Cross-Connection Control Specialist Certification Requirement (CCCPH 3.4.2)

Cross-Connection Control Specialists shall maintain valid certification from a certifying organization recognized by the SWRCB pursuant to CCCPH Chapter 3 Article 4. Certification requires completion of a program that includes the following:

- Timed and proctored written exams with prescribed number of test questions and covering specified material.
- Completion of an instructional training course.
- Recertification no less frequently than every three years.
- Recertification through an exam, 12 contact hours of continuing education, or a combination of both.

Similar to programs requirements for BPA testers, the program for Cross-Connection Control Specialists from the accredited organization must contain:

- Provisions for revocation of a specialist's certification.
- A publicly available list of certified specialists.
- A valid backflow prevention assembly tester certification as well as completion of an instructional training course for initial certification or when an examinee has not held a valid certification for three or more years.

Cross-Connection Control Specialists working for the City MUED will be required to be certified from an approved accredited organization.



Cross-Connection Control Plan

5.0 CROSS-CONNECTION CONTROL PROTECTION REQUIREMENTS (CCCPH 3.2.2)

5.1 General Requirements (CCCPH 2.2)

Unprotected cross-connections are prohibited. No water service connection to any premises will be installed or maintained by the City MUED unless the PWS is protected from contamination and pollution. Whenever backflow protection is found to be necessary, the City MUED will require the water user to install, test, and maintain an approved BPA at their expense for continued water service or before a new water service will be granted.

Wherever backflow protection is found to be necessary on a water supply line entering a water user's premises, then any and all water supply lines from the City MUED's potable mains entering such premises, buildings, or structures shall be protected by an approved BPA.

The type of assembly to be installed will be in accordance with the requirements of this section and Appendix D of the CCCPH. If it is found that a backflow protection control or assembly has been removed or bypassed, water service will be discontinued until corrected, and fines may be imposed.

Topics addressed in this section include:

- Backflow Protection Requirements
- BPA Minimum BPA Type by Degree of Hazard
- Hazard Assessments

5.2 Backflow Protection Requirements

An approved BPA shall be installed per the City MUED's standard drawings and be selected from the City MUED's list of approved BPAs. The assembly shall be installed prior to the initiation of water for new customer's water systems at or near the property line and before the first branch line leading off the service line.

Protection is required when the following conditions exist:

- When a premises contains an auxiliary water supply, the water supply to the premises shall be protected against backflow, unless the auxiliary water supply is accepted as an additional source by the water purveyor and is approved by the public health agency having jurisdiction.
- When a premises has the potential for any onsite industrial fluid or any other objectional substance handled in such a manner that could permit the fluid or substance to enter the water system, the PWS shall be protected against backflow from the premises.
- When a premises has internal cross-connections that cannot be permanently corrected or controlled to the satisfaction of the state or local health department, the PWS shall be protected against backflow.
- When a premises has intricate piping arrangements or where entry to all or portions of the site are restricted so that inspections for cross-connections cannot be made with sufficient frequency or at sufficiently short notice to assure that no cross-connection exist, the PWS shall be protected against backflow.



Cross-Connection Control Plan

- When a premises has a history of repeated cross-connections being established or reestablished, the PWS shall be protected against backflow.
- When the City MUED deems necessary to protect the PWS.

5.2.1 BPA Minimum BPA Type by Degree of Hazard

Unless specified otherwise, the PWS must, at all times, protect its water distribution system from high hazard cross-connections pursuant to the example high hazard cross-connection control premises listed in Appendix D of the CCCPH, by way of premises containment, using one or more AGs or RPs. Following SWRCB review and approval, the City MUED may implement an alternate method of premises protection in lieu of an AG provided that the proposed alternative would provide at least the same level of protection to public health. Following SWRCB review and approval, the City MUED may use internal protection in lieu of premises containment when premises containment is infeasible.

The following premises are considered by the City MUED to be cross-connections and are subject to the following requirements to protect the approved water supply at the user's water connection to premises. Situations that are not covered below shall be evaluated on a case-by-case basis, and the appropriate backflow protection shall be determined by the City MUED pursuant to the CCCPH Section 3.2.2 and the high hazard examples provided in Appendix D of the CCCPH.

5.2.2 Toxic, Sewage, or Hazardous Substances

On a premises where toxic or hazardous substances are handled in any manner that may allow for contamination for the water systems, the PWS shall be protected by an RPDA at the service connection.

5.2.3 Auxiliary Water Supplies

Protection from auxiliary water supplies shall comply with the following:

- On a premises where there is an unapproved auxiliary water supply that is interconnected with the PWS, an AG shall be used. An RP may be provided in lieu of an AG if approved by the City MUED, including on residential properties using an onsite graywater system interconnected to the customer's water system via irrigation piping or other connections.
- On a premises where there is an unapproved auxiliary water supply and there are no interconnections with the PWS, an RP shall be used.

5.2.4 Commercial Fire System

Protection of the PWS from fire protection systems shall consist of no less than a DCDA and shall comply with the following:

- A high hazard cross-connection fire protection system, including but not limited to fire protection systems that may utilize chemical addition (e.g., anti-freeze) or an auxiliary water supply, must have no less than RPDA protection.
- Premises where the fire system is directly supplied from the PWS and where there is an unapproved auxiliary water supply on or to the premises (not interconnected) will install a RPDA with no exception.



Cross-Connection Control Plan

- Premises where the fire system is supplied from the PWS and where either elevated storage tanks or fire pumps that take suction from the private reservoirs or tanks are used will install a DCDA with no exception.
- Premises where a fire system is interconnected with more than one service connection from the PWS, and where no other system hazard exists, will install a DCDA with no exception.

5.3 Single Family Residential Fire Systems

Low hazard fire systems on single-family residential user premises will require a BPA unless the following five criteria are met:

1. The user premises has only one service connection to the PWS;
2. A single service line onto the user premises exists that subsequently splits on the property for domestic flow and fire protection system flow, such that the fire protection system may be isolated from the rest of the user premises;
3. A single, water industry standard, water meter is provided to measure combined domestic flow and fire protection system flow;
4. The fire protection system is constructed of piping materials certified as meeting NSF/ANSI Standard 61; and
5. The fire protection system's piping is looped within the structure and is connected to one or more routinely used fixtures (such as a water closet) to prevent stagnant water.

5.4 Hazard Assessments (CCCPH Chapter 3 Article 2)

An evaluation of hazards on a user's premises will be performed by a certified Cross-Connection Control Specialist to determine whether high, low, or no hazard is present. The required BPA at a user's premises will be determined by the degree of hazard and observed water use. The observations and final determination of the required BPA will be included in a final report that will be maintained by the City MUED for reference.

5.4.1 Access for Inspection

The customer's water system shall be accessible for inspection at all times to an authorized representative of the City MUED to assess whether a cross-connection or hazard exists. When an imminent hazard to public health or safety becomes known, the City MUED may deny or immediately discontinue water service to the premises until the customer has corrected the condition to the satisfaction of the City MUED.

5.4.2 Initial Hazard Assessment

The City MUED will evaluate the potential of backflow into the PWS through an initial hazard assessment of existing customers. The assessment will consider the following items:

- The existence of cross-connections
- The type and use of materials handled and present, or likely to be, on the user premises
- The degree of piping system complexity and accessibility
- Access to auxiliary water supplies, pumping systems, or pressure systems
- Distribution system conditions that increase the likelihood of a backflow event



Cross-Connection Control Plan

- User premises accessibility
- Any previous backflow incidents on the user premises
- The requirements and information provided in the CCCPH

The City MUED will perform the initial assessment using a combination of the following actions:

- Review of building permits
- Review of as-built or record drawings
- Review of customer classification
- Date of construction
- Cross referencing billing records with known backflow assemblies
- Field inspections
- Review Google maps and aerial photos
- Reporting from backflow assembly testers

5.4.3 Initial Hazard Assessment for Existing Services

The City MUED's timelines for conducting initial hazard assessments are included in Table 5-1.

Hazard assessments will be tracked and documented through the City MUED's backflow software and the City MUED's Geographic Information System (GIS). Additionally, the City MUED will perform a hazard assessment by July 2026 at their PWS facilities to confirm all non-testable devices are installed and maintained according to the California Plumbing Code.

5.4.4 New Construction

Commercial, Industrial, Multi-Family and Irrigation sites currently require an evaluation of hazard assessments during the planning and permitting processes. Residential properties being newly constructed or undergoing renovations triggering a requirement for a fire sprinkler system will be required to have a DC installed on the fire service line or branch to the fire system or to have a pass-through/purged system that complies with the following requirements:

- The premises has one service connection from the PWS;
- A single service line on the premises exists that split on the property for domestic flow and fire protection system flow, isolating the fire protection system from the rest of the premise;
- A single, water industry standard, water meter is provided to measure the domestic and fire protection system flow;
- The fire protection system is constructed of piping materials certified as meeting NSF/ANSI Standard 61; and
- The fire protection system's piping is looped within the structure and connected to one or more routinely used fixtures to prevent stagnant water.



Cross-Connection Control Plan

Category	Tasks	Expected Commencement Date	Expected Completion Date
Existing Commercial/ Industrial/Fire/ Multi-Family/Irrigation/ Temporary Connections	Audit billing data/water services against backflow inventory to determine services missing backflows	Started	7/1/20227
	Determine degrees of hazard for existing services with backflows using NAICS and/or SIC codes or other classification method	7/1/2025	7/1/2027
	Survey identified high hazard sites without known backflows. High hazard sites will be issued a 60-day notice to install RP assemblies (Additional information found in Section 5.5.1.2)	1/1/2026	7/1/2030
	Remainder of services surveyed or evaluated to determine hazard and need for backflow protection	1/1/2026	7/1/2034
Existing Single-Family Residential	Audit billing data/water services against backflow inventory to determine services that have backflows and confirm the associated hazard	Started	7/1/2027
	Evaluate areas that may have auxiliary water supplies, (including County well data), evaluate building records for pools and gray water systems and other complicated plumbing devices	7/1/2025	7/1/2027
	Survey high hazard sites first and require a backflow within 60 days of notice	7/1/2026	7/1/2029
	Determine areas/homes built after 2011 to evaluate fire sprinkler systems	7/1/2025	Completed within 10 years
	Evaluate remainder of homes through aerial photos, user-supplied surveys, neighborhood HOA plans	7/1/2026	Completed within 10 years

5.5 Follow Up Hazard Assessments

Unless protection is provided by an RP or AG, and unless the RP or AG continues to successfully pass the annual tests, the Program Administrator or the Cross-Connection Control Specialist will conduct hazard assessments:

- If a user’s premises changes ownership, excluding single-family residences;
- If a user’s premises is newly connected to the PWS;
- If evidence exists of potential changes in the activities or materials on a user’s premises;
- If backflow from a user’s premises occurs;
- If the SWRCB requests a hazard assessment of a user’s premises; or
- If the City MUED concludes an existing hazard assessment may no longer be correct.

Follow up hazard assessments will be conducted by a certified Cross-Connection Control Specialist.



Cross-Connection Control Plan

5.5.1 Hazard Assessment Outcomes

Following completion of hazard assessments, the City MUED may need to address various outcomes related to backflow protection as further described below.

5.5.1.1 Meets Requirements

If the presently installed BPA is found to meet the requirements of the City MUED and CCCPH and is found to be in good working order, no further changes will be required.

5.5.1.2 Non-Complying Assembly

All presently installed backflow prevention assemblies that do not meet the requirements set forth in the CCCPH will be replaced by a BPA meeting the requirements of the CCCPH and that is approved by the City MUED. The customer will be notified and required to install the appropriate backflow assembly within 60 calendar days. Within the 60 days, the City MUED will send a first notice allowing for 30 days. If action is not taken by the customer, then a second written notice is sent. If no action is taken within 45 days, an in-person staff visit is performed notifying of the discontinuance of water service in 15 days.

The City MUED will aim for compliance for non-complying assemblies within ten years.

5.5.1.3 New Assembly Required

All customers and premises existing prior to the adoption of the CCCPH are subject to a hazard assessment by the City MUED. If it is determined that an existing premises requires backflow prevention, the City MUED will provide a written notice to the customer to install an approved BPA within 60 calendar days. A similar timeframe is allowed as described in Section 5.5.1.2

5.6 Non-Compliance Penalties

The City MUED may discontinue water service for the following reasons:

- Refusal to install a required BPA
- Refusal to test a BPA
- Refusal to repair a faulty BPA
- Refusal to replace a faulty BPA
- Direct or indirect connection between the PWS and a sewer line
- Unprotected direct or indirect connection between the PWS and a system or equipment containing contaminants
- Unprotected direct or indirect connection between the PWS and an auxiliary water systems
- A situation which presents an immediate health hazard to the PWS

The City MUED will make reasonable effort to advise water users through direct contact or written notices to make corrective actions. If no action is taken within the written notice period, water service may be terminated. In more severe situations, the City MUED will terminate water supply and lock the service valve.



Cross-Connection Control Plan

6.0 BACKFLOW PREVENTION ASSEMBLIES (CCCPH ARTICLE 3)

This section provides a description of approved BPAs and of BPA installation requirements.

6.1 Approved BPAs (CCCPH 3.3.1)

Only approved BPAs shall be allowed for installation by a water user to protect the PWS. Approved backflow preventors, which may be subjected to back-pressure or backsiphonage, must be fully tested and granted a certificate of approval by a certified laboratory. The City MUED will provide, upon request, to any water user required to install a backflow preventer, a list of approved BPAs.

Approved BPAs must have passed both laboratory and field evaluation tests in accordance with standards found in any of the following:

- The latest edition of the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California Manual of Cross-Connection Control;
- The certification requirements for BPAs in the latest edition of ASSE International; or
- An equivalent testing organization approved by the State Water Board.

BPAs must not be modified from the configuration granted approval. The protective device required shall depend on the degree of hazard. Different types of approved backflow prevention devices are specified for various scenarios to protect the city water supply. BPA testers are required to notify the City MUED if a water user or City-owned BPA has been modified.

6.2 Installation Requirements (CCCPH 3.3.2)

BPAs shall be installed by the customer on the customer's water service side according to City MUED standards and prior to issuance of a final occupancy permit in situations of new water services. The BPAs shall be installed in a manner prescribed in the CCCPH and as close as practical to the user's service connection on the user's premises for containment. The City MUED shall provide final authority in determining the required location. If internal protection installed as isolation protection and further proposed for the purpose of containment, the City MUED must be able to access the user's premises and ensure that the on-site protections meet the requirements of the CCCPH. All BPAs shall be readily accessible for field testing and maintenance. Requirements for the specific elements of BPAs are described in the following subsections.

6.2.1 Air Gap Separation (AG)

An AG is to be installed on the user's premises at the water user's service connection and in accordance with CCCPH requirements. The received water container must be located on the water user's premises at the water user's service connection. Alternate locations must be approved by the City MUED. All piping between the water user's service connection and the discharge location of the receiving water container must be above grade and accessible for visual inspection. If installed at the user service connection, the air gap must be approved by the State Water Board prior to installation. The water inlet piping shall terminate a distance of at least two pipe diameters of the supply inlet, but in no case less than one inch above the overflow rim of the receiving tank.



Cross-Connection Control Plan

6.2.2 Reduced Pressure Principle BPA (RP)

The approved RP assembly shall be installed on the user's side of and as close to the service connection as is practical. The assembly shall be installed such that the lowest point of the assembly is a minimum of 12 inches above the finished grade and not more than 36 inches above grade measured from the bottom of the assembly and with a minimum of 12 inches side clearance, unless an alternative is approved by the City MUED. However, a minimum side clearance of 24 inches must be provided on the side of the assembly that contains the test cocks. The assembly should be installed so that it is readily accessible for maintenance and testing and no part of the valve will be submerged. See City MUED Standard Drawing: #A-20516: Typical Reduced Pressure Installation within Appendix D.

6.2.3 Reduced Pressure Principle Detector BPA (RPDA and RPDA II)

Similar installation requirements to a RP.

6.2.4 Double Check Valve BPA (DC)

DCs installed or replaced must be installed on the user's side of and as close to the service connection as is practical. The assembly must be installed with its lowest point at least 12 inches and no more than 36 inches above the finished grade, measured from the bottom of the assembly, and should maintain a minimum side clearance of 12 inches unless an alternative is approved by the City MUED. However, a minimum side clearance of 24 inches must be provided on the side of the assembly that contains the test cocks. The assembly should be installed so that it is readily accessible for maintenance and testing. Below ground installation may be approved by the City MUED where no alternative option is available. Existing below grade DCs can remain until a field test has failed and the assembly must be replaced. Upon new installation, the assembly will be installed above grade. See City MUED Standard Drawing: #A-20517: 3-inch to 10-inch DC Fire Service (Above Ground) within Appendix E.

6.2.5 Double Check Detector BPA (DCDA and DCDA II)

Similar installation requirements to the DC.

6.2.6 Pressure Vacuum Breaker BPA (PVB)

A PVB must be installed a minimum of 12 inches above all downstream piping and outlets. A PVB may only be used for containment (service protection) when no potential for backpressure is present such as roadway right of way irrigation systems.

These requirements ensure the proper installation, accessibility, and maintenance of BPAs to protect the water supply.

6.3 Swivel-Ells (CCCPH 3.2.2(d))

Except as allowed or prohibited in a City statute or in the CCR Title 22, Division 4, Chapter 3, a swivel-ell may be used instead of an AG for premises containment protection when temporarily substituting tertiary recycled water use areas with potable water from the PWS in accordance with the requirements of this section.

The City MUED does not currently utilize swivel-ell assemblies for recycled water, but as the recycled water program is planned to expand, the section below outlines the procedures and necessary design in compliance with the CCCPH.



Cross-Connection Control Plan

6.3.1 Design and Construction Requirements (CCCPH Appendix C)

A swivel-ell connection must be designed and constructed with the minimum requirements outlined below. Prior to the operation of a swivel-ell, the City MUED must obtain approval from the SWRCB for the design and construction of each proposed swivel-ell.

1. The drinking water supply must not under any circumstances be directly connected to the recycled water supply, nor be designed such that the recycled water use site could be supplied concurrently by a recycled water supply and a drinking water supply.
2. The drinking water supply line and the recycled water supply line must be offset in a manner that ensures any tee-connection, spool, or other prefabricated mechanical appurtenance could not be readily utilized in lieu of the swivel-ell connection, nor result in the recycled water use site being supplied concurrently by recycled water and drinking water.
3. The recycled water supply line proposed to be configured with the swivel-ell must be the only recycled water supply to the recycled water use site.
4. The swivel-ell must be located as close as practical to the PWS service connection, with the swivel-ell connection being located as close as practical to the RP upstream of the swivel-ell.
5. The potable water supply for the swivel-ell must be permanently metered, have an RP directly downstream of the meter, and the meter be locked off when not in use.
6. The swivel-ell assembly must:
 - a) Be located above ground;
 - b) Be color-coded pursuant to Section 116815 of the California Health and Safety Code and its implementing regulations;
 - c) Include appropriate signage, as required by regulation and the SWRCB;
 - d) Include the security necessary to prevent interconnections, vandalism, unauthorized entry, etc.; and
 - e) Be provided with meters on both the recycled water service and drinking water service connections.

6.3.2 Swivel-Ell Safety Procedures

Swivel-ells will be inspected every 12 months, all such compliance inspections will be documented, and the documentation will include all design and construction-related requirements.

The potable RP used in conjunction with the swivel-ell on the potable water supply must be field tested and found to be functioning properly according to the following requirements:

1. Immediately upon each switchover to potable water use, a visual inspection of the device must be completed.
2. Within 72 hours of each switchover to potable water use, a field test must be completed.



Cross-Connection Control Plan

3. At least every 12 weeks that the use site is being supplied with potable water. The City MUED with SWRCB, the recycled water wholesaler and permit holder, will create an agreement about the process for switchovers to and from potable water. Elements of the agreement will include:
 - a) Notification to the City MUED with a request from the recycled water user to switch water sources.
 - b) Determination of a date for switchover and estimated timeframe for how long the new configuration will be in place.
 - c) Testing of the backflow assembly on the potable water supply immediately prior to switchover.
 - d) Notification to the SWRCB of the switchover within 24 hours. The notification will include the location, the timeframe for the switchover, the most recent backflow assembly test, and the identities of those individuals representing the recycled water user, the City MUED.

The City MUED will maintain records of all switchovers and will perform yearly inspections as part of its record maintenance. Records will be maintained for a minimum of three years.



Cross-Connection Control Plan

7.0 TESTING AND MAINTENANCE OF BACKFLOW PREVENTION ASSEMBLIES (CCCPH 3.3.3)

This section outlines the testing and maintenance of BPAs and notification procedures followed by the City MUED.

7.1 BPA Testing

Below is a description of the policies and procedures for BPA testing.

7.1.1 Frequency of Testing

The City MUED requires all backflow prevention assemblies with active water services to be field tested upon installation, repair, overhauled, replaced or when relocated/removed, and whenever an assembly is depressurized which include all procedures/work listed in this section. Thereafter, the City MUED requires BPAs to be field tested at a minimum of once annually by a certified BPA Tester acceptable to the City MUED as described in Section 4.1.1, with inspection intervals not exceeding one year.

The City MUED, at its discretion, may require more frequent testing intervals or inspections than the annual requirement. AG installations providing protection at the water service, and swivel-ell installations, will be inspected annually to ensure compliance.

7.1.2 Procedures for Testing

Testing results shall be submitted to the City MUED on a City MUED approved backflow assembly form in electronic format, submitted through BSI Online. Backflow Assembly Testers shall use the most current approved testing procedures. All backflow assembly testing is to be at the expense of the owner. Backflow assembly tests must be performed by Certified City MUED personnel, or a certified tester approved by the City MUED.

All test results and maintenance activities must be regularly reported in forms provided by the City MUED and maintained on file at City MUED offices. Failure to submit the required test and maintenance reports will result in the City MUED considering the connection unprotected, and service may be discontinued.

7.1.3 New Installations

A passing field test must be received for all newly installed BPAs providing containment protection before water service can be provided. Newly installed assemblies or air gaps must be inspected for compliance with the CCCPH and confirm successful passing of the assembly performance test.

7.1.4 Failed Test

Assemblies that fail the field test shall be repaired, overhauled, or replaced and then re-tested immediately. Upon receipt of a failed test report, the City MUED will send a notification requiring that the backflow to be repaired or that a new assembly shall be installed within thirty (30) days of the notification. If additional time is needed, the customer should seek an extension from the City MUED. If no action is taken the City MUED will send a second notice once the 30 days has expired. Fifteen days following the second notice, the City MUED will make an onsite visit to notify of required repairs or replacement. If no action is taken, the water service will be terminated fifteen days after the site visit notification.



Cross-Connection Control Plan

7.1.5 Upgrading

Assemblies that are no longer on the City MUED's list of approved assemblies may remain in place until the point of complete failure (repairs and overhauls cannot remedy) if the assembly passes field tests. When an assembly fails the field test, a new assembly shall be installed at the property owner/water user's expense. Only assemblies that are found in the City MUED's approved backflow prevention assembly list shall be installed. The City MUED will only accept the approved backflow preventor that meets the degree of hazard for containment behind the water meter at the customer's point of connection to the PWS.

7.2 Notifications

7.2.1 Notification Process

It is the responsibility of the City MUED to ensure that all premises with a backflow prevention assembly receive a passing field test at a minimum of at least once, annually. Backflow assembly owners will receive a first notification notice allowing thirty (30) days to hire a certified backflow assembly tester to perform a field test and submit a test report on the condition of the backflow assembly. If a test report is not received, a second notice will be sent notifying customers that their backflow assembly test reports are past due and allowing an additional thirty (30) days in order to submit required test reports. The City MUED's goal is to work with customers to ensure timely backflow testing. Property owner/water user communication and correspondence is documented by the City MUED to establish a communication trail.

In situations where no action is taken by the backflow assembly owner, the City MUED attempts an in-person visit with the water user fifteen days after a second notice is sent. If still no action is taken, the City MUED will discontinue water service fifteen days after the in-person visit. In total the City MUED provides 60 days to test backflow assemblies.

Additional service of water to any premises may be discontinued by the water division after applicable notification if unprotected cross connections exist on the premises, or if any defect is found in an installed backflow preventive device has been removed or bypassed, and service will not be restored until such conditions or defects are corrected.

7.2.2 Yearly Testing Notifications

Annual notification letters to water users will include the following information:

- Instructions for accessing the list of approved backflow testers;
- Processes for submitting the backflow test report;
- Due date for submitting test results; and
- The backflow assembly of records details including meter number, assembly serial number, model and size, and location.

7.2.3 Notification of Imminent Hazard

Backflow assembly property managers and/or water users are required to notify the City MUED within 24 hours of determining a known backflow or cross-connection incident. Water users should contact the customer service number who will connect them with the Cross-Connection Control Specialist. The City MUED will immediately conduct an investigation and discontinue water service to the premises if an imminent hazard to public health is found. The water service will not be restored until confirmation of a correction is made and a passing backflow assembly field test is received.



Cross-Connection Control Plan

8.0 RECORD MAINTENANCE (CCCPH 3.5.1)

The City MUED will retain the following records in electronic form and make them available to the SWRCB upon request.

8.1 Cross-Connection Control Plan

This CCCP will be reviewed every five years and updated as necessary. An electronic version will be saved on the City MUED's servers.

8.2 Hazard Assessments

The two most recent hazard assessments conducted according to Section 5.4.3 of this CCCP will be saved in an electronic format on the City MUED's servers that can be accessed by multiple City MUED employees.

8.3 Assembly Records

The City MUED currently uses BSI online database to organize and track assembly records. The online database allows the City MUED to send notifications and receive test reports directly from certified backflow testers.

For each backflow prevention assembly, the following information are kept electronically: type, associated hazard, location, owner, manufacturer and model, size, installation date, serial number, account number, consumer of record, and repair history.

For each AG installation, the following information is kept electronically: associated hazard, location, owner, and as-built plans.

For each swivel-ell, the following information will be kept electronically: location, appropriate contacts, agreements, and inspection results.

8.4 Testing Results

Test results on all assemblies, AGs, and swivel-ells will be kept electronically for three calendar years and will include the name, test date, repair date, and certification number of the backflow assembly tester. Reports are to be stored electronically.

8.5 Repairs

Records will be retained for all repairs made to backflow prevention assemblies for the previous three calendar years.

8.6 Recycled Water Cross-Connection Control Shutdown Tests

The most recent cross-connection control shutdown test will be kept for each recycled water site.

8.7 User Supervisors

Records will be retained that include current contact information on the user supervisor and water user, and any applicable training and qualifications as described by Section 10.3 of this CCCP.



Cross-Connection Control Plan

8.8 Incident Reports

Descriptions and follow-up actions related to all backflow incidents for the most recent ten calendar years will be retained within the City MUED's internal server locations.

8.9 Public Education Material

Any public outreach or educational materials issued as required by the CCCPH will be retained for the previous three calendar years.

8.10 Contract and Agreements

Any contract or agreements that involves work performed on the Program will be retained.



Cross-Connection Control Plan

9.0 INCIDENT RESPONSE AND NOTIFICATION

The City MUED will investigate for possible backflow incidents, including but not limited to, when the following triggers are reported:

- Water quality complaint that cannot be explained as a normal aesthetic problem; and
- A backflow incident suspected or known to have occurred.

Additionally, the City MUED will initiate a notification and water quality sampling procedure when a water main break or power outage causes a negative loss of water pressure within a significant area of the distribution system.

9.1 Incident Response Procedure (CCCPH 3.5.2)

In the event of a potential backflow or cross-connection related incident, the City MUED will take the following steps. The City MUED will follow the most recent Emergency Notification Plan that is on file with the Water Board.

9.1.1 Incident Investigation

If a suspected backflow incident has occurred during business hours, the City MUED's will begin an investigation by sending a Water Distribution Field Staff to the location of the reported incident. Under supervision will perform a field inspection to determine if contamination is present in the PWS and the extent of the impacted area. Water Distribution Field Staff will perform the following actions to investigate for potential cross-connections:

- Survey area for possible main breaks;
- Visit the premises to observe possible sources of contamination;
- Evaluate meters for negative consumption (meters moving backwards); and
- Survey facilities and appurtenances, such as hydrants, blow offs, and air inlet valves for possible sources of contamination.

If a cross-connection or backflow incident on a customer's water system is responsible for the system contamination, the City MUED will discontinue water service to that service(s) until a corrective action is taken.

If a suspected backflow incident has occurred outside of business hours, the On-Call Water Distribution Field Staff will follow similar procedures as above and will notify the Cross-Connection Control Specialist immediately.

9.1.2 Sources of Contamination Isolation

The City MUED will isolate the portion of the system suspected of being contaminated by closing isolation valves or the water service and will notify impacted customers. and notifying customers impacted of the disruption of water.



Cross-Connection Control Plan

9.1.3 Notification and Coordination with Outside Agencies

The City MUED will be responsible for notifying outside agencies including the SWRCB – Division of Drinking Water and San Bernadino County Environmental Health Services Department as soon as practical to accurately communicate and properly mitigate potential health effects resulting from an incident. The City MUED will use their most current water quality emergency notification plan as guidance.

9.1.4 Sampling Plan

A sampling plan will also be established and implemented to confirm when the system meets Safe Drinking Water Standards. The sampling plan will be submitted to the SWRCB will describe the steps required to identify the contaminants, assess the extent of the contamination, and define the necessary remediation efforts.

9.1.5 Notification of Affected Customers

When required, the City MUED will issue a Tier 1 public notification pursuant to CCR, Title 22, Section 64463.1. The City MUED follow the current water quality emergency notification plan for notifying affected customers

9.1.6 Backflow Incident Notification (CCCPH 3.5.3)

If required by the SWRCB, the City MUED must submit, by a date specified by the SWRCB, a written incident report describing the nature and severity of the backflow, the actions taken by the City MUED in response to the incident, and any follow up actions required to prevent future incidents. The written report will contain, at a minimum, the information provided in Appendix F of the CCCPH.



Cross-Connection Control Plan

10.0 PUBLIC OUTREACH, EDUCATION, AND COORDINATION

Topics addressed in this section include public outreach, training, designation of user supervisors, and inter-agency coordination.

10.1 Public Outreach and Education

The City MUED uses public outreach as an opportunity to educate the general public, staff, and BPA owners on the City MUED's Program and the importance of testing and maintaining BPAs. Public outreach may include:

- Fliers or pamphlets
- Consumer confidence report
- A webpage

Public outreach educational materials will focus on customers that are required to install backflow preventors, providing background on the importance of protection for the PWS.

10.2 Internal Training

The City MUED encourages its Water Distribution Officers, Water Meter Readers, and other staff to obtain and maintain water related certifications such as BPA testers and Cross-Connection Control Specialist certifications.

10.3 User Supervisors (CCCPH 3.2.2.-f)

The City MUED may require, when necessary and at its discretion, a water user to designate a user supervisor. The water user shall inform the City of the user supervisor's identity on, at a minimum, an annual basis and whenever a change occurs.

The user supervisor will be responsible for monitoring BPAs and avoiding cross-connections. In the event of contamination or pollution of the PWS due to a cross-connection on the premises, the City MUED shall be promptly notified by the user supervisor.

The user supervisor will be required to attend, at the owner's expense, a yearly training provided by the City MUED that covers the Program, types of hazards, and concerns typically found on the user's premises.

The City MUED has Recycled Water Site Supervisors (RWSS) on sites with recycled water to prevent cross-connections from occurring. For more information on recycled water site supervisors see Section 11 of this CCCP.

10.4 Coordination

10.4.1 Inter-Department Coordination

The City MUED works closely with the Engineering Division to ensure Standards and Specifications meet regulations and new construction is built according to Standards. Building and Inspection review and inspect Tenant Improvement permits and will notify the Utilities Department of possible new hazards. The Fire Department reviews fire plans including plans with backflow assemblies.



Cross-Connection Control Plan

10.4.2 Inter-Agency Coordination

The City MUED coordinates, when required, with the SWRCB and the San Bernardino County Environmental Health Services Department for environmental and public health concerns. The City communicates with SWRCB for recycled water coordination. Additionally, the City MUED collaborates with Yucaipa Valley Water District for Recycled Water with regards to Crafton Hills College. The City MUED collaborates and maintains interties with Western Heights Water Company, Rocky Comfort Mutual Water Company, and the City of Loma Linda.



Cross-Connection Control Plan

11.0 RECYCLED WATER COMPLIANCE

11.1 Introduction

Tertiary-treated recycled water is provided to customers within the City MUED's service area and is regulated under the CCR Title 22. While CCCPH doesn't mandate protection of the recycled water system itself, the City MUED takes a proactive approach by applying similar protective measures used for potable water systems. This section outlines how the City safeguards the recycled water system and how the recycled water program supports the protection of the potable water supply.

Cross-connections between the recycled water system and potable water system are strictly prohibited.

11.2 Recycled Water System Description

The City MUED owns, operates, and maintains its own wastewater collection system, which conveys wastewater to the Redlands Wastewater Treatment Facility (WWTF). This facility provides both secondary and tertiary levels of treatment. It is located at 1950 Nevada St, approximately six miles from the Redlands City Center.

The tertiary-treated recycled water produced by the WWTF is distributed to end users through a dedicated recycled water distribution system, which is also owned and operated by the City MUED.

The recycled water system is operated under the requirements of Order No. R8-2006-0008 issued by the Regional Water Quality Control Board, Santa Ana Region. Additionally, the City MUED has developed further rules and regulations applicable to recycled water facilities. The following is a list of applicable State and City rules and regulations:

- CCR Title 22
- State Water Resources Control Board Cross-Connection Control Policy Handbook
- Supplement Title 22 Engineering Report (West Yost, 2020)
- Title 22 – Citywide Engineering Report for the Production, Distribution, and Use of Recycled Water (URS, 2010)
- City Ordinance No. 2615 for Recycled Water Services, Redlands Municipal Code – Chapter 13.58 Recycled Water
- Redlands Municipal Code – Chapter 13.20 Cross-Connections and Backflow Prevention

11.3 Service Connection Protection

Recycled water services must include, at a minimum, a DC assembly installed downstream of the recycled water meters for dedicated irrigation meters without chemical injection systems or booster pumps. If a site includes chemical injection systems or booster pumps, an irrigation RP is required.



Cross-Connection Control Plan

For areas where recycled water is not yet available and the City MUED has determined that recycled water will be supplied in the future, onsite facilities must be designed to meet recycled water requirements. In the interim the follow protections are required:

- Irrigation supplied with potable water: Water shall be supplied through a temporary potable water connection using a RP assembly installed per the City MUED requirements. The onsite system will be connected to the recycled water distribution system once it becomes available in accordance with the City MUED requirements.
- Irrigation system supplied with non-potable water: Non-potable water shall be supplied through at least a DC assembly, installed per the City MUED requirements. The onsite system will be connected to the recycled water distribution system once it becomes available in accordance with the City MUED requirements.

As described in Section 5, the potable (domestic) water meter must be protected against any accidental cross connections through the installation of a RP.

11.4 Roles and Responsibilities

The City MUED is the recycled water permit holder for distribution of recycled water to users. The City MUED is responsible for recycled water delivery, meter reading, site compliance monitoring, and reporting to the SWRCB.

Recycled water customers are responsible for using recycled water according to the rules and regulations established by the City MUED. This includes designating a recycled water Site Supervisor, training employees who work with the recycled water system, maintaining project signage, and annually testing potable water RPs.

11.5 Site Compliance Monitoring

11.5.1 Design

Before any new recycled water system is constructed or any existing recycled water system is modified, on-site recycled water irrigation plans must be approved by the City MUED and the SWRCB-DDW. Approval will be contingent upon evidence that all applicable design requirements, rules and regulations for a recycled water system are satisfied and that the system, as designed, can be operated in accordance with the City MUED requirements. Information required on plans can be obtained by contacting the City MUED's regulatory compliance officer.

11.5.2 New Construction Site Inspection

The City MUED, or its designated representative, will conduct on-site inspections during the construction phase to verify that all materials, installation practices, and procedures comply with the approved plans, specifications, and applicable regulations.

To facilitate timely inspections, the Recycled Water Site Supervisor must notify the City MUED of the schedule for all phases of planning, construction, and system start-up.

Upon completion of all installations, the City MUED will perform a coverage test to evaluate for overspray, runoff, and ponding, and to verify that all required tags, labels, and signage are properly installed. A punch list will be prepared to document any items found to be non-compliant.



Cross-Connection Control Plan

Before the irrigation recycled water system is connected to the recycled water supply, the City MUED will perform a final inspection to ensure all items on the punch list have been addressed.

11.5.3 Annual Site Inspection

The City MUED, or its designated representative, will inspect each recycled water system annually, or on a more frequent basis if warranted by the size and complexity of the site or other considerations.

The City MUED will schedule an annual inspection of existing irrigation systems with the Recycled Water Site Supervisor and their landscape maintenance company to verify that the site complies with City MUED requirements.

The annual inspection will include, at a minimum, a visual inspection of all backflow prevention assemblies, exposed piping, valves, pressure-reducing valves, sprinklers, controllers, signs, labels, tags, and all points of connection. The City MUED will also observe the irrigation system to assess whether any modifications have been made to the approved system (e.g., new mainlines, valves, etc.).

If major system changes are observed, such as the installation of new irrigation mainlines, the City MUED will require the Water User to submit a construction change request to both the City MUED and the SWRCB for re-review and re-approval.

The City MUED will also conduct a coverage test to verify the proper operation of the irrigation system. It is anticipated that the site representative will operate each irrigation station for up to two minutes during this test.

Finally, the City MUED will schedule a final walkthrough to verify the completion of all punch list items.

11.5.4 Cross-Connection Shutdown Test

At any site where a recycled water system is present, a cross-connection shutdown test will be performed to ensure there is no interconnection between the potable and recycled water systems.

This test is required under Section 13521 and 13523 of the California Water Code, Sections 60314 and 60316 of Title 22 of the California Code of Regulations, and Chapter 7, Sections 116800 and 116805 of the California Health and Safety Code.

The test will be conducted by the City MUED or its designated representative using one of the nine approved methods outlined in the San Diego Department of Environmental Health and Quality Manual for Recycled Water Plan Check and Inspection. The shutdown test must meet SWRCB approval and must last a minimum of four (4) hours. Only one system, either recycled water or potable water, may be tested at a time.

The City MUED will conduct a cross-connection shutdown test as follows:

- New recycled water projects: Prior to the installation of the recycled water meter(s).
- Existing recycled water projects: At least once every four years, or more frequently if warranted by the size, complexity, or specific conditions of the site.



Cross-Connection Control Plan

11.5.5 Recycled Water Site Supervisor

A RWSS must be designated by the Water User and approved by the City MUED for every site where recycled water is used. Although the City MUED retains ultimate responsibility for use of recycled water at all sites, the Site Supervisor is the primary means for ensuring safe use of recycled water at a given site.

The RWSS is considered a User Supervisor as described in Section 10.3 as there is a shared responsibility to protect the potable water system. The Site Supervisor is differentiated by the additional responsibility to operate and maintain the on-site recycled water system according to City MUED requirements and to meet requirements within CCR Title 22.

11.5.6 Training

The designated RWSS must attend a Site Supervisor Certification Training, provided by the City MUED, within the first 90 days of receiving recycled water service. Failure to attend the Site Supervisor Certification Training may result in the termination of recycled water service.

11.5.7 Responsibilities

The RWSS shall be responsible for the operation and maintenance of the On-Site Recycled Water System. He or she also shall ensure that the site complies with all applicable City requirements. The RWSS shall also maintain “as-built” drawings of the On-Site Recycled Water System. The RWSS shall review the installation and modification of any potable or recycled water pipelines and equipment to ensure that there are no cross-connections.

11.5.8 Changes to the Site Supervisor

The Water User must notify the City MUED immediately of any change in personnel for the RWSS position. Upon a change in personnel, the new RWSS must attend a Site Supervisor Certification Training within 90 days of the position change or as soon as training is made available by the City MUED. Failure to attend the Site Supervisor Certification Training may result in the termination of recycled water service.

Appendix A

Cross-Connection Control Policy Handbook (Amended June 17, 2025)

State Water Resources Control Board

Cross-Connection Control Policy Handbook

Standards and Principles for California's
Public Water Systems

Adopted: December 19, 2023

Effective: July 1, 2024

Amended: June 17, 2025

California Environmental Protection Agency

Table of Contents

Acronyms and Abbreviations.....	1
Chapter 1 – Policy Overview	2
1.1 Objective	2
1.2 Applicability	2
1.3 Policy Development Background and Legal Authorities	2
1.3.1 California Safe Drinking Water Act	2
Chapter 2 – Background on Backflow Protection and Cross-Connection Control	6
2.1 What is a Cross-Connection?	6
2.2 Purpose of a Cross-Connection Control Program	7
2.3 Notes on Applicability of the Cross-Connection Control Policy Handbook	7
Chapter 3 – Standards for Backflow Protection and Cross-Connection Control.....	10
Article 1 – Definitions and General Requirements	10
3.1.1 Definitions	10
3.1.2 Applicability	14
3.1.3 Program for Public Water System Cross-Connection Control.....	14
3.1.4 Plan for Public Water System Cross-Connection Control	16
Article 2 – Hazard Assessments and Required Protection	19
3.2.1 Hazard Assessments	19
3.2.2 Backflow Protection Required	20
Article 3 – Backflow Prevention Assemblies	23
3.3.1 Standards for Types of Backflow Protection	23
3.3.2 Installation Criteria for Backflow Protection	23
3.3.3 Field Testing and Repair of Backflow Prevention Assemblies and Air Gap Inspection	24
Article 4 – Backflow Prevention Assembly Testers and Cross-Connection Control Specialists	26
3.4.1 Backflow Prevention Assembly Tester Certification.....	26
3.4.2 Cross-Connection Control Specialist Certification	30
Article 5 – Recordkeeping, Backflow Incident Response, and Notification	33
3.5.1 Recordkeeping	33
3.5.2 Backflow Incident Response Procedure	33
3.5.3 Backflow Incident Notification.....	34
Appendix.....	36

Appendix

Appendix A: Assembly Bills 1671 (2017, Chapter 533) and 1180 (2019, Chapter 455)

Appendix B: ASME A112.1.2-2012(R2017) Table 1, Minimum Air Gaps for Generally used Plumbing Fixtures, page 4

Appendix C: Backflow Prevention Assembly Diagrams

Appendix D: High Hazard Premises

Appendix E: General Range of Knowledge for Cross-Connection Control Specialists

Appendix F: Example Backflow Incident Reporting Form

Appendix G: Related Statutes and Regulations

Acronyms and Abbreviations

As used in this policy, acronyms and abbreviations reference the following:

<i>Acronym or Abbreviation</i>	<i>Meaning</i>
AB	Assembly Bill
AG	Air Gap separation
BAT	Best Available Technology
BPA	Backflow Prevention Assembly
Bus. & Prof. Code	Business and Professional Code
CA	California
CBSC	California Building Standards Commission
CCCPH	Cross-Connection Control Policy Handbook
CCR	California Code of Regulations
C.F.R.	Code of Federal Regulations
CHSC	California Health and Safety Code
Civ. Code	Civil Code
DC	Double Check valve backflow prevention assembly
DCDA	Double Check Detector backflow prevention Assembly
DCDA-II	Double Check Detector backflow prevention Assembly – type II
Division	Division of Drinking Water
EPA	Environmental Protection Agency
Gov. Code	Government Code
MCL	Maximum Contaminant Level
Pen. Code	Penal Code
PVB	Pressure Vacuum Breaker backsiphonage prevention assembly
PWS	Public Water System
RP	Reduced Pressure principle backflow prevention assembly
RPDA	Reduced Pressure principle Detector backflow prevention Assembly
RPDA-II	Reduced Pressure principle Detector backflow prevention Assembly – type II
RW	Recycled Water
SB	Senate Bill
SDWA	Safe Drinking Water Act
State Water Board	State Water Resources Control Board
SVB	Spill-resistant Pressure Vacuum Breaker backsiphonage prevention assembly
U.S.	United States

Chapter 1 – Policy Overview

1.1 Objective

The primary objective of the Cross-Connection Control Policy Handbook (CCCPH) is the protection of public health through the establishment of standards intended to ensure a public water system's (PWS) drinking water distribution system will not be subject to the backflow of liquids, gases, or other substances. In addition, by providing basic educational information on backflow prevention, the State Water Resources Control Board (State Water Board) intends to build a foundation of awareness within the regulated community regarding the importance of backflow protection and cross-connection control, leading to the implementation of a robust cross-connection control program for PWSs.

1.2 Applicability

The CCCPH and its standards apply to all California PWSs, as defined in California's Health and Safety Code (CHSC, section 116275 (h)). Compliance with this CCCPH is mandatory for all California PWSs.

1.3 Policy Development Background and Legal Authorities

Through the adoption of the CCCPH, the State Water Board is exercising its authority, under California's Safe Drinking Water Act¹ (SDWA), to establish enforceable standards applicable to California's PWSs. Failure to comply with the CCCPH may result in the issuance of compliance, enforcement, or other corrective actions against a PWS.

1.3.1 California Safe Drinking Water Act

On October 6, 2017, Assembly Bill 1671 (AB 1671) was approved and filed with the Secretary of State (see Appendix A). AB 1671 amended California's SDWA through the establishment of CHSC sections 116407 and 116555.5. AB 1671 also amended section 116810 of the CHSC, which is briefly discussed in Appendix G.

On October 2, 2019, Assembly Bill 1180 (AB 1180) was approved and filed with the Secretary of State. AB 1180 amended Section 116407 of the CHSC and added section 13521.2 to the Water Code. AB 1180 requires that the CCCPH include provisions for the use of a swivel or changeover device (swivel-ell).

¹ CHSC, div. 104, pt. 12, ch. 4, section 116270 et seq.

AB 1671 and 1180 established the following:

- The State Water Board must adopt standards for backflow protection and cross-connection control by January 1, 2020.
- The State Water Board may establish standards for backflow protection and cross-connection control through the adoption of the CCCPH, with the CCCPH not being subject to the requirements of the CA Administrative Procedure Act.²
- If standards for backflow protection and cross-connection control are established via the CCCPH, the State Water Board must:
 - Consult with state and local agencies and persons, identified by the State Water Board, as having expertise on the subject of backflow protection and cross-connection control.
 - Hold at least two public hearings before adoption of the CCCPH.
 - Post the CCCPH on the State Water Board website.
- Upon the effective date of the CCCPH, the previous cross-connection control standards³ become inoperative, and are repealed 90 days later, unless the State Water Board determines not to repeal a specific existing regulation.
- A PWS must implement a cross-connection control program that complies with the standards adopted by the State Water Board.
- Use of a swivel-ell must be consistent with any notification and backflow protection provisions contained in the CCCPH.

The development of the CCCPH included consultation with stakeholders, including state and local agencies, on an array of subjects related to cross-connection control, consistent with the statutory mandate, as well as consideration of input from other stakeholders and the general public in a February 20, 2020 workshop.

Prior to adoption of the CCCPH, in accordance with the statutory mandate, the State Water Board held two public hearings - one on April 27, 2021, and the other on December 5, 2022. A Board Workshop was held on October 18, 2023.

Pursuant to sections 116407 and 116555.5 of the CHSC, the State Water Board chose to adopt standards for backflow protection and cross-connection control through the adoption of this CCCPH, which became effective July 1, 2024.

Aside from the mandates of AB 1671 related to the State Water Board's need and authority to develop and adopt an enforceable CCCPH, there are long-standing statutory mandates in California's SDWA concerning backflow protection and cross-connection control, some of which are summarized below.

² Gov. Code, tit. 2, div. 3, pt. 1, ch. 3.5, section 11340 et seq.

³ Cal. Code Regs., tit. 17, div. 1, ch. 5, subch. 1, grp. 4, arts. 1 & 2, section 7583 et seq.

- The State Water Board is required to adopt regulations for the control of cross-connections that it determines to be necessary for ensuring PWSs “distribute a reliable and adequate supply of pure, wholesome, potable, and healthy water.” (CHSC section 116375, subd. (c).)
- Any person who owns a PWS is required to ensure that the distribution system will not be subject to backflow under normal operating conditions. (CHSC section 116555, subd. (a)(2).)

Prior to AB 1671 and the adoption of this CCCPH, California’s regulations pertaining to cross-connection control were set forth in regulations in CCR Title 17,⁴ which were adopted in 1987 with minor revisions in 2000. Although still protective to public health, the CCR Title 17 cross-connection regulations required updating as both the drinking water and cross-connection control industries had evolved. This CCCPH updates those regulations, which as previously noted are no longer operative following the adoption of the CCCPH.

The State Water Board may update its standards for backflow protection and cross-connection control through revisions of the CCCPH. Prior to adopting substantive revisions to the CCCPH, the State Water Board will consult with state and local agencies and persons identified as having expertise on the subject by the State Water Board, and the State Water Board will hold at least one public hearing to consider public comments.

⁴ Cal. Code Regs., tit. 17, div. 1, ch. 5, subch. 1, grp. 4, arts. 1 & 2, section 7583 et seq.

This page intentionally left blank

Chapter 2 – Background on Backflow Protection and Cross-Connection Control

2.1 What is a Cross-Connection?

A cross-connection is an interconnection between a potable water supply and a non-potable source via any actual or potential connection or structural arrangement between a PWS and any source or distribution system containing liquid, gas, or other substances not from an approved water supply. Bypass arrangements, jumper connections, removable sections, improperly installed swivel or change-over devices and other temporary or permanent devices through which, or because of which backflow can occur are considered to be cross-connections.⁵ The CCCPH includes acceptable installation criteria for swivel-ell and other types of backflow prevention assemblies (BPAs) to prevent backflow.

Backflow is the undesired or unintended reversal of flow of water and/or other liquids, gases, or other substances into a PWS's distribution system or approved water supply.

The presence of a cross-connection represents a location in a distribution system through which backflow of contaminants or pollutants can occur. Backflow occurs when a non-potable source is at a greater pressure than the potable water distribution system. Backflow can occur from either backsiphonage or backpressure. Backsiphonage occurs when a non-potable source enters the drinking water supply due to negative (i.e., sub-atmospheric) distribution system pressure. Backpressure occurs when the pressure from a non-potable source exceeds the pressure in the potable water distribution system.

Backsiphonage may be caused by a variety of circumstances, such as main breaks, flushing, pump failure, or emergency firefighting water demand. Backpressure may occur when heating, cooling, waste disposal, or industrial manufacturing systems are connected to potable supplies and the pressure in the external system exceeds the pressure in the distribution system. Both situations act to change the direction of water, which normally flows from the distribution system to the customer, so that non-potable substances from industrial, commercial, or residential premises flows back into the distribution system through a cross-connection.

Cross-connections are not limited to industrial or commercial facilities. Submerged inlets are found on many common plumbing fixtures and are sometimes necessary features of the fixtures if they are to function properly. Examples of this type of design are siphon-jet urinals or water closets, flushing rim slop sinks, and dental cuspidors.

⁵ California Department of Health Services (DHS), Public Water Supply Branch. (1988). *Guidance Manual for cross connection Control Program (Green Manual)*. California Department of Health Services.

Older bathtubs and lavatories may have supply inlets below the flood level rims, but modern sanitary design has minimized or eliminated this cross-connection in new fixtures. Chemical and industrial process vats sometimes have submerged inlets where the water pressure is used as an aid in diffusion, dispersion and agitation of the vat contents. Even though a supply pipe may be installed above a vat, backsiphonage can still occur. Siphon action has been shown to raise a liquid in a pipe such as water almost 34 feet. Some submerged inlets are difficult to control, including those which are not apparent until a significant change in water level occurs or where a supply may be conveniently extended below the liquid surface by means of a hose or auxiliary piping. A submerged inlet may be created in numerous ways, and its detection may be difficult.

Chemical and biological contaminants have caused illness and deaths during known incidents of backflow, with contamination affecting several service connections, and the number of incidents reported is believed to be a small percentage of the total number of backflow incidents that actually occur. The public health risk from cross-connections and backflow is a function of a variety of factors including cross-connection and backflow occurrence and type and amount of contaminants.

2.2 Purpose of a Cross-Connection Control Program

The purpose of a cross-connection control program is to prevent the occurrence of backflow into a PWS's distribution system in order to protect customers from contamination or pollution from any on-site hazards. Properly installed and maintained BPAs, devices or methods provide protection against the threat posed by many conditions typically found on a user's premise.

The use of approved BPAs ensures that the appropriate performance evaluation of the assembly was conducted. It is important and required by the CCCPH to select and properly install an approved BPA that is capable of protecting the distribution system from the hazard identified. The success of a program depends on individuals that are knowledgeable about cross-connection control to identify actual and potential hazards, apply principles of backflow protection and prevention, and implement cross-connection control policies and procedures. A successful program will have ongoing surveillance of a PWS to ensure BPAs, devices or methods are working, and identify new hazards or changes in the distribution system. Certified specialists are needed to properly evaluate the degree of hazard that exists in the distribution system. Hazards typically identified in distribution systems along with the required level of protection are specified in Chapter 3 of the CCCPH.

2.3 Notes on Applicability of the Cross-Connection Control Policy Handbook

The CCCPH provides the basis for regulating the use and management of cross-connection control programs and BPAs in PWSs, and related requirements for supporting programs and policies. Activities or uses outside of the scope of the

authority of the State Water Board to regulate PWSs are not regulated by the CCCPH, including California Plumbing Code requirements and definitions not related to PWSs.

Recycled water cross-connection control installations and programs for the purposes of protecting the recycled water supply are not regulated by the CCCPH, although a PWS that uses recycled water is regulated by the CCCPH to ensure that a PWS's drinking water system has adequate backflow protection from a recycled water system.

Water systems that do not meet the definition of a PWS (e.g. "State Small Water Systems" under CCR Title 22, Article 3) are not regulated by the CCCPH, although they may need to comply with the California Plumbing Code, local health agencies, and other laws or entities.

Transient noncommunity and nontransient noncommunity systems are PWSs and must comply with both the California Plumbing Code and CCCPH. The California Plumbing Code and the CCCPH will overlap in protection of these user premises. To ensure compliance, these noncommunity water systems may need to have internal cross-connection control programs within the user premises.

Noncommunity water systems must have the ability to enforce backflow protection within the premises. Compliance with the California Plumbing Code can be verified by the PWS and used for compliance with the CCCPH. Compliance with the CCCPH is documented through the hazard assessment and maintenance of an inventory of field-testable BPAs and methods. Annual field testing of BPAs is required. Where the minimum backflow protection differs between the California Plumbing Code and the CCCPH, the more protective minimum protection will be required.

This page intentionally left blank

Chapter 3 – Standards for Backflow Protection and Cross-Connection Control

Article 1 – Definitions and General Requirements

3.1.1 Definitions

The following definitions apply to the terms used in the CCCPH:

“Air-gap separation” or **“AG”** means a physical vertical separation of at least two (2) times the effective opening, as defined in section 207.0 of the California Plumbing Code, between the free-flowing discharge end of a potable water supply pipeline and the flood level of an open or non-pressurized receiving vessel, and in no case less than one (1) inch.

“Approved water supply” means a water source that has been approved by the State Water Board for domestic use in a public water system and designated as such in a domestic water supply permit issued pursuant to section 116525 of the CHSC.

“Auxiliary water supply” means a source of water, other than an approved water supply, that is either used or equipped, or can be equipped, to be used as a water supply and is located on the premises of, or available to, a water user.

“Backflow” means an undesired or unintended reversal of flow of water and/or other liquids, gases, or other substances into a public water system’s distribution system or approved water supply.

“Backflow prevention assembly” or **“BPA”** means a mechanical assembly designed and constructed to prevent backflow, such that while in-line it can be maintained and its ability to prevent backflow, as designed, can be field tested, inspected and evaluated.

“Backflow prevention assembly tester” means a person who is certified as a backflow prevention assembly tester.

“Community water system” means a public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents of the area served by the system.

“Contact hour” means not less than 50 minutes of a continuing education course.

“Continuing education course” means a presentation or training that transmits information related to cross-connection control programs and backflow prevention and protection.

“Cross-connection” means any actual or potential connection or structural arrangement between a public water system, including a piping system connected to the public water system and located on the premises of a water user or available to the water user, and any source or distribution system containing liquid, gas, or other substances not from an approved water supply.

“Cross-connection control specialist” means a person who is certified as a cross-connection control specialist.

“Distribution system” has the same meaning as defined in section 63750.50 of CCR, Title 22, Division 4, Chapter 2.

“Double check detector backflow prevention assembly” or **“DCDA”** means a double check valve backflow prevention assembly that includes a bypass with a water meter and double check backflow prevention assembly, with the bypass’s water meter accurately registering flow rates up to two gallons per minute and visually showing a registration for all rates of flow. This type of assembly may only be used to isolate low hazard cross-connections. See Diagram 1, Appendix C.

“Double check detector backflow prevention assembly – type II” or **“DCDA-II”** means a double check valve backflow prevention assembly that includes a bypass around the second check, with the bypass having a single check valve and a water meter accurately registering flow rates up to two gallons per minute and visually showing a registration for all rates of flow. This type of assembly may only be used to isolate low hazard cross-connections. See Diagram 2, Appendix C.

“Double check valve backflow prevention assembly” or **“DC”** means an assembly consisting of two independently-acting internally-loaded check valves, with tightly closing shut-off valves located at each end of the assembly (upstream and downstream of the two check valves) and fitted with test cocks that enable accurate field testing of the assembly. This type of assembly may only be used to isolate low hazard cross-connections. See Diagram 3, Appendix C.

“Existing public water system” or **“existing PWS”** means a public water system initially permitted on or before July 1, 2024 as a public water system by the State Water Board.

“Hazard Assessment” means an evaluation of a user premises designed to evaluate the types and degrees of hazard at a user’s premises.

“High hazard cross-connection” means a cross-connection that poses a threat to the potability or safety of the public water supply. Materials entering the public water supply through a high hazard cross-connection are contaminants or health hazards. See Appendix D for some examples.

“Low hazard cross-connection” means a cross-connection that has been found to not pose a threat to the potability or safety of the public water supply but may adversely affect the aesthetic quality of the potable water supply. Materials entering the public water supply through a low hazard cross-connection are pollutants or non-health hazards.

“New public water system” or **“new PWS”** means a public water system permitted after July 1, 2024 as a public water system by the State Water Board. A new public water system includes a public water system receiving a new permit because of a change in ownership.

“Noncommunity water system” means a public water system that is not a community water system.

“Nontransient noncommunity water system” means a public water system that is not a community water system and that regularly serves at least 25 of the same persons over six months per year.

“Premises containment” means protection of a public water system’s distribution system from backflow from a user’s premises through the installation of one or more air gaps or BPAs, installed as close as practical to the user’s service connection, in a manner that isolates the water user’s water supply from the public water system’s distribution system.

“Pressure vacuum breaker backsiphonage prevention assembly” or **“PVB”** means an assembly with an independently-acting internally-loaded check valve and an independently-acting loaded air inlet valve located on the discharge side of the check valve; with test cocks and tightly closing shutoff valves located at each end of the assembly that enable accurate field testing of the assembly. This type of assembly may only be used for protection from backsiphonage and is not to be used to protect from backpressure. See Diagram 4, Appendix C.

“Public water system” or **“PWS”** has the same meaning as defined in section 116275(h) of the CHSC.

“Recycled Water” is a wastewater which as a result of treatment is suitable for uses other than potable use.

“Reduced pressure principle backflow prevention assembly” or **“RP”** means an assembly with two independently acting internally-loaded check valves, with a hydraulically operating mechanically independent differential-pressure relief valve located between the check valves and below the upstream check valve. The assembly shall have shut-off valves located upstream and downstream of the two check-valves, and test cocks to enable accurate field testing of the assembly. See Diagram 5, Appendix C.

“Reduced pressure principle detector backflow prevention assembly” or **“RPDA”** means a reduced pressure principle backflow prevention assembly that includes a bypass with a water meter and reduced pressure principle backflow prevention assembly, with the bypass’s water meter accurately registering flow rates up to two gallons per minute and visually showing a registration for all rates of flow. See Diagram 6, Appendix C.

“Reduced pressure principle detector backflow prevention assembly – type II” or **“RPDA-II”** means a reduced pressure principle backflow prevention assembly that includes a bypass around the second check, with the bypass having a single check valve and a water meter accurately registering flow rates up to two gallons per minute and visually showing a registration for all rates of flow. See Diagram 7, Appendix C.

“Spill-resistant pressure vacuum breaker backsiphonage prevention assembly” or **“SVB”** means an assembly with an independently-acting internally-loaded check valve and an independently-acting loaded air inlet valve located on the discharge side of the check valve; with shutoff valves at each end and a test cock and bleed/vent port, to enable accurate field testing of the assembly. This type of assembly may only be used for protection from backsiphonage and is not to be used to protect from backpressure. See Diagram 8, Appendix C.

“State Water Board”, unless otherwise specified, means the State Water Resources Control Board or the local primacy agency having been delegated the authority to enforce the requirements of the CCCPH by the State Water Resources Control Board.

“Swivel-Ell” means a reduced pressure principle backflow prevention assembly combined with a changeover piping configuration (swivel-ell connection) designed and constructed pursuant to this Chapter. See design and construction criteria, as well as Diagrams 9a and 9b, Appendix C.

“Transient noncommunity water system” means a noncommunity water system that does not regularly serve at least 25 of the same persons over six months per year.

“User premises” means the property under the ownership or control of a water user and is served, or is readily capable of being served, with water via a service connection with a public water system.

“User’s service connection” means either the point where a water user’s piping is connected to a water system or the point in a water system where the approved water supply can be protected from backflow using an air gap or backflow prevention assembly.

“User Supervisor” means a person designated by a water user to oversee a water use site and responsible for the avoidance of cross-connections.

“Water supplier” means a person who owns or operates a public water system.

“Water user” means a person or entity who is authorized by the PWS to receive water.

3.1.2 Applicability

A public water system (PWS) must comply with the requirements of the CCCPH.

3.1.3 Program for Public Water System Cross-Connection Control

(a) A PWS must protect the public water supply through implementation and enforcement of a cross-connection control program. Unless otherwise specified by this Chapter or directed by the State Water Board, a PWS may implement its cross-connection control program, in whole or in part, either directly or by way of contract or agreement with another party. The PWS, however, shall not be responsible for abatement of cross-connections which may exist within a user's premises. The cross-connection control program must include at a minimum the following elements:

(1) **Operating rules or ordinances** – Each PWS must have operating rules, ordinances, by-laws or a resolution to implement the cross-connection program. The PWS must have legal authority to implement corrective actions in the event a water user fails to comply in a timely manner with the PWS's provisions regarding the installation, inspection, field testing, or maintenance of BPAs required pursuant to this Chapter. Such corrective actions must include the PWS's ability to perform at least one of the following:

- (A) deny or discontinue water service to a water user,
- (B) install, inspect, field test, and/or maintain a BPA at a water user's premises, or
- (C) otherwise address in a timely manner a failure to comply with the cross-connection control program.

(2) **Cross-Connection Control Program Coordinator** – The PWS must designate at least one individual involved in the development of and be responsible for the reporting, tracking, and other administration duties of its cross-connection control program. For PWS with 3,000 service connections or more the Cross-Connection Control Program Coordinator must be a cross-connection control specialist.

(3) **Hazard Assessments** – The PWS must survey its service area and conduct hazard assessments per Article 2 of this Chapter that identifies actual or potential cross-connection hazards, degree of hazard, and any backflow protection needed.

(4) **Backflow Prevention** – The PWS must ensure that actual and potential cross-connections are eliminated when possible or controlled by the installation of approved BPAs or AG's consistent with the requirements of the Article 3 of this Chapter.

(5) **Certified Backflow Prevention Assembly Testers and Certified Cross-Connection Control Specialists** – The PWS must ensure all BPA testers and cross-connection control specialists used are certified per Article 4 of this Chapter.

(6) **Backflow Prevention Assembly Testing** – The PWS must develop and implement a procedure for ensuring all BPAs are field tested, inspected, and maintained and AG's are inspected and maintained in accordance with CCCPH section 3.3.3.

(7) **Recordkeeping** – The PWS must develop and implement a recordkeeping system in accordance with CCCPH section 3.5.1.

(8) **Backflow Incident Response, Reporting and Notification** – The PWS must develop and implement procedures for investigating and responding to suspected or actual backflow incidents in accordance with Article 5 of this chapter.

(9) **Public Outreach and Education** – The PWS must implement a cross-connection control public outreach and education program element that includes educating staff, customers, and the community about backflow protection and cross-connection control. The PWS may implement this requirement through a variety of methods which may include providing information on cross-connection control and backflow protection in periodic water bill inserts, pamphlet distribution, new customer documentation, email, and consumer confidence reports.

(10) **Local Entity Coordination** – The PWS must coordinate with applicable local entities that are involved in either cross-connection control or public health protection to ensure hazard assessments can be performed, appropriate backflow protection is provided, and provide assistance in the investigation of backflow incidents. Local entities may include but are not limited to plumbing, permitting, or health officials, law enforcement, fire departments, maintenance, and public and private entities.

(b) The cross-connection control program must be developed in consultation with a cross-connection control specialist if:

(1) The PWS has 1,000 or more service connections, or

(2) required by the State Water Board.

(c) A PWS must have at least one cross-connection control specialist as a permanent or contracted employee of the PWS, and that specialist, or their designee, must be able to be contacted within one hour, if:

(1) The PWS has 3,000 or more service connections, or

(2) the PWS has less than 3,000 service connections and is directed by the State Water Board based on hazard assessments conducted pursuant to CCCPH section 3.2.1. or the PWS's history of backflow incidents.

3.1.4 Plan for Public Water System Cross-Connection Control

(a) After adoption of the CCCPH, each PWS must submit a written Cross-Connection Control Plan for State Water Board review in accordance with the following schedule:

- (1) An Existing PWS must submit the Cross-Connection Control Plan no later than 12 months after the effective date of the CCCPH.
- (2) A new PWS must submit the Cross-Connection Control Plan for review and approval prior to issuance of a domestic water supply permit.
- (3) A PWS may submit a written request to the State Water Board for an extension of the deadline for submittal of its initial Cross-Connection Control Plan. The PWS's application must include a written description of the need for an extension. Approval of an extension will be at the sole discretion of the State Water Board.

(b) The Cross-Connection Control Plan for a community water system must include, at a minimum, the following cross-connection control program procedures and documentation:

- (1) a description of how the community water system will achieve and maintain compliance with each requirement in this Chapter;
- (2) a description of the process, personnel, and timeframes for completing initial and ongoing hazard assessments pursuant to CCCPH section 3.2.1;
- (3) a description of the legal authority pursuant to CCCPH section 3.1.3 to implement corrective actions in the event a water user fails to comply in a timely manner with the provisions of the PWS's cross-connection control program;
- (4) a description of the process and timeframes for ensuring each BPA is inspected and field tested, and AG is inspected, at a frequency no less than required by this Chapter;
- (5) a description of the process and timeframe for ensuring each non-testable backflow preventer that is under the PWS ownership or administration is installed and maintained according to the California Plumbing Code;
- (6) a description of the process for ensuring individuals field testing and inspecting BPAs are no less qualified than required by this Chapter, including but not limited to confirmation of the individual's:
 - (A) certification as a backflow prevention assembly tester,
 - (B) field test kit or gage equipment accuracy verification, and
 - (C) BPA field test result reports;
- (7) a description of the procedures and timeframes of activities for responding to backflow incidents, including notification of customers, and reporting of backflow incidents pursuant to CCCPH section 3.5.2;
- (8) contact information for cross-connection control personnel including any cross-connection control program coordinator and specialist;
- (9) a description of the tracking system that maintains current and relevant information, including:

- (A) recordkeeping information required pursuant to CCCPH section 3.5.1,
- (B) location and type of each BPA, and
- (C) highest threat potential hazard from which a given BPA is protecting the public water system distribution system;

(10) for user supervisors, if used, the required information pursuant to CCCPH section 3.2.2 (f);

(11) the corrective actions, including timeframes for the corrective actions, that a community water system will implement when:

- (A) a cross-connection exists and the BPA installed is not commensurate with the user premises' hazard or no BPA has been installed, or
- (B) a BPA needs to be replaced or maintained;

(12) a description of the public outreach and education program to comply with CCCPH section 3.1.3(a)(9); and

(13) the procedures for coordination with local entities

(c) The Cross-Connection Control Plan for a noncommunity water system must include, at a minimum, the following cross-connection control program procedures and documentation:

(1) a description of how the noncommunity water system will achieve and maintain compliance with each requirement in this Chapter that is applicable to the noncommunity water system;

(2) a description of the process, personnel, and timeframes for completing initial and ongoing hazard assessments pursuant to CCCPH section 3.2.1;

(3) a description of the legal authority pursuant to CCCPH section 3.1.3 to implement corrective actions in the event a water user fails to comply in a timely manner with the provisions of the PWS's cross-connection control program;

(4) a description of the process and timeframes for ensuring each BPA is inspected and field tested and AG is inspected, at a frequency no less than required by this Chapter;

(5) a description of the process and timeframe for ensuring each non-testable backflow preventer for internal protection that is under the PWS ownership or administration is installed and maintained according to the California Plumbing Code;

(6) a description of the process for ensuring individuals field testing and inspecting BPAs are no less qualified than required by this Chapter, including but not limited to confirmation of the individual's:

- (A) certification as a backflow prevention assembly tester,
- (B) field test kit or gage equipment accuracy verification, and
- (C) BPA field test result reports;

- (7) a description of the procedures and timeframes of activities for responding to backflow incidents, including notification of customers, and reporting of backflow incidents pursuant to CCCPH section 3.5.2;
- (8) contact information for cross-connection control personnel including the cross-connection control program coordinator;
- (9) maintaining a tracking system with current and relevant information, including:
 - (A) recordkeeping information required pursuant to CCCPH section 3.5.1,
 - (B) location and type of each BPA,
 - (C) location and type of each non-testable backflow preventer used for internal protection in accordance with the California Plumbing Code, if applicable, and
 - (D) potential hazard from which a BPA is protecting the public water system distribution system;
- (10) for user supervisors, if used, the required information pursuant to CCCPH section 3.2.2(f);
- (11) the corrective actions, including timeframes for the corrective actions, that a noncommunity water system will implement when:
 - (A) a cross-connection exists and the BPA installed is not commensurate with the user premises' hazard or no BPA has been installed, or
 - (B) a BPA or non-testable backflow preventer needs to be replaced or maintained;
- (12) a description of the public outreach and education program to comply with CCCPH section 3.1.3(a)(9); and,
- (13) the procedures for coordination with local entities (e.g., local health departments with internal cross-connection control programs, building officials, plumbing officials, etc.).

(d) A PWS must ensure its Cross-Connection Control Plan is, at all times, representative of the current operation of its Cross-Connection Control program. The PWS must make its Cross-Connection Control Plan available to the State Water Board for review upon request. If a PWS makes a substantive revision to its Cross-Connection Control Plan, the PWS must submit the revised Cross-Connection Control Plan to the State Water Board for review.

Article 2 – Hazard Assessments and Required Protection

3.2.1 Hazard Assessments

(a) To evaluate the potential for backflow into the PWS, each community water system must conduct an initial hazard assessment of the user premises within its service area and each noncommunity water system must conduct an initial hazard assessment of its water distribution system. The hazard assessment must consider:

- (1) The existence of cross-connections;
- (2) the type and use of materials handled and present, or likely to be, on the user premises;
- (3) the degree of piping system complexity and accessibility;
- (4) access to auxiliary water supplies, pumping systems, or pressure systems;
- (5) distribution system conditions that increase the likelihood of a backflow event (e.g., hydraulic gradient differences impacted by main breaks and high water-demand situations, multiple service connections that may result in flow-through conditions, etc.);
- (6) user premises accessibility;
- (7) any previous backflow incidents on the user premises; and
- (8) the requirements and information provided in the CCCPH.

(b) Each hazard assessment must identify the degree of hazard to the PWS's distribution system as either a high hazard cross-connection, a low hazard cross-connection, or having no hazard. Examples of some high hazard cross-connection activities may be found in Appendix D.

(c) The hazard assessment must determine whether an existing BPA, if any, provides adequate protection based on the degree of hazard.

(d) Hazard assessments completed prior to the adoption of the CCCPH may be considered as an initial hazard assessment provided that such hazard assessments and associated backflow protection provide protection consistent with the CCCPH and the PWS describes their review of these assessments in the Cross-Connection Control Plan required in CCCPH section 3.1.4.

(e) Subsequent to the initial hazard assessment described in subsection (a), a community water system must perform a hazard assessment under the following criteria:

- (1) if a user premises changes account holder, excluding single-family residences;
- (2) if a user premises is newly or re-connected to the PWS;
- (3) if evidence exists of changes in the activities or materials on a user's premises;
- (4) if backflow from a user's premises occurs;
- (5) periodically, as identified in the PWS's Cross-Connection Control Plan required pursuant to CCCPH section 3.1.4.;

- (6) if the State Water Board requests a hazard assessment of a user's premises;
or
- (7) if the PWS concludes an existing hazard assessment may no longer accurately represent the degree of hazard.

(f) Noncommunity water systems must conduct an initial or follow-up hazard assessment within three years of the effective date of the CCCPH.

(g) Noncommunity water system must conduct a follow-up hazard assessment of its water distribution system if any changes are made that could result in a cross-connection or any backflow incidents occur.

(h) A cross-connection control specialist must review or conduct each initial and follow-up hazard assessment pursuant to this section and make a written finding that, in the specialist's judgment based on cross-connection control principles, the PWS's hazard assessment properly identified all hazards at the time of the assessment, the appropriate degree of hazards, and the corresponding backflow protection.

3.2.2 Backflow Protection Required

(a) A PWS must ensure its distribution system is protected from backflow from identified hazards through the proper installation, continued operation, and field testing of an approved BPA (see Article 3 for installation and approved BPA criteria). When a DC is required or referenced in the CCCPH, a DCDA or DCDA-II type of assembly may be substituted if appropriate. When an RP is required or referenced in the CCCPH, an RPDA or RPDA-II type of assembly may be substituted if appropriate.

(b) The BPA installed must be no less protective than that which is commensurate with the degree of hazard at a user premises, as specified in this Chapter and as determined based on the results of the hazard assessment conducted pursuant to CCCPH section 3.2.1.

(c) Unless specified otherwise in this Chapter, a PWS must, at all times, protect its distribution system from high hazard cross-connections (see Appendix D for examples), through premises containment, through the use of AG(s) or RP(s).

(1) Following State Water Board review and approval, a PWS may implement an alternate method of premises containment in lieu of a required AG provided that the proposed alternative would not increase the level of risk to protection of public health.

(2) Following State Water Board review and approval, a PWS may accept internal protection in lieu of containment when premises containment is not feasible.

(d) Except as otherwise allowed or prohibited in statute or in CCR Title 22, Division 4, Chapter 3, a swivel-ell may be used instead of an AG for premises containment protection when temporarily substituting tertiary recycled water use areas with potable water from a PWS if all the following criteria are met:

- (1) the swivel-ell is approved by the State Water Board;
- (2) the PWS has a cross-connection control program, required pursuant to CCCPH section 3.1.3, and the use and operation of the swivel-ell is described in the Cross-Connection Control Plan required pursuant to CCCPH section 3.1.4;
- (3) the design and construction-related requirements of the swivel-ell adheres to the criteria in Appendix C;
- (4) at least every 12 months, inspections are performed and documented to confirm ongoing compliance with the design and construction-related requirements in Appendix C;
- (5) the RP used in conjunction with the swivel-ell is field tested and found to be functioning properly:

- (A) immediately upon each switchover to potable water use, a visual inspection of the RP must be completed
- (B) within 72 hours of each switchover to potable water use, a field test must be completed, and
- (C) at least every 12 weeks the use site is supplied with potable water; and

(6) there is a legally binding agreement between the PWS and the entity supplying the recycled water, signed by those with relevant legal authority, that includes the following requirements:

- (A) The State Water Board will be notified within 24 hours of all switchovers to or from potable water, will be given an estimate of the timeframe until the next switchover, and will be provided the results of the field testing required in paragraph (5);
- (B) a trained representative of the PWS be present to supervise each switchover; and
- (C) within seven days of each switchover, if requested by the State Water Board, the PWS will submit a written report describing compliance with this subsection, as well as potable and recycled water usage information.

(e) Except as noted below, a PWS must ensure its distribution system is protected with no less than DC protection for a user premises with a fire protection system within ten years of the effective date of the CCCPH.

- (1) A high hazard cross-connection fire protection system, including but not limited to fire protection systems that may utilize chemical addition (e.g., wetting agents, foam, anti-freeze, corrosion inhibitor, etc.) or an auxiliary water supply, must have no less than RP protection.

(2) For existing fire protection systems that do not meet Section 3.2.2 (e)(3) or cannot install DC protection within ten years of the effective date of the CCCPH, a PWS may propose in the cross-connection control plan submitted for CCCPH Section 3.1.4:

- (A) an alternative date; or
- (B) an alternative method of backflow protection that provides at least the same level of protection to public health.

(3) A BPA is not necessary for a low hazard fire protection system on a residential user premises if the following criteria are satisfied:

- (A) the user premises has only one service connection to the PWS;
- (B) a single service line onto the user premises exists that subsequently splits on the property for domestic flow and fire protection system flow, such that the fire protection system may be isolated from the rest of the user premises;
- (C) a single, water industry standard, water meter is provided to measure combined domestic flow and fire protection system flow;
- (D) the fire protection system is constructed of piping materials certified as meeting NSF/ANSI Standard 61; and
- (E) the fire protection system's piping is looped within the structure and is connected to one or more routinely used fixtures (such as a water closet) to prevent stagnant water.

(f) The State Water Board and PWS may, at their discretion, require a water user to designate a user supervisor when the user premises has a multi-piping system that conveys various types of fluids and where changes in the piping system are frequently made. If a user supervisor is designated the following is required:

- (1) The user supervisor is responsible for the avoidance of cross-connections during the installation, operation and maintenance of the water user's pipelines and equipment. The user supervisor must be trained on the fluids used and backflow protection for the premise, and must inform the PWS of changes in piping, and maintain current contact information on file with the PWS; and
- (2) The PWS must include in the Cross-Connection Control Plan required in CCCPH section 3.1.4 the training and qualification requirements for user supervisors, identify the entity that will provide the user supervisor training, and frequency of any necessary recurring training. The training must adequately address the types of hazards and concerns typically found.

(g) Facilities producing, treating, storing, or distributing drinking water that are an approved water supply or water recycling plants as defined by CCR Title 22, Section 60301.710 must have proper internal protection from cross-connections to ensure that all drinking water produced and delivered to customers and workers at those facilities is free from unprotected cross-connections.

Article 3 – Backflow Prevention Assemblies

3.3.1 Standards for Types of Backflow Protection

(a) The PWS must ensure that each AG used for its Cross-Connection Control Program meets the requirements in Table 1, Minimum Air Gaps for Generally used Plumbing Fixtures, page 4 of the American Society of Mechanical Engineers (ASME) A112.1.2-2012(R2017) (See Appendix B).

(b) The PWS must ensure that each replaced or newly installed PVB, SVB, DC, and RP for protection of the PWS is approved through both laboratory and field evaluation tests performed in accordance with at least one of the following:

- (1) Standards found in Chapter 10 of the *Manual of Cross-Connection Control, Tenth Edition*, published by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research; or
- (2) certification requirements for BPAs in the Standards of ASSE International current as of 2022 that include ASSE 1015-2021 for the DC, ASSE 1048-2021 for the DCDA & DCDA-II, ASSE 1013-2021 for the RP, and ASSE 1047-2021 for the RPDA & RPDA-II and must have the 1YT mark.

(c) BPAs must not be modified following approval granted under section 3.3.1 (b). PWS must require BPA testers to notify the PWS if a water user or PWS-owned BPA has been modified from the CCCPH section 3.3.1 (b) approval.

3.3.2 Installation Criteria for Backflow Protection

(a) For AGs, the following is required:

- (1) The receiving water container must be located on the water user's premises at the water user's service connection unless an alternate location has been approved by the PWS;
- (2) all piping between the water user's service connection and the discharge location of the receiving water container must be above finished grade and be accessible for visual inspection unless an alternative piping configuration is approved by the PWS;
- (3) the PWS must ensure that the AG specified in CCCPH section 3.3.1 (a) has been installed; and
- (4) any new air gap installation at a user's service connection must be reviewed and approved by the State Water Board prior to installation.

(b) RPs must be installed such that the lowest point of an assembly is a minimum of twelve inches above grade, and, unless an alternative is approved by the PWS, a maximum of thirty-six inches above the finished grade.

(c) DCs installed or replaced after the adoption of the CCCPH must be installed according to CCCPH section 3.3.2 (b). Below ground installation can be considered if approved by the PWS where it determines no alternative options are available.

(d) A PVB or SVB must be installed a minimum of twelve inches above all downstream piping and outlets.

(e) SVBs may not be used for premises containment. PVBs may only be used for roadway right of way irrigation systems as premises containment where there is no potential for backpressure.

(f) A RP or DC installed after the adoption of the CCCPH must have a minimum side clearance of twelve inches, except that a minimum side clearance of twenty-four inches must be provided on the side of the assembly that contains the test cocks. The PWS may approve alternate clearances providing that there is adequate clearance for field testing and maintenance.

(g) Backflow protection must be located as close as practical to the water user's service connection unless one or more alternative locations have been approved by the PWS. If internal protection is provided in lieu of premises containment, the PWS must obtain access to the user premises and must ensure that the on-site protection meets the requirements of this Chapter for installation, field testing, and inspections.

(h) Each BPA and air gap separation must be accessible for field testing, inspection, and maintenance.

3.3.3 Field Testing and Repair of Backflow Prevention Assemblies and Air Gap Inspection

(a) PWS must ensure that all BPAs installed for its Cross-Connection Control Program are field tested following installation, repair, depressurization for winterizing, or permanent relocation. All required field testing must be performed by certified backflow prevention assembly testers.

(b) BPAs must be field tested at least annually. The CCCPH does not preclude a PWS, the State Water Board, or a local health agency from requiring more frequent field testing for premises with high hazard cross-connection or BPA at increased risk of testing failure.

(c) Air-gap separations must be visually inspected at least annually to determine compliance with this Chapter by persons certified as backflow prevention assembly testers or certified as a cross-connection control specialist pursuant to this Chapter.

(d) PWS must receive passing field tests before providing continuous service to a water user with a newly installed BPA.

(e) PWS must ensure that BPAs that fail the field test are repaired or replaced within 30 days of notification of the failure. Extensions may be allowed by the PWS if included as part of the Cross-Connection Control Plan.

(f) PWS must require backflow prevention assembly testers to notify the PWS as soon as possible within 24 hours if a backflow incident or an unprotected cross-connection is observed at the BPA or prior to the user premises during field testing. PWS must immediately conduct an investigation and discontinue service to the user premises if a backflow incident is confirmed, and water service must not be restored to that user premises until the PWS receives a confirmation of a passing BPA field test from a backflow prevention assembly tester and the assembly is protecting the PWS.

Article 4 – Backflow Prevention Assembly Testers and Cross-Connection Control Specialists

3.4.1 Backflow Prevention Assembly Tester Certification

(a) A PWS must ensure that each BPA required by this Chapter to protect the public water system is field tested by a person with valid certification from a certifying organization recognized by the State Water Board pursuant to this Article.

(b) A State Water Board-recognized organization certifying backflow prevention assembly testers is one that has a certification process that, at a minimum, includes the following:

(1) A timed and proctored written⁶ exam, using a closed-book, objective grading format, consisting of no less than 100 questions for initial certification and no less than 50 questions for recertification. A passing score must be achieved by an examinee as a requirement for certification.

(A) Written exam proctors must:

1. not provide an examinee any assistance in answering exam questions, verbal or otherwise; and
2. be impartial.

(B) Passing scores for the written exams are to be determined prior to exam sessions, such that passing a written exam demonstrates sufficient knowledge of subjects associated with the proper field testing of BPAs, including but not limited to:

1. the hydraulics and theory of backflow;
2. California's laws, regulations, and requirements related to cross-connection control;
3. types of BPA field test equipment and the need to verify accuracy, at least annually and when otherwise necessary, to ensure accuracy of field test results;
4. field test procedures for an RP, RPDA, RPDA-II, DC, DCDA, DCDA-II, PVB, and SVB using the procedures provided in the *Manual of Cross-Connection Control, Tenth Edition*, published by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or equivalent;
5. identification of improperly functioning BPAs (i.e., diagnostics or troubleshooting); and
6. recordkeeping and safety.

⁶ The requirement for a written exam does not preclude using computerized exams.

(2) A performance (i.e., hands-on) exam, using a closed-book, objective grading process and the field test procedures in paragraph (1)(B)(4), designed such that passing the performance exam demonstrates proficiency in accurately determining the operating condition of an RP, DC, PVB, and SVB, when properly or improperly functioning, including but not limited to BPAs with leaks in shutoff valves, and failures in check valves, air inlet valves, or relief valves. A passing score must be achieved by an examinee as a requisite for certification. The performance exam process must include the following:

(A) Performance exam proctors must:

1. be certified as a backflow prevention assembly tester pursuant to this Article;
2. evaluate no more than one examinee at a time;
3. not provide an examinee any assistance in answering exam questions, verbal or otherwise;
4. provide no indication an examinee has erred until completion of a BPA field test, at which time only the fact the examinee has erred may be indicated (i.e., not the nature of the error);
5. be impartial and not affiliated with the certifying organization's preparation of, or preparatory course for (if applicable), the performance exam; and
6. not evaluate an examinee who was trained by the proctor during the six-month period prior to the exam or other conflict of interest.

(B) An examinee is considered to have failed a performance exam if the examinee:

1. makes a field test procedure or recording error that could impact an accurate determination of the operating condition of a BPA,
2. completes the BPA performance exam form with an error,
3. is informed of making an error (see subparagraph (A)(4)) and begins the procedure a second time, and
4. errs a second time and completes the BPA performance exam form accordingly.

(3) recertification requirements of no less frequently than every three years which includes both a written and performance exam;

(4) provisions for revocation of a backflow prevention assembly tester's certification, including but not limited to, revocation for falsifying field test results or field test reports;

(5) a website providing public access to the most recent list of backflow prevention assembly testers:

- (A) who hold a valid certification from the certifying organization. At a minimum, the list is to include each backflow prevention assembly tester's last name, first name, certification number, and the date on which each backflow prevention assembly tester's certification expires; and
- (B) whose certification was revoked, pursuant to paragraph (4), in the three years preceding the date of the list. At a minimum, the list is to include each backflow prevention assembly tester's last name, first name, revoked certification number, the date on which each backflow prevention assembly tester's certification was revoked, and the reason for revocation.

(6) as a prerequisite to sections 3.4.1(b)(1) and (b)(2), completion of an instructional training course accepted by the certifying organization⁷ that covers the subjects in subsection (1)(B) and is no less than 30 hours in length over no fewer than four days for:

- (A) a backflow prevention assembly tester's initial certification;
- (B) a backflow prevention assembly tester's recertification as a result of revocation; or

(7) In lieu of compliance with section 3.4.1(b)(6) a certifying organization may accept two years prior experience in backflow prevention assembly testing.

(c) To be recognized by the State Water Board as a certifying organization for backflow prevention assembly testers, a certifying organization shall:

(1) submit an application with the following information to the State Water Board for review:

- (A) written documentation of a certification program that includes a process that is no less stringent than the criteria in subsection (b);
- (B) evidence that the organization's certification program and exam process has been reviewed, with concerns adequately addressed, by a credentialed psychometrician proficient in the design of objective exams, experienced in the assessment of certification or licensing organizations, and familiar with the application of the requirements of *ISO⁸/IEC⁹ 17024: Conformity Assessment- General Requirements for Bodies Operating Certification of Persons*; and

⁷ But not limited only to training provided by the certifying organization or its affiliates.

⁸ International Organization for Standardization

⁹ International Electrotechnical Commission

(C) a written statement, signed by the certifying organization's representative(s) having the authority and legal responsibility for operation of the certifying organization, attesting that the certifying organization will implement its certification program in a manner meeting or exceeding the criteria in subsection (b) and consistent with the application submitted to the State Water Board.

(2) adequately address each State Water Board comment and/or question concerning the application, and

(3) receive written acknowledgment from the State Water Board that the application is complete.

(d) A certifying organization, accredited by the American National Standards Institute (ANSI) in accordance with ISO/IEC 17024, which complies with subsection (b), will be considered to be a State Water Board-recognized certifying organization. Beginning three years after the effective date of the CCCPH, only those testers with a valid certification from an ANSI-accredited certifying organization shall satisfy subsection (a) and certifications obtained by organizations in accordance with subsection (c) will be invalid.

(e) This Article does not preclude a local health agency from maintaining a backflow prevention assembly tester certification program for the field testing of BPAs within the local health agency's jurisdiction. Accepting a tester certified by a local health agency does not relieve a PWS from meeting the requirements of this Article.

(f) This Article does not preclude a PWS from disallowing the use of an individual tester certified pursuant to this Article if the PWS has reason to believe a certified tester may not be proficient in accurately determining the operating condition of BPA, or for any other reason (e.g., fraud, deceit, negligence, misconduct, etc.). A PWS must report any evidence of a tester falsifying reports to that tester's certifying organization.

(g) This Article is effective July 1, 2026.

3.4.2 Cross-Connection Control Specialist Certification

(a) A PWS must ensure that cross-connection control specialists, used pursuant to the CCCPH, have valid certification from a certifying organization recognized by the State Water Board pursuant to this Article.

(b) A State Water Board-recognized organization certifying cross-connection control specialists is one that has a certification process that, at a minimum, includes the following:

(1) A timed and proctored, written¹⁰ exam, using a closed-book, objective grading format, consisting of no less than 100 questions for certification. A passing score must be achieved by an examinee as a requirement for certification.

(A) Written exam proctors must:

1. not provide an examinee any assistance in answering exam questions, verbal or otherwise; and
2. be impartial.

(B) Passing scores for the exams are to be determined prior to exam sessions, such that passing an exam demonstrates sufficient and comprehensive range of knowledge of the subjects provided in Appendix E, as they may relate to cross-connection control and the causes, effects, and prevention of backflow.

(2) recertification requirements of no less frequently than every three years. Recertification may be done through at least one of the following:

- (A) an exam as required by section 3.4.2 (b)(1),
- (B) through 12 contact hours from continuing education courses covering material in Appendix E or,
- (C) a combination of exam and continuing education contact hours equivalent to (A) or (B);

(3) provisions for revocation of a specialist's certification, including but not limited to, falsifying information or providing negligent recommendations inconsistent with industry-standard cross-connection control guidelines;

(4) a website providing public access to the most recent list of cross-connection control specialists:

- (A) who hold a valid certification from the certifying organization. At a minimum, the list is to include each specialist's last name, first name, certification number, and the date on which each specialist's certification expires; or

¹⁰ The requirement for a written exam does not preclude using computerized exams.

(B) whose certification was revoked, pursuant paragraph (3), in the three years preceding the date of the list. At a minimum, the list is to include each specialist's last name, first name, revoked certification number, the date on which each specialist's certification was revoked, and the reason for revocation.

(5) initial certification requirements:

(A) a valid backflow prevention assembly tester certification from a certification organization recognized by the State Water Board pursuant to section 3.4.1; and

(B) completion of an instructional training course (acceptable to the certifying organization¹¹) that covers the subjects in Appendix E and is no less than 30 hours in length over no fewer than five days (inclusive of an exam, if provided). This paragraph does not preclude a certification organization from providing the instructional training course to the public, including certified specialists.

(C) As an alternative to (A) the certifying organization may accept additional instruction in the subject areas of testing, maintaining and repairing BPAs equivalent in length and scope to the requirements in 3.4.1(b)(6).

(D) As an alternative to (A) the certifying organization may accept a minimum of five (5) years documented experience performing cross-connection control specialist duties, as outlined in Appendix E.

(c) To be recognized by the State Water Board as a certifying organization for cross-connection control specialists, a certifying organization shall:

(1) submit an application with the following information to the State Water Board for review:

(A) Written documentation of a certification program that includes a process that is no less stringent than the criteria in subsection (b);

(B) evidence that the organization's certification program and exam process has been reviewed, with concerns adequately addressed, by a credentialed psychometrician proficient in the design of objective exams, experienced in the assessment of certification or licensing organizations, and familiar with the application of the requirements of *ISO¹²/IEC¹³ 17024: Conformity Assessment- General Requirements for Bodies Operating Certification of Persons*; and

¹¹ But not limited only to training provided by the certifying organization or its affiliates.

¹² International Organization for Standardization

¹³ International Electrotechnical Commission

(C) a written statement, signed by the certifying organization's representative(s) having the authority and legal responsibility for operation of the certifying organization, attesting that the certifying organization will implement its certification program in a manner meeting or exceeding the criteria in subsection (b) and consistent with the application submitted to the State Water Board.

- (2) adequately address each State Water Board comment and question concerning the application, and
- (3) receive a written acknowledgment from the State Water Board that the application is complete:

(d) A certifying organization, accredited by the American National Standards Institute (ANSI) in accordance with ISO/IEC 17024, which complies with subsection (b), will be considered to be a State Water Board-recognized certifying organization. Beginning three years after the effective date of the CCCPH, only those specialists with a valid certification from an ANSI-accredited certifying organization shall satisfy subsection (a) and certifications obtained by organizations in accordance with subsection (c) will be invalid.

(e) This Article does not preclude a local health agency from maintaining a cross-connection control specialist certification program for specialists within the local health agency's jurisdiction. Using a specialist certified by a local health agency does not relieve a PWS from meeting the requirements of this Article.

(f) This Article does not preclude a PWS from disallowing the use of an individual cross-connection control specialist certified pursuant to this Article if the PWS has reason to believe a certified specialist may not be proficient in their knowledge of cross-connection control and the causes, effects, and prevention of backflow, or for any other reason (e.g., fraud, deceit, negligence, misconduct, etc.). A PWS must report any evidence of a specialist falsifying reports to that specialist's certifying organization.

(g) This Article is effective July 1, 2026.

Article 5 – Recordkeeping, Backflow Incident Response, and Notification

3.5.1 Recordkeeping

(a) Each PWS must maintain the following records:

- (1) The two most recent hazard assessments for each user premise, conducted pursuant to CCCPH section 3.2.1 (Hazard Assessment);
- (2) for each BPA, the associated hazard or application, location, owner, type, manufacturer and model, size, installation date, and serial number;
- (3) for each AG installation, the associated hazard or application and the location, owner, and as-built plans of the AG;
- (4) results of all BPA field testing, AG inspection, and swivel-ell inspections and field tests for the previous three calendar years, including the name, test date, repair date, and certification number of the backflow prevention assembly tester for each BPA field test and AG and swivel-ell;
- (5) repairs made to, or replacement or relocation of, BPAs for the previous three calendar years;
- (6) the most current cross-connection tests (e.g. shutdown test, dye test);
- (7) if a user supervisor is designated for a user premise, the current contact information for the user supervisor and water user, and any applicable training and qualifications as described by CCCPH section 3.2.2(f);
- (8) descriptions and follow-up actions related to all backflow incidents;
- (9) if any portion of the cross-connection control program is carried out under contract or agreement, a copy of the current contract or agreement;
- (10) the current Cross-Connection Control Plan as required in CCCPH section 3.1.4.; and
- (11) any public outreach or education materials issued as required in CCCPH section 3.1.3.(a)(9) for the previous three calendar years.

(b) All information in subsection (a) must be available to the State Water Board upon request.

3.5.2 Backflow Incident Response Procedure

Each PWS must include backflow incident response procedures in the Cross-Connection Control Plan required in CCCPH section 3.1.4. The PWS must describe its procedures for investigating and responding to suspected backflow incidents including, but not limited to, the following:

(a) Consideration of complaints or reports of changes in water quality as possible incidents of backflow;

(b) Water quality sampling and pressure recording; and

(c) Documentation of the investigation, and any response and follow-up activities.

3.5.3 Backflow Incident Notification

(a) Each PWS must notify the State Water Board and local health agencies of any known or suspected incident of backflow within 24 hours of the determination. If required by the State Water Board, a PWS must issue a Tier 1 public notification pursuant to CCR, Title 22, Section 64463.1.

(b) If required by the State Water Board, the PWS must submit, by a date specified by the State Water Board, a written incident report describing the details and affected area of the backflow incident, the actions taken by the PWS in response to the backflow incident, and the follow up actions to prevent future backflow incidents. The written report must contain, at a minimum, the information requested in Appendix F.

This page intentionally left blank

Appendix

Appendix A: Assembly Bill 1671 (2017, Chapter 533) and Assembly Bill 1180 (2019, Chapter 455).

Appendix B: ASME A112.1.2-2012(R2017) Table 1, Minimum Air Gaps for Generally used Plumbing Fixtures, page 4

Appendix C: Backflow Prevention Assembly Diagrams

Appendix D: High Hazard Premises

Appendix E: General Range of Knowledge for Cross-Connection Control Specialists

Appendix F: Example Backflow Incident Reporting Form

Appendix G: Related Statutes and Regulations

This page intentionally left blank

Appendix A

Assembly Bill 1671 (2017, Chapter 533)
Assembly Bill 1180 (2019, Chapter 455)

This page intentionally left blank

Assembly Bill No. 1671

CHAPTER 533

An act to amend Section 116810 of, and to add Sections 116407 and 116555.5 to, the Health and Safety Code, relating to drinking water.

[Approved by Governor October 6, 2017. Filed with
Secretary of State October 6, 2017.]

LEGISLATIVE COUNSEL'S DIGEST

AB 1671, Caballero. Backflow protection and cross-connection controls: standards.

(1) Existing law, the California Safe Drinking Water Act, requires the State Water Resources Control Board to administer provisions relating to the regulation of drinking water to protect public health, including, but not limited to, conducting research, studies, and demonstration projects relating to the provision of a dependable, safe supply of drinking water, enforcing the federal Safe Drinking Water Act, adopting regulations, and conducting studies and investigations to assess the quality of private domestic water wells. Existing law makes certain violations of the act a misdemeanor.

Existing law requires any person who owns a public water system to ensure that the system does certain things, including, but not limited to, that it will not be subject to backflow under normal operating conditions. Existing law, to ensure that testing and maintenance of backflow prevention devices are performed by persons qualified to do testing and maintenance, authorizes local health officers to maintain programs for certification of backflow prevention device testers and requires the certification program to be consistent with backflow protection regulations adopted by the state board. A violation of these provisions, or an order by a local health officer pursuant to these provisions, is a misdemeanor.

This bill would require a public water system to implement a cross-connection control program that complies with, and would require the certification program to be consistent with, applicable regulations and the standards described in (2).

(2) Existing regulations establish standards for a backflow prevention device and cross-connection control.

This bill, on or before January 1, 2020, would require the state board to adopt standards for backflow protection and cross-connection control and would authorize the state board to do so through the adoption of a policy handbook, as specified. By authorizing the state board to adopt standards, the violation of which would be a crime, the bill would create a new crime and impose a state-mandated local program.

(3) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

The people of the State of California do enact as follows:

SECTION 1. Section 116407 is added to the Health and Safety Code, to read:

116407. (a) On or before January 1, 2020, the state board shall adopt standards for backflow protection and cross-connection control.

(b) The state board may implement subdivision (a) through the adoption of a policy handbook that is not subject to the requirements of Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code. The policy handbook shall include standards for backflow protection and cross-connection control. In developing the standards and any amendments to those standards, the state board shall consult with state and local agencies and other persons whom the state board has identified as having expertise in the subject of backflow protection and cross-connection control. The state board shall hold at least two public hearings before adopting the policy handbook. The policy handbook shall be posted on the board's Internet Web site.

(c) (1) Upon the effective date of a policy handbook adopted by the state board pursuant to subdivision (b), the regulations set forth in Article 1 (commencing with Section 7583) and Article 2 (commencing with Section 7601) of Group 4 of Subchapter 1 of Chapter 5 of Division 1 of Title 17 of the California Code of Regulations shall become inoperative, and, 90 days thereafter, are repealed, unless the state board makes a determination not to repeal a specific regulation.

(2) If the state board determines not to repeal a specific regulation pursuant to paragraph (1), the state board shall provide to the Office of Administrative Law and the Secretary of State written notice of its determination, including identification of the specific regulation that is not repealed. That regulation, upon the provision of that written notice to the Office of Administrative Law and the Secretary of State, shall become operative.

SEC. 2. Section 116555.5 is added to the Health and Safety Code, to read:

116555.5. A public water system shall implement a cross-connection control program that complies with applicable regulations and with standards adopted by the board pursuant to Section 116407.

SEC. 3. Section 116810 of the Health and Safety Code is amended to read:

116810. To ensure that testing and maintenance of backflow prevention devices are performed by persons qualified to do testing and maintenance,

local health officers may maintain programs for certification of backflow prevention device testers. The local health officer may suspend, revoke, or refuse to renew the certificate of a tester, if, after a hearing before the local health officer or his or her designee, the local health officer or his or her designee finds that the tester has practiced fraud or deception or has displayed gross negligence or misconduct in the performance of his or her duties as a certified backflow prevention device tester. The local health officer may collect fees from certified testers to offset the cost of the certification program provided pursuant to this section. The certification standards shall be consistent with standards adopted by the state board pursuant to Section 116407 and any other applicable backflow protection regulations.

SEC. 4. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency or school district will be incurred because this act creates a new crime or infraction, eliminates a crime or infraction, or changes the penalty for a crime or infraction, within the meaning of Section 17556 of the Government Code, or changes the definition of a crime within the meaning of Section 6 of Article XIII B of the California Constitution.

This page intentionally left blank

Assembly Bill No. 1180

CHAPTER 455

An act to amend Section 116407 of the Health and Safety Code, and to add Section 13521.2 to the Water Code, relating to water.

[Approved by Governor October 2, 2019. Filed with Secretary
of State October 2, 2019.]

LEGISLATIVE COUNSEL'S DIGEST

AB 1180, Friedman. Water: recycled water.

(1) Existing law, the California Safe Drinking Water Act, requires the State Water Resources Control Board to administer provisions relating to the regulation of drinking water to protect public health. Existing law requires, on or before January 1, 2020, the state board to adopt standards for backflow protection and cross-connection control through the adoption of a policy handbook, as specified.

This bill would require that handbook to include provisions for the use of a swivel or changeover device to supply potable water to a dual-plumbed system during an interruption in recycled water service.

(2) Existing law requires the state board to establish uniform statewide recycling criteria for each varying type of use of recycled water where the use involves the protection of public health.

This bill would require the state board, on or before January 1, 2023, as specified, to update the uniform statewide criteria for nonpotable recycled water uses.

The people of the State of California do enact as follows:

SECTION 1. The Legislature finds and declares all of the following:

(a) On December 11, 2018, the State Water Resources Control Board unanimously adopted an amendment to the policy for water quality control for recycled water, which included a goal to increase the use of recycled water in the state from 714,000 acre-feet per year in 2015 to 1,500,000 acre-feet per year by 2020 and 2,500,000 acre-feet per year by 2030.

(b) Section 13521 of the Water Code requires the state board to establish uniform statewide recycling criteria for each varying type of use of recycled water where the use involves the protection of public health.

(c) The regulations establishing the uniform statewide criteria for recycled water uses are set forth in Chapter 3 (commencing with Section 60301.050) of Division 4 of Title 22 of the California Code of Regulations. The regulations that pertain to nonpotable recycled water uses have not been updated since 2000.

(d) The regulations relating to backflow protection and cross-connection control for recycled water are set forth in Article 1 (commencing with Section 7583) and Article 2 (commencing with Section 7601) of Group 4 of Subchapter 1 of Chapter 5 of Division 1 of Title 17 of the California Code of Regulations. These regulations have not been updated since 1987.

(e) Section 1 of Chapter 533 of the Statutes of 2017 (Assembly Bill 1671 of the 2017–18 Regular Session) requires, on or before January 1, 2020, the state board to adopt backflow protection and cross-connection control standards and authorizes their implementation through a policy handbook.

(f) In order to maximize the amount of recycled water California can safely use for beneficial purposes, it is necessary to update the uniform statewide criteria for nonpotable recycled water uses and specify certain associated backflow protection and cross-connection control provisions.

SEC. 2. Section 116407 of the Health and Safety Code is amended to read:

116407. (a) On or before January 1, 2020, the state board shall adopt standards for backflow protection and cross-connection control.

(b) (1) The state board may implement subdivision (a) through the adoption of a policy handbook that is not subject to the requirements of Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code. The policy handbook shall include standards for backflow protection and cross-connection control. In developing the standards and any amendments to those standards, the state board shall consult with state and local agencies and other persons whom the state board has identified as having expertise in the subject of backflow protection and cross-connection control. The state board shall hold at least two public hearings before adopting the policy handbook. The policy handbook shall be posted on the board's internet website.

(2) (A) The policy handbook described in this subdivision shall include provisions for the use of a swivel or changeover device to supply potable water to a dual-plumbed system during an interruption in recycled water service.

(B) The use of a swivel or changeover device shall be consistent with any notification and backflow protection provisions contained in the policy handbook.

(c) (1) Upon the effective date of a policy handbook adopted by the state board pursuant to subdivision (b), the regulations set forth in Article 1 (commencing with Section 7583) and Article 2 (commencing with Section 7601) of Group 4 of Subchapter 1 of Chapter 5 of Division 1 of Title 17 of the California Code of Regulations shall become inoperative, and, 90 days thereafter, are repealed, unless the state board makes a determination not to repeal a specific regulation.

(2) If the state board determines not to repeal a specific regulation pursuant to paragraph (1), the state board shall provide to the Office of Administrative Law and the Secretary of State written notice of its determination, including identification of the specific regulation that is not repealed. That regulation, upon the provision of that written notice to the

Office of Administrative Law and the Secretary of State, shall become operative.

SEC. 3. Section 13521.2 is added to the Water Code, to read:

13521.2. (a) On or before January 1, 2023, the state board shall update the uniform statewide criteria for nonpotable recycled water uses established in Chapter 3 (commencing with Section 60301.050) of Division 4 of Title 22 of the California Code of Regulations. The deadline imposed by this section is mandatory only if the Legislature has appropriated sufficient funds, as determined by the executive director of the state board, in the annual Budget Act or otherwise to cover the state board's costs associated with the performance of the duties imposed by this section.

(b) For purposes of the update to the uniform statewide criteria for nonpotable recycled water uses described in subdivision (a), the state board shall adopt a regulation that incorporates by reference the criteria and applicable backflow protection provisions, including the provisions for the use of a swivel or changeover device for dual-plumbed systems, that are contained in the most recently adopted version of the policy handbook adopted pursuant to Section 116407 of the Health and Safety Code and any future versions of the policy handbook.

This page intentionally left blank

Appendix B

ASME A112.1.2-2012(R2017) Table 1,
Minimum Air Gaps for Generally used Plumbing
Fixtures, page 4

This page intentionally left blank

Appendix B
ASME A112.1.2-2012(R2017) Table 1, Minimum Air Gaps for Generally used Plumbing Fixtures,¹ page 4

TABLE 1
Minimum Air Gaps for Generally used Plumbing Fixtures⁴

FIXTURES	WHERE NOT AFFECTED BY SIDEWALLS ¹ (inches)	WHERE AFFECTED BY SIDEWALLS ² (inches)
Effective opening ³ not greater than ½ of an inch in diameter	1	1½
Effective openings ³ not greater than ¾ of an inch in diameter	1½	2¼
Effective openings ³ not greater than 1 inch in diameter	2	3
Effective openings ³ greater than 1 inch in diameter	Two times the diameter of effective opening	Three times the diameter of effective opening

For SI units: 1 inch = 25.4 mm

Notes:

¹ Sidewalls, ribs, or similar obstructions do not affect air gaps where spaced from the inside edge of the spout opening at a distance exceeding three times the diameter of the effective opening for a single wall, or at a distance exceeding four times the effective opening for two intersecting walls.

² Vertical walls, ribs, or similar obstructions extending from the water surface to or above the horizontal plane of the spout opening other than specified in Footnote 1 above. The effect of three or more such vertical walls or ribs has not been determined. In such cases, the air gap shall be measured from the top of the wall.

³ The effective opening shall be the minimum cross-sectional area at the seat of the control valve or the supply pipe or tubing that feeds the device or outlet. Where two or more lines supply one outlet, the effective opening shall be the sum of the cross-sectional areas of the individual supply lines or the area of the single outlet, whichever is smaller.

⁴ Air gaps less than 1 inch (25.4 mm) shall be approved as a permanent part of a listed assembly that has been tested under actual backflow conditions with vacuums of 0 to 25 inches of mercury (85 kPa).

¹ Reprinted from ASME A112.1.2-2012(R2017), by permission of The American Society of Mechanical Engineers. All rights reserved

This page intentionally left blank

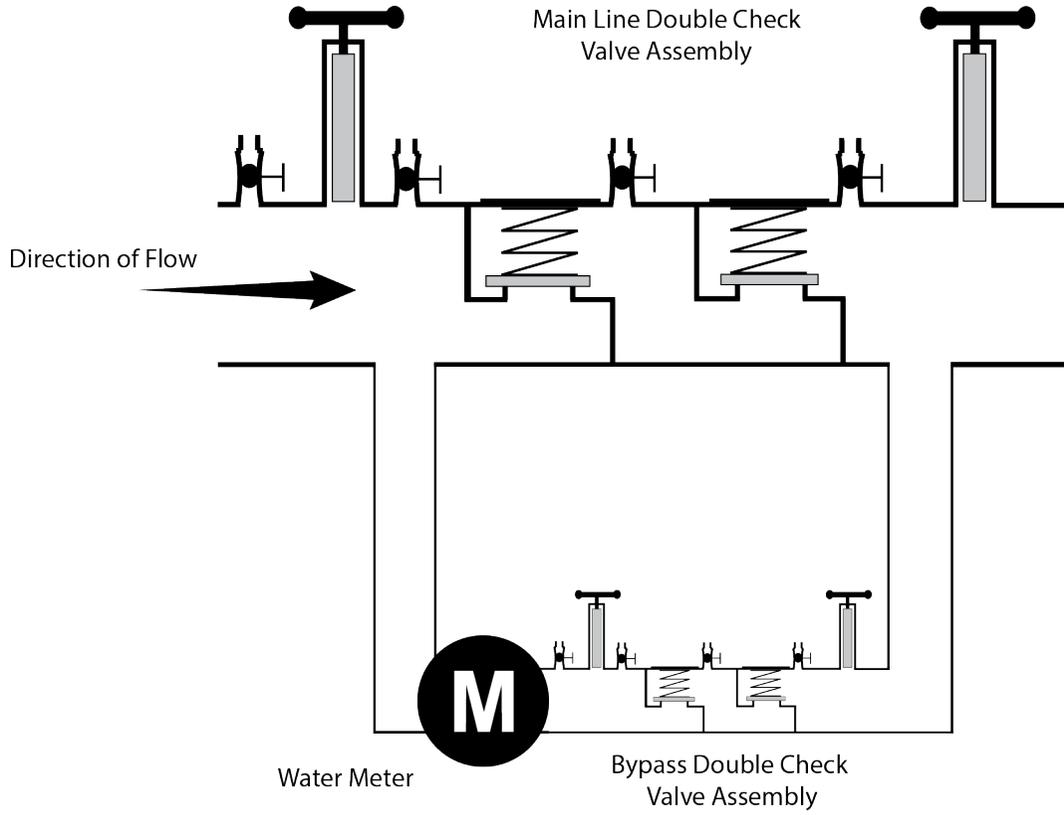
Appendix C

Backflow Prevention Assembly Diagrams

This page intentionally left blank

Appendix C

Diagram 1
Double check detector backflow prevention assembly¹

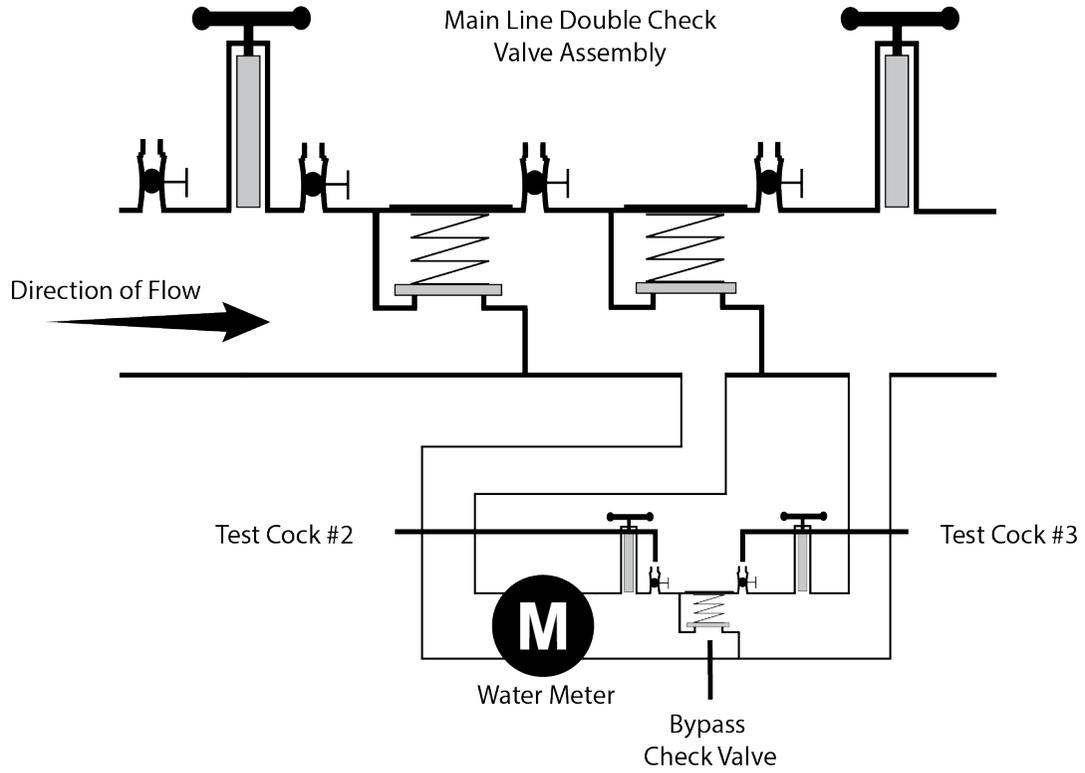


¹ © 2023 University of Southern California. Used with permission.

Appendix C

Diagram 2

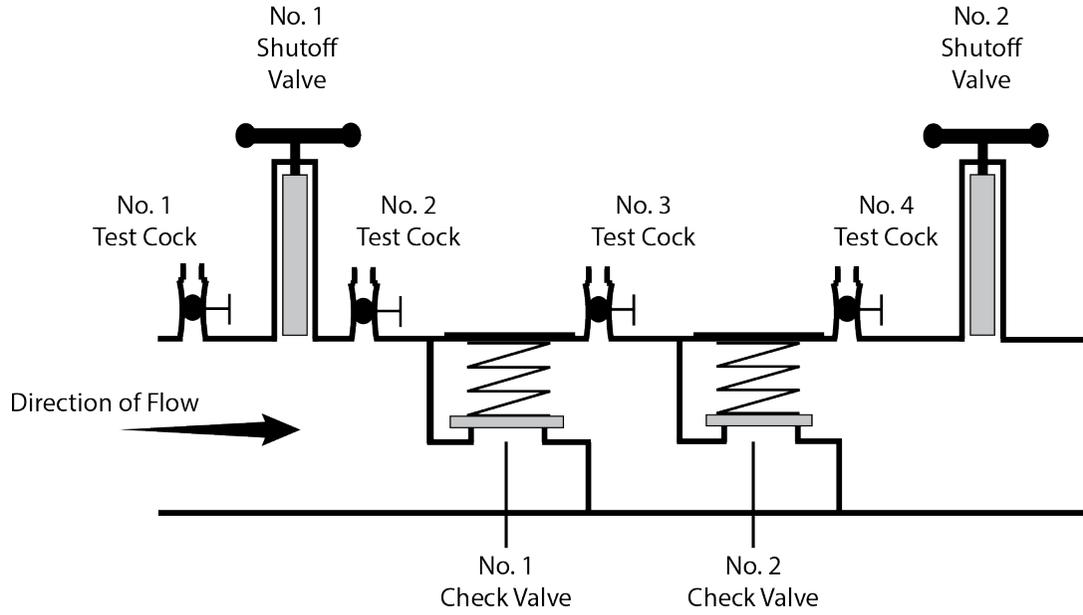
*Double check detector backflow prevention assembly – type II*²



² © 2023 University of Southern California. Used with permission.

Appendix C

Diagram 3
Double check valve backflow prevention assembly³

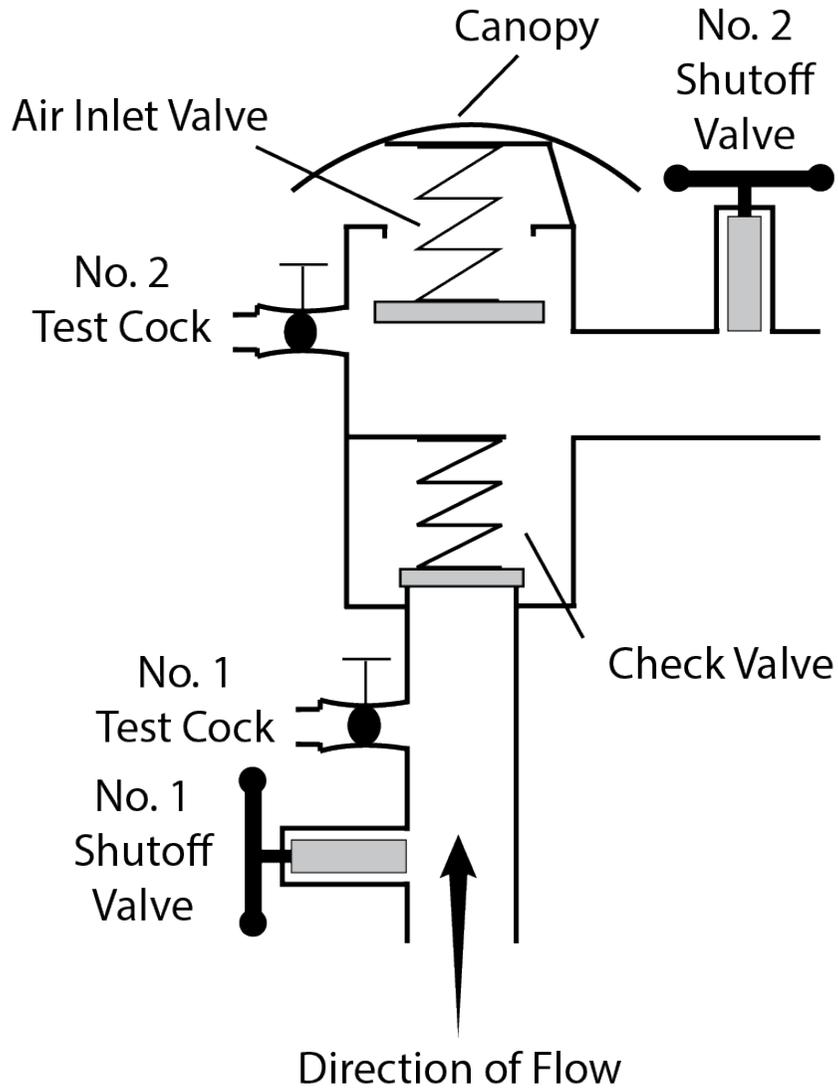


³ © 2023 University of Southern California. Used with permission

Appendix C

Diagram 4

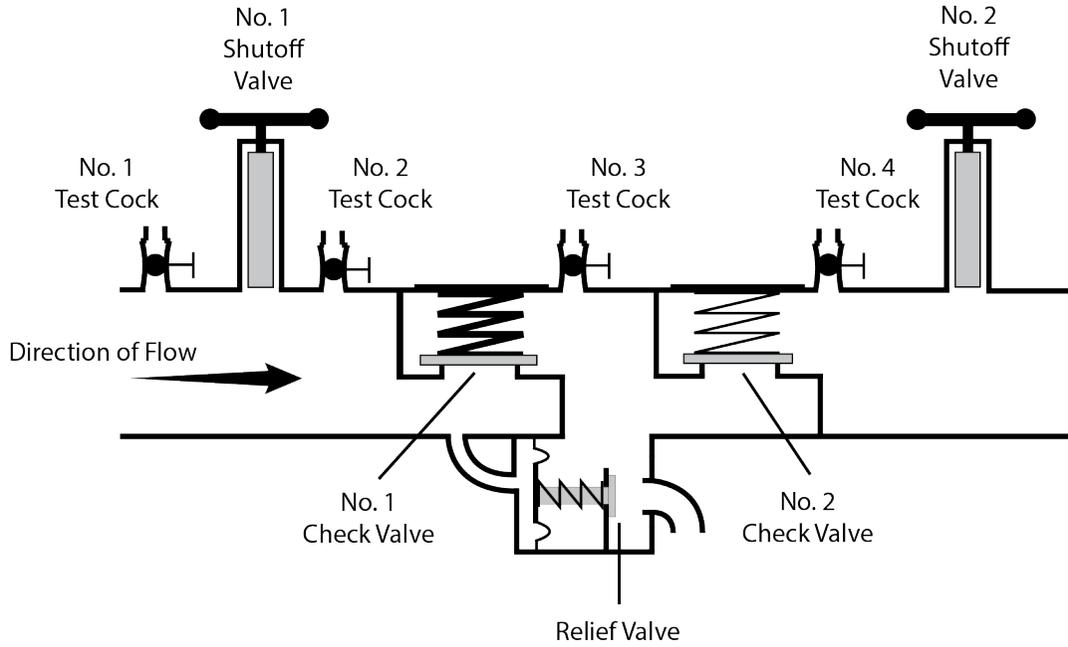
*Pressure vacuum breaker backsiphonage prevention assembly*⁴



⁴ © 2023 University of Southern California. Used with permission

Appendix C

Diagram 5
*Reduced pressure principle backflow prevention assembly*⁵

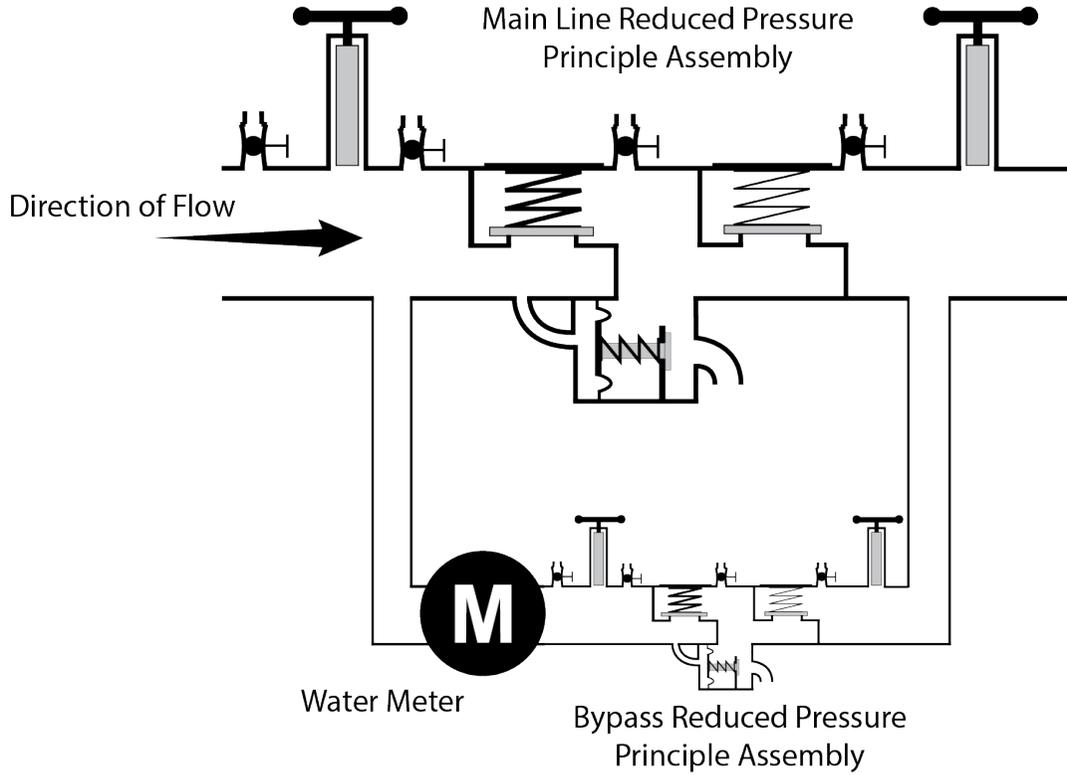


⁵ © 2023 University of Southern California. Used with permission

Appendix C

Diagram 6

*Reduced pressure principle detector backflow prevention assembly*⁶

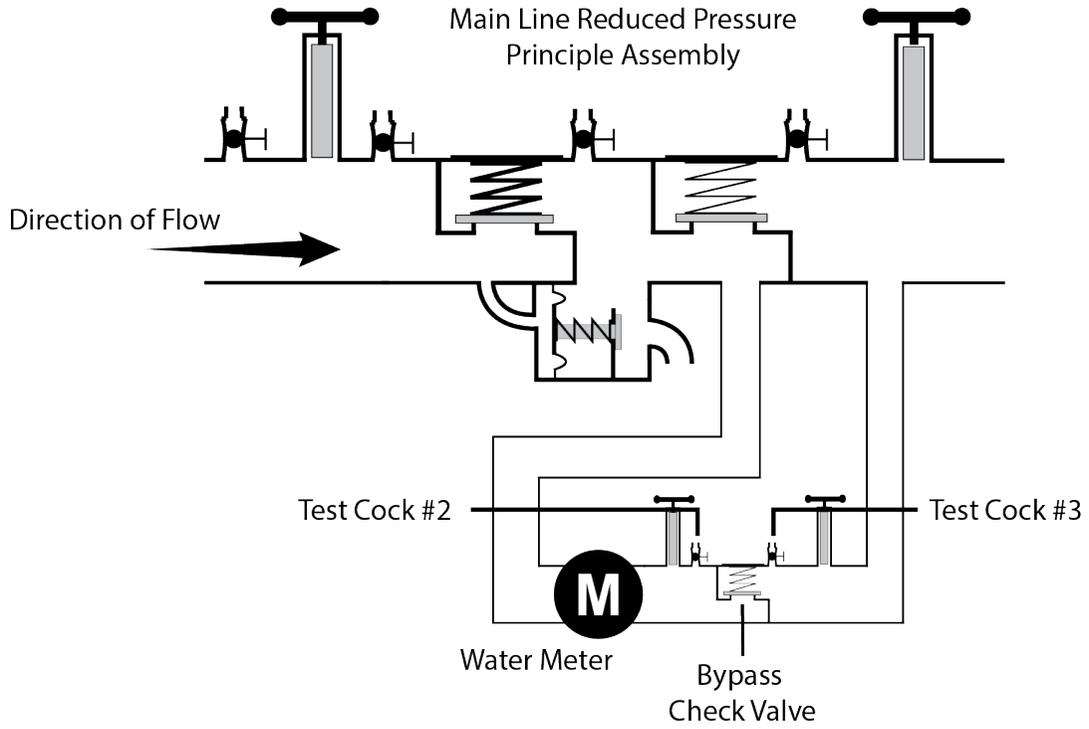


⁶ © 2023 University of Southern California. Used with permission

Appendix C

Diagram 7

*Reduced pressure principle detector backflow prevention assembly – type II*⁷

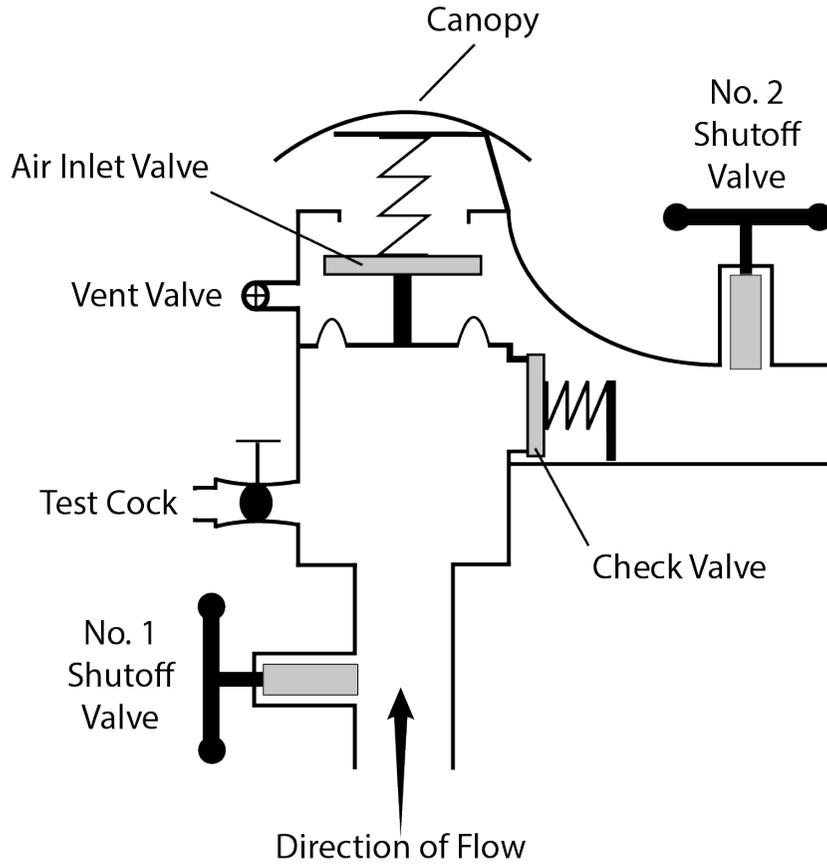


⁷ © 2023 University of Southern California. Used with permission

Appendix C

Diagram 8

*Spill-resistant pressure vacuum breaker backsiphonage prevention assembly*⁸



⁸ © 2023 University of Southern California. Used with permission

Appendix C

Swivel-ElI Design and Construction Criteria

The criteria below, in conjunction with the swivel-ell diagrams that follow (Diagrams 9a and 9b), are **minimum** acceptable design and construction-related requirements for utilizing a swivel-ell. For restrictions and allowances for utilizing a swivel-ell, see CCCPH section 3.2.2.

A. Prior to operation of a swivel-ell, the PWS will receive approval for the design and construction plans of that swivel-ell from the State Water Board.

B. The drinking water supply must not, under any circumstances, be directly connected to the recycled water supply, nor be designed such that the recycled water use site could be supplied concurrently by a recycled water supply and a drinking water supply.

C. The drinking water supply line and the recycled water supply line must be offset (see Diagram 9b) in a manner that ensures a tee-connection, spool, or other prefabricated mechanical appurtenance(s) could not be readily utilized in lieu of the swivel-ell connection, nor result in the recycled water use site being supplied concurrently by recycled water and drinking water.

D. The recycled water supply line used in conjunction with the swivel-ell must be the only recycled water supply to the recycled water use area.

E. The swivel-ell must be located as close as practical to the public water system service connection, with the swivel-ell connection being located as close as practical to the RP upstream of the swivel-ell.

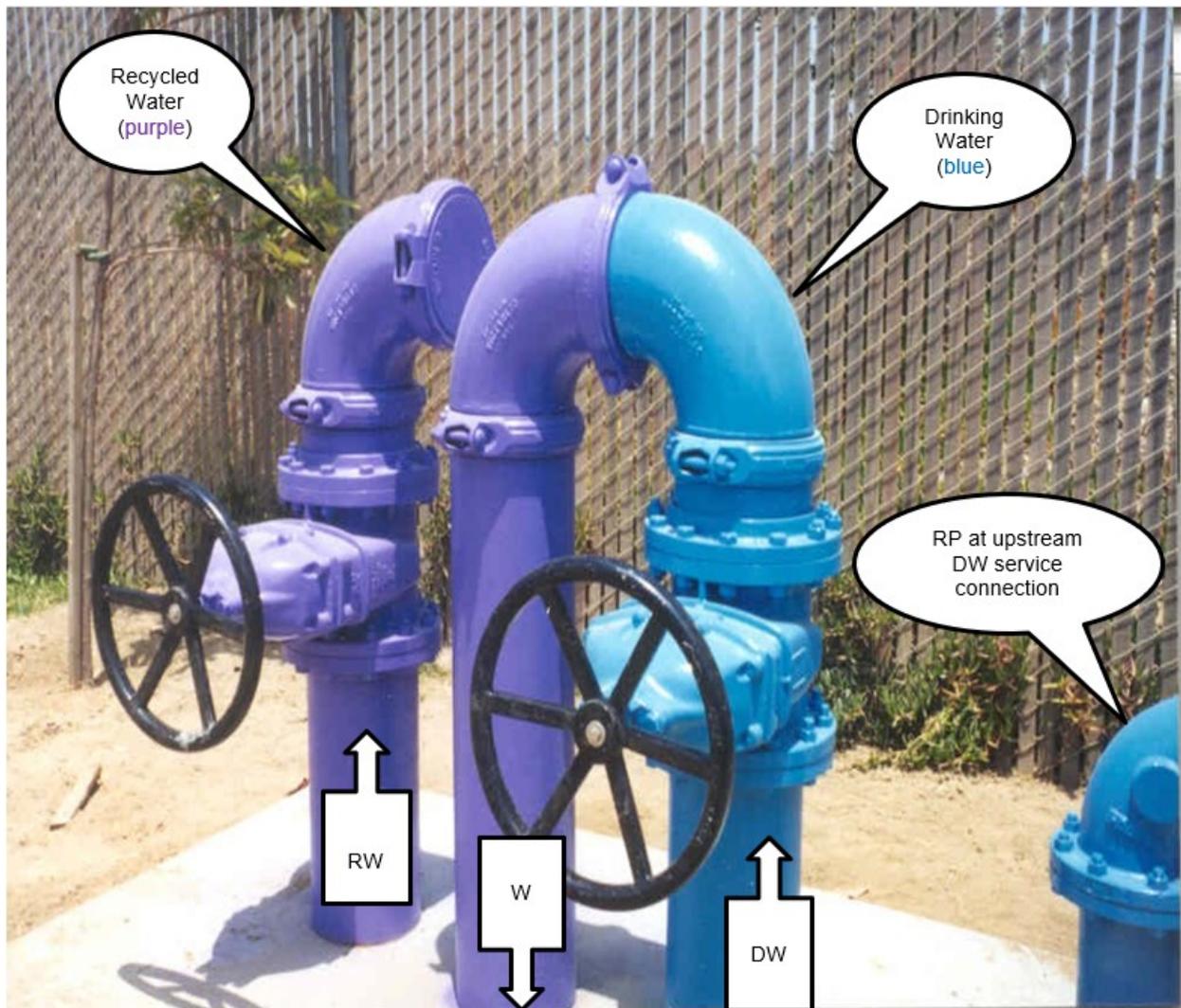
F. The swivel-ell must:

1. be located above ground;
2. be color-coded pursuant to section 116815 of the CHSC and its implementing regulations;
3. include appropriate signage, as required by regulation and the State Water Board;
4. be provided the security necessary to prevent interconnections, vandalism, unauthorized entry, etc.; and
5. be provided with meters on both the recycled water service and drinking water service connections.

Legend for Diagram 9a and 9b (also see next page)

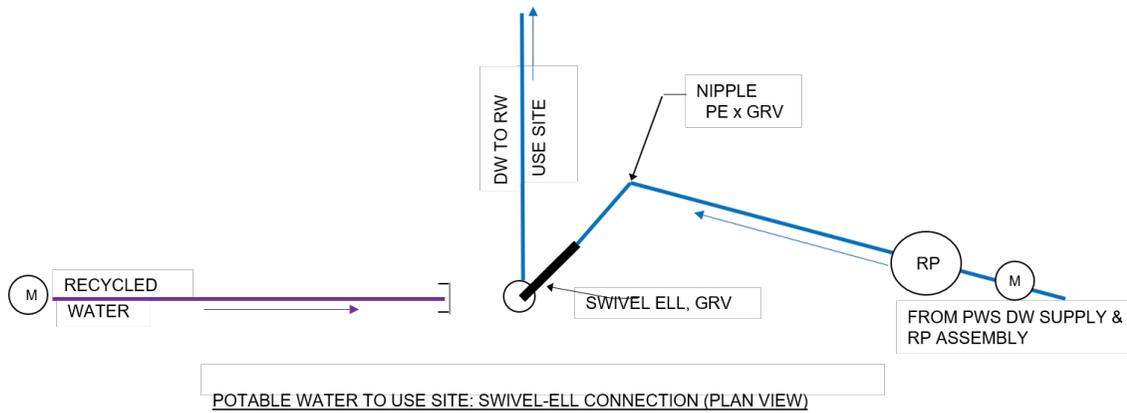
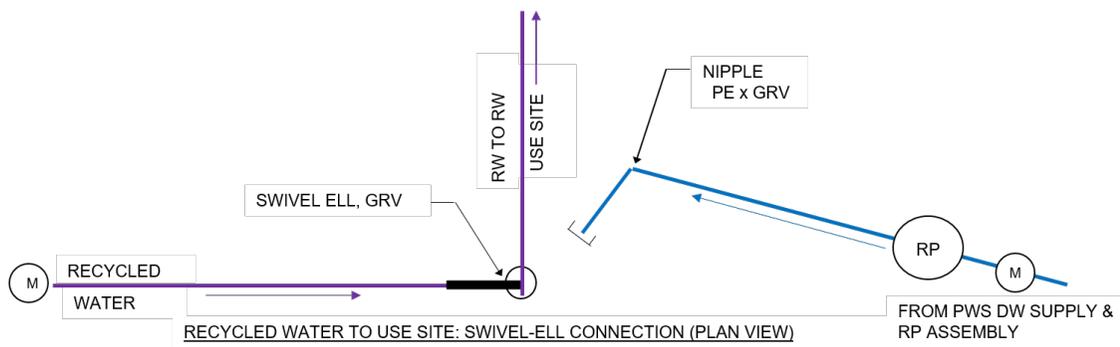
- RP = Reduced pressure principle backflow prevention assembly
- RW = Tertiary-treated recycled water originating from wastewater treatment facility
- DW = Drinking water originating from a public water system
- W = Water (tertiary recycled water or drinking water) to use site. As pictured, configured for supplemental drinking water to the use site.
- M = Meter (*next page*)
- PE = Plain End (*next page*)
- GRV = Groove (*next page*)
- PWS = Public Water System (*next page*)

Diagram 9a: Example Swivel-Ell Pictorial (also see Plan View Schematics)



Note: The RP, a required component of an acceptable swivel-ell, is not shown in the picture.

**Diagram 9b: Swivel-Ell Typical Plan View Schematics
(not intended to be an exact portrayal of the pictorial)**



This page intentionally left blank

Appendix D

High Hazard Premises

This page intentionally left blank

APPENDIX D

HIGH HAZARD CROSS-CONNECTION CONTROL PREMISES

The list below identifies premises that require backflow protection provided by an air gap or a reduced pressure principle backflow prevention assembly, unless noted otherwise. The list below is not intended to be all-inclusive. A PWS, State Water Board, or local health agency may require an AG, RP, or both to protect a PWS from other hazards not listed below and identified in premises through the hazard assessment completed in CCCPH Chapter 3, section 3.2.1. A PWS may reduce or increase the minimum protection required for a previously hazard-assessed user premise following a hazard reassessment as described in CCCPH Chapter 3, section 3.2.1.

1. Sewage handling facilities
2. Wastewater lift stations and pumping stations
3. Wastewater treatment processes, handling, or pumping equipment that is interconnected to a piping system connected to a PWS (+)
4. Petroleum processing or storage plants
5. Radioactive material storage, processing plants or nuclear reactors
6. Mortuaries
7. Cemeteries
8. Sites with an auxiliary water supply interconnected with PWS (+)
9. Sites with an auxiliary water supply not interconnected with PWS
10. Premises with more than one connection to the PWS (++++)
11. Recycled water (++)(+++)
12. Recycled water interconnected to piping system that contains water received from a PWS (+)
13. Graywater systems, as defined in California Water Code Section 14876, that are interconnected to a piping system that is connected to a PWS
14. Medical facilities
15. Kidney dialysis facilities
16. Dental office with water-connected equipment
17. Veterinarian facilities
18. Chemical plants
19. Laboratories
20. Biotech facilities
21. Electronics manufacture
22. Dry cleaner facilities
23. Industrial or commercial laundry facilities
24. Metal-plating facilities
25. Business park with a single meter serving multiple businesses
26. Marine-port facilities
27. Car wash facilities
28. Mobile home park, RV park, or campgrounds with RV hookups

29. Hotels/motels
30. Gas stations
31. Fire stations
32. Solid waste disposal facilities
33. Pet groomers
34. Agricultural premises
35. Hazard assessment access denied or restricted
36. Railroad maintenance facilities
37. Incarceration facilities (e.g. prisons)
38. Temporary connections to fire hydrants for miscellaneous uses, including construction
39. Private water distribution mains
40. Drinking water storage tank overflow connected to a sump or storm drain (+)
41. Airports

(+) Premise isolated by air gap only except as allowed through CCCPH Section 3.2.2(c)

(++) Dual-plumbed use areas established per CCR Title 22, Section 60313 through 60316.

(+++ Residences using recycled water for landscape irrigation as part of an approved dual plumbed use area established pursuant to CCR Title 22, sections 60313 through 60316 shall use, at a minimum, a DC. If the water supplier is also the supplier of the recycled water, then the recycled water supplier may obtain approval of the local public water supplier or the State Water Board, to utilize an alternative backflow protection plan that includes an annual inspection of both the recycled water and potable water systems and an annual cross-connection test of the recycled water and potable water systems pursuant to subsection 60316(a) in lieu of any BPA.

(++++ All connections must receive at least the same level of protection excluding fire protection when connected to the PWS distribution system (e.g. if one connection requires an RP then all connections must have RPs installed).

Appendix E

General Range of Knowledge for Cross-
Connection Control Specialists

This page intentionally left blank

APPENDIX E

General Range of Knowledge for Cross-Connection Control Specialists

To effectively prevent unintended backflow into a PWS's distribution system, it is necessary for a cross-connection control specialist to have an understanding of a range of subjects related to cross-connection control. This appendix provides a list of such subjects.

This appendix is not meant to preclude instruction of additional subjects that may be necessary or beneficial to the goal of a prospective or existing cross-connection control specialist in being proficient in protecting public health from backflow through cross-connection control measures. Emphasis on particular subjects should be in a manner that best achieves that goal.

(a) GENERAL

- (1) Cross-connection control terminology.
- (2) The history leading to the need for cross-connection control, including causes, impacts, including but not limited to:
 - (A) potable water distribution systems;
 - (B) examples of backflow incidents and actual or potential public health impacts; and
 - (C) evolution of methods of cross-connection control and backflow prevention assemblies.
- (3) Hydraulics (general) – An understanding of hydraulic gradients, pressure variations, flow rates, temperature, the properties of water, backsiphonage, backpressure, and other elements necessary to understand the causes for backflow.
- (4) Public outreach – How to appropriately convey the value of cross-connection control to PWS personnel and the public.

(b) LAWS, REGULATIONS, AND GUIDANCE

- (1) Federal – Applicable federal laws, regulations, and guidance.
- (2) State – California laws and regulations, including, but not limited to, the State Water Resources Control Board's most recent edition of its *Cross-Connection Control Policy Handbook* and other requirements related to cross-connection control.
- (3) Local – An understanding of the need to ensure local requirements are considered and how best to find such requirements.

(c) HAZARD ASSESSMENTS AND METHODS TO PREVENT BACKFLOW

A comprehensive understanding of how to conduct cross-connection surveys of water systems for the purpose of identifying cross-connections, assessing hazards, and identifying the most effective and legally appropriate methods for protection from backflow. At a minimum, the following topics should be considered to achieve such an understanding:

(1) Surveys:

- (A) Preparation (e.g., authority, notification, prioritizing customers/premises, coordinating with public water systems, etc.);
- (B) Design and as-built drawings related to water supply and cross-connection control;
- (C) Public water system schematics;
- (D) How to identify existing and new construction, with an understanding of how construction may impact backflow protection;
- (E) How to identify cross-connections (actual and potential);
- (F) How to identify and differentiate between high hazard and low hazard cross-connections; and
- (G) Problems associated with multi-story buildings, multiple service connections at a premises, typical water-use equipment, etc., and varying types of water service, including irrigation, recycled water, gray water, fire prevention systems, and dual plumbed premises.

(2) Assessing Hazards:

- (A) Identifying and differentiating between premises activities leading to high hazard cross-connections and low hazard cross-connections (for examples of high hazard activities, see Appendix D); and
- (B) Understanding potential public health impacts from backflow associated with the problems in section (c)(1)(G) of this appendix.

(3) Assemblies and Methods for Backflow Prevention:

- (A) A comprehensive understanding of approved methods for cross-connection control and preventing backflow with respect to an assessed hazard;
- (B) Identifying unapproved methods for cross-connection control and preventing backflow;
- (C) An understanding of components, design and operation, proper installation and location of backflow prevention assemblies, including air gaps, and backflow prevention assembly field test methods, field test results, and the assessment of air gaps; and
- (D) Identifying unapproved assemblies, as well as those assemblies whose operation and/or state of repair necessitates replacement with an approved assembly.

(d) CROSS-CONNECTION CONTROL PROGRAMS

A comprehensive understanding of the development, elements, and administration of cross-connection control programs, including, but not limited to:

- (1) An ability to assess the federal, state, and local requirements applicable to a public water system's cross-connection control program, such that adherence to the cross-connection control program would result in compliance with the requirements;
- (2) The roles, responsibilities, and authority of individuals and entities involved in the critical elements of a successful plan for cross-connection control (see CCCPH section 3.1.4); and
- (3) The ability to assess the components of a public water system's Cross-Connection Control Plan (see CCCPH section 3.1.4) that best assures the prevention of undesired backflow into the public water system's distribution system, and to communicate deficiencies to public water system personnel.

(e) CROSS-CONNECTION TESTS

A comprehensive understanding of:

- (1) The purpose of a cross-connection test and when a cross-connection test should be performed;
- (2) The ability to develop protocols and make arrangements for cross-connection tests, and subsequently oversee and/or perform such cross-connection tests, in a manner that determines whether interconnections exist between unapproved sources and approved water supplies; and
- (3) Follow-up actions and notifications if a cross-connection test indicates an interconnection.

(f) RECORDKEEPING AND INCIDENT RESPONSE

A comprehensive understanding of:

- (1) The agencies and authorities to be notified in the event of a backflow incident;
- (2) How to determine the cause of a backflow incident and the actions necessary to prevent similar incidents in the future;
- (3) How to properly document a backflow incident, including but not limited to the information in the example backflow incident response form in Appendix F; and
- (4) How to properly document the elements associated with surveys and hazard assessments, including those identified in section (c) of this appendix.

This page intentionally left blank

Appendix F

Example Backflow Incident Reporting Form

This page intentionally left blank

BACKFLOW INCIDENT REPORT FORM

Water System: _____

Water System Number: _____

Incident Date: _____

Incident Time (if known): _____

Incident Location: _____

How was the incident discovered?

Backflow Originated from:

Premise Location: _____

Address: _____

Premise Contact Person: _____ Title: _____

Phone: _____ Email: _____

Connection Type: (please check one)

Industrial Commercial Single-Family Residential Multi-Family Residential

Irrigation Recycled Water Water System Facility

Other: _____

Description and source of backflow substance (please be as descriptive as possible):

If available, please attach an MSDS or other chemical description form

Was the backflow fluid contained within the user side? YES NO

Estimated Number of Affected Persons: _____

Number and description of consumer complaints received:

Did any consumers report illness? Please describe.

If applicable, please describe the consumer notification:

INVESTIGATION

Please describe the water system investigation including time frames:

What was the area system pressure? _____

Is this within typical range: YES NO - typical pressure: _____

Was a sample of the water contaminated by the backflow incident collected and stored before flushing? YES NO

Please describe all sampling:

DDW recommends laboratory or field sampling for the following parameters: total coliform, E. coli, free and total chlorine residual, pH, odor, turbidity, temperature, and color. Additional sampling should be collected at the PWS and regulatory agency's discretion.

CORRECTIVE ACTIONS

Please describe the corrective actions taken by the water system:

Was the chlorine residual increased after discovery of backflow incident? YES NO

Date of the last cross-connection control hazard assessment of the premise with the backflow incident conducted: _____

Did the premise have backflow prevention assemblies? YES NO

Date of most recent backflow prevention assembly test(s): _____

When was the Division of Drinking Water or Local County Health office notified?

Date: _____ Time: _____ Contact Person: _____

Was the Division or Local County Health notified within 24 hours? YES NO

Other agencies or organizations contacted?

CERTIFICATION

Name: _____ Job Title: _____

Certification(s): _____

Please list all cross-connection control related certifications including number and expiration date

I certify that the forgoing information is true and correct to the best of my ability.

Signature: _____ Date: _____

Attach the following applicable documentation

1. Laboratory Test Results
2. Sketch of the cross-connection and modifications
3. MSDS or chemical information forms if chemical hazard is known
4. Applicable backflow assembly test reports including the most recent test before the incident
5. Other relevant supporting documentation

Appendix G

Related Statutes and Regulations

This page intentionally left blank

The following laws and regulations are considered related or tangential to the CCCPH, and are included in a descriptive format to provide additional, relevant background information

California Laws and Regulations

In addition to the California SDWA statutory requirements cited in CCCPH Chapter 1, section 1.3.1, California has statutes addressing certain authorities and requirements that may have influenced the CCCPH or may otherwise be of interest.

- Urban and community water systems must have a written policy on discontinuation of residential service for nonpayment and must not discontinue residential service for nonpayment if certain conditions are met. (CHSC sections 116900 – 116926)
- Senate Bill 1263 (2017) requires that before a person submits an application for a permit for a proposed new public water system, the person shall first submit a preliminary technical report which must include a cost comparison of a new public water system and consolidations with an existing system. (CHSC section 116527)
- Effective June 24, 2015, Senate Bill 88 (SB 88) (Statutes 2015, Chapter 27) added sections 116680-116684 to the CHSC, allowing the State Water Board to require certain water systems that consistently fail to provide safe drinking water to consolidate with, or receive an extension of service from, another public water system. The consolidation can be physical or managerial.
- Local health officers may maintain programs for the control of cross-connections by water users, within water users' premises, where public exposure to backflow may occur. Such programs may include water user premises inspections, collection of fees, certification of backflow prevention assembly¹ (BPA) testers, and other discretionary elements. Local health officer BPA tester certification standards must be consistent with the standards prescribed in the CCCPH. Water users are required to comply with all orders, instructions, regulations, and notices from the local health officer regarding installation, testing, and maintenance of a BPA. (CHSC sections 116800 - 116820).
- Pursuant to the California Building Standards Law (CHSC sections 18901 - 18949.31), the California Building Standards Commission (CBSC) must administer the processes related to the adoption, approval, and publication of regulations referred to as the California Building Standards Code (Title 24, California Code of Regulation). Title 24 serves as the basis for the minimum design and construction

¹ California statutes use a variety of terms when referencing a 'backflow prevention assembly' (e.g., backflow protective device, backflow protection equipment, backflow prevention device, backflow or back siphonage protection device, backflow preventer, or backflow device). For consistency with industry terminology, 'backflow prevention assembly' is used in the CCCPH, unless directly quoted otherwise.

of buildings in California and includes the California Plumbing Code (Part 5 of Title 24), which contains requirements pertaining to cross-connection control and backflow prevention.

- A BPA intended to convey or dispense water for human consumption via drinking or cooking must meet California’s “lead free” requirements. (CHSC section 116875)
- Limits are established for the installation of backflow protection equipment where automatic fire sprinkler systems are utilized. (CHSC section 13114.7)²
- Cross-connection control must be addressed in engineering reports that are required (CCR Title 22, section 60323) for recycled water projects. (Wat. Code section 13552.8)
- If a public agency requires the use of recycled water for toilet and urinal flushing in a structure (except certain mental health facilities), the public health agency must prepare an engineering report that addresses cross-connection control. (Wat. Code section 13554)
- Prior to indoor use of recycled water in a condominium project, the entity delivering the recycled water must submit a report, for State Water Board³ approval, and include the following related to cross-connection control (Wat. Code section 13553(d)(1)):
 - The condominium project must be provided with a backflow prevention assembly approved by the State Water Board.
 - The backflow prevention assembly must be inspected and tested annually by a certified tester.
 - The condominium project must be tested by the recycled water agency or local agency at least once every four years for indications of possible cross-connections between the condominium’s potable and non-potable systems.
- California’s Department of Water Resources was required to convene a task force, known as the 2002 Recycled Water Task Force, to identify constraints, impediments, and opportunities for the increased use of recycled water and report

² CHSC section 13114.7 historically provided potential limits for backflow prevention assemblies on fire sprinklers. Even though current standards differ from the language stated in CHSC section 13114.7, it is still being provided as a historical reference as there may still be installations with the now outdated limits established in section 13114.7

³ The California Department of Public Health’s authority and responsibility pertaining to this reference was transferred to the State Water Board via Senate Bill 861 (2014, Chapter 35). As such, applicable statutory mandates that may refer to “California Department of Public Health” or “Department” may be referred to as “State Water Board” in this document.

to the Legislature by July 1, 2003. The task force was also asked to advise and make recommendations concerning cross-connection control, including the applicability of visual inspections instead of pressure tests for cross-connections between potable and non-potable water systems. (Wat. Code section 13578(b)(1). The final report⁴ provided the following recommendations to the State Water Board – Division of Drinking Water (Division):

- Prepare guidance on dual plumbed regulations (22 CCR sections 60313-60316) consistent with Appendix J of plumbing code (Chapter 15 of 2019 California Plumbing Code, formerly Chapter 16A).
- Support thorough assessment of risk associated with cross-connections between disinfection tertiary recycled water and potable water.
- Ensure uniform interpretation of cross-connection control requirement of Title 22 regulations (recycled water) and Title 17 (cross-connection control regulations)
- Recommend stakeholders to review draft Title 17 regulations.
- A person engaged in the salvage, purchase, or sale of scrap metal who knowingly possesses a backflow prevention assembly (or connections to the assembly or any part of the assembly), or who failed to report the possession of such items, which was previously owned by a utility or public agency, is guilty of a crime. (Pen. Code section 496e)
- Junk dealers or recyclers who possess a backflow prevention assembly (or connections to that assembly or any part of the assembly) without a written certification from the agency or utility owning or previously owning the assembly will be liable to the agency or utility for the wrongful possession. (Civ. Code section 3336.5 and, similarly, Bus. & Prof. Code section 21609.1)

Please note that a number of the codes, regulations, and statutes cited above are implemented under the authority of regulatory entities other than the State Water Board and would therefore be beyond the scope of this CCCPH. The intent of providing such citations is to increase general awareness with respect to other potential statutory requirements associated with cross-connection control. The list is not exhaustive and does not include other requirements that may exist, including those via regulations that may have been adopted by an appropriate regulatory entity.

Federal Laws and Regulations

⁴ California Department of Water Resources. (2003). *Water Recycling 2030: Recommendations of California's Recycled Water Task Force*

All suppliers of domestic water to the public are subject to regulations adopted by the U.S. Environmental Protection Agency (EPA) under the U.S. Safe Drinking Water Act (SDWA) of 1974, as amended (42 U.S.C. section 300f et seq.), as well as by the State Board under the California SDWA (Health & Saf. Code, div. 104, pt. 12, ch. 4, section 116270 et seq.). Additionally, the State Water Board has been delegated primacy - the responsibility and authority to administer U.S. EPA's drinking water regulations within California – on the condition that California adopt enforceable requirements no less stringent than U.S. EPA's.

The U.S. EPA currently has no distinct cross-connection control requirements that apply broadly to public water systems (PWS); however, the importance of cross-connection control is evident by the issue papers and guidance documents developed by U.S. EPA and their recognition that cross-connections and backflow represent a significant public health risk (see discussion in Chapter 2). Although U.S. EPA currently has no distinct cross-connection control requirements, the subject of cross-connection or backflow prevention assemblies is included in the U.S. SDWA and the Code of Federal Regulations (C.F.R.) in relation to PWS, including the following:⁵

- If used exclusively for non-potable services, a backflow prevention assembly (BPA) is exempt from the federal lead prohibitions. (42, U.S.C. section 300g)
- Allows increasing disinfectant concentrations in a PWS distribution system in the event of a cross-connection (backflow) event. (40 C.F.R. section 141.130(d))
- Proper maintenance of the distribution system, including cross-connection control, is identified as a best available technology (BAT) for microbial contaminant control. (40 C.F.R. section 141.63(e))
- Under the federal Revised Total Coliform Rule, a PWS having a cross-connection control program is one of the enhancements necessary to reduce monitoring for a PWS that had been under an increased monitoring frequency. (40 C.F.R. section 141.854(h)(2))
- Under the federal Revised Total Coliform Rule, a PWS having a cross-connection control program is a criterion for a state to allow a reduced monitoring frequency (40 C.F.R. section 141.855(d)(1))
- If a state allows the monitoring frequency reductions previously mentioned under the federal Revised Total Coliform Rule, a state is required to include in its primacy package to U.S. EPA how a PWS will be required to demonstrate cross-connection control. (40 C.F.R. section 142.16(q))

⁵ For requirements unrelated to cross-connection control, please consult California's laws and regulations specific to the topic of interest. California may have more stringent requirements (e.g., reduced monitoring allowed via federal regulations may be prohibited in California).

Appendix B

Chapter 13.20 Cross-Connection and Backflow Prevention

CHAPTER 13.20

CROSS CONNECTIONS AND BACKFLOW PREVENTION

SECTION:

13.20.010: Cross Connection Unlawful; Exception

13.20.020: Purpose And Intent

13.20.030: Definitions

13.20.040: Protection Required; Where

13.20.050: Protection Required; Type

13.20.060: Responsibilities

13.20.070: Discontinuance Of Service

13.20.080: Right Of Entry

13.20.010: CROSS CONNECTION UNLAWFUL; EXCEPTION:

No person, firm or corporation shall install or maintain any physical connection between any private source of water supply and the city water supply; provided, however, that subject to the approval of the board of health of the state, the city may maintain emergency connections with other public utilities serving water. (Prior code § 59123)

13.20.020: PURPOSE AND INTENT:

A. The purpose of these regulations is:

1. To protect the public water supply against actual or potential cross connections by isolating within the premises contamination or pollution that may occur because of some undiscovered or unauthorized cross connection on the premises;
2. To eliminate existing connections between drinking water systems and other sources of water that are not approved as safe and potable for human consumption;
3. To eliminate cross connections between drinking water systems and other sources of water or process water used for any purpose whatsoever which jeopardize the safety of the drinking water supply;
4. To prevent the making of cross connections in the future.

B. These regulations are in accordance with the state of California department of public health Administrative Code, title 17 entitled "Regulations Relating To Cross Connections".

C. It is the intent of these regulations to recognize that there are varying degrees of hazard and to apply the principle that the degree of protection should be commensurate with the degree of hazard. (Prior code § 59125)

13.20.030: DEFINITIONS:

As used in this chapter:

AIR GAP SEPARATION: A physical break between a supply pipe and a receiving vessel. The air gap shall be at least double the diameter of the supply pipe, measured vertically above the top rim of the vessel, in no case less than one inch (1").

APPROVED CHECK VALVE: A check valve that seats readily and completely and has been previously approved for use in this service by the city. It must be carefully machined to have free moving parts and assured watertightness. The face of the closure element and valve seat must be bronze, composition, or other noncorrodible material which will seat tightly under all prevailing conditions of field use. Pins and bushings shall be of bronze or other noncorrodible, nonsticking material, machined for easy, dependable operation. The closure element (e.g., clapper) shall be internally weighted or otherwise internally equipped to promote rapid and positive closure in all sizes where this feature is obtainable.

APPROVED DOUBLE CHECK VALVE ASSEMBLY: An assembly which has previously been approved for use in this service by the city and consists of at least two (2) independently acting approved check valves including tightly closing shutoff valves on each side of the check valve assembly and suitable leak detector drains plus connections available for testing the watertightness of each check valve.

APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION DEVICE: A device which has previously been approved for use in this service by the city and consists of incorporating two (2) or more check valves and an automatically operating differential relief valve located between the two (2) checks, two (2) shutoff valves, and equipped with necessary appurtenances for testing. The device shall operate to maintain the pressure in the zone between the two (2) check valves, less than the pressure on the public water supply side of the device.

At cessation of normal flow, the pressure between check valves shall be less than the supply pressure. In case of leakage of either check valve the differential relief valve shall operate to maintain this reduced pressure by discharging to the atmosphere. When the inlet pressure is two (2) pounds per square inch or less the relief valve shall open to the atmosphere, thereby providing an air gap in the device. To be approved, these devices must be readily accessible for maintenance and testing and installed in a location where no part of the valve will be submerged.

APPROVED WATER SUPPLY: Any water supply approved by or under the public health supervision of a public health agency of the state of California, or its political subdivisions. In determining what constitutes an approved water supply, the state department of public health reserves final judgment as to its safety and potability.

AUXILIARY SUPPLY: Any water supply on or available to the premises other than the public water supply.

CITY: As used in chapters 13.08 through 13.32 of this title, means the cross connection control board of the city which is herein established and shall consist of the city manager, the director of public works and the water superintendent and engineer.

CROSS CONNECTIONS: Any unprotected connection between any part of a water system used or intended to supply water for drinking purposes and any source or system containing water or substance that is not or cannot be approved as safe, wholesome, and potable for human consumption. (Prior code § 59126)

13.20.040: PROTECTION REQUIRED; WHERE:

A. Each service connection from the city water system for supplying water to premises having an auxiliary water supply shall be protected against backflow of water from the premises into the public water system, unless the auxiliary water supply is accepted as an additional source by the water purveyor, and is approved by the public health agency having jurisdiction.

B. Each service connection from the city water system for supplying water to premises on which any substance is handled in such a fashion as to permit its entry into the water system, shall be protected against backflow of the water from the premises into the public system. This shall include the handling of process waters and waters originating from the city water supply system which have been subject to deterioration in sanitary quality.

C. Backflow prevention devices shall be installed on the service connection to any premises that have internal cross connections unless such cross connections are abated to the satisfaction of the city and approved by the state or local health department. (Prior code § 59127)

13.20.050: PROTECTION REQUIRED; TYPE:

Not an RP? What about recycled water sites?

The protective device required shall depend on the degree of hazard as tabulated in this section:

A. At the service connection to any premises where there is an auxiliary water supply handled in a separate piping system with no known cross connection, the city water supply shall be protected by an approved double check valve assembly.

B. At the service connection to any premises on which a substance that would be objectionable (but not necessarily hazardous to health), if introduced into the public water supply, is handled so as to constitute a cross connection, the city water supply shall be protected by an approved double check valve assembly.

C. At the service connection on any premises on which there is an auxiliary water supply where cross connections are known to exist which cannot be presently eliminated, the public water supply system shall be protected by an approved reduced pressure principle backflow prevention device. A double check valve assembly may be used in lieu of such device if local experience indicates that double check valves are reliably operated and if approved by the water purveyor and local health agency.

D. At the service connection to any premises on which any material dangerous to health or toxic substance in toxic concentration is or may be handled, the public water supply shall be protected by an air gap separation. The air gap shall be located as close as practicable to the service cock and all piping between the service cock and receiving tank shall be entirely visible. If these conditions cannot reasonably be met, the public water supply shall be protected with either an approved reduced pressure principle backflow prevention device, or an approved double check valve assembly, providing the alternative is acceptable to both the water purveyor and the local health agency.

E. At the service connection to any sewage treatment plant or sewage pumping station the city water supply shall be protected by an air gap separation. The air gap shall be located as close as practicable to the service cock and all piping between the service cock and receiving tank shall be entirely visible. If these conditions cannot be reasonably met, the public water supply shall be protected with an approved reduced pressure principle backflow prevention device, providing this alternative is acceptable to both the water purveyor and local health agency. Final decision in this matter shall rest with the state department of public health. (Prior code § 59128)

13.20.060: RESPONSIBILITIES:

A. It shall be the responsibility of the city to make the determination if any service connection or the handling of substances within the premises served is deemed to constitute a hazard to the city water system and to determine the degree of hazard and establish the requirements for protection. The city shall accomplish this in conjunction with the local health agency.

B. It shall be the responsibility of the user of the water to install and maintain the required protective device as specified by the city and to have the device inspected and tested periodically by a person approved as qualified by the city. Inspection intervals shall be one year maximum. Required interval may be less if determined by the city that a history of malfunctioning has been established or if the

degree of hazard makes more frequent inspections advisable. All devices shall be disassembled for maintenance and repair at least every five (5) years. All test results and all maintenance steps taken shall be reported regularly in forms to be provided by the city and maintained on file at the city offices. Failure to file with the city the required test and maintenance reports will require the city to consider the connection unprotected and service may be discontinued. (Prior code § 59129)

13.20.070: DISCONTINUANCE OF SERVICE:

A. Service of water to any premises may be discontinued by the water division after reasonable notification if unprotected cross connections exist on the premises, or if any defect is found in an installed backflow preventive device has been removed or bypassed, and service will not be restored until such conditions or defects are corrected.

B. Discontinuance of service may be summary, immediate and without notice whenever, in the judgment of the water superintendent of the water division, such action is necessary to protect the purity of the water supply or the safety of the water system, and the water superintendent's determination shall be final and conclusive. (Prior code § 59130)

13.20.080: RIGHT OF ENTRY:

The city representative assigned to inspect premises relative to possible hazards shall carry proper credentials of his office, upon exhibition of which he shall have the right of entry, during usual business hours, to inspect any and all buildings and premises in the performance of his duty. This right of entry shall be a condition of water service in order to provide assurance that the continuation of service to the premises will not constitute a menace to the health, safety and welfare of the people throughout the city's water system. (Prior code § 59131)

Appendix C

Backflow Test Report



Test Report

City of Redlands

Assembly ID		Facility Name:			
Acct Number:		Meter #:		Test Report Due:	
Service Address:				Schedule Code:	
				Assembly Info: (Replacement/Correction)	
NOTES:				SN	<input type="checkbox"/>
Premise Code		Containment		Mfr	<input type="checkbox"/>
Contact Name		PH		Type	<input type="checkbox"/>
Map Page		#2		Size	<input type="checkbox"/>
				Model	<input type="checkbox"/>
				Install Date	
				Acct.#	
<input type="checkbox"/> - Confinement		<input type="checkbox"/> - Freeze Protection		Hazard Type	Haz. Level

Line pressure at time of test:		REPORT OF TEST RESULTS			<input type="checkbox"/> Approved BFP	
Initial Test	<input type="checkbox"/> Held at _____ PSID	<input type="checkbox"/> Held at _____ PSID	<input type="checkbox"/> Opened at _____ PSID	<input type="checkbox"/> Air Inlet Opened at _____ PSID		
	<input type="checkbox"/> Closed Tight <input type="checkbox"/> Leaked	<input type="checkbox"/> Closed Tight <input type="checkbox"/> Leaked	<input type="checkbox"/> Did Not OPEN	Open Fully Y <input type="checkbox"/> N <input type="checkbox"/> <input type="checkbox"/> Checked Held at _____ PSID <input type="checkbox"/> Leaked		
Pass Fail				Shut off Valves		
					#1 #2	
R E P A I R	<input type="checkbox"/> CLEANED <input type="checkbox"/> REPLACED					
	<input type="checkbox"/> Disc <input type="checkbox"/> Spring <input type="checkbox"/> Guide <input type="checkbox"/> Seat <input type="checkbox"/> O-Ring (s) <input type="checkbox"/> Module <input type="checkbox"/> Rubber Kit <input type="checkbox"/> _____	<input type="checkbox"/> Disc <input type="checkbox"/> Spring <input type="checkbox"/> Guide <input type="checkbox"/> Seat <input type="checkbox"/> O-Ring (s) <input type="checkbox"/> Module <input type="checkbox"/> Rubber Kit <input type="checkbox"/> _____	<input type="checkbox"/> Disc <input type="checkbox"/> Spring <input type="checkbox"/> Guide <input type="checkbox"/> Seat <input type="checkbox"/> O-Ring (s) <input type="checkbox"/> Module <input type="checkbox"/> Rubber Kit <input type="checkbox"/> _____	<input type="checkbox"/> Disc <input type="checkbox"/> Spring <input type="checkbox"/> Guide <input type="checkbox"/> Seat <input type="checkbox"/> O-Ring (s) <input type="checkbox"/> Module <input type="checkbox"/> Rubber Kit <input type="checkbox"/> _____	CLEANED <input type="checkbox"/> <input type="checkbox"/> REPLACED <input type="checkbox"/> <input type="checkbox"/> REPAIRED <input type="checkbox"/> <input type="checkbox"/> Other <input type="checkbox"/> <input type="checkbox"/>	
Final Test	_____ PSID	_____ PSID	<input type="checkbox"/> Opened at _____ PSID	Air Inlet _____ PSID		
	<input type="checkbox"/> Closed Tight	<input type="checkbox"/> Closed Tight	_____ PSID	CK Valve _____ PSID		
				Closed Tight <input type="checkbox"/> <input type="checkbox"/>		
				PASS <input type="checkbox"/>		

THE ABOVE REPORT IS CERTIFIED TO BE TRUE:

Tester Signature

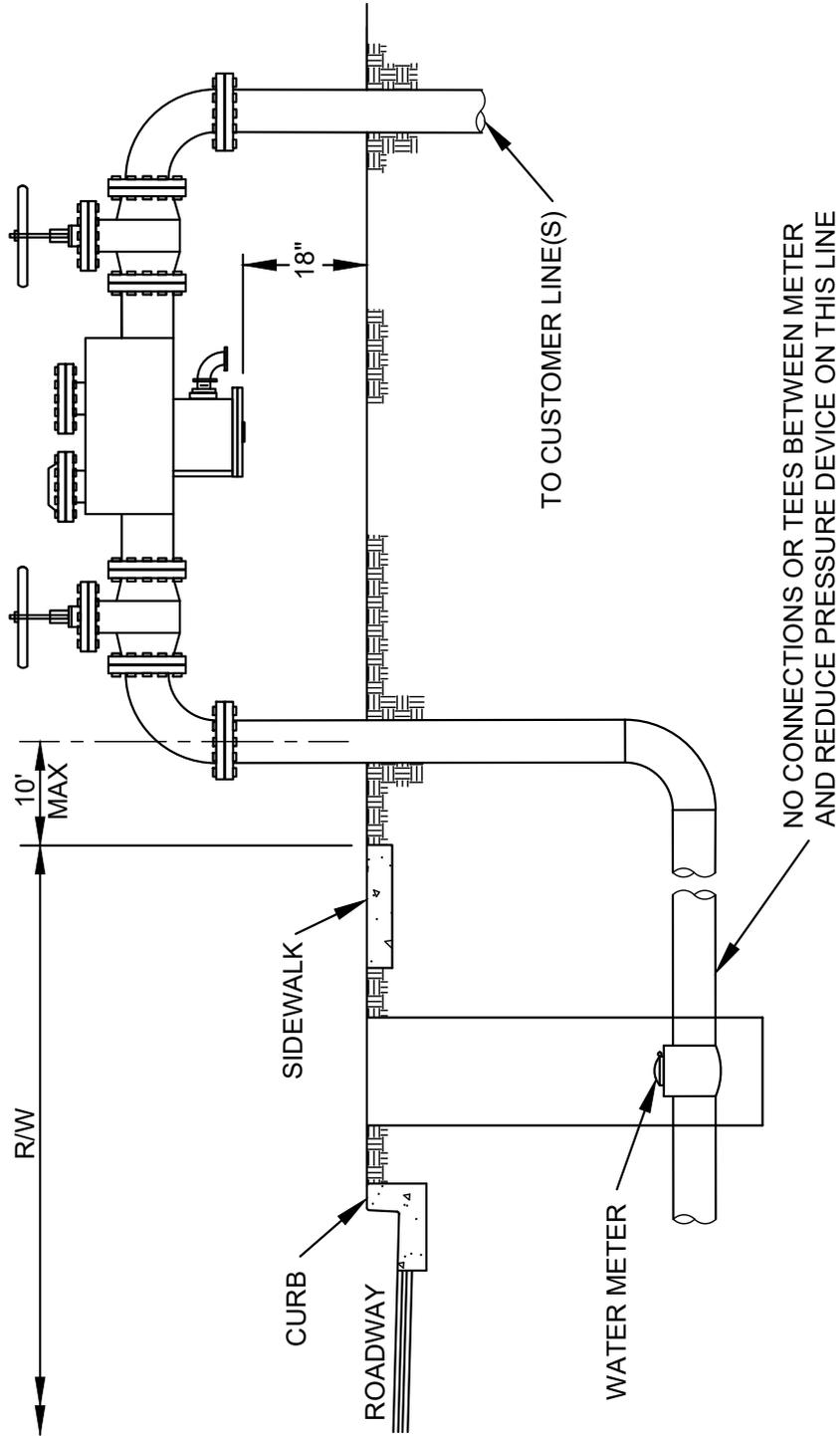
1A

Tester Print Name	Certificate	Test Date:		Company	Phone
Final Test By					
Repair By					

Appendix D

Standard Drawing A-20516 Typical Reduced Pressure Installation

NOTE:
 INSTALLATION AND REDUCED PRESSURE
 DEVICE SHALL BE APPROVED BY THE
 CITY OF REDLANDS, MUNICIPAL UTILITIES
 & ENGINEERING DEPARTMENT



CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

TYPICAL REDUCED PRESSURE INSTALLATION

STD. DWG. NUMBER

A-20516

APPROVED:

DATE: 01/03/2023

Goutam K. Dobby, City Engineer RCE 75646

SHEET 1 OF 1

REV.	BY	DATE

Appendix E

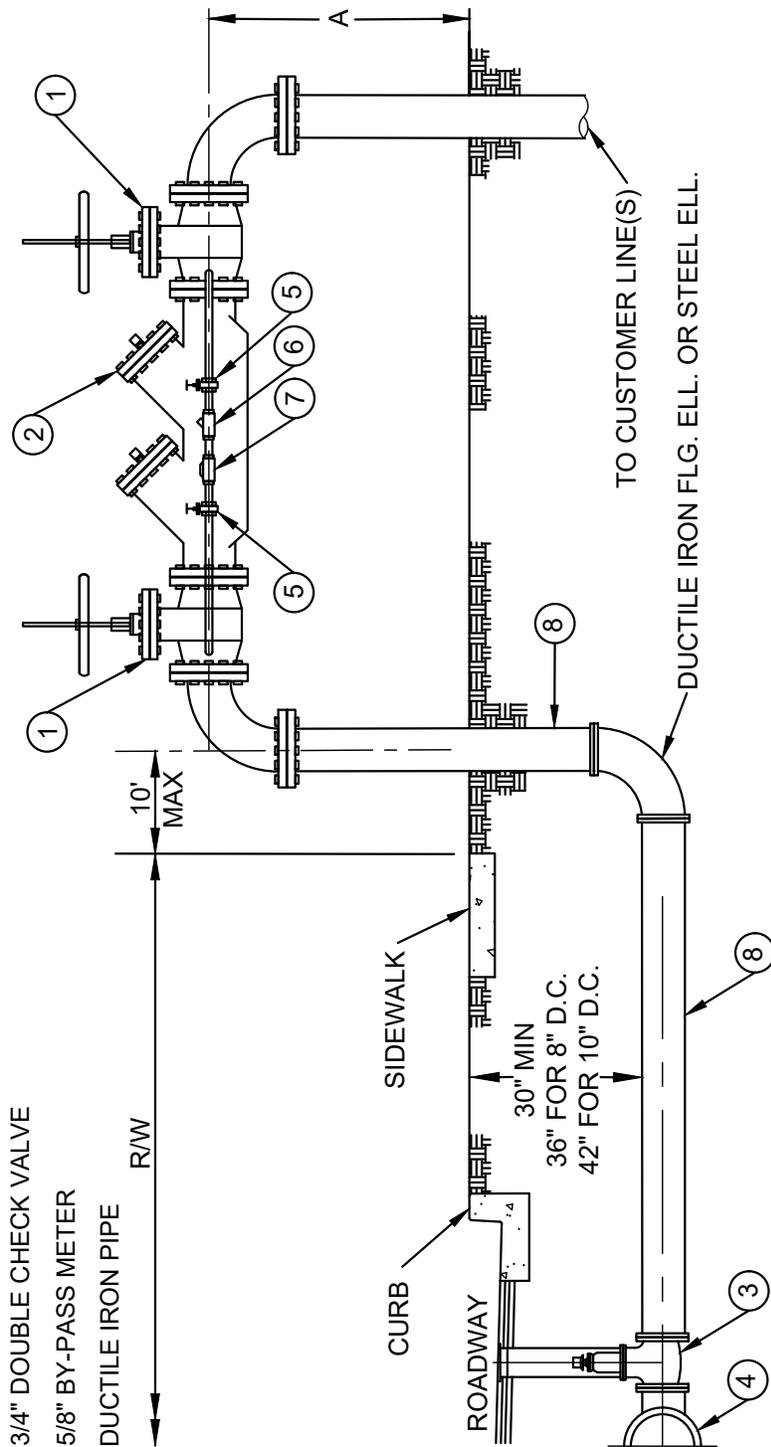
Standard Drawing A-20517 3-Inch to 10-Inch DC Fire Service (Above Ground)

GENERAL NOTE:

1. ALL BRASS FITTINGS SHALL BE PAINTED RED

NOTES:

- 1. FLANGED GATE VALVE OUTSIDE SCREW AND YOKE (RESILIENT WEDGE OR SEAT)
- 2. USC APPROVED BACKFLOW PREVENTION ASSEMBLY.
- 3. FLANGED GATE VALVE NON RISING STEM (RESILIENT WEDGE OR SEAT)
- 4. CUT IN TEE OR TAPPING SLEEVE; IF APPROVED, TAPPING SLEEVES SHALL BE FULL CIRCLE AND PRE-APPROVED.
- 5. FOR PVC PIPE (RMAC-SST 945)
- 6. FOR A.C. PIPE (MUELLER H-619 OR CLOW F-5207)
- 7. FOR C.I. PIPE (MUELLER H-615 OR CLOW F-5205)
- 8. 3/4" SERVICE COCK VALVE (LOCK TYPE)



SIZE	DIM.
3"	18"
4"-10"	24"

CITY OF REDLANDS MUNICIPAL UTILITIES AND ENGINEERING DEPARTMENT

**3" -10" D.C. FIRE SERVICE
(ABOVE GROUND)**

STD. DWG. NUMBER

A-20517

APPROVED:

DATE: 01/03/2023

Goutam K. Dobby, City Engineer RCE 75646

SHEET 1 OF 1

REV.	BY	DATE

